Improve Cognitive Abilities Through Aerobic Dance Based on Traditional Dance: Literature Review

Poppy Elisano Arfanda[1], Ians Aprilor[2],Ricardo Valentino Latuheru[3], Hasnah[4], Retno Farhana Nurulita[5] , M Adam Mappaompo[6]

[1,2,3,4,5,6] Department Physical of education, Universitas Negeri Makassar, Makassar, Indonesia.

poppy.elisano@unm.ac.id

Abstract. This writing aims to explore some literature about traditional dance-based aerobic exercise to improve cognitive abilities. Many factors contribute to a person's cognitive decline, including aging and lack of physical activity. The physical activity discussed here is aerobic exercise. Physical activity interventions, such as aerobic exercise, can enhance cognitive function in adults, particularly in the elderly with modest cognitive impairment. This research is in the form of a literature review, a collection of Scopus articles, web of Science, crossref, and Google Scholar using the keywords dance, traditional dance, aerobic dance, elderly, and cognitive. The results of this research are that traditional dance based on aerobic exercise can improve a person's cognitive abilities, both related to the movements performed. So aerobic exercise based on traditional dance can be used as a choice for physical activity to improve cognitive abilities.

Keywords: dance, traditional dance, aerobic dance, cognitive and elderly

1 Introduction

This review aims to illustrate how physical activity, especially aerobic dance based on traditional dance, can improve a person's cognitive abilities, whether they are teenagers or elderly. This review focuses on several literatures that discuss dance, traditional dance, aerobic dance, and cognitive improvements influenced by aerobic dance based on traditional dance.

Dancing is a fun physical activity that can potentially improve a person's physical and mental health[1]. Dance is a mind-body activity of rhythmic movements following the beat of music [2]. Dancing can be done anywhere, inside and outside the home, does not require special equipment and movements can be modified. Dance routines can also be adjusted to suit age level, physical limitations, and previous experience[3]

The role of dancing may vary in different regions regarding culture. For example, dancing serves as a means of socialization and recreation in American culture; whereas in Asian culture, dancing is more related to art. But in recent years, apart from aesthetics and recreation, society has become increasingly aware of dance's potential

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to improve physical and mental well-being [1]. Dance is a multidimensional exercise that combines physical, cognitive, artistic, and social activities, all of which are important for improving cognitive performance[4][5][6]. Dance can stimulate neuroplasticity in several cognitive functions such as learning and memory to learn new movement patterns, attention to follow instructions, executive function to execute complex movement patterns, and social cognition to link movements with meaning and emotional expression in social interactions.[7]. Recent evidence suggests beneficial changes in brain structures such as increased hippocampal volume[8]. Dance also strengthens connectivity between the two hemispheres of the brain with neural activation in the motor, somatosensory, and cognitive brain areas [2]. Several recent studies have shown that aerobic dance can improve global cognition as well as other specific domains, such as executive function and memory retention in seniors without cognitive impairment. [9][10][11].

The body will interact with oxygen every day. This is because every cell, organ, and tissue in the body needs oxygen to produce energy and function properly. However, waste substances or oxygen metabolism residues will produce free radicals in the body. Mild cognitive impairment (MCI) is often considered a transition stage in the aging process[1][9]. MCI is considered to disrupt a person's life, as cognitive abilities decrease, there will be greater dependence on other people[1]. Prevention of the decline in MCI can be achieved by increasing physical activity and cognitive training All the literature used in this research shows that dancing activities can provide the same benefits as moderate-intensity aerobic exercise. Moderate-intensity aerobic exercise is an effective way to increase nitric oxide levels in the blood, and dancing can also have the same effect.[12]. specifically noted that participants in the dance/movement therapy group were more motivated and satisfied with dance-based exercise routines compared to other aerobic exercise groups, indicating that dance/movement therapy may be a good option for people who engage in dance/movement exercises, but don't enjoy conventional exercise, but still want to gain the positive health benefits of being physically active[13]

2. Method

This research is a study that reviews the literature by analyzing relevant articles and focuses on improving cognitive ability through aerobic dance based on traditional dance. The articles used in this literature review are articles obtained via Google Scholar, Science Direct, Web of Science, and crossref with the keywords "dance, traditional dance, aerobic dance, cognitive and elderly. The literature used starts from 2014-2023. Literature searches using Medical Subject Headings (MeSH) and involving free words, for example for cognitive the relevant words are 'cognitive dysfunction, cognitive impairment, cognitive decline, and so on. Next is to combine the words cognitive with dance, traditional dance, and elderly. The literature search was carried out until September 20, 2023.

3. Results and Discussion

From the collection of limited literature starting from 2014-2023 and limited to 514 literature, and 44 literature is considered as literature based on the abstract. After eliminating multiple studies, 38 were obtained which were divided into several categories, namely dance (dance, traditional dance, and aerobic dance with 25 literature, cognitive with 9 literature, physical exercise with 1 literature and elderly with 2 literature and physical activity with 1 literature).

Aerobic exercise is a movement that can be used as therapy, with routine dance-based aerobic exercise, compared to other aerobic exercises. Dance-based aerobic exercise can be an alternative for people who don't enjoy conventional exercise but still want to do physical activity and get the benefits.[12]. Dance-based aerobics is an interesting sport because each movement has a different style, which makes the performer happy and does not feel like the sport being done is monotonous. Apart from that, dance-based aerobic exercise can improve cardiorespiratory fitness, balance, flexibility and speed up metabolism. [14]. For example, seniors experienced improvements in cardiorespiratory fitness, balance, and muscle strength after doing dance training for 8 weeks, three times a week. [15].

The dance training you do must also enter a training zone that can improve your cardiovascular system. Dance can be classified as intermittent aerobic exercise with moderate intensity[16]. Regular dancing at moderate intermittent intensity is associated with increased motivation[17]. Zumba is one of the dances recommended as an aerobic physical activity that influences cognitive function, improves working memory, and reduces symptoms of depression.[18]. Aerobic exercise based on traditional Korean dance is recommended as a regular exercise program[19].

Dance is an activity carried out by coordinating movement and music, as well as aerobics. Both of these activities require brain activation because they must continuously learn and remember new steps. Dance is a kinetic musical skill, which requires coordinating body movements with rhythmic stimuli, as well as developing movement adaptability.Regular physical activity is an important factor in lifestyle. Physical activity in the elderly has good cognitive and physical effects, this is associated with increased survival of the elderly. Activities recommended for seniors should lead to improving or maintaining physical and mental health[20].

Research conducted in China looked at the effect of square dancing on the quality of life of elderly people with mild cognitive impairment. The results showed a positive effect of square dancing on all study outcomes assessed, especially on depressive symptoms and quality of life-related to the mental well-being of the participants. This study shows that square dancing is a strategy for elderly people with mild cognitive impairment and can provide benefits if done in the long term[21]. Research was also conducted on traditional Greek dance[22][23]and specially designed aerobics exercises[24]for the MCI population. This study went through an intervention period of 40

weeks or 48 weeks and found positive effects on overall cognitive development[22][23]. Traditional Greek dancing for 24 weeks showed positive effects on balance and quality of life. In contrast, aerobic exercise designed for 12 weeks did not show a positive effect on depression, balance, or quality of life but showed a positive effect on cognitive function. [25][24][21].

Aerobic exercise significantly improves global cognitive function and memory in elderly people with MCI[9]. Traditional dance-based aerobic exercise is very well-received [26]. Aerobic exercise training is effective in improving memory and balance abilities in the elderly during the COVID-19 pandemic in China. Aerobic exercise is a promising physical activity in encouraging physical activity in the elderly[27]. Aerobic exercise training for 24 weeks affects levels of cognitive decline, mood, and daily physical function with a training duration of 60 minutes per session, which includes 10 minutes of warm-up intervention in certain cognitive domains, 40 minutes of core movement, and 10 minutes of cool-down[28]. Aerobic exercise training for 3 months can increase right and total hippocampal volume and improve memory in elderly people with MCI[29]. Deficits are often difficult to overcome, but by providing rehabilitative physical activity for 16 weeks, which is improvised and involves cognition, significant cognitive improvement can be obtained. [30]. Remembering that cardiorespiratory fitness can decrease rapidly along with sedentary behavior[17]and the role of cardiorespiratory fitness in metabolic and functional health, a strategy is needed to prevent behaviors that lead to boredom.

Based on the research results, it was also found that low-impact aerobic dance videos performed with a frequency of 3 times/week for 6 weeks increased cardiovascular endurance, flexibility, and concentration in young women with a sedentary lifestyle.[31]. Physical activity interventions, including aerobic exercise, can improve cognitive function in elderly people with mild cognitive impairment[24][32][33]. It is also believed that involvement in social communities can improve cognitive function in elderly people with mild cognitive impairment as a result of aerobic exercise. [34].

Additionally, lifelong adherence to dance training was associated with a greater reduction in risk of death from cardiovascular disease compared with conventional walking training[35]. Compared to other aerobic exercises, aerobic exercise has the added benefits of stimulating emotions, increasing social interactions, and stimulating acoustics and music[36][37]. Thus, aerobic exercise is a more effective modality for improving cognitive function than other aerobic exercises[22]. The results showed that there was a significant increase in average concentration between before and after the low-impact aerobic exercise video intervention with memorization[31]. Exercise also increases brain volume, memory, and executive function[38].

4. Conclusion

Based on the results of a literature review of 44 articles related to dance and cognition, all of the literature suggests that aerobic exercise based on traditional dance can be used as an alternative to improve cognition, especially for the elderly.

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