ENHANCING ENGAGEMENT, MOBILITY, AND COGNITIVE RESPONSE IN OLDER ADULTS WITH DEMENTIA THROUGH CHAIR YOGA: A NON-PHARMACOLOGICAL INTERVENTION STUDY

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Abstract
This study evaluated the feasibility and impact of a structured chair yoga program as a non-pharmacological intervention for elderly individuals with mild to moderate dementia residing in a long-term care facility. Given the growing prevalence of dementia and the limitations of pharmacologic treatments, this study aimed to explore whether movement-based, mind-body practices could improve physical, cognitive, and emotional outcomes in a real-world setting. A total of 18 participants (ages 70–99), primarily female and racially diverse, engaged in at least one of eleven weekly chair yoga sessions conducted in a familiar group setting. The sessions were designed to promote comfort, engagement, and routine using guided yoga postures, live music, interactive activities, and personalized pacing. An observational design was employed to assess outcomes across three core domains: coordination and precision, mobility and flexibility, and mood and emotional engagement. Attendance patterns indicated progressive comfort with the program, peaking in session 4 and stabilizing across subsequent sessions. Many participants who initially demonstrated difficulty with specific exercises showed marked improvement over time, gaining fluency and confidence through repeated exposure and stepwise instruction. Emotional responses also improved, with greater expressions of joy, interaction, and enthusiasm observed in later sessions. The program was well tolerated, and adaptive strategies were employed to accommodate individual cognitive and physical limitations. Findings support the implementation of structured, low-impact chair yoga as a sustainable, engaging, and beneficial practice in memory care settings, with potential to enhance quality of life, participation, and social connection in elderly individuals with dementia.

Keywords:
Chair yoga, Dementia care, Elderly engagement, Cognitive stimulation, Mobility and flexibility, Emotional well-being

1. INTRODUCTION

Dementia, encompassing conditions like Alzheimer's disease, constitutes significant challenges to the aging population, affecting cognitive functions, emotional well-being, and physical capabilities. Globally, over 55 million people were living with dementia in 2020[1], with projections

indicating a rise to 78 million by 2030 and 139 million by 2050[2, 3, 23]. In the United States alone, approximately 6.9 million individuals aged 65 and older are living with Alzheimer's in[24] 2024, accounting for about 10.9% of this age group[4]. Notably, one in three seniors dies with Alzheimer's or another dementia[5, 6], surpassing mortality rates from breast and prostate cancers combined[3]. The financial implications are substantial, with the global cost of dementia estimated at US$1.3 trillion in 2019, projected to rise to US$2.8 trillion by 2030[7, 8]. This escalating prevalence emphasizes the urgency for effective interventions to enhance the quality of life for affected individuals.

As dementia impacts millions worldwide, interest has grown in using non-pharmacologic interventions that can safely be implemented in long-term care. Many pharmacologic interventions have limited effectiveness and may also carry the risk of adverse side effects, especially in older persons, making complementary, low-intensity interventions a vital focus for clinical and therapeutic investigation[21]. Within these modalities, movement-based mind-body interventions—including yoga, tai chi, qigong, and dance therapy—have gained attention for their potential to support cognitive function, emotional well-being, and physical health in older adults. These interventions incorporate slow physical movements, breathing techniques, mindfulness, and body awareness to foster holistic health benefits. Recent research indicates that these interventions have the potential to enhance balance, decrease stress levels, promote relaxation, and increase quality of life, particularly in individuals with mild cognitive impairment or early dementia[22, 23].

Chair yoga, a modified form of traditional yoga[9] performed while seated, has emerged as a promising approach to meet the adaptable needs of elderly residents with dementia. Physically, chair yoga offers gentle exercises that improve balance and mobility. A study involving participants with Alzheimer's disease demonstrated significant improvements in balance following an eleven-week chair yoga program, suggesting that motor learning remains possible despite cognitive decline[10]. Moreover, chair yoga has been shown to enhance coordination and precision, particularly in individuals with moderate cognitive impairment, by reinforcing neuromuscular control through repetitive and structured movements. Structured chair yoga programs led to greater postural stability and smoother movement transitions among participants. Research indicates that yoga interventions may benefit cognitive functioning, particularly in areas such as attention and verbal memory, offering a non pharmacological avenue to support mental acuity in individuals with mild cognitive impairment or dementia[11]. One study observed that regular participation in chair yoga led to increased activation in the prefrontal cortex, a region associated with decision-making and problem-solving, and slows cognitive decline in dementia patients[12].

Emotionally, chair yoga contributes to improved mood and quality of life. Studies have shown that individuals with moderate-to-severe dementia, who engaged in chair yoga, notably improved their quality of life compared to those involved in other activities, highlighting its potential to alleviate symptoms of depression and anxiety[13]. Additionally, guided chair yoga sessions involve breathing techniques and mindfulness, associated with decreased cortisol levels, indicating stress reduction and overall improved emotional well-being. Additionally, engagement levels significantly increase in dementia patients during chair yoga sessions

because the structured and repetitive sequence of movements provides a sense of familiarity and attainment. Increased engagement during chair yoga sessions promotes socialization, crucial in minimizing feelings of isolation and loneliness among elderly populations[11].

Chair yoga also plays a significant role in improving flexibility and mobility among elderly individuals with cognitive impairment. Participants in a study on chair yoga interventions demonstrated enhanced range of motion in both the upper and lower extremities, leading to increased independence in daily activities[12]. Utilization of modified yoga poses allows individuals to gently stretch and strengthen muscles, which can reduce joint stiffness and reduce discomfort associated with aging[11].

In our research study, we sought to explore the feasibility and effectiveness of chair yoga as an intervention for elderly residents with dementia in a structured care setting. Through an iterative approach, we implemented a series of sessions designed to assess participant engagement, physical mobility, cognitive function and emotional well -being. By incorporating progressive modifications, such as nostalgic music, pet therapy, and live performances, we aimed to further enhance familiarity and participation while observing improvements in quality of life. Our research indicates that chair yoga is a sustainable low-impact intervention that positively impacts quality of life in this vulnerable population[14, 15].

Given the growing body of evidence supporting its effectiveness, chair yoga represents a practical and holistic approach to addressing the physical, cognitive, and emotional challenges faced by individuals with dementia. Its adaptability and accessibility make it an ideal addition to dementia and Alzheimer care programs, offering a low-cost and sustainable solution to improving well-being and mitigating functional decline.

2. METHODOLOGY

2.1 Aim of the Study

In our research study, we sought to explore the feasibility and effectiveness of chair yoga as an intervention for elderly residents with dementia in a structured care setting.

2.2 Research Design

The study employed an observational research design to evaluate the effects of chair yoga on elderly residents with dementia. This design aimed to naturally integrate chair yoga into participants' routines, minimizing disruption while observing changes in engagement, mobility, and cognitive response[18]. Data was collected prospectively over eleven sessions, each designed to introduce and reinforce chair yoga practices gradually. Progressively incorporated interactive elements were assessed to assess their impact on participation and engagement[11].

Setting

The study was conducted at a local elderly center that provides support for residents with dementia and other memory-related or motor impairments. The care facility is a structured residential environment with communal spaces, including a shared recreational room where the chair yoga sessions took place. A relaxed and supportive atmosphere was prioritized to foster higher engagement and social interactions. Background music, live performances, and other interactive activities were incorporated alongside chair yoga to create an environment that encouraged social engagement and cognitive stimulation[15].

Intervention: Chair Yoga Program

The chair yoga intervention comprised eleven sessions, each designed to build familiarity, engagement, and physical benefits progressively. Sessions incorporated interactive elements, including nostalgic music, pet therapy, and live violin performances aimed at stimulating memory and emotional well-being.

Structure of Sessions

Each session followed a consistent format to promote routine and comfort, beginning with introductions and warm-up exercises targeting mobility in the hands, feet, and legs. The core session consisted of guided chair yoga movements demonstrated through instructional videos or direct facilitation, supported by visual and verbal guidance. Interactive components, including music and sensory activities, were integrated to foster engagement and enjoyment.

The Three Themes

To guide analysis and structure observations, three broad thematic domains were developed: coordination and precision, mobility and flexibility, and mood and engagement. The themes were utilized to track participants' responses to the chair yoga intervention in a structured way. Systematized observations within each domain allowed for a comprehensive understanding of physical, cognitive, and emotional responses throughout the sessions.

Program Evolution

The program demonstrated progressive adaptation to increasing familiarity and engagement levels. By mid-intervention, participants demonstrated greater consistency and confidence, relying less on verbal cues and more on their recollection of movements. Enhanced instructional techniques, including the incorporation of live music and social elements, fostered higher engagement and attendance rates. As the program progressed, sessions evolved to accommodate increasing participant familiarity and engagement levels. The first session introduced basic chair yoga exercises and focused on trust-building, with an initial attendance of eight participants. By the second session, the integration of nostalgic music and pet therapy increased participation, reaching ten attendees. As participants grew more comfortable, session three demonstrated greater consistency in engagement, with participants showing improved social interactions and physical movement. By the fourth session, live violin music was introduced, significantly enhancing mood and participation, as participants appeared more responsive and engaged. Sessions five and six refined instructional techniques, balancing video-guided demonstrations with verbal facilitation to improve learning. In session seven, participants showed increased independence, relying less on external guidance and demonstrating familiarity with movements. By session eight through eleven, verbal and visual instructions were emphasized, allowing facilitators to assess participants’ ability to follow cues without excessive demonstration.

Table 1: Sequence of Postures and Descriptions of Each

Posture Sequence	Posture	Description of Posture
1	Head Nods	Gentle head movements mimicking 'yes' and 'no' movements.
2	Shoulder Rolls	Rolling shoulders forward and backward to relieve tension and increase range of motion.
3	Hand-to-Shoulder Taps	Touching hands to shoulders to promote upper body mobility and awareness.
4	Arm Raises	Lifting arms overhead to improve shoulder flexibility and circulation.
5	Wrist Circles	Circular movements of the wrists to improve joint mobility and flexibility.
6	Finger-to-Thumb Taps	Sequentially touching each fingertip to the thumb to improve fine motor coordination.
7	Side Reaches	Leaning to the side while seated to stretch and engage the obliques.
8	Spinal Twists	Twisting the torso gently side to side to promote spinal flexibility and awareness.
9	Leg Lifts	Seated leg lifts to strengthen lower limbs and improve circulation.
10	Hand-to-Knee Taps	Alternating hand taps to opposite knees to promote coordination and cross-body movement.
11	Toe-to-Heel Rocking	Shifting from toe to heel to improve ankle flexibility and balance.
12	Breathing Exercises	Guided deep breathing to promote relaxation and mental clarity.
13	Dance Movements	Freestyle or guided movements to music to encourage expression and social interaction.

The chair yoga program incorporated a variety of seated postures designed to promote mobility, flexibility, coordination, and relaxation. Exercises included upper-body movements such as head nods, shoulder rolls, arm raises, and wrist circles, as well as coordination-focused activities like hand-to-shoulder taps, finger-to-thumb taps, and hand-to-knee taps. Lower-body movements

included leg lifts and toe-to-heel rocking to support balance and circulation. Additional exercises such as side reaches, spinal twists, and breathing techniques helped enhance relaxation and spinal flexibility. The sessions often concluded with dance movements to foster self-expression and social interaction.

2.3 Consent and Ethical Considerations

Participation in the study was voluntary, with individuals free to withdraw at any time without repercussion. Facilitators prioritized non-invasive, supportive practices, ensuring that exercises were tailored to match individual physical and cognitive capabilities. The intervention aimed to foster well-being through a relaxed and inclusive environment while upholding ethical standards. Confidentiality and privacy of the respondents were maintained; no data would be disclosed to a third party. No identifiers such as name or pictures were disclosed in the article or while conducting the study. Ethical guidelines of research were followed.

2.4 Sample

Participants were identified and recruited from a local elderly care center specializing in dementia care. The facility houses residents diagnosed with mild to severe dementia, providing a controlled environment for conducting structured interventions. Recruitment was conducted through staff recommendations, with care staff identifying participants who met the inclusion criteria.

Inclusion Criteria is as follows

1. Diagnosis of mild to moderate dementia
2. Aged 65 and above
3. Ability to follow basic verbal instructions
4. Physically capable of engaging in seated exercise

Exclusion Criteria is as follows

1. Severe cognitive impairments preventing comprehension of instructions
2. Physical limitations that would prevent safe participation in chair yoga[16]

Unlike randomized controlled trials, this study relied on voluntary participation, allowing residents to join or decline sessions based on their comfort and interest. No external recruitment methods were employed, as the study aimed to integrate chair yoga within the existing care structure, ensuring feasibility and sustainability in real-world conditions.

Table 2: Number of Participants Per Session and Percentage Out of Total Number of Participants

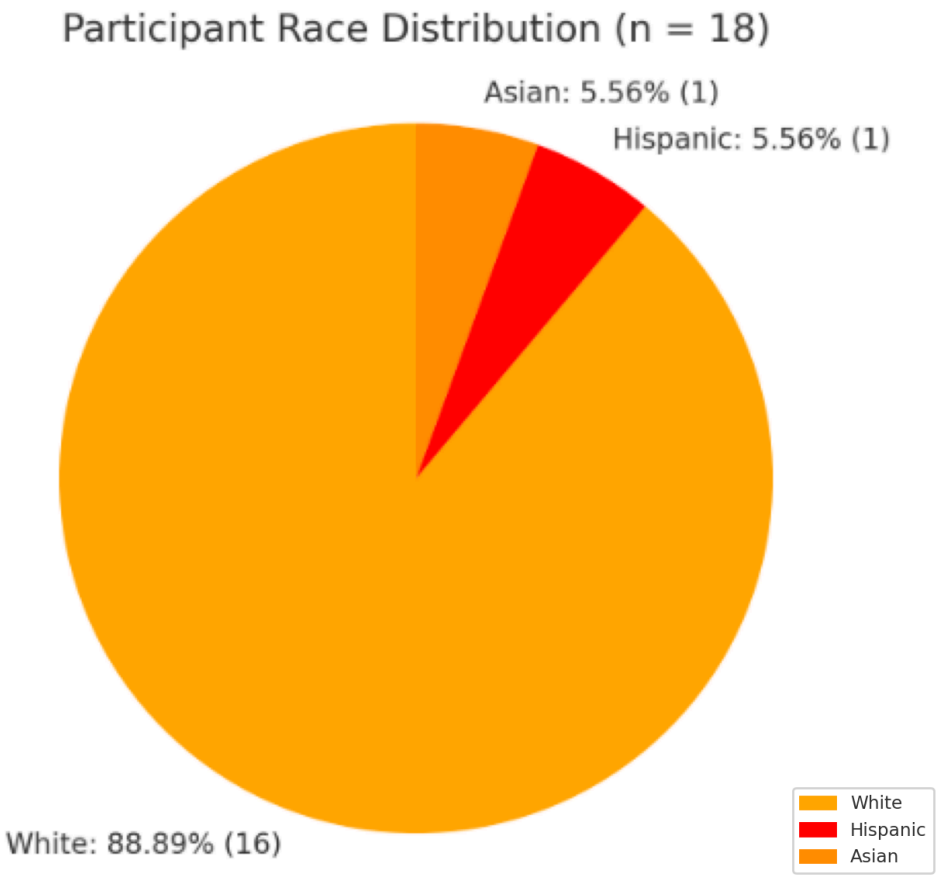
Session Number	Number of Participants Per Session	Percentage Out of Total Participants (Rounded to the Nearest Hundredth)
1	8	44.44%
2	10	55.56%
3	14	77.78%
4	17	94.44%
5	10	55.56%
6	10	55.56%
7	12	66.67%
8	13	72.22%
9	10	55.56%
10	13	72.22%
11	10	55.56%

Over the course of the eleven-session chair yoga program, participant attendance varied across sessions. The number of participants per session ranged from 8 to 17, representing between 44.44% and 94.44% of the total participant pool (N=18). Session 4 recorded the highest attendance with 17 participants, while Sessions 1, 5, 6, 9, and 11 had the lowest at 10 participants. Despite minor fluctuations, engagement levels remained relatively stable in the second half of the program, with more than half of the total participant group attending each session.

Demographics & Baseline Characteristics:

Table 3: Age and Race Distribution of the Sample Participants (N=18)

Gender	Highest age	Lowest age	Percentage of Sample	Race
Male	93	84	22.22%	100% White
Female	99	71	77.78%	7.14% Asian, 7.14% Hispanic, 85.71% White



A total of 18 participants engaged in at least one session of the chair yoga program. Participants ranged in age from 71 to 99 years, with the majority falling between 90 and 99 years. Of the sample, 22.22% were male and 77.78% were female. The racial distribution among female participants included 7.14% Asian, 7.14% Hispanic, and 85.71% White, while all male participants identified as White. Out of the 18 total participants, 5.56% were Asian, 5.56% were Hispanic, and 88.89% were White. All participants were diagnosed with mild to moderate dementia and were recruited based on clinical staff recommendations to ensure they met the study's inclusion criteria.

2.5 Data Collection Procedure

Qualitative and observational data were collected to assess physical mobility, cognitive engagement, emotional well-being, and sustained participation among elderly residents with dementia. Participants exhibited notable physical improvements, including enhanced mobility, coordination, and reduced dependence on guidance. Cognitive engagement increased through routine building and interactive elements, while emotional well-being improved with repeated exposure and social reinforcement.

3. RESULTS

Coordination and Precision

Participants demonstrated steady improvements in motor coordination and precision throughout the chair yoga sessions. As the program progressed, individuals became more synchronized in their movements and responded more effectively to verbal and visual cues. Although some participants initially struggled with multi-step exercises, repeated exposure, and gradual instruction enhanced their motor control, timing, and rhythm. During the hand-to-knee tap exercise, 10 out of 12 participants successfully coordinated alternating taps between their hands and knees, maintaining rhythm and demonstrating improved synchronization. The remaining two participants, who initially had difficulty, aligned with the group after slowing their pace and observing others. A similar pattern emerged in the finger-to-thumb tap exercise, where 10 participants completed the sequence smoothly, while two required individualized step-by-step guidance before performing the full movement with confidence. Notable progress was also observed in wrist circles, requiring controlled movement in clockwise and counterclockwise directions. Of the 15 participants, 13 performed smooth, complete rotations, while the two who initially struggled improved significantly after the exercise was broken down into smaller increments (90°, 180°, 270°, 360°). This technique of segmenting complex movements supported progress in other exercises as well. In the hand-to-shoulder tap activity, 9 out of 13 participants performed the movement with precision and rhythm, while the remaining four, who initially needed assistance, gained fluency through repeated guided practice. These motor coordination improvements reflect the potential of yoga-based interventions to enhance neuromuscular control and rhythm in older adults with cognitive impairments, aligning with existing research on the benefits of structured movement programs for individuals with dementia.

Mobility and Flexibility

Participants showed clear gains in mobility and flexibility throughout the program, particularly when exercises were adapted to suit varying physical abilities. For instance, in wrist rotation exercises, those who initially experienced joint stiffness or restricted movement responded well to gradual progression. Breaking the motions into smaller increments—such as 90°, 180°, and eventually 360°—allowed participants to increase their range of motion comfortably and at their own pace. This approach enabled smoother, more complete joint mobility in the later sessions without discomfort or overexertion. Shoulder flexibility also improved over time. During the hand-to-shoulder tap activity, 9 out of 13 participants successfully alternated tapping both shoulders, demonstrating increased upper-body mobility and control. This exercise, which involved lifting the arms and crossing the body's midline, was initially challenging for some due to limited shoulder flexibility. However, facilitators began with simplified movements, guiding participants through short-range motions that helped them develop the strength and coordination needed to complete the full activity. The four participants who initially required assistance eventually performed the taps independently after multiple attempts. These improvements suggest that progressive stretching, adaptive pacing, and personalized guidance effectively enhance functional movement for individuals with dementia. By increasing physical confidence and reducing resistance to activity, this approach contributed to greater overall participation in the program.

Mood and Engagement

Participants' moods and emotional engagement improved steadily throughout the sessions, particularly when exercises were introduced gradually and within a supportive, low-pressure environment. When complex movements—such as wrist rotations—were segmented into smaller increments (90°, 180°), individuals who initially showed hesitation became more comfortable and engaged. This structure improved physical performance and fostered emotional benefits, including boosted confidence, reduced frustration, and a greater sense of achievement. Participants often responded with smiles, nods, and other signs of satisfaction after successfully completing tasks. The hand-to-shoulder tap activity provided further insight into emotional responsiveness. Nine of the thirteen participants performed the exercise with visible enthusiasm, maintaining rhythm and focus while expressing enjoyment. Among the remaining four participants, initial reluctance led to active participation following individual support and encouragement. After observing their peers and receiving guidance, these individuals joined in and completed the exercises with increased confidence. Their transitions from passive observation to active involvement were accompanied by positive expressions, verbal affirmations, and social interaction—such as laughter or comments reflecting memory recall of prior sessions. These findings underscore the impact of structured guidance and routine in enhancing emotional well-being in individuals with dementia. As participants became more familiar with the sessions and achieved small, consistent successes, they exhibited increased social responsiveness and enthusiasm. The supportive environment and familiar group dynamic were crucial in sustaining engagement and creating a positive, uplifting atmosphere throughout the program.

Table 4: Observations Based on the Three Themes (Coordination and Precision, Mobility and Flexibility, Mood and Engagement) and End of Session Activity Per Session

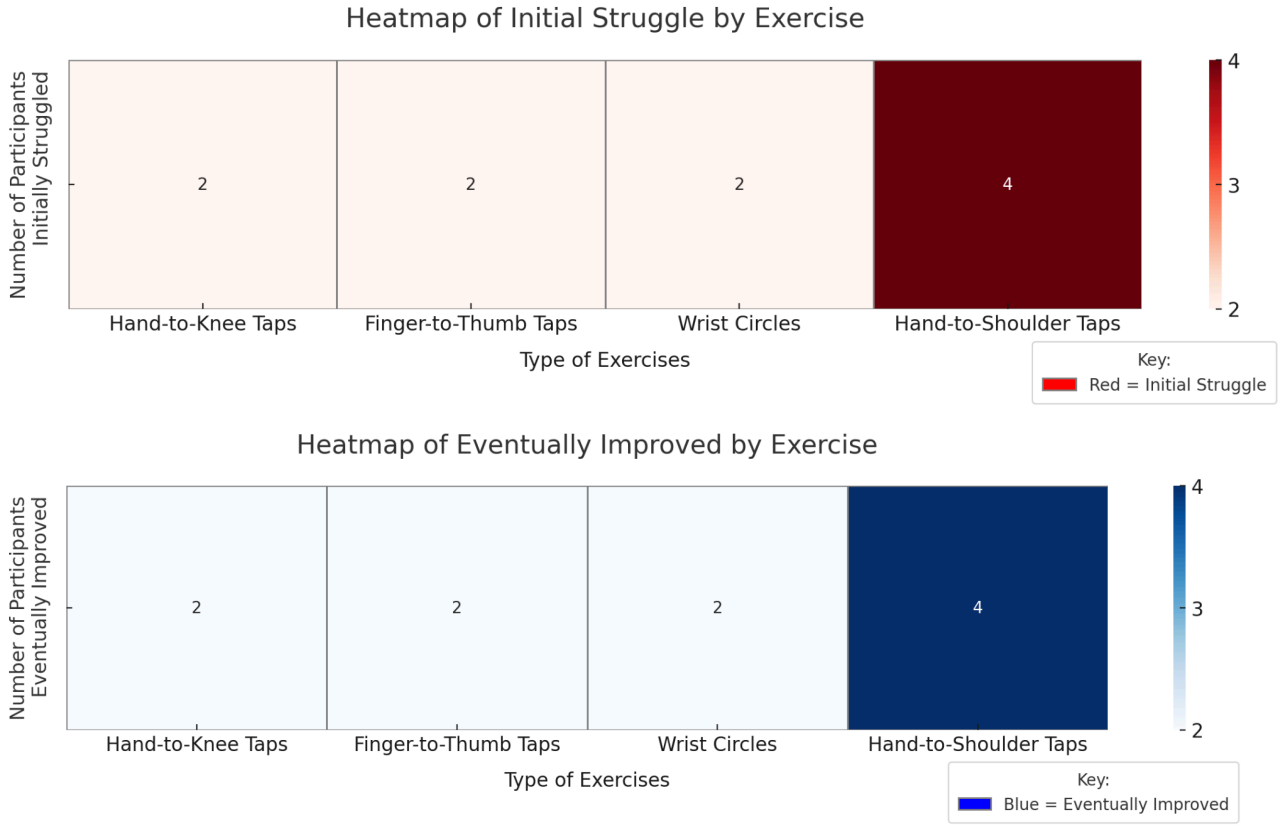
Session Number	**Coordination and Precision Observations**	**Mobility and Flexibility Observations**	**Mood and Engagement Observations**	**End of Session Activity**
1	Basic hand, leg, and foot exercises introduced. Participants followed simple motions with video guidance.	Simple seated mobility exercises performed. Participants showed range in initial flexibility.	Calm environment helped build trust. Mild expressions of curiosity, smiles observed.	Simple hand/leg movements and wrap-up
2	Began to follow rhythmic cues with rock & roll music. Introduction of new coordination tasks through dance.	Dancing introduced, encouraged full body movement. Greater range of motion in arms and legs observed.	Participants recognized facilitators. Excitement increased, music and pet therapy boosted mood.	Dancing with 50s–60s music and interaction with dog

3	Reinforced basic coordination through repeated exercises. Participants mimicked movements with better timing.	Reinforced flexibility through stretching routines. Some stiffness still present but reduced compared to session 1.	Deeper connection and social interaction increased with snacks and routine	Snacks shared with residents and casual conversations
4	Participants followed violin rhythm, promoting precise timing. Increased synchronization observed.	Full body engagement during music-led yoga. Improved leg and upper body range of motion.	High energy session with music. Participants smiled and interacted more.	Live violin performance followed by group reflections
5	Live and video demonstrations used. Participants able to follow wrist, leg, and arm exercises.	Wrist, arm, and leg mobility exercises practiced. Participants followed through entire mobility sequence.	Participants responded well to social activities. Session ended on a positive note.	Chair yoga recap and distribution of snacks
6	Performed same exercises; consistent repetition improved timing. Flow maintained with continuous video	Flowing yoga videos helped continuous joint motion. Participants adapted to repeated movements with ease	Strong enjoyment expressed throughout. One participant left mid-session	Chair yoga conclusion with positive remarks
7	Less reliance on video, participants more precise. Nearly all engaged with coordinated	Improved fluidity of leg and shoulder movements. More complex positions tolerated better	Participants enthusiastic, needed less prompting. Consistent engagement noted	Dancing and light music to close session
8	Verbal instructions less effective than visual. Video reintroduced to support coordination.	Limited response to verbal-only instruction for movement. Demonstrations led to better flexibility outcomes.	Verbal instructions caused slight confusion. Better response after demonstration.	Video replay and light verbal discussion

9	Participants remembered exercises independently. Improved fluency in previously difficult movements.	Visible improvement in flexibility after time away. Returning participants had better mobility than non-regulars	Participants expressed excitement and supported each other. Previously passive participants became more engaged.	Dancing, snacks, and peer interaction
10	More advanced shoulder and leg movements added. Participants followed rhythm and pace smoothly	Participants executed both new and familiar movements. Advanced stretches introduced and well-tolerated	More relaxed, joyful expressions see. Participants danced and shared stories.	Dancing initiated by participants with music
11	All knew sequences; highly synchronized movements. Minimal prompting required for coordination.	Breathing and movement synchronized. All participants showed strong mobility control.	Participants smiled throughout. Demonstrated social memory and enthusiasm.	Breathing exercises and snack distribution

The chair yoga sessions were carefully structured to support participant growth across three core areas: coordination and precision, mobility and flexibility, and mood and engagement. Over the course of the eleven sessions, steady progress was observed in each domain. Early sessions emphasized simple guided movements and built trust through consistent routines, with participants gradually improving their ability to follow motions with fewer prompts. In terms of mobility and flexibility, participants progressed from basic seated exercises to more dynamic and complex movements, such as shoulder rolls and toe-to-heel rocking, reflecting an increased range of motion and joint adaptability. Mood and engagement also improved, with participants showing greater enthusiasm, verbal interaction, and peer support as the program continued. End-of-session activities were intentionally designed to enhance social and emotional engagement. These activities included dancing to nostalgic music, pet therapy, live violin performances, verbal reflections, and snack sharing. As participants became more familiar with the structure, these closing interactions served as both a motivator and a reward, reinforcing routine and fostering a sense of community. Overall, the session structure and concluding elements played a vital role in encouraging physical participation while enriching the program's emotional and social dimensions.

Figure 2: Heat Maps of Initial Struggled Participants by Exercise



The heatmaps illustrate the initial challenges and subsequent improvements in participants' performance across four key chair yoga exercises. Each exercise—Hand-to-Knee Taps, Finger-to-Thumb Taps, Wrist Circles, and Hand-to-Shoulder Taps—had two participants who initially struggled, with the exception of Hand-to-Shoulder Taps, where four participants faced difficulty at the outset. Despite these challenges, the same number of participants in each exercise group eventually showed improvement, indicating that tailored instruction and repeated practice were effective in helping individuals overcome early difficulties. The consistent pattern of initial struggle followed by progress underscores the adaptability of the chair yoga program for older adults with varying levels of physical and cognitive function.

4. DISCUSSION

This study investigated the effectiveness of structured chair yoga programs as a non-pharmacological intervention for elderly individuals with mild to moderate dementia. Throughout eleven sessions, participants showed consistent improvements across three key domains: motor coordination and precision, mobility and flexibility, and emotional engagement. The findings revealed that participants who initially required step-by-step guidance progressively became independent and confident in performing multi-step exercises. Movements became more fluid, coordinated, and responsive to verbal and visual cues. Additionally, emotional engagement improved steadily, with more participants displaying positive effects such as smiling and expressing enthusiasm, particularly during sessions incorporating music, live performances, and social interaction.These findings are consistent with previous literature highlighting yoga's cognitive and physical benefits for individuals with cognitive impairments. A systematic review

found that yoga-based interventions led to improvements in attention, memory, and mood among individuals with mild cognitive impairment and early-stage dementia[16]. Our study corroborates these findings by demonstrating notable enhancements in motor function and engagement, further supporting the feasibility of yoga as a therapeutic approach in dementia care. Furthermore, our study also emphasizes the importance of routine, familiarity, and social interaction in sustaining engagement—a point supported by the findings of Tiedemann et al. (2022), who observed that combining physical movement with music and peer interaction significantly boosts motivation and adherence in older adults[12].

One major strength of this study was its observational design, which allowed real-time adaptation to participant needs while capturing natural engagement patterns in a care facility setting. Multiple interactive elements, such as nostalgic music, pet therapy, and live violin performances, helped enhance participant enthusiasm, making the intervention both engaging and adaptable. The progressive structure of the sessions fostered gradual skill acquisition, allowing participants to build familiarity and confidence in each movement. Social benefits were also evident as participants increasingly interacted with peers, fostering a supportive community atmosphere.

Future research should address these limitations by employing randomized controlled trials with larger sample sizes to enhance statistical rigor and mitigate bias.

Utilizing structured observational tools such as video analysis or validated scales—could improve consistency and data reliability. Additionally, investigating the effectiveness of chair yoga in diverse care environments, such as home-based and culturally tailored interventions, would help expand its applicability. Collaboration with healthcare providers to integrate chair yoga into routine dementia care practices is essential, along with evaluating optimal session frequency and duration to maximize long-term benefits.

5. CONCLUSION

In conclusion, this study demonstrates chair yoga's feasibility and therapeutic potential as a holistic intervention for individuals with dementia. By promoting physical coordination, mobility, and emotional well-being through structured and supportive exercises, chair yoga can be valuable in enhancing the quality of life for older adults experiencing cognitive decline.

6. LIMITATIONS

Despite these promising outcomes, the study had several limitations. The small sample size and the single-site setting limited generalizability, and voluntary participation may have introduced selection bias, as residents inclined toward group activities might have been more likely to take part. The non- randomized design further limits the ability to draw causal conclusions. Since participation was voluntary and not randomized, selection bias may have influenced engagement outcomes, as residents already inclined toward group activities may have been more likely to participate. Additionally, the frequency and timing of sessions were constrained by staff schedules and logistical factors, potentially affecting the continuity and retention of therapeutic benefits. The reliance on behavioral observation for data collection, though valuable, introduced a degree of subjectivity and may have missed more subtle changes in cognition or emotional state. Communication challenges with participants who had varying cognitive abilities also impacted instruction delivery, and the use of a standardized program limited personalization for differing physical and emotional needs. Finally, cost and travel time for facilitators or staff could present barriers for scalability and widespread implementation, particularly in more

resource-limited settings. Addressing these limitations in future research will help refine intervention strategies and optimize the accessibility of chair yoga for diverse dementia care populations.

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