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# The benefits of music for patients suffering from Alzheimer Disease

## A systematic literature review

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## Abstract/Summary

Alzheimers disease (AD) is a degenerative diseases that affects the neurological system. Approximately, 10million people are affected globally by Alzheimers disease globally. The disease is characterised by a progressive deterioration of the cognitive ability of affected individual. The management of Alzheimers disease have relied majorly on the use of pharmacological method. Evaluation of alternative ways of managing the Alzheimer' patients will further support the use of medication and improve the quality of life of AD patients. Therefore this study was designed with the aim of evaluating the probable benefits of music in the management of AD patients.

This study was done through a qualitative systematic review. Articles with years of publication between 2014 and 2023 were identified from different databases. The Theory of Comfort by Katharine Kolcaba was adapted as the theoretical framework of the study.

Three (3) major themes and ten (10) sub themes emerged from the ten (10) articles that were subjected to thematic content analysis. The major findings showed that music possessed the ability to improve behaviour of AD patients through reduction in agitation, anxiety and reduction in the frequency of resisting care. Music also plays a role in improving memory, cognition, motor function and communication. It was also revealed that music can be used to lower stress, improve mood and enhance the quality of life of AD patients. In conclusion , music be use employed as alternation safe and effective method is the management of Alzheimer's disease patients

Language: English Key words: Alzhiemer disease , Cognition, Motor functions, Music therapy , quality of life

## Contents

# 1 Introduction

Alzheimer’s disease (AD) is a degenerative disease that affects the neurological system. It has been reported that about 10million people are affected annually all over the world. This means that approximately one new cases of AD is diagnosed in every three seconds (Alzheimer’s Disease International, 2020). AD is characterised by the continuous impairment of the cognitive function that is completely irreversible. There occur different forms of neuropsychological changes in affected individual such as aphasia, apraxia, agnosia coupled with a pronounced impairment of memory.The disease also comes with behavioural changes such as mood swings which also progresses to a state of complete dependency ( Pinto, Bismarck, Scherezada Exeni, and Karina Peñaloza, 2007).

According to the Alzheimer's Association (2021), Alzheimer's disease is the most common form of dementia, causing between 60 to 80 percent of all dementia cases worldwide. Dementia is a syndrome brought on by a brain disorder that affects memory, reasoning, behaviour, and the ability to carry out daily tasks (Hansson et al., 2021). According to the World Health Organization (WHO, 2023). Alzheimer's disease affects certain parts of the brain responsible for memory, language, and cognitive skills, causing a slow deterioration in cognitive ability that is characterized by memory loss and issues with communication and daily activities (WHO , 2023).

The WHO (2023), emphasizes how the disease's development can cause behavioural and psychological issues, such as agitation, sorrow, and mood swings, which ultimately culminate in a loss of independence and complete dependence on others for care. The stages of Alzheimer's disease can be managed through nursing interventions that put a priority on maintaining the patient's independence, enhancing communication, sociability, and meaningful activities, as well as ensuring proper nourishment and hydration,

according to the WHO guidelines on risk reduction of cognitive decline and dementia released in 2019 (WHO, 2019)

Alzheimer's disease is the most common form of dementia in Finland, affecting an estimated 200,000 people (Finnish Institute for Health and Welfare, 2022). As the world population ages, Alzheimer's disease will likely increase quickly, and by 2050, there will be 139 million people worldwide suffering from dementia (WHO, 2021). Alzheimer's Association, (2021) Alzheimer disease is signified by a gradual decline in cognitive function, including memory loss, language problems, and impaired judgment, among other symptoms. In addition to cognitive and functional impairments, the illness is often associated with neuropsychiatric symptoms such despondency, anxiety, agitation, and apathy. These symptoms can have a detrimental effect on the quality of life for both patients and their carers (Hansson et al., 2021)

Nursing interventions for people with Alzheimer's disease can be difficult because these people may struggle to understand and follow instructions, show behavioural and psychological symptoms, and lose interest in previously enjoyed activities (WHO, 2019). The treatment of behavioural and psychological symptoms, the involvement of family caregivers, customized activities that take into account the patient's skills and interests, clear instructions, a safe setting, and the management of these problems may all be addressed (WHO, 2019). The efficacy of nursing treatments can be increased with frequent training and support, as well as with activities like music therapy, art therapy, or memory therapy (WHO, 2019).

According to previous studies, music therapy has been used to enhance cognition, lower sadness, anxiety and improve the total quality of life. Singing, listening to music, and playing musical instruments are all effective ways to give music therapy

In my working experience, I had the chance to see a group of choristers that entertained elderly people with a wide range of songs on a regular basis. I saw that the elderly residents' benefits from these activities, particularly one specific client who would actively engage by singing and reciting scriptures on each visit and most clients shows interest by dancing with a partner every time music was played. These findings are an indication of the probable roles of music in improving the well being of AD patients. This research seeks to increase nurses' understanding of the possible advantages of these music activities for those who work in the elderly care homes.

# 2 Background

This chapter aims to give an in-depth analysis of the background of the study by providing information on the meaning of AD, symptoms of AD, benefits of music therapy for those living with Alzheimer's disease, Types of Alzheimer's disease , causes of Alzheimers diseases , risk factors for the development of Alzheimer diseases , stages of Alzheimer's diseases , pharmacological intervention in AD, Non pharmacological intervention and other related information about the chosen research topic.

## 2.1 Definition of Alzheimer diseases

According to the WHO, Alzheimer's disease is a progressive brain disorder that cannot be cured. According to the WHO, it is the most prevalent kind of dementia in older individuals and significantly decreases memory (WHO 2019). Alzheimer's disease generally manifests as modest memory loss that progress to increasingly serious cognitive and functional deficiencies, such as difficulty speaking, recognizing relatives and friends, and carrying out everyday tasks (Alzheimer's Association, 2021). Alzheimer's disease is linked to neuropsychiatric symptoms such despair, anxiety, agitation, and apathy in

addition to cognitive and functional deficits. These symptoms can have a major negative influence on patients' and their carers' quality of life (Brodaty & Donkin, 2009).

The disease's progression can also result in issues with speech, judgment, and problem-solving. This chronic condition steadily devalues a person's mental abilities and may eventually make it difficult for them to carry out basic everyday activities like eating, dressing, and taking a shower. The research cited primarily looks at people with mild-to-moderate Alzheimer's disease who can still carry out certain daily tasks on their own but may require help or support for more difficult ones(Clemmensen et al., 2020).

## 2.2 Symptoms of Alzheimer diseases

- Memory loss: Short-term memory loss is the most typical sign of Alzheimer's disease. Patients may repeat themselves in speech and forget significant events or facts (Abyadeh, 2023)
- Language issues: People with Alzheimer's disease may have trouble comprehending language or finding the correct words, which makes it difficult for them to communicate (Weintraub et al., 2012).
- Disorientation: Even in familiar settings, Alzheimer's patients may experience disorientation, confusion, and loss due to the condition (Alzheimer Associaion, 2023).
- Mood and behavioural changes: According to Alzheimer Associaion, 2023, patients with Alzheimer's disease may experience a range of mood and behavioural changes, including agitation, anxiety, and sadness (Alzheimer Associaion, 2023).
- Loss of interest in previously enjoyed activities: According to Allan et al (2001), Alzheimer’s disease can cause a patient to lose interest in previously enjoyed activities(Allan et al., 2001).

- Difficulty with everyday tasks: As the condition worsens, persons with Alzheimer's disease may experience difficulties with daily tasks including eating, dressing, and taking a bath or shower (Allan et al., 2001)
- Perception of space issues: People with Alzheimer's disease may find it difficult to read maps, judge distances, or identify recognizable landmarks (Rizzo and Nawrot, 1998)

## 2.3 Types of Alzheimer disease

Based on the age of onset and hereditary variables, the Alzheimer's Association, (2021) identifies three basic forms of Alzheimer's disease. These kinds include:

- Familial Alzheimer's disease with early onset (EOFAD) Less than 5% of instances of Alzheimer's disease are of this form, which commonly affects adults in their 30s, 40s, and 50s. APP, PSEN1, or PSEN2 gene mutations are the three ones that lead to the condition.

- Late-onset Alzheimer's disease (LOAD): The most common type of Alzheimer's disease, late-onset Alzheimer's disease (LOAD), which accounts for 95% of all cases, often affects adults over 65. Although the exact cause of LOAD remains unknown, a mix of genetic, environmental, and behavioural factors are responsible.

- Mixed Alzheimer's disease: This form of the illness is defined by the occurrence of both Alzheimer's pathology and another kind of dementia, such as vascular dementia or Lewy body dementia.

## 2.4 Courses of Alzheimer diseases.

Genetic factors: Research has shown that a person's chance of getting AD may be increased by genes. The most recognized gene that is responsible as the risk factor is the apolipoprotien(APOE) gene (Kunkle et al., 2021).

Environmental factors: According to Cai et al. (2020), exposure to environmental chemicals such heavy metals, pesticides, and air pollution increases the likelihood of developing AD. The risk of AD may also be increased by head injuries and traumatic brain injuries (Gardner et al., 2014).

- Lifestyle factors: According to Lourida et al. (2019), several lifestyle factors, such as smoking, inactivity, and a diet heavy in refined sugars and saturated fats, have been linked to an increased risk of AD.

- Brain changes: According to Serrano-Pozo et al. (2011), AD is marked by alterations in the brain and accumulation of dead plaques which obstruct communication between brain cells and cause cell death. Millions of individuals throughout the world are afflicted with the horrible illness known as Alzheimer's. Memory loss, confusion, and communication issues are just a few of the signs of this degenerative brain condition.

## 2.5 Risk factors of Alzheimer disease

According to the research by De la Rosa et al. (2020), there are several risk factors for Alzheimer's disease (AD), including a lack of education, genetics, and bad lifestyle decisions such as poor diet, insufficient exercise, sleep problems, hypertension, hearing loss, and previous brain trauma. The authors emphasize that activity and physical activity can be important in lowering the risk of cognitive decline and Alzheimer disease. Although physical activity and exercise are two different ideas, the article points out that

they are frequently used synonymously in the research. The writers argue that regular exercise is useful for both preventing and treating Alzheimer.

## 2.6 Stages of Alzheimer diseases

Alzheimer's disease has many stages, each with its unique set of signs and characteristics such as :

### 2.6.1 First stage

Amyloid-beta and tau proteins are present in the brain during the preclinical stage of Alzheimer's disease, which may be seen using imaging studies. Currently, there aren't any obvious signs, however. (Sperling et al, 2011). According to the Alzheimer's Association (2021), moderate cognitive impairment, which includes memory loss, difficulty speaking and understanding others, and a reduction in executive function, describes the early stage of Alzheimer's disease. Individuals are still capable of carrying out their daily responsibilities independently at this period, which may last for several years.

### 2.6.2 Stage two

Alzheimer's disease-related moderate cognitive impairment: At this stage, people may have minor memory issues as well as issues with language, judgment, and other cognitive abilities. in 2011 (Albert et al). Mild Alzheimer's disease: People who are at this stage of the illness have more noticeable memory loss and cognitive impairment, which includes difficulties speaking and problem-solving. Additionally, their attitude and conduct may alter (McKhann et al., 2011).

According to the Alzheimer's Association (2021), those who are in the middle phase of the illness face a progression of cognitive loss, a worsening of language and communication difficulties, and a worsening of confusion and disorientation. Changes in

behaviour, such as anger and hostility, are another feature of this period. People become more and more reliant on caregiver support over the course of several years.

### 2.6.3 Third stage

Severe Alzheimer's disease: This stage of the disease is defined by a total loss of cognitive function, including the capacity for speech or the ability to identify close friends or family. A full-time caregiver and support with all daily tasks are necessary for those who are in this stage of life ( McKhann and colleagues, 2011). The late stage of Alzheimer's disease is marked by significant cognitive impairment, which results in the loss of communication capacity and need full-time support with everyday tasks, according to the Alzheimer's Association (2021). People may also endure physical deterioration at this stage, including mobility and swallowing issues.

## 2.7 Pharmacological interventions

According to several academic researches, conventional treatments for Alzheimer's disease are mostly pharmacological, such as cholinesterase inhibitors and N-methyl-D-aspartate (NMDA) receptor antagonists. For instance, Kishi et al. (2017) evaluated the efficacy and safety of memantine and cholinesterase inhibitors for Alzheimer's disease and concluded that these medications can have some advantages, such as enhancing cognitive function and delaying the progression of symptoms in Alzheimer's patients. Memantine can enhance cognition and behaviour in people with moderate to severe Alzheimer's disease ( Feldman et al., 2019).

### 2.7.1 The benefits of pharmacological intervention

While cholinesterase inhibitors and NMDA receptor antagonists can be useful in enhancing cognitive performance and reducing the course of Alzheimer's disease, they have limits, according to research by Birks and Harvey (2018). For instance, some medications may be ineffective in treating later illness stages and may have unpleasant side effects like nausea, vomiting, and diarrhoea. Additionally, these medications do not provide a cure for the illness and do not attend to the emotional and social requirements of Alzheimer's sufferers. To enhance the quality of life of Alzheimer's patients, it is crucial to investigate non-pharmacological therapies such music therapy, physical activity, and cognitive stimulation.

### 2.7.2 Non pharmacological Intervention

Non-pharmacological treatments including cognitive stimulation, physical activity, and music therapy have been demonstrated to help Alzheimer's patients' quality of life. For instance, Särkämö et al. (2014) study revealed that music therapy can enhance social interaction, cognitive performance, and mood in people with mild to severe Alzheimer's disease. Another research by Lautenschlager et al. (2008) demonstrated that Alzheimer's patients who exercise can have better cognitive performance. As a result, combining pharmacological and non-pharmacological treatments may be more efficient in reducing Alzheimer's disease symptoms and enhancing patients' quality of life.

### 2.7.3 The impact of music therapy on Alzheimer patients

In people with Alzheimer's disease, music therapy has been found to improve mood, social interaction, anxiety, anger, and cognitive function, among other elements of wellbeing. Additionally, music therapy can be a useful form of communication for those

who find it difficult to express themselves in more traditional ways (Van der Steen et al., 2018).

In 2011, Mary Mitelman, a researcher at NYU School of Medicine in New York, USA, established The Unforgettable, a chorus program for people with dementia and their family members or caregivers. The program's goal is to give people with mild to moderate dementia a stimulating activity that will enable them to interact socially and cognitively with their caregivers (Mitelman, 2016). The results of the pilot study showed that carers' quality of life, social support, communication, and self-esteem all improved, Furthermore, the fact that people with dementia had to learn fresh songs for each performance raises the possibility that this exercise might slow cognitive deterioration. The participants in Chen's study on the impact of music therapy on cognitive performance in older adults, which was published in Innovation in Aging in 2020, had notable gains in several cognitive domains, including memory, attention, and executive function (Chen, 2020).

The research of Cabedo-Mas & Moliner-Urdiales (2014), opined that music therapy can be used as an effective tool to improve cognitive function in people with AD. Between January 2000 and June 2013, they searched the PubMed database for music intervention studies involving people with Alzheimer's disease where cognitive function was tested as a result. The studies had to be intervention-based, focused on music, involve people with AD, and evaluate cognitive capacity as an outcome to be included. The authors stress the value of using music therapy as a practical strategy to improve cognitive function in AD patients.

According to Ueda et al. (2013) and McDermott et al. (2013), the study that look at how music affects memory, awakening, attention, learning, or anxiety in older people can improve the effectiveness of music therapy with the dementia/DAT group. Music therapists who work with this group of people can benefit from any research that

investigates these aspects of music therapy. The effectiveness of music therapy with this population has been thoroughly reviewed and meta-analysed by these writers. Music therapists who deal with the dementia/DAT population might benefit from the reviews done by Ueda et al. (2013) and McDermott et al. (2013) since they offer recommendations on relevant research and a description of the evidence base. Additionally, these reports might be helpful to administrators who are thinking about adding music therapy programs.

Digital music players are the most widely used distribution method for listening programs. Sung, Chang, and Lee (2010) discovered that giving patients with dementia 30 minutes of their favourite music twice a week for six weeks dramatically reduced anxiety levels compared to those who did not get the intervention.

Researchers have concluded that active music-making is particularly beneficial, even though several studies have demonstrated the benefits of music-listening therapy for patients with chronic or degenerative disorders. According to Cevasco and Grant's (2006) study, people with Alzheimer's disease enjoy the most in singing and rhythmic activities, and according to Lancioni et al. (2013)'s study, people with Alzheimer's who receive active music stimulation from a therapist exhibit higher levels of positive engagement than people who only hear music. In comparison to those who got music-listening stimulation, caregivers and staff assessed active music-making as more effective and pleasant engagement. Active music-making was viewed as more efficient by caregivers and workers as well.

According to research, personalised care is necessary, and each patient's involvement in the musical activity and personal therapeutic connection are essential elements of this kind of care. For instance, Cevasco (2010) investigated how 38 individuals with dementia and DAT reacted to the nonverbal behaviour of a music therapist in terms of engagement

and mood. The findings showed that good emotion and closeness were utilised by the therapist during treatment to get greater results. In a different research, Belgrave (2006) examined at how touch affected people with late-stage Alzheimer's disease and discovered that expressive and instrumental touch during music therapy sessions helped patients stay aware and the therapists build connection.

There has been increasing evidence in recent years that people with dementia can still maintain their musical memory and skills. According to studies, older persons' well-being, mood, and cognitive function can all benefit from creating music. A study of qualitative research on elder choir programs stated, according to Särkämö et al. (2012), that singing can help elders feel competent, independent, and confident while also preventing loneliness and isolation. Additionally, listening to music can cause a variety of physical, cognitive, and emotional reactions as well as open emotional and memory connections.

## 2.8 Types of music therapy

Active music therapy, in people with neurological diseases such stroke, traumatic brain injury, and Parkinson's disease, active music therapy has been demonstrated to enhance social and emotional functioning as well as cognitive and physical capacities (Raglio et al., 2016, p. 128). Receptive music therapy has been found to be effective in reducing anxiety and stress levels in patients undergoing medical procedures or experiencing chronic pain ( Chan et al., 2010 .p. 240). Guided imagery and music has been shown to be effective in reducing symptoms of anxiety, depression, and stress, as well as improving overall well-being and quality of life ( Wigram & Gold 2006)

Singing in a group, numerous researches on musical experiences have revealed that singing in a group may increase a person's sense of support, belonging, and self-worth. (Clements-Cortes, 2013). The emotional and physical stimulus that music provides can

even help those who are weak (Sorrell and Sorrell, 2008).Making music may be a substitute for verbal communication and social contact for those with dementia, resulting in a more rewarding social life. (Ridder et al., 2013). Särkämö et al. (2012) found that people with dementia may still be strongly influenced by music, recognizing well-known songs, understanding musical emotions, properly perceiving rhythm, and melody, remembering lyrics, and remembering song titles.

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## 2.9 Combination of physical activity and music therapy

A non-pharmacological therapy that involves mixing physical exercises and music is known as a combined physical activity and music intervention (Wittwer et al., 2013). Many advantages for the physical and psychological well-being of older persons have been demonstrated for these exercises. Terry et al. (2020) have noted a connection between improvements in a variety of physical activities and the use of music treatments or music-based interventions. Among those who are suffering from different levels of cognitive decline, regular physical activity, especially structured exercise aimed to promote health and fitness; it has been related to improved cognitive function.

Age-related social connection and participation among older people can be promoted through community-based music therapy programs. Age-related cognitive impairment in

older persons has been demonstrated to benefit from both receptive (passive) and active music therapy techniques. Studies have also looked at the advantages of mixing music therapy with other activities like physical activity or art (Chen, 2020).

Malthouse and Fox (2014) and McCurry et al (2010) both state that older adults with different degrees of cognitive impairment encounter extra challenges when trying to engage in physical exercise because of their medical conditions and caregiver relationships. Deteriorating orientation, memory issues, and anxiety over social stigma associated with walking and balance issues are a few of these obstacles. Early Alzheimer's disease (AD) intervention has been shown to provide clinical and financial advantages (Barnett et al., 2014; Cummings et al., 2007). Because of this, pre-dementia stages of cognitive impairment should be included in physical activity (PA) programs to achieve the best results. The factors influencing PA involvement among people with moderate cognitive impairment (MCI) or Alzheimer's disease (AD) are yet unknown, though (Barnett et al., 2014).

According to Cabedo-Mas and Moliner-Urdiales (2014), music therapy can improve cognitive function in people with Alzheimer's disease (AD). Between January 2000 and June 2013, they searched the PubMed database for music intervention studies involving people with Alzheimer's disease where cognitive function was tested as a result. The studies had to be intervention-based, focused on music, involve people with AD, and evaluate cognitive capacity as an outcome to be included. The authors stress the value of using music therapy as a practical strategy to improve cognitive function in AD patients.

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# 3 Aim and Research questions

The aim of the study is to enhance the knowledge of nurses working in the elderly home about the benefits of music activity with patients suffering from Alzheimer's disease.

## 3.1 The research question

1. In what way can music be effective in enhancing the quality of life of Alzheimer's patients in elderly homes?

# 4 Theorectical framework

Theoretical framework The Katharine Kolcaba Theory of Comfort, a nursing theory presented in this chapter in terms of its fundamental concepts. The patient's whole experience while receiving medical care is the main emphasis of this approach. The concept, which was first introduced in the 1990s, emphasizes the value of actively promoting patients' feelings of comfort. This recognition results from an awareness of the enormous effects that comfort has on a patient's general well-being, healing process, and level of medical care. According to Kolcaba's theory, comfort is a fleeting feeling of reinforcement that develops when numerous demands for relief, calm, and elevation are satisfied across bodily, psycho-spiritual, socio-cultural, and environmental dimensions.

## 4.1 Relief Comfort

In accordance with the tenets of the Kolcaba ‘s  theory of comfort, to lessen the physical and mental distress of patients by easing their suffering from pain, anxiety, and other uncomfortable symptoms. According to the concept, listening to music may be a powerful trigger for feelings of comfort and peace in persons who are living with Alzheimer's disease. In particular, studies have revealed that receiving music therapy reduces anxiety, agitation, and even pain perception in people with Alzheimer's disease. This method significantly improves listeners' overall comfort as defined by the Kolcaba Theory by bringing back fond memories, inspiring positive emotions, and creating a profound sense of relaxation through the use of well-known melodies from their own tales.

## 4.2 Ease comfort

According to the tenets of the Kolcaba Theory of Comfort, the idea of Ease Comfort is based on the creation of a loving atmosphere, kind help, and supportive relationships to foster a sense of fulfilment and general wellbeing. Particularly when tailored to the tastes

of people with Alzheimer's disease, music may be a powerful instrument for creating a calm and interesting environment. This idea may be used as a guide to help caregivers and medical professionals use music to build relationships with patients, create deep connections, and provide a profound feeling of emotional consolation.

## 4.3 Transcendence Comfort

This involves helping people discover meaning, purpose, and control over their situations. Music may aid Alzheimer's patients in experiencing transcendence by restoring memories, emotions, and intimate relationships. Even those with advanced Alzheimer's disease may respond well to the music they used to like, which can help them get above their cognitive limitations and re-establish a link with their sense of self. Kolcaba's idea must be taken into account while examining the possibilities of music therapy for Alzheimer's sufferers. Kolcaba's idea must be taken into account while examining the possibilities of music therapy for Alzheimer's sufferers.

### 4.3.1 Physical Comfort.

Music's rhythmic structures and melodies have the power to have a soothing effect on the body, reducing physiological stress responses and promoting a feeling of relaxation.

### 4.3.2 Psychospiritual comfort

Music has the power to evoke emotions, trigger memories, and create a sense of inner peace, aligning with the psycho spiritual comfort aspect of Kolcaba’s theory.

### 4.3.3 Sociocultural Comfort

Incorporating music that is culturally relevant and meaningful to the patient can help maintain a connection to their identity and background, contributing to their socio-cultural comfort.

### 4.3.4 Environmental Comfort

The general comfort level of Alzheimer's patients can be increased by creating a warm and encouraging setting for music therapy sessions. In conclusion, Katharine Kolcaba's Theory of Comfort offers a useful foundation for comprehending how music therapy might promote emotional comfort and lessen anxiety for people with Alzheimer's disease. Healthcare workers may successfully utilize the therapeutic potential of music to improve the well-being of people with Alzheimer's disease by addressing several comfort dimensions, including physical, psycho-spiritual, socio-cultural, and environmental factors.

# 5 Methodology

This chapter describes the approach used to obtain important data for my thesis, which investigates the benefits of music for people with Alzheimer's disease. To find and evaluate studies that look into the effects of music on Alzheimer's patients, the main objective of my study is to conduct a systematic review, which requires a thorough and well-structured assessment of the body of current literature. The combination of both qualitative and quantitative evidence has been studied by Dixon-Woods and colleagues (2005) using a variety of methodologies, such as systematic literature reviews.

This strategy follows a well-defined process that entails carefully examining electronic databases and the abstracts of possibly relevant studies to ascertain whether they are

appropriate for inclusion in this research. In addition, I will describe the qualitative content analysis approach to clarify the methodology that will be utilized to evaluate the findings from the chosen research.

The literature review is a critical component of studies that are qualitative, quantitative, or mixed (Boote et al., 2005; Combs, Bustamante, & Onwuegbuzie, 2010; Onwuegbuzie et al., 2010). Boote et al. (2005) emphasize the significance of a thorough and insightful literature review as the basis and source of inspiration for successful research, particularly in the challenging field of education research.

## 5.1 Systematic literature review

A systematic literature review is a type of research technique that tries to find, assess, and summarize all the information that is currently accessible on a certain research issue or subject(Higgins & Green, 2011). It entails a thorough and careful process of exploring several databases and other sources, screening articles against predetermined inclusion and exclusion criteria, collecting data from the selected articles, and synthesizing the findings in a transparent and understandable way. Articles are reviewed against specified inclusion and exclusion criteria, data is taken from the selected articles, and the results are then openly and clearly presented. A systematic literature review's major goals are to offer an extensive and objective account of the present state of knowledge on a particular subject and to identify evidence base problems that could call for more study (Higgins & Green, 2011).

## 5.2 Data collections and research strategies

The following databases were thoroughly searcher to retrieve relevant research relevant to the advantages of musical practice for people with Alzheimer's disease: DOAJ, Pubmed,

Sage , CINAHL complete , EBSCO. The identified relevant studies were screened in accordance to the study's inclusion and exclusion crieteria ( Table one ) .

The search was carried out with the following search terms in conjunction with the bolean operators :

*'' Benefits OR positive effects OR importance OR impact OR advantages AND music therapy OR music intervention OR musical therapy OR music-based intervention OR therapeutic music AND alzheimer's disease OR alzheimer's or dementia ''*

TABLE ONE : STUDY INCLUSION AND EXCLUSION CRITERIA

| Inclusion criteria | Exclusion criteria |
|---|---|
| a. Qualitative and quantitative studies related to the chosen topic<br>b. Articles that are published in English Language<br>c. Articles that were accessible in full text<br>d. Articles that were published between 2014 and 2023 | Systematic reviews , thesis or dissertations related to the chosen topic<br>Articles that are published on other language aside English<br>Articles that could not be retrieved in full text<br>Articles that were published in other years than 2014 to 2023 |

## 5.3 Data analysis

Data analysis in scientific peer review is the analysis and interpretation of the information gathered during research to identify trends, patterns, and connections (Higgins & Green, 2011). To do this, researchers use the data to test hypotheses, respond to research questions, and form conclusions based on the findings. The techniques utilized for data analysis are unique to the study's design and the type of information gathered. For instance, although qualitative studies may entail theme analysis of written information,

quantitative studies often involve statistical analysis of numerical data. Additionally, methodologies integrating both quantitative and qualitative data are the main mixed-methods approaches.

Researchers must make sure that their data analysis is comprehensive, open, and consistent regardless of the techniques they choose. As well as facilitating the peer review process by allowing other researchers to evaluate and reproduce their work, this is crucial to ensuring the validity and dependability of their findings.

## 5.4 Data extraction

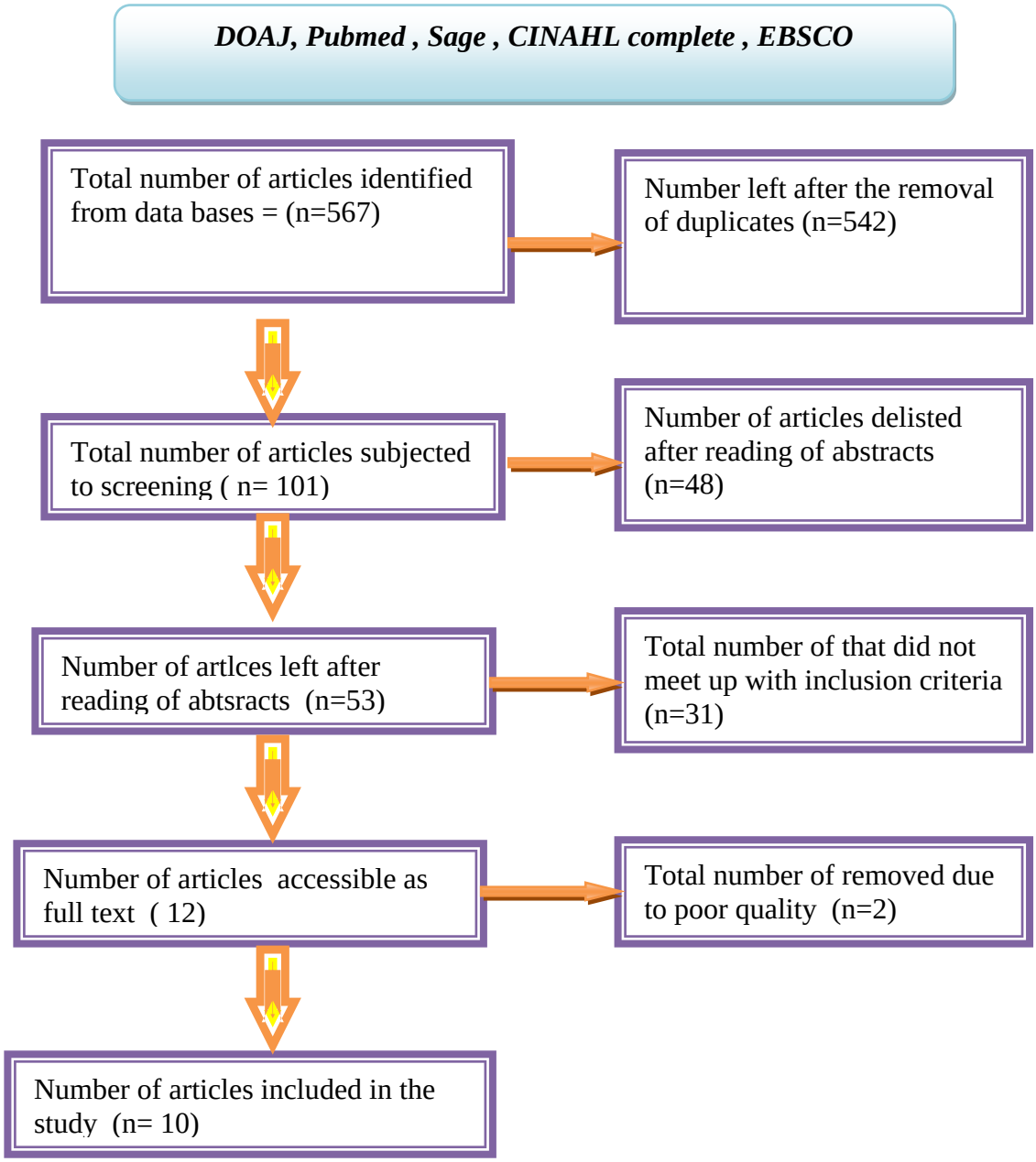
A thorough selection procedure was used to narrow down this collection of papers to those that were most relevant to our study. Ten articles that satisfied all inclusion requirements were found during this screening. The Directory of Open Access Journals (DOAJ), PubMed, , EBSCOhost CINAHL Complete, Academic Search Elite, Sage Journals was the sources from which these 10 articles were chosen. The full text, peer-reviewed, English-language, published within the previous ten years, and updated requirements were all satisfied by these publications. Also, a PRISMA flow chat was employed to give a visual image of the search process with information on the criteria on the inclusion and exclusion of articles which also promote the reliability and transparency of collected data (**shown in Figure one ).**

## 5.5 Ethical considerations

Gaining study participants' informed permission is a fundamental ethical necessity in the field of research, not merely a box to check. According to the principles outlined by the Finnish National Advisory Board on Research Ethics (TENK, 2019), obtaining voluntary agreement from potential participants requires that they are fully informed about the research's goals, methods, potential dangers, and potential rewards. Respect for

Participants' Privacy and Autonomy: When doing research, protecting participants' privacy and autonomy is a crucial ethical concept. Simply put, this implies that researchers must maintain the greatest possible secrecy about any information supplied by participants and ensure that their names are kept a secret, particularly in any research publications. The right to choose whether or not to engage, free from any pressure is another aspect of respecting participants autonomy (TENK, 2019).

**Figure one: PRISMA Flow chat illustration of article selection**

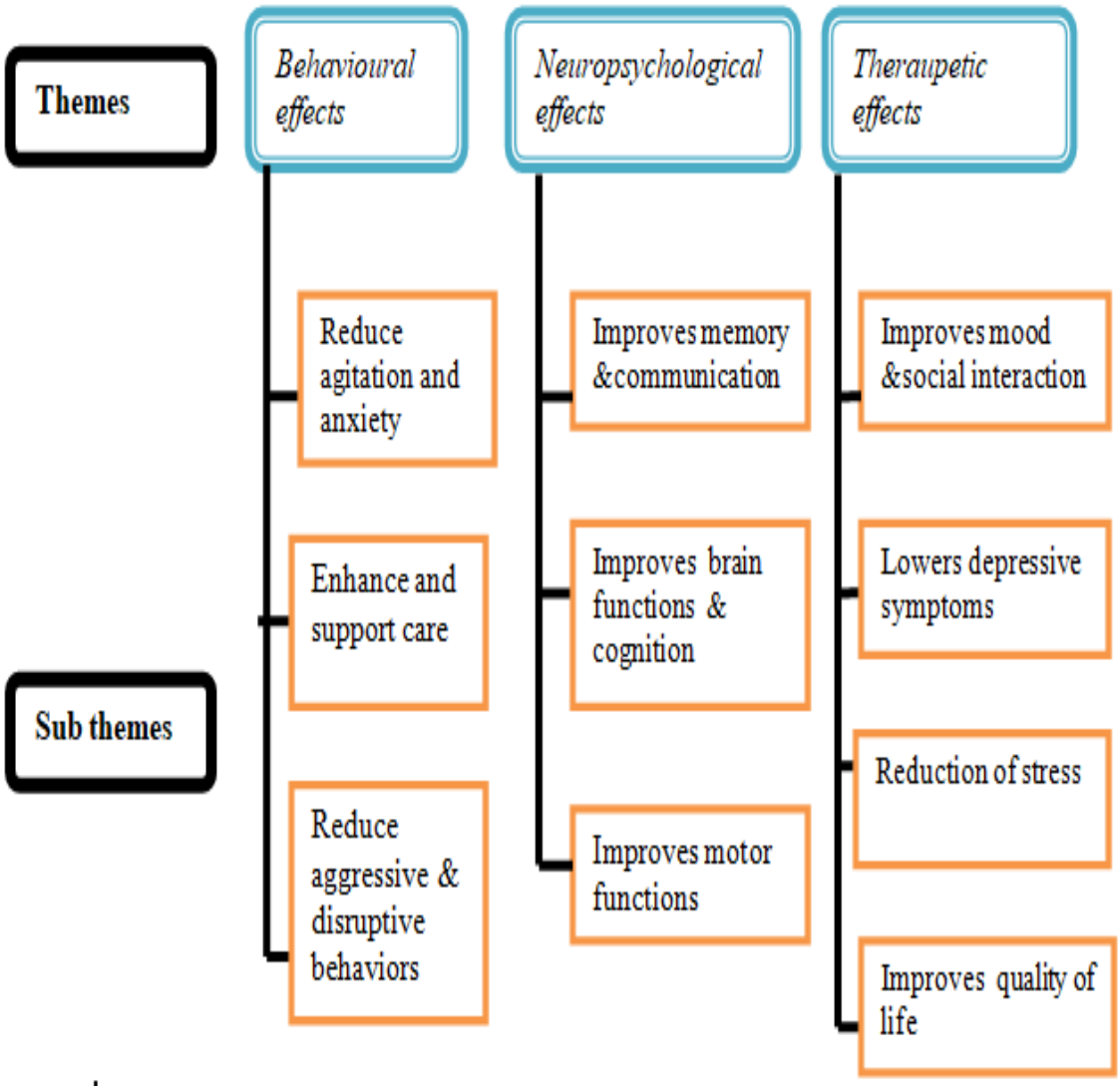



# 6 Results

A total of 10 articles were analysed (**check Appendix two**). These ten studies were carefully selected because they have a strong connection to the study topic, "Benefits of Music for People suffering from Alzheimer's disease."These ten articles were chosen after a thorough

study that made sure they fulfilled all requirements for inclusion, such as being up-to-date full text, peer-reviewed, written in English, and published within the last ten years Output from the data analysis as presented in themes and subtheme in an attempt to answer the research question what are the benefits of music in patients suffering from Alzheimer's diseases .In all , three (3) themes and ten (10) sub themes **( Check figure two )** were found to relevant in providing suitable information in answering the research question .

***Figure two: Benefits of music to Alzheimers patients ( themes & Sub themes)***



## 6.1 Behavioural effects of music in Alzheimer patients

This theme contains three sub themes which all have a close relationship on the effect of music on the behaviour of Alzheimer patients. The three sub themes are: reduction in agitation and level of anxiety, enhance and support the receiving of care from care givers and reduction in the display of aggressive and disruptive behaviours, reduction of stress, depressive symptoms(Sakamoto, Ando & Tsutou, 2013; Innes et al., 2018; Lyu et al., 2018; Belenchia , 2023 ; Sadier & Abou-Abbas, 2023;).

Information from the analysed article showed that music has the potential to decrease agitation especiallly motor agitation in elderly patients with Alzhiemers diseases (Belenchia et al., 2023). In a study that was carried out by Belenchia (2023), Alzhiemers patients with the mean age of 84.19years (70 to 90years ) were put into four groups and the ability of music in reducing agitation was evaluated . It was found out that there was a reduction in the level of agitation in all the four groups. Also , there was decrease in the occurence of resistance of care and a significant reduction in aggressiveness in this elderly patients thereby easing the stress on the path of the carers ( Belenchia , 2023). According to the report of Belenchia (2023) .carer were astonized by the responsiveness of patients to music and the prompt action in the reduction of agitation .

> *As soon as the head phone was was set on the clients who was so much agitated , he started smiling , clapping and nodding his head almost immediately when the music started playing. He became so relaxed and cooperated with the nurses to care him ( Belenchia , 2023)*

*A patient was wandering around , searching for his wife and refused to listen to instructions from the carers . when he was given the music and headphone , getting him back to his was alot easier , he sat on his bed , set his feet down and started playing a puzzle (Belenchia , 2023 )*

*A gentle man who is alway agitated when being treated and receiving palliative care did not enjoy headphones by likes to listen to Haitian gospel music and was found to be calm and shows lesser signs of anxiety (Belenchia 2023 ). .*

*Music therapy can be used as a tool to control the expression of psychiatric symptoms in clients with severe Alzheimers disease thereby lowering the stress experience by care giver due to less resistance and cooperation of these patients after exposure to music therapy ( Lyu et al., 2018).*

## 6.2 Neuropsychological effects of music in Alzheimer patients

Three sub –themes were found to be relevant on the neuropsychological effect of music in patients suffering from Alzheimer's diseases. The subthemes includes: enhancement of memory and communication, improvement of brain functions and cognition and a better motor function (Innes et al., 2018; Lyu et al., 2018; Ariana., Pamela., Jorge., & Carlos, 2021; Belenchia, 2023; Chéour et al., 2023 ; Vanstone, Cui, & Cuddy , 2023).

The result from this study showed that an individualized music listening session in an Alzheimers patient have a significant effect in decreasing motor agitation thereby promoting mobility ( Belenchia 2023). Also was found to be actively involving in the stimulation of autobiography memory as shown in a study conducted by Ariana et al. (2021). The roles of

musical stimulation as a therapeutic tool for optimizing autobiography memory (AM) in Alzheimers patients was examined . statisical analysis revealed that a significantly higher score was obtained in the post intenvention test in comparism with the pre- intervention which show the experiment had a positive impact on the ability of the sampled Alzheimer patient clients to remember their past and evoked old memories (Ariana et al., 2021; Lyu et al., 2018).

In addition, the ability of music to induce motor function was also found in the study conducted by Matziorinis et al. (2023) and Chéour et al. (2023). It was found out that there was a significant increase in the lenght of steps covered , increase in walking speed and a balance posture after exposure of elderly patients suffering from mild Alzheimers to music therapy (Chéour et al., 2023). Improvement in mobility was another positive impact of music in Azhiemers patients as reported in a study were the mobility of patients was assessed with Bathex index before and after exposure to music therapy. Patients showed a better mobility after exposure in comparison to pre-exposure but there was no major difference with respect to the effect of music on the activities of daily living in patients suffering from moderate to severe Alzheimers disease (Lyu et al., 2018).

> *Music therapy can be used as a tool to activate various network within the neuron therby resulting to an improvement in language function* ( Lyu et al., 2018)

According to the study , the use of music therapy as an intervention resulted in a significantly improved cognition indices after the assessment of the patients with Mini mental State Examination (MMSE) . Also , finding from this systematic literature review showed that there was a better memory function, improvement in communication and a better ability to remember past occurrence in Alzheimer diseases patience after participation in a singhin

workshop . It was observed that the patientswere able to recite the songs off hand and were able to memorize the melody of the song they listened to(Chéour et al.,2023).

> *Listening to music was noted to be beneficiall in improving semantic memory despite the presence of more advanced level of cognitive impairement (Vanstone, Cui, & Cuddy , 2023).*

> *Participation in music therpapy for a period of 3 to 6months is associated with a significant gain in memory and cognitive ability in elderly patients with Alzhiemers diseases ( Innes et al., 2018 )*

## 6.3 Therapeutic effects of music in Alzheimer patients

This study also found that music has therapeutic effects in Alzheimer patients. Four sub-themes were found to be applicable under this themes; an improved mood coupled with a better level of social interaction and an improvement in quality of life ( Lyu et al., 2018; Sakamoto, Ando & Tsutou, 2013; Bleibel, Cheikh, Sadier & Abou-Abbas, 2023; Innes et al., 2018).

Information from one of the analyzed article revealed that music has a theraupetic effects on the anxiety and depression in patients suffering from mild to moderate level of Alzhiemers diseases (Lyu et al., 2018). Also , listening to music can lead to reduction of stress in elderly with severe Alzhiemer's disease and improve their emotional state (Sakamoto et al., 2013). Also, one of the analyzed articles revealed that subjecting elderly patients with Alzheimers can improve their quality of life as if was stated that music is associated with special memories including reduction of stress level and an increase in positive emotional reactions

which both translate to a improve quality of life and a better activity of daily living in elderly patients with severe Alzheimers diseases ( Sakamoto et al., 2023 ) .

*An individualized music session can be used as both passive and interactive invention in the reduction of stress and improve relaxation in elderly with severe Alzhiemer (Sakamoto et al., 2023).*

*Interactive music interaction can be employed to reduce paranoid and delusional thoughts , unwanted activity disturbance and display of agrressive behabiour in clients with Alzhiemers diseaseses. (Sakamoto et al., 2023)*

*After assessment of patients with the Face Scale Assesment , passive and interactive music intervention evolked a pleasant state of emotions in elderly patients suffering from Alzheimers disease ( Sakamoto et al., 2023).*

*Apart from the potential of music in eliciting positive emotions , music also have a long term beneficial effects on lowering psychological and behavioral symptoms of Alzhiemers disease in elderly patients ( Bleibel et al., 2023) .*

*Another important benfit of music in Alzhiemers patients is the potential of music to improve mood, lower stres , enhance better sleep which all translate to a better a quality of life ( Innes et al., 2018).*

# 7 Discussion

This study was done to provide a better understanding on the benefits on music in the life on patients with Alzheimer's diseases . This study was done in an attempt to enrich the body of knowledge on ways of managing patients with this progressive, untreatable neurological disorder. Alzheimer's disease is estimated to be prevalent in about 5% of men and 6% of women who are more than 60years all over the world (WHO, 2011) . Also, the prevalence of this disease increases strongly with age as people who are 85years and above have a prevalence of 24 % to 33% (Ferri et al., 2005). According to predictions, the number of elderly patients suffering from Alzheimer's disease will continue to increase in all part of the world (Ferri et al., 2005). The result from this qualitative content analysis of ten articles will be discussed in two fold. The first part is the discussion of the findings from study which provided the needed information in answering the research question while the second part is on the discussion of the methodology.

## 7.1 Discussion of results

Alzheimer patients can benefit greatly from music therapy as it was found out that this have a profound effects on their behaviours. The level of agitation in elderly patients with Alzheimer's was found to be reduced after participation in an individualized music listening session . In addition to decrease in agitation , there was also a decrease in care resistance among the patients as it was found out that patients show more willingness and readiness to receive care after exposure to music listening sessions ( Belenchia , 2023; Sakamoto et al., 2023) .

Moreover, it was found out in this study that music is impactful in lowering the agitation and the display of aggressive behaviours among the elderly after being subjected to an individualize music session which gives an indication that music could be employed as a tool in the non pharmacological treatment of patients with Alzheimer diseases. This finding is strongly linked to the nursing theory which was employed as the theoretical framework in this research.

According to the Kolcaba ‘s theory of comfort, physical and mental distress in patients is lessen when listening to music due to the ability of music to trigger the feeling of comfort and peace in people suffering from Alzhiemers diseases.Finding from this study is supported by result obtained by (Pedersen , Andersen , Lugo , Andreassen & Sutterlin , 2017) in a study that examined the effectiveness of music interventions on rate of agitation in patients suffering from Alzheimer’s diseases. In the study if was reported that music has a relatively stable medium benefits on tested groups of patients ( Pedersen et al., 2017).

Additionally, the potential impact of music in improving memory, cognition and communication was another interesting finding from this study. Music was found to a tool that is suitable in improving both autobiographic and semantic memory in elderly Alzhiemers patients. Patients who have been subjected to music therapy able to remember and tell stories about their lives (Ariana et al. (2021; Lyu etal., 2018 ).Another notable important finding was the potential benefits on music in improving motor functions (Matziorinis et al., 2023; Chéour et al., 2023).

Interestingly, the potential beneficial effects on music on cognitive skills reported in this study is buttered by the Kolcaba theory of comfort which stated that listening to music evoke old memories , makes emotions better and also creates a feeling of relaxation. Findings from

this study is supported by the research of (Fang , Ye & Huangfu , 2017) who opined that music therapy improves memory and verbal communication in patients with mild Alzhiemers disease in addition to the reduction in the expression of psychiatric symptoms such as hallucinations , care giver distress , and aberrant motor activities ( Fang et al., 2017).

Furthermore, the therapeutic impact of music was another finding in this study. The thematic content analysis that was done in this study revealed that music can be used a tool to improve mood, promote social interaction and overall quality of life in patients with mild to moderate AD. Music is linked with the resuction of stress, make people laugh, alleviate fear and increase participation of elderly in activities of daily living which ultimately translate to a better quality of life ( Lyu et al., 2018; Innes et al., 2018; Bleibel, 2023).

The finding from this study is corroborated by the Katherine Kolcaba's theory of comfort which stated that music enhance the wellbeing of individuals with Alzheimer's diseases by examining various aspect of comfort such as physical , psychospiritual , socio-cultural and environmental factors . The study of Cho (2018) is similar to the result of this study as it was reported that music therapy sessision where people are put in singing groups showed a better quality of life. The study also opined that music could be used as a tool in the non pharmological intervention in improving the qualify of life of Alzhiemers patients in care facilities ( Cho , 2018 ).

## 7.2 Discussion of methodology

As part of the effort to ensure the quality of this study, the discussion of the methodology is hereby presented in order to give necessary information which aids readers in understanding the result and outcomes of this study. This study was carried out as a systematic literature review involving a qualitative study. The collected data was analysed for credibility,

dependability, transferability and trustworthiness as described by Polit & Beck (2012). Credibility provides the assurance that the collected data are accurate, dependability ensures that the result from the study is in conformity with the gathered date while transferability describes the application of the results from the study in another context (Polit & Beck, 2012).

The current study was done on the effects on music in Alzheimer's patients with the aim of finding out how music can be used to manage and improve the quality of life of elderly with Alzheimer's diseases. Different databases were systematically searched for relevant articles **(Check Figure one).** The articles were screened according to the inclusion and exclusion criteria **( Table one**) . The PRISMA flow chat utilized to show visual pathway on how the collection and screening of articles that were used in this study (**Figure one).** Thereafter, ten (10) articles were selected and subjected to thematic content analysis. Data collected were grouped into themes and sub-theme(s) which serve as the result of the study.

Going further, Katharine Kolcaba theory of comfort was adapted as the theoretical framework in this study. According to the theory, comfort is centred on reducing the physical and mental distress in patients through the alleviation of suffering, pain and anxiety., The theory of comfort also provided an insight into how listening to music can be utilized to evoke the feeling of peace and comfort in patients who are experiencing pain and discomfort . This theory also opined that music improves memory, brings about positive emotions and a relaxed state of mind. Sequel to the beneficial effect of music which has been highlighted in this study, the result from this study will provide additional information non pharmacological approach in the management of Alzheimer's patients.

# 8 Study's strength and limitations

The major strength of this research was that the study was done in order to address the most common disease that affects most of the elderly patients in different parts of the world. This study was done to find alternative way of managing Alzheimer's patients apart from the use of medication. It is important to state that the system literature review has been carried strictly with total compliance with the recommended guidelines in carrying a qualitative study.

Another strength of the study is the reliability and credibility of the result obtained from this study. Ensuring the systematic search, identification and screening of previous studies while carrying out the research according to a well organized research plan and a clearly described methodology ensure the credibility and reliability of the results. The reliability of the study was further reinforced by carrying out a quality assessment of the selected article using the PRISMA quality assessment checklist. Overall, the study has a high level of transferability because the data obtained can easily be employed in different care setting to improve the quality of life of Alzheimer's elderly patients

One of the limitations of this study is a small number of articles that were analyzed in this study. It would have been better if more articles were analyzed in this study as this would have provided more relevant information and further enhance the transferability of the study. However, the ten articles that were analysed in this study are still enough to give a reliable result. Time constraint and limitation in the availability of resources was a major factor that limited the study to just ten articles because some articles were deemed fit to be useful for the study but are not available in full text .Also , some articles need to be paid for before they are accessible **.**

Moreso, findings from this study cannot be used to make a generalized statement because few articles have been analyzed. It is not acceptable to state a definite conclusion based on the results obtained from the analysis of the few selected articles. This study was also carried by a single author. As a result all the result from this study is output from one individual and it was not possible to share knowledge and idea which is available where there are co-authors.

# 9 Comparing the study with other studies

Different studies have been carried on ways of managing elderly patients with Alzheimer's disease. However, there is a dearth of information on how music can be employed in care facilities to improve the life of Alzheimer's patient. A closely related study by Pedersen et al.(2017) evaluated the probable benefits of music in reducing agitation in patients that are demented. This study was done as a Meta analysis. The study reported that agitation is a common problem in dementia patients which is regularly managed with the use of pharmacological methods. Twelve studies were analyzed in the metal analysis and it was found out that the use of music have a medium positive effect on the level of agitation in dementia patients which signal the potential application of music intervention in caring for Alzheimer's patients in clinical settings . The study went further to suggest the use of non pharmacological method and states the importance of more research on this area to further proof the suitability of music in managing Alzheimer's patients.

# 10 Conclusion

Conclusively, this study has examined the beneficial impact of music as an alternative to pharmacological approach in the management of elderly clients with Alzheimer's disease. It is crystal clear that listening to music can be used as an effective intervention in patients with

Alzheimer’s diseases in care settings. Music improves cognition, motor functions, communication, social interaction and lower the expression of psychological symptoms in Alzheimer’s patients.

Therefore this study contributes to the existing body of knowledge with regards to the provision of evidence based care that is safe and patient centred to patient with Alzheimer’s disease .within the limit of the available evidence from this study, non pharmacological and personalized interventions involving listening to music should be employed as part of the treatment plan in the management of behavioural and psychological symptoms of Alzheimer

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**Appendix one : Overview of studies that were analyzed for the systematic review**

| S/N | Title Author, publication year | Aim | Method | Results |
|---|---|---|---|---|
| 1 | *Belenchia E. J. (2023). An individualized music listening program to reduce agitation in hospitalized patients with Alzheimer's disease and related dementias.* | This study was done with the aim of evaluation ways throught the level of agitation in Alzheiemr's disease and related dementia (ADRD) can be reduced throught the use of individualized music session in an | The study was done through a quasi experiment in a 32bed capacity inpatient medical and surgical ward . The groups of adults considered in the study have been confirmed as having a diagnosis of dementia . The Pittsburgh Agitation Scale (PAS) was used to measure agitation in patients by assessing the intensity of behaviors related to agitation : aberrant vocalization, motot agitation , aggressiveness and resisting care. Patients were assesed before and after individualized music listerning session | The result from this study showed that music has a positive impact in reducing agitation in ADRD patients as indicated by lower PAS score after intervention in all the four agitation related behavior that was evaluated . |

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| | | acute care settings | | |
| 2 | *Ariana, P.P., Pamela, A.R., Jorge, C.C., & Carlos., R. G (2021). Music Stimulation as a Method of Optimizing Autobiographical Memory in Patients Diagnosed with Alzheimer's Disease.* | The study was aimed at evaluating the role of a musical stimulation procedure on the performance of autobiographical memory in patients with Alzheimer's disease | The study was initiated with field observation of 14 residents with Alzheimer's diseases. The intervention protocol that was used entails different music therapy techniques such as singing, active and passive listening, rhythm and melody. participant were evaluated after participation in the study some questions and rated 1-5 based on their ability to provide answers | The result showed a preliminary evidence on the potential impact of music in improving the execution of autobiographical memory in Alzheimer patients |
| 3 | *Matziorinis, A. M., Flo, B. K., Skouras, S., Dahle, K., Henriksen, A., Hausmann,* | The study was aimed at evaluating the benefit of continuous | The study was carried out as randomized pilot design among 18 participants with diagnosis of mild to moderate Alzheimer's disease in Norway over a period | The result showed that the implementation of the protocol in patient was not |

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| | *F., Sudmann, T. T., Gold, C., & Koelsch, S. (2023). A 12-month randomised pilot trial of the Alzheimer's and music therapy study: a feasibility assessment of music therapy and physical activity in patients with mild-to-moderate Alzheimer's disease.* | inclusion of Alzheimer disease patients in active non pharmacological therapy through the implementation of music therapy | of 12months; Singing lessons were delivered to the clients by a registered music therapist. Thereafter, the clients were subjected to neuropsychological. Testing and neuro-imaging to access the rate of deceleration of brain aging in the group of clients that has been diagnosed of AD. | totally feasible and the compliance with the implementation of this method was poor. |
| 4 | *Chéour, S., Chéour, C., Gendreau, T., Bouazizi, M., Singh, K. P., Saeidi, A., Tao, D., Supriya, R.,* | The purpose of the research was to compare the impact of music therapy and | The study involved 28 AD clients who received music therapy by listening to music picked by a music therapist. After which the level of cognition was assessed with the Mini-Mental State Examination | The study reported that music therapy have great benefits on the cognitive ability of the evaluated |

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| | *Bragazzi, N. L., Baker, J. S., & Chéour, F. (2023). Remediation of cognitive and motor functions in Tunisian elderly patients with mild Alzheimer's disease: implications of music therapy and/or physical rehabilitation.* | physical rehabilitation on motor function and cognition in elderly clients with Alzheimer's disease | (MMSE) . The gait parameters and the Six –Minutes Walk Test (6MWT) were both utilized to evaluate the their motor functions | patients while physical rehabilitation enhance motor functions |
| 5 | *Lyu, J., Zhang, J., Mu, H., Li, W., Champ, M., Xiong, Q., Gao, T., Xie, L., Jin, W., Yang, W., Cui, M., Gao, M., & Li, M. (2018). The Effects of Music* | The study explored the effects on music therapy on cognition and mental status of AD patients | The study examined 290 AD patients with mild, moderate and severe level of dementia. The participants were put into groups and were subjected to music intervention for three months. The clients were then subjected to series of neuropsycholological and ADL test after three and 6months post treatment. | It was found out in the study that music therapy is efficient in improving verbal skills , memory and lower the frequency of care resistance in the patients |

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| | *Therapy on Cognition, Psychiatric Symptoms, and Activities of Daily Living in Patients with Alzheimer's Disease* | | | |
| 6 | *Simmons-Stern, N. R., Deason, R. G., Brandler, B. J., Frustace, B. S., O'Connor, M. K., Ally, B. A., & Budson, A. E. (2012). Music-based memory enhancement in Alzheimer's disease: promise and limitations* | The study examined the effects of music on memory in patients with AD | The study involved 12 patients with clinical diagnosis of AD while 17 healthy adults with no with reported history psychiatric illnesses, alcohol misuse nor brain disorder served as control. The two groups were subjected to neurological test after participating in a music listening session which lasted for approximately one hour and 30minstes | The resulted obtained from the study showed that music enhance memorial awareness in AD patients |

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| 7 | *Vanstone, A. D., Cui, A.-X., & Cuddy, L. L. (2023). Using fsQCA to Illuminate Person Attributes of Music Engagement in Alzheimer's Disease.* | The study evaluated the practical application of music therapy as a tool in the management of AD. | The research sampled 15 clients with confirmed diagnosis of AD( 10males and 5females) while 29 patients who have been examined to be without any cognitive impairment served as the control group . A set of qualitative comparative analysis was done to evaluate the involvement of music as a therapeutic tool. | The study found out that music has a positive impact in the enhancement of memory. |
| 8 | *Sakamoto, M., Ando, H., & Tsutou, A. (2013). Comparing the effects of different individualized music interventions for elderly individuals with severe dementia* | The study was aimed at evaluating potential roles of music in the reduction of behavioral and psychological | Thirty nine elderly with severe AD were randomly selected and put into two groups. One as the intervention group and the second as the control group. The intervention group was subjected to music listening session after which the emotional response and stress level in these clients was evaluated | The output from the research revealed that music has a potential positive effect in improving the emotional state and reduction of BPSD |

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| | | symptoms of dementia ( BPSD) | | |
| 9 | Bleibel, M., El Cheikh, A., Sadier, N. S., & Abou-Abbas, L. (2023). The effect of music therapy on cognitive functions in patients with Alzheimer's disease: a systematic review of randomized controlled trials | The study examined the effect of music therapy as a single intervention or in combination with the use of medication on cognitive skills in AD patients | Groups of patients that have been examined in a randomized controlled trials by undergoing a music therapy and other non musical intervention with respect to the effects of music on their cognitive skills | there a pronounced effect of music on cognition, memory , language in those patients that were involved in the study |
| 10. | Innes et al., 2018. Effects of Meditation and Music-Listening on Blood | The study was done to estimate the effect of use of medication | The study participants were subjected to a 3months relaxation programme involving listening to music for 12minutes per day . The biomarkers were estimated at | There was a significant improvement in congition and psychosocial status in |

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| | Biomarkers of Cellular Aging and Alzheimer's Disease in Adults with Subjective Cognitive Decline . | and music therapy on biomarkers that are associated with cognitive decline | 3months and 6months to assess the effect on cognitive, stress , sleep , mood and QQL . | the evaluated group of clients , |

**Appendix two: Assessment of the quality of articles that were selected for the systematic review**

| | Authors name(s) , publication year and name of journal | Belenchia E. J. (2023). An individualized music listening program to reduce agitation in hospitalized patients with Alzheimer's disease and related dementias | Ariana, P.P., Pamela, A.R., Jorge, C.C., & Carlos., R. G (2021). Music Stimulation as a Method of Optimizing Autobiographical Memory in Patients Diagnosed with Alzheimer's Disease | Matziorinis, A. M., Flo, B. K., Skouras, S., Dahle, K., Henriksen, A., Hausmann, F., Sudmann, T. T., Gold, C., & Koelsch, S. (2023). A 12-month randomised pilot trial of the Alzheimer's and music therapy study: a feasibility assessment of music therapy and physical activity in patients with mild-to-moderate Alzheimer's disease |
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| | ***Title and abstracts of the study*** | | | |
| a. | The title and abstract of the research were written clearly and comprehensible | Y | Y | Y |
| | ***Introduction and methodology*** | | | |
| b | There was a clear introduction that there are existing problems | Y | Y | Y |
| c | The studies aims and objectives were clearly written | Y | Y | Y |
| d | The inclusion and exclusion criteria for selection of the study | Y | Y | Y |

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| | participant understandable | | | |
| e | The process of data collection was clear | Y | Y | Y |
| | ***Results*** | | | |
| f. | There was a flat chat representation about the outcomes of the study | Y | Y | Y |
| g. | The results of the study was presented in systematic way | Y | Y | Y |
| h. | It was easy to understand the result of the study | Y | Y | Y |
| | ***Disccussion*** | | | |
| i. | There was a clear and broad interpretation of the result which was presented within the context of available evidence in the study | Y | Y | Y |
| | ***Other information*** | | | |
| j. | The limitation of the research was written | Y | Y | Y |
| k. | There was information on the implication of the results for | Y | Y | Y |

| | | | | |
|---|---|---|---|---|
| | pratice, policy and future research were stated | | | |
| l. | The sources of financial and non financial resoures was reported | Y | Y | Y |
| m | All conflict of interest during the study were reported | Y | Y | Y |
| n | There is an indication of where the study protocol and ethical issues during the study was written | Y | Y | Y |

| | | | | |
|---|---|---|---|---|
| | Authors name(s) , publication year and name of journal | Chéour, S., Chéour, C., Gendreau, T., Bouazizi, M., Singh, K. P., Saeidi, A., Tao, D., Supriya, R., Bragazzi, N. L., Baker, J. S., & Chéour, F. (2023). | Lyu, J., Zhang, J., Mu, H., Li, W., Champ, M., Xiong, Q., Gao, T., Xie, L., Jin, W., Yang, W., Cui, M., Gao, M., & Li, M. (2018). The Effects of Music | Simmons-Stern, N. R., Deason, R. G., Brandler, B. J., Frustace, B. S., O'Connor, M. K., Ally, B. A., & Budson, A. E. |

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| | | Remediation of cognitive and motor functions in Tunisian elderly patients with mild Alzheimer's disease: implications of music therapy and/or physical rehabilitation. | Therapy on Cognition, Psychiatric Symptoms, and Activities of Daily Living in Patients with Alzheimer's Disease. *Journal of Alzheimer's disease* | (2012). Music-based memory enhancement in Alzheimer's disease: promise and limitations |
| | ***Title and abstracts of the study*** | | | |
| a. | The title and abstract of the research were written clearly and comprehensible | Y | Y | Y |
| | ***Introduction and methodology*** | | | |
| b | There was a clear introduction that there are existing problems | Y | Y | Y |
| c | The studies aims and objectives were clearly written | Y | Y | Y |
| d | The inclusion and exclusion criteria for selection of the study participant understandable | Y | Y | Y |
| e | The process of data collection was clear | Y | Y | Y |
| | ***Results*** | | | |
| f. | There was a flat chat representation about the outcomes of the study | Y | Y | Y |
| g. | The results of the study was presented in systematic way | Y | Y | Y |

| | | | | |
|---|---|---|---|---|
| h. | It was easy to understand the result of the study | Y | Y | Y |
| | ***Disccussion*** | | | |
| i. | There was a clear and broad interpretation of the result which was presented within the context of available evidence in the study | Y | Y | Y |
| | ***Other information*** | | | |
| j. | The limitation of the research was written | Y | Y | Y |
| k. | There was information on the implication of the results for pratice, policy and future research were stated | Y | Y | Y |
| l. | The sources of financial and non financial resoures was reported | Y | Y | Y |
| m | All conflict of interest during the study were reported | Y | Y | Y |

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|---|---|---|---|---|---|
| | Authors name(s) , publication year and name of journal | Vanstone, A. D., Cui, A.-X., & Cuddy, L. L. (2023). Using fsQCA to Illuminate Person Attributes of Music Engagement in Alzheimer's Disease. Music & Science | Sakamoto, M., Ando, H., & Tsutou, A. (2013). Comparing the effects of different individualized music interventions for elderly individuals with severe dementia. *International* | Bleibel, M., El Cheikh, A., Sadier, N. S., & Abou-Abbas, L. (2023). The effect of music therapy on cognitive functions in patients with Alzheimer's | Innes et al., (2018). Effects of Meditation and Music-Listening on Blood Biomarkers of Cellular Aging and Alzheimer's Disease in Adults with |

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| | | | *psychogeriatrics* | disease: a systematic review of randomized controlled trials. *Alzheimer's research & therapy* | Subjective Cognitive Decline: An Exploratory Randomized Clinical Trial. *Journal of Alzheimer's disease* |
| | ***Title and abstracts of the study*** | | | | |
| a. | The title and abstract of the research were written clearly and comprehensible | Y | Y | | Y |
| | ***Introduction and methodology*** | | | | |
| b | There was a clear introduction that there are existing problems | Y | Y | | Y |
| c | The studies aims and objectives were clearly written | Y | Y | | Y |
| d | The inclusion and exclusion criteria for selection of the study participant understandable | Y | Y | | Y |
| e | The process of data collection | Y | Y | | Y |

| | | | | | |
|---|---|---|---|---|---|
| | was clear | | | | |
| | ***Results*** | | | | |
| f. | There was a flat chat representation about the outcomes of the study | Y | Y | | Y |
| g. | The results of the study was presented in systematic way | Y | Y | | Y |
| h. | It was easy to understand the result of the study | Y | Y | | Y |
| | ***Disccussion*** | | | | |
| i. | There was a clear and broad interpretation of the result which was presented within the context of available evidence in the study | Y | Y | | Y |
| | ***Other information*** | | | | |
| j. | The limitation of the research was written | Y | Y | | Y |
| k. | There was information on the implication of the results for pratice, policy and future research were stated | Y | Y | | Y |

| | | | | | |
|---|---|---|---|---|---|
| l. | The sources of financial and non financial resoures was reported | Y | Y | | Y |
| m | All conflict of interest during the study were reported | Y | Y | | Y |
| n | There is an indication of where the study protocol and ethical issues during the study was written | Y | Y | | Y |

**List of tables and figure**



**List of Abbreviatios**

**PRISMA: Preferred reporting Items for Systematic Reveiws and Meta-analysis**

**DOAJ: Directory of Open Access Journal**

**AD: Azheimers Diseases**

**WHO: World health organisation**

**MT: Music Therapy**

**QOL. Quality of life .**