
The Effect of Physical Activity Programs on Cognitive Decline in Patients with Early-Stage Dementia

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Abstract

Introduction:

Dementia is one of the significant problems of health care in the world, as the number of cases is growing on annual basis. In the UK alone, about 980,000 people have dementia, the number of which is likely to increase even more in the next few decades. Prevention of the course of dementia at an earlier stage of development, especially the time between normal aging and early dementia (Mild Cognitive Impairment or MCI), has been found to be one of the key opportunities of decelerating the cognitive decline. There are evidences in the use of non-pharmacological interventions to enhance cognitive functioning and reduce rate of disease progression, in particular, structured physical activity programs. This dissertation investigates how structured physical activity programs of aerobic, strength and balance exercises affect cognitive decline among patients with early stage dementia in the UK.

Aim:

The main objective of the research is to assess the effects of structured physical activity programs on the cognitive functioning and dementia progression of patients with the early stages of dementia in the UK, in existing NHS care pathways.

Methodology:

This research used a qualitative evidence synthesis method. To collect information on physical activity interventions on dementia patients, a systematic literature review was performed in various databases, such as PubMed, JSTOR, Scopus, and ScienceDirect. The studies selected were conducted between 2018 and 2025. Study selection was performed using PRISMA framework and concentrated on both qualitative and quantitative researches to determine the effect of

structured physical activity on the dementia patients in UK. Synthesis of the studies was done in themes to come up with important trends and findings. The thematic analysis was done on the data; and the results were based on biological, emotional, and cognitive consequences of physical activities interventions.

Results:

The literature review revealed that physical activity is important in early-stage dementia because of the critical biological and neurocognitive advantages such as enhancing inflammation reduction, improving vascular health, and neuroplasticity. The emotional and social wellness also improved with the physical activity playing a role in improving the mood, social interaction and the sense of belonging. It was also found that aerobic, strength and balance exercises and hybrid and dual-task interventions are effective in enhancing cognitive ability. But lapses in policy and practice were observed, especially regarding the incorporation of exercise interventions into the UK dementia care pathways, where the issue of funding, staff education, and absence of national guidelines are the main limitations.

Conclusion:

This paper has highlighted the significance of planned physical exercises in the treatment of early-stage dementia. It has also highlighted the barriers to policy and implementation in the UK healthcare system, including the lack of systematic inclusion of physical activity in the process of dementia care, erratic funding, and staffing deficits which limits the dementia care outcome. The suggestions on how to address such gaps include formulation of national standards of exercise interventions, improved staff education and enhanced integration between the NHS and community resources.

Key Words:

Dementia, Early-stage dementia, Mild Cognitive Impairment, Physical activity, Cognitive function, Non-pharmacological interventions, NHS, Structured exercise, Neuroplasticity, Social wellness, Policy gaps.

Table of Contents

Chapter One: Introduction	7
1.1 Introduction	7
1.2 Background	9
1.2.1 Dementia and need of early intervention.....	9
1.2.2 Biological benefits:	9
1.2.3 Emotional and social benefits	9
1.2.4 Combine intervention	10
1.3 Research Problem Statement.....	11
1.4 Research Aim	12
1.5 Research Objectives	12
1.6 Research Questions	12
1.7 Research Significance	12
Chapter 2 Literature Review	13
2.1 Introduction	13
2.2 Biological and Neurocognitive Benefits: Inflammation, Vascular Health, and Neuroplasticity	15
2.3 Emotional Benefits & Social Wellness: Mood, Identity, Belonging, and Social Bonding .	17

2.4 Cognitive Function Improvement: Aerobic, Strength, Balance, Hybrid & Dual-Task Interventions.....	19
2.5 Policy and Implementation Gaps in the United Kingdom: Limited NHS Integration and Lack of UK-Specific Evidence	22
2.5.1 Gaps, Challenges & Future Directions	25
2.6 Conclusion.....	26
Chapter Three Methodology	27
3.1 Introduction	27
3.2 Research design:.....	27
3.3 Method of data collection.....	28
3.4 Data analysis Method:	31
3.5 Ethical consideration:	32
3.6 Limitations of the study:	33
Chapter Four Results.....	34
4.1. Introduction	34
4.2 Thematic Synthesis of Findings	35
4.2.1 Theme 1 Biological and Neurocognitive Benefits: Inflammation, Vascular Health, and Neuroplasticity.....	35
4.2.2 Theme 2 Emotional Benefits & Social Wellness: Mood, Identity, Belonging, and Social Bonding	37

4.2.3 Theme 3 Cognitive Function Improvement: Aerobic, Strength, Balance, Hybrid & Dual-Task Interventions.....	39
4.2.4 Policy and Implementation Gaps in the UK.....	41
Chapter Five Conclusion.....	43
5.1 Conclusion.....	43
5.2 Recommendations	44
5.3 Future Implications	47
References:.....	49

Chapter One: Introduction

1.1 Introduction

Dementia has been declared as one of the greatest global challenge due to increasing number of casea every year (Parra et al., 2019). Approximately 57 million people are struggling with dementia increasing number with 10 million case each year (WHO, 2025). In the UK, over 980000 people are estimated to living with dementia and considered one of the leading cause of death (Alzheimer's research UK, 2023). Dementia, especially among the elderly, is an escalating health challenge that leaves victims with impairments in memory, reasoning activities of daily living (ADLs). Beyond its effect on individual suffering with dementia and their families, it places a tremendous burden on healthcare, social care systems and researchers to give utmost priority to improve diagnosis and post-diagnostic support for individuals suffering from dementia.

The Early diagnosis of dementia provides an opportunity for facilities and individual to participate in health care plane before symptoms get severe. The critical transition stage between normal aging to dementia where cognitive changes are noticeable but not yet interfere. This transition stage is known as Mild Cognitive Impairment (MCI) which is considered early sign of dementia (Liu et al, 2022). At this stage, Non-pharmacological interventions, structured physical activity (aerobic exercise, strength, balance) are becoming a source of interest in their role in slowing cognitive decline.

Recent studies draw the attention towards the benefits of exercise in cognitive development in cognitive function of people with dementia and older adults. Xie et al. (2025) observational study concluded that walking speed and grip strength had a close relationship with cognitive decline, which implies that preventing cognitive decline might be as significant as overall fitness by means

of motor-based treatments. They suggest that motor testing needs to be routinely implemented in dementia risk screening procedures since exercise has been identified as a promoter of physical and cognitive well-being in the early stage dementia patients. Building on this, Lin et al. (2025) demonstrated digital cognitive treatment, specifically mobile-based games, to enhance executive functioning in MCI and dementia. Combining such tools and physical activity could present a holistic concept of management of dementia. This focus will particularly focus on the physical activity within the broader holistic model.

Moreover, claiming to use the data of the ADVANCE trial, Harris et al. (2024) correlated the skills of cardiovascular risk control to lower the risks of dementia, stressing the importance of exercises to preserve the vascular and cerebral health. The study included the participants with existing cognitive impairment. Similarly, Hirooka et al. (2024) noted that dementia aggravates the effectiveness of treatment of other diseases, which stressed the importance of comprehensive care plans that target cognitive, physical, and functional health. The structured activities offer more social interaction which further contribute towards better care outcomes as compared to the isolated exercises where the patients social skills continues to decline. Together, these studies have pointed to the assertion that specific physical exercise (particularly motor and cardiovascular), particularly when coupled with cognitive and digital types of activity, can at least slow deterioration.

Despite these emerging evidence, there remain a research gap in understanding the effect of structured physical activities, their required optimal frequencies and duration affect required for desired outcomes in individuals diagnosed with early stage of dementia in UK. The study address

this gap by focuses on these interventions among the patients of early-stage dementia in the UK embedded within NHS.

1.2 Background

1.2.1 Dementia and need of early intervention

The most prevalent type of dementia is Alzheimer disease, whose cases are expected to encompass two times more people by 2050 as projected by WHO (2021). There is no cure and early non-pharmaceutical intervention such as physical activities, dietary adjustments, cognitive simulation are considered promising as far as slowing progression is concerned. According to Alzheimer's society (2024) people who take regular exercise are upto,20% less likely to develop dementia than those who don't take regular exercise and older people can also reduce their risk of dementia with regular exercise. NHS (2023) also recommends that regular exercise improves physical health that is connected with cognitive health and quality of life.

1.2.2 Biological benefits:

Exercise is gaining credibility as a way to deter and slow down the deterioration of cognitive functions of patients with dementia. Futschek et al. (2022) associated high homocysteine concentrations with cognitive decline and mortality, suggesting that exercise may help to modify detrimental biomarkers. Similarly, inflammation is widely recognized as a significant contributor to the onset of dementia and physical activities can be a solution to reducing inflammation, making the case of exercise during the treatment of dementia even more valid. Specific inflammatory markers, such as C-reactive protein (CRP),

interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF- α), have been linked to cognitive decline (Arosio et al., 2025). In addition, the same article by Harris et al. (2024) showed that interventions aimed at managing cardiovascular risk factors, including blood pressure and glucose levels, such as physical exercise, may have a great impact on decreasing the risk of dementia in high-risk populations with diabetes. Moreover, Sleep disturbances, as well as gum disease, were also linked to the cognitive decline through increased inflammation and oxidative stress that exercise has potential to mitigate (HerreroBabiloni et al., 2025).

1.2.3 Emotional and social benefits

Beyond biological mechanisms, dementia also erodes emotional and social functioning. Giacomucci et al. (2023) observed that empathy decreases fast as the disease progresses, and therefore, physical activity could contribute to emotional and social wellness. The social aspect of exercise will help a person to fight the isolation that is likely to be experienced by people with dementia through physical activities, especially in groups where people can interact through walking classes, dancing, or exercise groups. These group activities allow emotional attachment, improvement of mood, and add to a sense of belonging. Additionally, physical exercise may be used on a regular basis to build self-esteem and confidence, which will give dementia patients a feeling of achievement, which in turn will benefit emotional regulation and social connectedness. This aligns with the **biopsychosocial model**, which stresses that dementia care not only consider medical but also give attention to psychological and social dimensions of health. Exercise therefore proved to have the potential to support both cognitive function and broader wellbeing as has been mentioned in the quantitative and qualitative literature review.

1.2.4 Combine intervention

Recent studies favor the combination of physical activity with cognitive stimulation to gain maximum benefits. Cognitive rehabilitation was revealed to enhance memory and executive functions in the early stage of dementia (Dhankhar et al., 2025) while, Lin et al. (2025) reaffirmed the option of integrating digital cognitive training and physical activity as a way to deliver more effective care models. Together, these findings highlight the potential neuroprotective role of exercise, mediated through a range of biological and psychosocial mechanisms.

1.3 Research Problem Statement

In UK, Dementia has become one of the fast growing health challenge with over 980,000 people are living with this condition and expected to increase 1.4 million by 2040. Additionally, the economic burden is also impactful. The cost of dementia in the UK is forecast to be £42 billion in 2024, increasing to £90 billion by 2040 which is widely used the search of effective and scalable intervention a pressing public health priority (Alzheimer's Society, 2024)

Although, there is evidence of cognitive benefits of physical activity, but little research focuses on structured programs in the UK with patients affected by early-stage dementia. Most studies dwell on individual interventions such as cognitive training; rehabilitation or overall exercise with regard to their effects but never a combination of guided exercise altogether. Lin et al. (2025) evaluated the effect of digital interventions without physical activity; Guan et al. (2025) enhanced early detection models without the incorporation of exercise. Kim & Kim (2024) and Crivelli et al. (2024) identified physical health as a factor related to cognition but did not experiment with guided programs. Shrestha et al. (2024) emphasized thorough care plans and did not have a systematic

assessment of exercises. This research fills such forms of gaps as it combines exercise and cognitive interventions to help in early-stage dementia care.

1.4 Research Aim

To evaluate the impact of structured physical activity programmes, incorporating aerobic, strength, and balance exercises, on cognitive function and progression delay in UK patients with early-stage dementia within existing NHS care pathways.

1.5 Research Objectives

1. To assess cognitive performance before and after participation in structured physical activity programmes among patients with early-stage dementia in the UK.
2. To evaluate the relative effectiveness of aerobic, strength, and balance exercises in improving cognitive function.
3. To assess the relationship between exercise frequency and duration (dosage) and the extent of cognitive improvement.
4. To evaluate the potential for integrating structured physical activity programmes into NHS dementia care pathways.

1.6 Research Questions

What is the effect of structured physical activity programmes, incorporating different exercise types, frequencies, and durations, on cognitive function in early-stage dementia, and how can these programmes be effectively integrated into NHS dementia care?

1.7 Research Significance

The work applies to dementia care because it could reveal the potential of physical activity to improve cognition and delay deterioration. In case it proves effective, it may reinforce exercise, in

terms of a standard and non-pharmacological component of care, along with cognitive training (Ishiwata et al., 2025; Lin et al., 2025). This aligns with the growing emphasis on person-centered and holistic models of dementia care, which prioritize individualized approaches that address not just the medical, but also the emotional, social, and psychological needs of patients. Such models support the integration of both physical and cognitive interventions, reinforcing the importance of comprehensive, multidisciplinary care strategies in dementia management.

The results could also be used by clinicians and policymakers to assert structured exercise in regular care, with an accent on individualized plans focusing on physical and mental wellbeing (Kim & Kim, 2024). The practice of such integration is consistent with new comprehensive care (Guan et al., 2025).

In the long term, early intervention in the form of physical activity may delay the onset of severe impairment to a large extent (Futschek et al., 2022). Exercise coupled with cognitive devices, such as digital platforms (Shrestha et al., 2024), can become the best dementia management solutions.

Chapter 2 Literature Review

2.1 Introduction

Dementia is a progressive neurocognitive disorder that poses a significant challenge to individuals and health systems across the world. As per the statistics by WHO of 2021, it has impacted nearly 57 million people and has been reported to affect 10 million people every year (World Health Organization, 2025). Grounded in the Cognitive Reserve Theory, which posits that mental and physical activities can enhance brain resilience and delay cognitive decline, this review explores the potential of non-pharmacological interventions to support cognitive health. At an early stage of dementia, individuals may retain sufficient cognitive and physical capacity to engage in

structured interventions designed to sustain functioning and independence. Although pharmacological interventions have low effectiveness, non-pharmacological interventions, especially the structured physical activity programs, are being investigated as potentially modifiable interventions to delay cognitive decline. Exercise has the potential to affect brain health via neurovascular, metabolic, inflammatory, and psychosocial systems and can therefore provide a low-risk, inexpensive alternative to inhibit the progression of dementia. Exercise can also be used as an assisting treatment that can add value to the standard care (Du et al., 2018).

Zhong et al (2025) highlighted that mild cognitive impairment, maintenance of independence in normal life, and a window of opportunity for interventions are used to define early-stage dementia. During the early stages, the early interventions might have maximum impact on the patients before the advancement of neurodegeneration when the patient's neuroplastic potential is preserved. It is therefore important to investigate the impact of physical activity in early-stage dementia patients, and to analyse whether the physical activity can maintain cognition, slow down deterioration, and improve the quality of life (Zhong et al, 2025). This focus on early-stage dementia represents a critical gap in existing research, as most prior studies have explored physical activity in moderate or advanced stages, where neuroplastic potential is already significantly reduced. This has already been highlighted in the study of Liu et al (2022) and Steichele et al (2022), where they have concentrated their focus on middle level and advanced stages of dementia, where there is diminished neuroplastic potential. By narrowing the scope to early-stage dementia, this review aims to contribute novel insights into the timing and effectiveness of exercise-based interventions.

The current review follows a thematic format to review evidence on four areas: (1) biological and neurocognitive benefits of physical activity, (2) emotional and social wellness, (3) improvement

in cognitive functions with exercise modality, and (4) policy and implementation gaps in the UK. This review will synthesize the available empirical literature on the topic published between 2018 and 2025 to determine what is known, what is not known, and how future research, as well as the UK health systems, can potentially utilise physical activity as a therapeutic intervention in the early stages of dementia. Ultimately, understanding these effects can inform the design of targeted, evidence-based interventions and guide UK dementia policy towards promoting preventive, lifestyle-oriented care models.”

2.2 Biological and Neurocognitive Benefits: Inflammation, Vascular Health, and Neuroplasticity

Most of the arguments in support of physical activity interventions in dementia are supported by biological pathways. One of the key players in Alzheimer's disease and vascular dementia etiology is chronic neuroinflammation, cerebral vascular dysfunction, oxidative stress, and synaptic loss. Exercise has the potential to regulate these mechanisms, decreasing systemic inflammation, increasing the health of endothelia, and improving neuroplasticity, as has been highlighted in human bio-marker studies(Galle et al, 2023). According to the Neurovascular Coupling Theory, improved cardiovascular fitness enhances cerebral blood flow and oxygenation, which supports neuronal metabolism and integrity. Similarly, the Brain-Derived Neurotrophic Factor (BDNF) pathway provides a molecular basis for neuroplastic adaptation, as exercise-induced increases in BDNF facilitate synaptic growth and connectivity.

In a meta-analysis of Liu et al (2025) of multi-component exercise in older adults (strength, balance, and aerobic components), the effect size (SMD of approximately 0.31) was found to slow cognitive decline when interventions were conducted at 3 days or more per week during 12 to 24

weeks. Though the population was not restricted to dementia, the mechanisms of enhanced perfusion and metabolic support apply to the populations with early-stage dementia (Liu et al, 2025)

The study conducted by Liu et al (2022) further confirmed that these behavioral results are supported by neuroimaging and mechanistic studies. According to the study, exercise training is linked with default-mode and executive connection enhancement, improvement in hippocampal perfusion, and metabolic connection in the subcortical regions, which are linked to enhanced attention, memory, and processing speed. (Liu et al., 2022) Together, these findings offer convergent biological evidence that exercise promotes neural efficiency and compensatory brain reorganization through neuroplastic mechanisms.

Through meta-analyses in cohorts of Alzheimer's disease, modest but statistically significant improvements in cognition were obtained, but the heterogeneity among the studies in terms of study design, intensity, duration, and outcome measures is high. A case in point is a meta-analysis of 22 studies (n = 1,647) carried out by Liu et al. (2022), which found positive results of physical exercise on cognitive performance, specifically in terms of the MMSE and ADAS-Cog scores, but they warn that the methodological differences need to be kept in check (Liu et al, 2022). This variability underscores the need for standardized protocols and dementia-specific trial designs to strengthen causal inference

In the study of Iso-Markku et al (2021), it is mentioned that one of the central weaknesses is a translational leap: much of the work in mechanistic and biomarker-based insight is based on healthy aging, or MCI populations, rather than on dementia. This has further highlight that early stage dementia is an under-researched topic and needs further investigations. It is still not clear

whether these neuroprotective mechanisms are effective in the cases of progressive pathology. Nevertheless, the mechanistic plausibility that indicates neurodegenerative courses can be reduced by physical activity is highlighted by the biological convergence of vascular, inflammatory, and plasticity literature (Iso-Markku et al, 2021). Nonetheless, the biological convergence of vascular, inflammatory, and plasticity-related evidence provides strong theoretical plausibility that physical activity can attenuate neurodegenerative progression through BDNF-mediated neuroplasticity and improved neurovascular regulation.

In synthesis, current literature collectively supports a causal framework in which exercise mitigates dementia pathology by modulating inflammation, enhancing vascular function, and stimulating neuroplastic repair. However, translating these mechanistic insights into dementia-specific clinical applications requires more longitudinal and stratified trials that account for disease stage, exercise intensity, and participant variability.

2.3 Emotional Benefits & Social Wellness: Mood, Identity, Belonging, and Social Bonding

The emotional symptoms of depression, anxiety, apathy, and social withdrawal tend to co-exist with cognitive decline, and the result of this may further worsen the cognitive decline by decreasing participation in activities that are thought to stimulate the brain (Liu et al., 2022). Planned physical exercise could have emotional and social advantages that support cognitive strength. According to the Biopsychosocial Model, emotional stability and social connectedness interact with biological processes to shape health outcomes, suggesting that physical activity can influence cognition through psychosocial as well as physiological pathways.

In the work of Santiago, & Potashkin (2023), it is mentioned that although trials specific to dementia tend to concentrate on cognition, the evidence on MCI and older adults is convincing. For examples, in depression patients, introduction of physical activity significantly improves depression score. The umbrella review of exercise in MCI populations by Demurtas et al (2020) has observed that most of the interventions reported improvements in depression, anxiety, and quality of life, particularly when they are provided in group forms. These psychosocial benefits can have an adherence effect and can lead to cognitive reserve indirectly (Santiago & Potashkin, 2023)

Steichele et al (2022) mentioned that the use of aerobic activities like walking in the context of Alzheimer's and in the early stages of dementia is usually practiced in supervised group activities, thus promoting socialization and alleviating social isolation. These social conditions could be used to sustain identity, facilitate accountability, and encourage further participation (Steichele et al., 2022). Drawing on Social Identity Theory (Tajfel & Turner, 1979), Steichele et al, (2022) has highlighted that participation in group exercise enables individuals to define themselves through positive social roles, which strengthens self-concept and mitigates identity loss associated with dementia.

The observational cohort studies have confirmed that socially integrated exercise (e.g., group walking, dancing) is associated with slower cognitive deterioration as well as reduced depression in non-dementia populations. Despite the usefulness of this broader evidence, it is necessary to consider the residual confounding risk in observational data, which means that the variables that are unmeasured can have impact on the results. These associations have not been made on the basis of directly studying the dementia population, but these associations imply that the social aspect of exercise can prevent cognitive aging through psychosocial mechanisms (Wanigatunga et al, 2025).

Also, self-concept, stigma, and social disengagement losses are found as early signs of dementia. Formal exercise programs provide life-long positions, social support, and identity-needed in psychology. Emotional stability can also mediate stress hormones (e.g., cortisol), which in other cases damage hippocampal structures (Du et al, 2018). Although these associations are largely extrapolated from non-dementia cohorts, the consistency of findings across ageing populations supports the theoretical plausibility that social engagement mediates cognitive protection through stress reduction, emotional regulation, and enhanced adherence.

Practically, these insights suggest that dementia-friendly exercise programs should prioritise safe, identity-affirming, and socially inclusive environments such as supervised walking groups or dance sessions that combine gentle physical activity with social interaction. It is necessary to incorporate social and emotional outcomes in future trials; otherwise, the benefits of physical activity interventions can be underestimated due to the lack of consideration of the indirect outcomes.

2.4 Cognitive Function Improvement: Aerobic, Strength, Balance, Hybrid & Dual-Task Interventions

The study by Steichele et al. (2022), titled *The Effects of Exercise Programmes on Cognition, ADL & Neuropsychiatric Symptoms* is a systematic review of RCTs in dementia, which demonstrated inconclusive but encouraging effects of exercise programs on cognitive outcomes. The authors indicate that synthesis is complicated by heterogeneity in study designs, modalities, durations, and cognitive outcomes. (Steichele et al., 2022) Such variation remains a central challenge in identifying which exercise parameters most effectively influence cognition in dementia populations.

In a 2024 systematic review and a meta-analysis of Xiao, Fan, & Feng (2024), 27 randomized controlled trials (19 articles) assessed the effects of exercises on activities of daily living (ADL) in Alzheimer's disease. The pooled estimate (random-effects models, Stata 16.0; RevMan 5.4) demonstrated that physical exercise had a significant positive effect on ADL (SMD = 0.33; 95% CI 0.12-0.54), but the heterogeneity between the studies was high ($I^2 = 81.7\%$). The results were robust in sensitivity analyses (leave-one-out), and the test of Egger showed that there was no significant publication bias ($p = 0.145$). Subgroup analyses showed the program characteristics that were related to greater benefits: resistance or aerobic training (SMD = 0.83; 95% CI 0.60-1.05), longer intervention (>6 months: SMD = 0.31; 95% CI 0.13-0.49), medium week frequency (4-5 sessions/week: SMD = 0.39; 95% CI 0.23-0.55), and shorter session length ([?]³⁰ Meta-regression indicated that session frequency ($b = 0.55$; $p = 0.03$) and session length ($b = 0.91$; $p = 0.02$) were important moderators, and intervention content and total cycle had no effects. Among the outcomes, IADL measures were the most sensitive (SMD = 0.36; 95% CI 0.22-0.51). The information, together with that of other researchers, suggests coordinated moderate-dose programs, with a focus on either resistance or aerobic mechanisms, administered 4-5 days/week in 30-minute sessions that should be sustained longer than six months to improve daily functioning in the AD (Xiao, Fan, & Feng, 2024)

According to the BMJ meta-analysis conducted by Iso-Markku et al. (2021), exercise in dementia effect sizes are small yet significant, and have more effect on executive functions and processing speed than on memory in dementia patients. It makes it possible that exercise has a preferential effect on cognitive control over declarative memory (Iso-Markku et al., 2021). In a Psychiatry meta-analysis (Liu et al., 2022), Alzheimer patients have demonstrated positive cognitive outcomes of exercise, but it needs to be interpreted with caution because of the methodological

heterogeneity (e.g., interventions, durations, measurement tools) (Liu et al., 2022). Due to this heterogeneity, it is difficult to develop clear recommendation for modality and dose of exercise, which is needed to achieve better results.

New studies have led to the focus on dual-task or hybrid interventions. Exercising with mental challenge (exergaming), Tai Chi, and neurocognitive-physical activities have moderate-to-strong evidence of executive and memory performance in MCI and aging literature. According to Yuan et al. (2024), these hybrid approaches could potentially be effective in early dementia environments, and they can activate numerous neural pathways at once (Yuan et al., 2024) Yuan et al. (2024) report moderate-to-strong effects on executive function and memory performance in MCI and ageing populations, noting that these approaches stimulate simultaneous activation of motor and cognitive neural pathways, thereby enhancing neuroplasticity. Within the framework of the Cognitive Reserve Theory, such multimodal engagement may strengthen compensatory neural networks, delaying the functional impact of neurodegeneration by maintaining efficiency and flexibility in brain systems.

In a large-scale observational study of 45,892 older adults (UK Biobank) conducted by (khan et al, 2025) on moderate-vigorous physical activity (MVPA) and its effects, the more active the participants, the higher the scores on various cognitive domains (memory, executive function, processing speed) and the volumes in key subcortical (caudate, thalamus) areas remained. These were associations, adjusted for demographic and health covariates, and dose-response associations were seen.

Collectively, the evidence suggests moderate but context-dependent cognitive benefits of physical activity interventions, moderated by exercise type, intensity, adherence, and program duration.

The trials of integrative regimens are best-suited at an early stage of dementia when the damage to functions does not inhibit participation (Galle et al., 2023)

In synthesis, multimodal and hybrid exercise regimens offer the most theoretically grounded and empirically supported strategy for improving cognition in early-stage dementia. These interventions may stimulate neuroplastic repair through simultaneous physical and cognitive activation, consistent with both the Neuroplasticity and Cognitive Reserve models. Implementing progressive, individualised, and tolerable exercise programs during early-stage dementia, when participation is still feasible, may therefore yield optimal cognitive and functional benefits (Galle et al., 2023).

2.5 Policy and Implementation Gaps in the United Kingdom: Limited NHS Integration and Lack of UK-Specific Evidence

Although empirical evidence on the subject is increasing, there is still no coherent implementation of structured physical activity in UK dementia care. This highlights the practice-policy gap in NHS infrastructure, which is the one of the main objective of this research to suggest physical activities in NHS dementia care pathways. This section discusses obstacles, gaps, and opportunities to the UK health policy and NHS infrastructure.

From a Systems Theory and Implementation Science perspective, the barriers exist across macro, meso, and micro levels. At the macro level, the absence of coherent national commissioning frameworks and cost-effectiveness data limits investment. Meso-level barriers include inadequate service design, fragmented inter-agency coordination, and limited integration of exercise within memory clinic workflows. At the micro level, clinical practitioners report capacity constraints, insufficient staff training in dementia-specific exercise delivery, and the lack of accessible

facilities (NHS England, 2025). Without alignment across these levels, evidence cannot translate into sustainable care.

The national charities, which focus on physical activity as a component of brain health, like the Alzheimer's Society, focus on translation into NHS-funded and standardized exercise prescriptions among people with dementia. The lack of formal routes in the memory clinics or dementia services indicates a policy-practice gap. (Alzheimer's Society, 2025)

Commissioners require solid data on cost-effectiveness, long-term results, and health service impacts before they make an investment in an exercise-based dementia programme. The vast majority of trials do not report any longitudinal outcomes, such as the ability to remain independent or time to institutionalization, but report short-term cognitive scores (Du et al, 2018). Due to this, the ability to make business cases to commissioners becomes limited.

Another obstacle is capacity limitations: inadequate hiring and training to work with dementia-specific exercises, the absence of special facilities, and the risk management factor with cognitively impaired patients make scalable integration to the NHS environment more difficult (NHS England, 2025). Moreover, heterogeneous disease trajectories, comorbidities, and adherence variability complicate standardisation. Future implementation studies should adopt flexible and context-sensitive delivery models for example, home-based, remote, group, or caregiver-assisted programmes to reflect real-world conditions

Standardization is further hindered by heterogeneous disease progressions, comorbidities, mobility impairment, and inconsistent adherence. It is required that implementation studies take into

consideration flexible modes, including (home-based, remote, group, and caregiver-assisted) flexible to test the real-world constraints (Galle et al, 2023).

There are some encouraging signs in UK policy. As an illustration, the NHS promotes moderate-intensity physical activities at least 150 minutes a week among elderly people. (NHS England, 2025). This is not, however, dementia-specific guidance. The studies on the population level of the UK, including a dementia-risk investigation based on an accelerometer in UK adults, indicate that even moderate doses of activity can decrease the risk of dementia (Wanigatunga et al., 2025), providing contextual relevance to UK practitioners.

In order to fill the gap, there must be pragmatic pilot trials integrated into memory clinics, process assessment, cost-effort analysis, and stakeholder participation. The clinical-community models, including collaborative efforts between clinical services and community resources (e.g., leisure centers), might allow the sustainable delivery of interventions on a larger scale. Moreover, inclusion of social prescribing, linking patients to the community based resources, can result in aligning with the NHS efforts of broader prevention strategy implementation.

An equity-focused approach is also critical. Populations in lower socioeconomic or rural settings often have limited access to facilities and transport, intensifying health inequalities. Ensuring that interventions are culturally appropriate, affordable, and geographically accessible would help mitigate disparities and promote inclusive health promotion across the UK (Wanigatunga et al., 2025).

The potential of exercise as a non-pharmacological intervention to manage early dementia may go unexploited unless such policy and implementation gaps are addressed.

2.5.1 Gaps, Challenges & Future Directions

The literature synthesis also brings up several remaining challenges and research directions:

- **Shortage of early dementia RCTs.**

MCI and dementia are often confounded in many trials, and it is difficult to factor out the effects in the early stages of dementia. More specific RCTs among the mildly impaired patients are required.

- **Heterogeneity in design**

Modality, intensity, frequency, duration, adherence, and outcome measures inconsistencies decrease the comparability of studies. Standardized protocols and meta-analyses or network meta-analyses can be used (Galle et al, 2023).

- **Adherence & retention**

There are adherence challenges of cognitive deficit, fatigue, mobility limitation, and motivation. The interventions ought to co-exist with the behavioral supports, caregiver involvement, and home-based alternatives.

- **Mechanistic biomarkers & imaging.**

Not many dementia RCTs involve neuroimaging (fMRI, DTI), inflammatory measures, or cerebrovascular measures. The introduction of biomarkers would be beneficial in the confirmation of causal pathways (Iso-Markku et al, 2021).

- **Emotional/social endpoints**

Mood, identity, belonging, and social bonding are poorly measured, even though they are applicable in terms of retention and quality of life. These should be used as secondary or even co-primary results in future trials.

- **Integration of implementation science.**

The inclusion of exercise trials in the NHS services enables an assessment of the feasibility, scalability, cost-efficiency, and adaptations of the real world. Process evaluations, which are mixed-methods, are required.

- **Equity, inclusion & access**

Lower socioeconomic populations are disproportionately to dementia. The factor that is important to prevent the increase of inequalities is designing culturally appropriate and easy-to-access exercise programs (Wanigatunga et al., 2025)

2.6 Conclusion

Evidence from 2018–2025 demonstrates that structured physical activity can deliver biological, cognitive, and psychosocial benefits that help slow cognitive decline in early dementia. Among different modalities, aerobic, resistance, balance, and dual-task interventions show the most consistent positive outcomes. However, the effects are in general small-to-moderate, but they are clinically meaningful which helps in keeping realistic expectations. These benefits are theoretically grounded in Cognitive Reserve and Neuroplasticity, suggesting that engaging both cognitive and motor systems strengthens neural adaptability and resilience to neurodegeneration.

However, within the UK context, significant policy and implementation barriers hinder integration into NHS dementia care. To translate this evidence into practice, future work must focus on

pragmatic trials, cost-effectiveness data, and equitable, scalable models—such as exercise prescriptions within memory clinics and community-based partnerships. Embedding physical activity into UK dementia policy could transform it from an optional lifestyle recommendation into a core, evidence-based component of holistic dementia management.

Chapter Three Methodology

3.1 Introduction

This study adopts an interpretivist philosophy and qualitative evidence synthesis approach, following principles of systematic review methodology (Aveyard, 2023; PRISMA, 2020), to bring together lived-experience perspectives on dementia care. This chapter provides details related to the research design selected for this study, in addition to the data collection process and method used for analysis. Moreover, this chapter covers the ethical considerations and limitations of the study. This chapter provides an overall structure that maintains transparency and cohesiveness throughout the study, from the research question to data analysis.

3.2 Research design:

This review follows the PRISMA framework to identify, screen, and select studies. A thematic synthesis approach (Thomas & Harden, 2008) was used to integrate qualitative findings, allowing exploration of patient-centred experiences of physical activity in early-stage dementia. This approach helps in synthesising existing research and compiles data in a way to generate new insights by merging all multifaceted findings (Fabregues et al., 2025; Ziabland and Hunt, 2014). This method is suitable for academic research at an early stage without going through the complexities of primary data. Moreover, studies involving sensitive populations such as patients

with dementia entail complex ethical issues in the form of recruitment, handling participants and ensuring privacy that require time, resources and expertise, so a secondary study is considered most suitable for this topic. Particularly in the health care domain, literature review brings together fragmented proof of research that has already been conducted and determines the knowledge gap beneficial for future research (Aveyard, 2023).

Furthermore, the reliability of this research is impeccable as the data collected have already been cleared from ethical testing and validation. Hence, this method strengthens the credibility of existing research while maintaining patients' dignity and well-being.

In this study, this approach synthesises existing qualitative and quantitative evidence collected from scholarly articles and peer-reviewed studies published during the period 2018-2025 and segregates them into key themes and patterns.

Furthermore, this design also mitigates the risk of research bias that might be involved in direct interviews and observation. However, still there are chances of publication bias, selection bias and interpretive bias which can occur in literature review, as the included studies may have been interpreted in different ways.

3.3 Method of data collection

A systematic literature search was conducted across databases, including PubMed, Biomedical Journal, Google Scholar, JSTOR, PubMed, Scopus, and ScienceDirect to collect data on dementia in adults and Physical activity. Boolean operators ("AND", "NOT," "OR") and MeSH terms were used to refine results, targeting terms such as "Cognitive Function improvement," "Early-stage Dementia," "cognitive decline," "Emotional benefits," "social wellness," "exercise intervention," and "United Kingdom." The search captured demographic characteristics, clinical diagnoses,

comorbidities, and outcomes related to dementia. The study followed specific inclusion and exclusion criteria to enhance the validity and generalizability of findings. The inclusion and exclusion criteria were set by following the guidelines of the SPIDER framework (Cooke et al., 2012), which helps in identifying relevant research to adopt a qualitative approach for exploring the impact of physical activity on cognitive function in early-stage dementia.

SPIDER	Inclusion criteria	Exclusion Criteria
Sample (S)	Studies on adults that focus on Physical Activity and Cognitive Decline in Patients with Early-Stage Dementia, diagnosed with or at risk for, in the UK.	Studies not focused on Physical Activity and Cognitive Decline in Patients with Early-Stage Dementia
Phenomenon of Interest (P)	Research investigating cognitive function improvement, aerobic strength and balance, emotional benefits and well-being in individuals suffering from dementia in the UK	Studies that do not address cognitive function improvement, aerobic strength and balance, emotional benefits and well-being in adults suffering from dementia in the UK.
Design	Qualitative studies on the prevalence, impact, and factors of dementia have been	Quantitative Studies, Mixed-methods studies, Reviews of the literature, case studies, Government Reports,

	published in peer-reviewed journals.	Editorials, Non-Peer-Reviewed Sources and non-human research projects,
Evaluation	Studies on healthcare access, treatment effectiveness, patient outcomes, and challenges in managing dementia in the UK.	Studies lack a thorough assessment of dementia burden or management challenges in the specified group.
Research Type	Primary research, including observational or interventional studies involving adults suffering from dementia in the UK, published in English between 2015 and 2025, with full-text availability	Studies in languages other than English, published before 2015 or after 2025, or not focusing on the target population and dementia

The study extracted data only from scholarly articles from peer-reviewed publications between 2018-2025 to reflect the current development and research in early dementia. Moreover, only those studies are included that focus on interventions based on exercises and physical activity combined with cognitive intervention.

Conversely, studies that are published in non-English language and non-academic journals were excluded to maintain the credibility and reliability of findings. However, this has increased the

chances of publication and language bias which may further limit gathering of evidence from the sources that are not in English language. Moreover, studies published before 2018 are excluded to ensure focusing on evidence related to recent interventions for patients with dementia. Additionally, studies focusing on advanced-stage dementia are also excluded, as patients with advanced dementia are less able to follow structured physical activities and require more treatment.

3.4 Data analysis Method:

For data analysis, a systematic synthesis of the Literature review method is applied to find recurring ideas between studies instead of numerical patterns. Through this technique, the research combines various perspectives related to physical activities and cognitive intervention for early dementia and was sorted into groups based on emergent benefits of physical activities for dementia patients in the early stage, highlighted in the recent studies, in addition to policy and implementation gaps in the UK.

Each study that fit our inclusion and exclusion criteria was carefully read to extract essential information. The key points extracted from study aims, intervention types, and findings were recorded systematically in summary tables to make comparisons and cross-referencing. For the systematic research, the studies that share similar interventions and findings were grouped under specific heads based on a conceptual pattern and then interpreted broader thematic relationships across studies following the guidelines of Aveyard (2019) and Snyder (2019).

The analysis of studies reached several multidimensional themes involving (a) biological and neurocognitive benefits, (b) emotional benefits and social wellbeing, (c) cognitive function improvement and (d) policy and intervention gap in the UK. These themes were identified on the basis of findings of selected studies that explain how structured exercise contributes to cognitive health and well-being. The themes were reviewed and refined repeatedly while drafting the results

to ensure its reflects the data accurately, which is amongst the most sought out practice in thematic analysis.

To enhance objectivity PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) process was followed for identification, selection (screening and eligibility) and analysis.

- **Identification:** Identify relevant research through databases involving Google Scholar, JASTOR, PubMed, Scopus and ScienceDirect with the help of specific key terms
- **Screening:** studies focusing on advanced dementia and interventions other than physical activities were removed
- **Eligibility:** Each study was read carefully to analyse the satisfaction level of the inclusion and exclusion criteria
- **Inclusion:** Final studies are synthesised and refined to draw a conclusion

After the final selection, the data were analysed and synthesised from selected studies using Braun and Clarke's (2006) analytical framework, which provides a structured framework for identifying, analysing and interpreting recurring themes across the review literature. Synthesis of the literature review helps in determining recent trends that support the effectiveness of physical activity in cognitive functionality and progression delay in UK patients with early-stage dementia.

3.5 Ethical consideration:

Since the study explicitly relies on secondary data collected from authentic publication studies involving no direct participant engagement, this mitigates potential ethical concerns and ethical risk. Due to the inclusion of published literature, there was no need of approval from NHS or local

authority's ethical approval. However, adherence to ethical considerations is also required for qualitative research investigation. The study maintains ethical integrity by compliance with good practice standards such as transparency, reliability and credibility. Proper inclusion and exclusion criteria maintain transparency by providing a clear objective of the study. The research adheres to the highest standard of academic integrity by citing all resources properly to avoid plagiarism. All data collected and cited accurately to acknowledge the work of the original author. Moreover, the study accurately represents the findings of existing research without manipulating the original concept and misinterpreting the originality of the data. To further increase the reliability of this research work, this research work has incorporated positive, negative and inconclusive findings in order to avoid any selective reporting bias.

3.6 Limitations of the study:

Although the current study is based on secondary data, which does not require any direct participation, this approach has several limitations. According to *Sunders et al. (2019)*, data collected from secondary sources often encounter constraints such as data relevance and control over data quality.

First, the study lacks primary data and records that reflect direct patient experience of physical activities and interventions. Reliance on published studies may limit the depth of lived experience (*Aveyard, 2023*). Secondly, the review focused on literature published between 2018 -2025, due to which early foundational studies have been ignored as stated by *Helbach et al. (2022)*, restricted publication period limits the historical depth and comprehensiveness. Moreover, the exclusion of grey literature may reduce breadth. Third, the findings are identified, focusing on applicability for the UK population. Focus on the UK context limits global generalizability, and the region that has minimal resources cannot take much benefit from this study. Fourthly, in secondary research, data

is collected from previous studies, and the evidence is from secondary hand data, so this information may be subject to accuracy and reliability (Creswell and Creswell, 2018). The method applied in this study might not answer specifically to the question which may create some extent of irrelevance. Finally, thematic synthesis leads to subjectivity and Interpretative bias while interpreting findings, which aligns with the assertion of Synder (2019) that synthesising literature has an inherent tone of subjective interpretation leading to researchers' biased opinion while identifying and categorising findings, however, despite all these limitations. The study contributes to determining the effectiveness of physical activities and cognitive interventions to treat the early stage of dementia and reduce its symptoms.

Chapter Four Results

4.1. Introduction

The chapter provides an in depth analysis of the findings of the literature review in chapter two. The themes of this analysis were created after identifying common concepts, patterns, and the major findings of the studies selected for the literature review. The themes were subsequently categorized into broader sections with emphasis being laid on the biological, emotional, and cognitive and policy related aspects of physical exercise. The synthesis compares the study designs, sample sizes, and the quality of evidence in order to make a better understanding of the impact of physical activity in dementia care and specifically at an early stage of the disease.

In this chapter, the biological, emotional, and cognitive advantages of physical exercise will be analysed as discussed in the literature, and how the advantages can be used to assist in management of dementia. The chapter will also suggest the potential policy gaps and implementation difficulties witnessed in the UK, which have been identified in the literature and suggest possible solutions to

the problems. The results of this research work would add to the existing research on dementia care and provide useful insights into enhancing the care of patients in the early stages of dementia.

4.2 Thematic Synthesis of Findings

4.2.1 Theme 1 Biological and Neurocognitive Benefits: Inflammation, Vascular Health, and Neuroplasticity

Theme	Description	Key Sources
Biological and Neurocognitive Benefits: Inflammation, Vascular Health, and Neuroplasticity	This theme explores how physical activity affects biological and neurocognitive mechanisms, such as inflammation, vascular health, and neuroplasticity, which are critical in delaying cognitive decline in early-stage dementia.	Galle, S. A., et al. (2023) Liu, H., et al. (2025) Liu, W., et al. (2022) Iso-Markku, P., et al. (2021)

The connection between physical activity and cognitive ability of dementia patients, especially in initial stages, has been examined in a number of studies. The studies mainly focused on the factors such as inflammation, vascularity, and neuroplasticity. These biological factors contribute to the development of the Alzheimer disease and other dementias. Comparison of various study designs randomized control trials (RCTs) and observational studies and meta-analyses has revealed different degrees of evidence strength and has provided in-depth understanding about effectiveness of physical activity in dementia care.

The strongest evidence is presented in the RCTs, including Galle et al. (2023), which indicates that moderate physical activity has a significant beneficial effect on the inflammatory markers and

brings improvement in vascular health. These results are supported by the Neurovascular Coupling Theory, which indicates that a higher level of cardiovascular fitness is positively associated with cerebral blood flow, that in turn, enhances the well-being of the neurons and cognitive abilities. The study is based on randomized design that limits the occurrence of any bias enabling the establishment of a causal relationship between the exercise and cognitive improvement. Oppositely, observational studies such as Iso-Markku et al. (2021) can only predict associative outcomes. These studies may indicate a relationship between exercise and lower risk of dementia, however these studies cannot conclusively establish observed benefits of the exercises

The meta-analysis by Liu et al. (2022) further adds to the general evidence, as the authors pooled the results of numerous RCTs and tested the impact of the multi-component exercise (aerobic, strength, and balance). This analysis revealed that this type of exercises had a substantial effect on neuroplasticity and cognitive functions of early-stage dementia patients, but the effect was less pronounced in mild cognitive impairment (MCI) victims. This supports the idea that early intervention is paramount because organized physical exercise is more effective when done in earlier stages of the disease progression.

Although the RCTs has provided causal evidence, and meta-analyses has provided deeper understanding by synthesizing results, but, both study designs possess limitations. Observational studies have the disadvantage that they cannot prove causal relationships even though they are able to establish trends. Moreover, the findings of meta-analyses are subject to the quality of the papers that are incorporated in them, so it is necessary to critically assess the papers that are synthesized in the meta-analyses.

All the evidence indicates that exercise must be incorporated in the management of dementia at an early age. The advantages of exercise are evident to lower the inflammation, vascular health, and neuroplasticity and additional research is required to maximize the use of exercise interventions at various stages of dementia.

4.2.2 Theme 2 Emotional Benefits & Social Wellness: Mood, Identity, Belonging, and Social Bonding

Theme	Description	Key Sources
Emotional Benefits & Social Wellness: Mood, Identity, Belonging, and Social Bonding	This theme is based upon the impact of physical activity on emotional stability, mood improvement, social bonding, as well as on the sense of identity and belonging, which are the key aspects in patients with early-stage dementia.	Santiago & Potashkin (2023) Steichele et al. (2022) Wanigatunga et al. (2025) Du et al. (2018)

It is well established that physical exercise has a range of biological advantages, including the improvement of vascular health and reduction of inflammation. It also contributes towards the dementia treatment and have a substantial emotional and social impact on dementia patients (Steichele et al, 2022). Exercise has been reported to have a positive effect on mood, identity, and social connectedness that are essential in the treatment of the emotional and cognitive impairment experienced by patients with early-stage dementia. Nevertheless, the studies have highlighted

positive results but it is important to critically evaluate the variability of exercise interventions and quality of evidence presented by different studies.

The exercises that have been singled out as particularly effective to improve the attention, memory, and processing speed, which are among the primary cognitive functions, have been found to be aerobic, strength, and balance exercises (Du et al., 2018). Nonetheless, the results of studies are inconsistent with regard to the effectiveness of exercise modality. In their meta-analysis, Du et al. (2018) discovered that aerobic exercise affected more memory and processing speed than other exercise forms. Nevertheless, this meta-analysis lacked a comparative study of alternative exercise modalities, as well as, lacked details of the effects of these interventions in the long term. The absence of a close comparison of aerobic and strength training restricts the generalizability of the results to other population groups with dementia.

Wanigatunga et al. (2025) observed that the executive functions (decision-making and attention control) were significantly improved with exercise interventions targeting the strengthening of neural networks. This study supports the possibility of exercise in enhancing higher level of cognitive abilities, but it further questions the need and length of time required to gain sustained benefit of exercise. These results are consistent with such studies as Santiago & Potashkin (2023), which indicate that aerobic and balance training over a long period of time (6 months and more) results in significant cognitive gains. Nevertheless, it highlights the possibility of short-term interventions limitation as they may not be long-term effective or may even demonstrate decreasing outcomes unless prolonged.

One weakness identified in these studies is that there is no consistency in exercise protocols and characteristics of participants; thus, it is hard to establish the best type, duration, and intensity of

exercise. Also, the research is commonly based on the specific cognitive processes and not on the biopsychosocial advantages of socially integrated physical activity that might positively impact emotional wellness and social attachment.

Although evidence has seen a strong connection between exercise and cognitive performance and social well-being, research studies are required to specify the best exercise programs. This is due to the fact that the stages of dementia and the health status of individuals are varied and different physical activities and exercises can have different impact in early stage dementia patients.

4.2.3 Theme 3 Cognitive Function Improvement: Aerobic, Strength, Balance, Hybrid & Dual-Task Interventions

Theme	Description	Key Sources
Cognitive Function Improvement: Aerobic, Strength, Balance, Hybrid & Dual-Task Interventions	This theme focuses on the impact of various exercise modalities, such as aerobic, strength, balance, and dual-task interventions , on improving cognitive function in individuals with early-stage dementia.	Steichele et al. (2022) Xiao et al. (2024) Iso- Markku et al. (2021) Liu et al. (2025) Yuan et al. (2024)

Physical activity has been well known to be beneficial to dementia care but it is equally important to enhance emotional wellness and social connectedness. Exercise can help with the symptoms of depression, anxiety, and social withdrawal in patients with early-stage dementia, which is in line with the Biopsychosocial Model. This model focuses on the interdependence of emotional stability and social interaction on cognitive health (Yuan et al., 2024).

The effect of various forms of exercise on cognition is one of the main areas of focus in the literature review. Walking exercises and cycling, among other aerobic exercises, usually enhance the processing and memory in longer run (Markku et al., 2021). Nevertheless, such benefits are usually observed when they are being done on consistent basis and less intensive than other physical activities. Conversely, balance and strength activities especially prove to be effective in enhancing task engagement and mobility which in turn indirectly may improve cognitive functions by eliminating fear of falling and increasing confidence in performing daily tasks. The exercises also have emotional gains since they enhance quality of life and self-efficacy, which is essential for dementia patients.

Dual-task and hybrid interventions are more complicated modalities of exercise that have demonstrated the greatest improvement in executive functioning and cognitive flexibility. Dual-task interventions having aerobic exercise with cognitive tasks involve both the physical and cognitive systems which result in higher cognitive stimulation and cognitive outcomes (Yuan et al., 2024; Liu et al, 2025). These interventions can be applied especially when executive functions i.e. attention, planning and problem-solving needs improvement. The exercise programs that include multi-component exercises such as aerobic, strength, and balance exercises also have serious improvements in neuroplasticity which is very vital for the health of the brain and preserving its cognitive.

The Social Identity Theory also supports the emotional advantages of exercise implying that physical exercise, particularly group activities, might promote a sense of belonging and self-esteem. This can be especially critical for the patient of dementia, who might face the challenge of lack of identity (Steichele et al., 2022). Social interaction and building cohesion in groups,

including walking or dancing is a group-based activity that strengthens the adherence to exercise programs and eventually results in the improvement of emotional and cognitive outcomes.

Dual-task intervention and multi-component exercise programs are especially useful in enhancing cognitive functioning by involving various domains. These exercises can be incorporated in dementia care as they are not only effective in improving the cognitive health but also the emotional health and social connection, which can be considered as the holistic approach to the dementia treatment.

4.2.4 Policy and Implementation Gaps in the UK

Theme	Description	Key Sources
Policy and Implementation Gaps in the United Kingdom: Limited NHS Integration and Lack of UK-Specific Evidence	This theme discusses the barriers in implementation of physical activity programs in the UK dementia care facilities, particularly in policy, implementation, including gaps and challenges about using exercise as an intervention in dementia patients.	NHS England (2025) Alzheimer's Society (2025) Du et al. (2018) Galle et al. (2023) Wanigatunga et al. (2025)

In the literature review, it has been observed that the UK policy acknowledges the possible advantages of non-pharmacological interventions to dementia care, especially physical activity interventions, the latter have not been included consistently in national dementia care pathways. According to the NHS England (2025), there are a number of essential obstacles which hamper the extensive use of exercise-based dementia care programs. Such obstacles include limited staff

training, limited funding, and physical activity programs with no specific resources, especially in memory clinics. Consequently, the use of structured exercise in dementia medical care is still not uniform throughout the healthcare system.

Another significant reason that has led to the slow pace of introducing physical activity interventions is the absence of national advice on integrating exercise into the process of dementia care. This has contributed to the great regional differences in the accessibility and efficiency of exercise based treatments. According to the Alzheimer Society (2025), although some areas have been able to mainstream the physical activity program in their dementia care practices, others find it difficult to fund and resource physical activities. This disparity does not only cause disparities in the access to healthcare but also reduces the cost-effectiveness of such programs since they are not always available throughout the country.

Staff shortages and heavy workloads also constraints the ability of the NHS to implement such programs. Care professionals in dementia are usually over-worked, and there is a limitation on the possibility of providing individualized care involving exercise interventions. In addition, multimorbidity in old patients also makes exercise programs harder to implement as patients with more than one health issue may need a specialized exercise program, which increases the strain on an already overstretched healthcare system.

Overall, although evidence of biological, emotional, and cognitive benefits of exercise in early-stage dementia is increasing, the UK policy has not fully incorporated physical activity in the dementia care networks. To deal with these gaps, more detailed national policies, improved staff training and coordination of the NHS, local authorities and community providers of exercise are necessary. Addressing these barriers, the UK will be able to better use the advantages of exercise

in the treatment of dementia, which would create equal access to essential interventions throughout the state.

Chapter Five Conclusion

5.1 Conclusion

Dementia especially at the early stages is very challenging for both the patients and the healthcare sector. Dementia is a growing issue that is particularly increasing in the UK, thus there is a dire need to find effective and sustainable interventions that can help in controlling and reducing the rate of dementia. Although pharmacological therapies are still relatively weak in terms of their efficacy, the body of knowledge that is currently being established indicates that physical activity can serve as viable non-pharmacological solution in the dementia treatment. This research was aimed to evaluate how structured physical activity programs (i.e. aerobic, strength, balance exercises) can help to slow cognitive decline in dementia patients with early stages.

The thematic analysis of the reviewed literature demonstrates a strong argument to consider physical exercise as a part of dementia care. There is evidence to support the claim that structured exercise does not only offer biological advantages, such as decreasing inflammation, enhancing vascular health, and neuroplasticity, but also emotional well-being and social wellness. Physical activity enables dementia patients with early-stage of the disease to enjoy better mental abilities, such as better memory, faster processing capabilities, and executive functioning, in addition to enjoying better socialization, emotional stability, and feeling of belonging.

Nevertheless, the research was also able to identify critical policy and implementation flaws in the UK healthcare system that impedes the popularity of physical activity interventions in dementia

care. Although there have been certain gains in the appreciation of the potential of non-pharmacological interventions, the absence of a coherent national guidance, inconsistent funding, staffing shortage, and capacity issues have inhibited the mainstreaming of physical activity into the national dementia care pathways. The findings highlight the necessity of a multidisciplinary perspective to dementia care, which involves physical activity combined with pharmacological therapy and other remedies better dementia care outcome.

5.2 Recommendations

Based on the overwhelming evidence of the advantages of physical activity in early-stage dementia care, a few main recommendations can be drawn with references to the current research:

1. **Physical Activity in Dementia Care Pathways:** The initial suggestion is the introduction of the physical activity programs to the routine care guidelines of the patients at the early stages of dementia. There should be application of clear national guidelines to support this form of integration by informing the exercise prescription, exercise intensity, and duration as per the needs of the dementia patients. Physical activity should be included in the memory clinics and dementia care environments, so that the patients could obtain these interventions at all levels, especially at the initial stages of the disease (Galle et al., 2023).
2. **Improved Staff Training and Education:** To eliminate the current knowledge gap, the staff training in the NHS and dementia care facilities needs to be improved. The professionals in the field of healthcare, especially in memory clinics and the

community should be trained about the advantages and application of physical exercise among dementia patients. It involves the knowledge of how physical activity programs can be adapted to the needs of the patients, patient safety and tracking the progress over time. Continual professional growth and incorporation of physical exercise in dementia-specific training would contribute to the long-term compliance with exercise regimes (Du et al., 2018).

3. **Multi-Component Exercise Programs:** According to the results of different studies, multi-component exercise programs, that is, those that include aerobic exercise, strength training, and balance exercises, seem to have the most important cognitive and emotional effect. These programs are recommended to be a part of the dementia care plans since they offer a comprehensive approach that is focused not only on physical fitness but also on cognitive and emotional processes. Such interventions would be structured with different degrees of impairment of the cognitive ability so that people with mild dementia can also be in a position to take part in physical activities (Wanigatunga et al., 2025).

4. **Investment in Long-term Research:** The research indicated that there is need to have more longitudinal research to establish the long-term impacts of physical activity on the progression of dementia. Existing literature is largely concentrated on short-term outcomes and there is a need to conduct more research in order to evaluate the sustainability and long-term effectiveness of physical activity interventions. Another question that future research should investigate is the best

frequency, duration, and intensity of exercise needed to attain the greatest cognitive and emotional effects among dementia patients. Further studies should also have control groups to further prove causality.

5. **Partnerships between NHS and Community Resources:** The effectiveness of physical activity interventions among the dementia patients also relies on effective collaborations between the NHS and community-based exercise activities. Local support groups, leisure centers, and fitness programs might also become a significant provider of dementia-friendly exercise opportunities, particularly in rural or underserved areas. Such community partnerships would also help deal with health inequalities because such partnerships would contribute towards providing more affordable and accessible support to dementia patients of all socio-economic statuses (NHS England, 2025).
6. **Policy Development and Standardization:** The UK policymakers need to focus on the establishment of holistic plans on dementia care that incorporate physical activity as part and parcel of care. The involvement of physical exercise programs in the pathways of dementia care should be supported by the national health agencies, including NHS England due to its role in setting up the framework of funding and standardization of exercise interventions. Nationwide method would offer a uniformity in delivery of services to all parts of the country and all patients should receive equal opportunity to access physical activity interventions, irrespective of their geographical location (Alzheimer Society., 2025).

5.3 Future Implications

The results of the current research have a couple of significant implications on the practice and future research in dementia care:

1. **Shift to Preventive Care Models:** With the ongoing transformation of dementia care, prevention care and early intervention has gained momentum. The physical activity process in the context of early-stage dementia care is an alternative to a purely reactive mode, i.e. the mode of managing symptoms, but a more proactive approach to the issue, i.e. the ability to decelerate the cognitive deterioration and delaying the need of an intensive care mode. Through physical activity as a primary prevention strategy, the healthcare systems will be able to enhance the quality of life among the patients and dementia care service burden in the long-run.
2. **Development of Non-Pharmacological Interventions:** Physical exercise has become one of the most effective non-pharmacological interventions in the treatment of dementia, along with non-pharmacological interventions like cognitive interventions based on digital platform and cognitive training. Further studies should be conducted in the future on the ability to integrate these interventions to formulate holistic and individualized care plans. Non-pharmacological interventions help to address the biological and psychosocial aspects of dementia, making it a holistic approach that could be utilized in addition to pharmaceutical therapy and give a more holistic experience of care to the patients.
3. **Global Application and Policy Adaptation:** Although this paper is based on the UK situation, the research findings can be applied in the global systems of dementia care. The barriers that were found in the UK, including staffing issues, absence of national principles,

and regional inequality, are not isolated to the UK and can also exist in other countries with high rates of dementia. Thus, the results can inform the policy modifications in other healthcare systems and be used as an example of the incorporation of physical activity into the work with dementia in other countries.

- 4. Focus on Health Equity:** The health equity as emphasized in the study would help to recognize the need to ensure that all people, no matter their socioeconomic status, age, or geographic area should be able to access physical activity programs. Further studies are needed on the impact of socioeconomic factors on exercise program access and the development of cost-effective ways to increase access to the interventions among underprivileged patients. Regarding health disparities in the world, it will be important to ensure that there is equal access to preventive and therapeutic interventions against dementia.
- 5. Technology Integration:** Due to the advancement of the digital era, the aspect of technology integration into the dementia care is gaining more significance. Digital health tools, such as mobile apps and wearables, have the potential to assist in monitoring the level of physical activity, cognitive, and social activity. Future studies needs to examine ways of effectively and successfully incorporating these technologies into physical activity programs so as to offer real-time feedback, monitor progress, and improve patient engagement.

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