

Research Article

# Dance Activity and Health-Related Quality of Life Among Middle-Aged and Older Women: A Cross-Sectional Survey Study in China

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## Abstract

**Background:** Physical activity has a significant effect on older adults, especially on enhancing their quality of life and well-being. More than physical activity, dance integrates music, sensory engagement, emotional expression and social connection, creating a multidimensional environment for aging population. **Objective:** This study explored whether dance activity habits can acutely improve physical and mental health of middle-aged and older women. A total of 143 healthy middle-aged and elderly women (50-80 years) participated in this study. Network survey of QoL was conducted. QoL of subjects was measured by using the MOS SF-36. All data were analyzed by using the SPSS 26.0 software system. **Main ideas:** The control group showed significant lower scores in role-physical ( $64.0 \pm 43.1$  VS.  $85.6 \pm 30.4$ ,  $p < 0.01$ ), general health ( $61.2 \pm 17.2$  VS.  $72.7 \pm 18.4$ ,  $p < 0.01$ ), vitality ( $72.9 \pm 15.7$  VS.  $79.1 \pm 15.0$ ,  $p < 0.05$ ) and Physical Component Summary ( $49.78 \pm 0.89$  VS.  $50.23 \pm 0.87$ ,  $p < 0.01$ ) than the dance group. The low-level dance group showed significant lower scores in physical functioning ( $76.0 \pm 21.8$  VS.  $88.8 \pm 12.7$ ,  $p < 0.01$ ), role-physical ( $72.4 \pm 39.7$  VS.  $94.6 \pm 17.1$ ,  $p < 0.01$ ), role-emotional ( $72.4 \pm 39.7$  VS.  $94.6 \pm 17.1$ ,  $p < 0.01$ ) and Physical Component Summary ( $49.8 \pm 0.96$  VS.  $50.5 \pm 0.69$ ,  $p < 0.01$ ) than the high-level dance group. **Conclusion:** These findings highlight the benefits of maintaining dance activity for improving physical and mental health related QoL, especially for physical health. Based on findings of the present study, we recommend that middle-aged and older people could have a regular dance activity at least 150 mins per week to improve their health-related quality of life.

## Keywords

Dance Activity, Quality of Life, Physical Health, Mental Health, Middle-Aged and Older Women

## 1. Introduction

Population aging has become a global phenomenon. Aging is accompanied with a progressive decline of mobility, flexibility, aerobic endurance, memory and cognition, which negatively affects their quality of life [1]. The health and quality of life promotion have gradually gained more concern and interest in middle-aged and older adults.

Quality of Life (QoL) refers to subjective satisfaction, well-being, and happiness regarding the objective elements of life [2]. According to World Health Organization (WHO), QoL can be regarded as the way an individual realizes his/her position in life and culture. There are many factors that affect QoL, the most important factor was the health-related quality

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of life (HRQoL). HRQoL refers to emotional and physical functioning as well as social well-being [3]. Numerous studies have indicated that physical inactivity not only can increase risk of hypertension, cardiovascular disease and diabetes in older adults, but also decrease motor and cognition functioning, then resulting in decreased health-related quality of life [4, 5].

Regular physical activity participation has been indicated as one way that improve physical and cognitive function and delay the process of age-related decline [6, 7]. A variety of physical activity types exists for the aging population. Dance has been thought more interesting, attractive and easy to maintain the habit since it usually performed to music and without any equipment. Dance activity interventions have been shown to affect physical health including balance, flexibility, strength and cardiovascular fitness [8-11]. In addition to physical health benefits, dance can promote psychological and cognitive health, improve sense of identity and well-being, self-esteem and QoL for older adults [9, 10, 12, 13].

Exercise programs were suggested to perform for older adults, mode, volume and intensity of exercise prescription have been investigated in recent years [14, 15]. However, regular intervention according to prescription in daily life is not easy to perform for older adults. For regular people, it is a kind of spontaneous and non-interventional physical activity habits or life-style without intensity or volume monitoring mostly. Most studies focusing on exercise as an intervention in various population, physical activity habits and its general effects for different populations is not yet fully ascertained [16]. In China, square dance and community dance with various modes are popular and preferred in middle-aged and older women, which was reported in many researches [17, 18]. Therefore, the first aim of this study is to determine if middle-aged and older women who have regular dance habits show a better health-related QoL compared to non-dance activity habits controls; the second aim of this study is to investigate the health-related QoL difference between high level and low level of dance activity per week.

## 2. Materials and Methods

### 2.1. Participant

A total of 143 healthy middle-aged and elderly volunteers (50-80 years) participated in this study. The dance group (DG) ( $n = 71$ ,  $63.3 \pm 5.8$  years) had a habit of dance activity with an average time of  $304.9 \pm 334.7$  min per week. The DG group was further categorized into the high-level group (dance activity  $\geq 150$  mins per week) and low-level group (dance activity  $< 150$  mins per week) according to suggested physical activity target for older adults from World Health Organiza-

tion [19]. The control group (CG) ( $n = 73$ ,  $62.7 \pm 7.3$  years) had no any dance activity habit or sport activity habits. All subjects signed their written informed consent before this study. As this study was simply a survey study, it did not need to be approved by the Institutional Ethics Board.

### 2.2. Quality of Life Evaluation

The Medical Outcomes Study (MOS) 36-Item Short Form Survey (SF-36) were used to assess the quality of life (QoL) in the two groups. This questionnaire was developed by Ware and has been validated to be useful in diverse populations [20]. The assessment consisted of 36 items in eight multiitem scales: physical functioning (PF), limitations due to physical health problems (role-physical; RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), limitations due to emotional problems (role-emotional; RE) and mental health (MH). The 8 scale scores, Physical Component Summary (PCS) and Mental Component Summary (MCS) scores of SF-36 were calculated according to the SF-36 scoring manual [21]. The higher scores, the better health status. In this study, the Chinese (HK) version SF-36 [22] was used. All surveys were conducted through online link and all data collection were completed in four weeks.

### 2.3. Dance Activity Habits Survey

In order to further explore the effect of habits duration on QoL, four more detailed dance habits questions were asked: 1) duration of dance habits (a. 1 year or less (at least 3 months); b. 2-3 years; c. 3-5 years; d. 5 years or more); 2) presence of dance habits at least once a week (a. Yes; b. No); 3) frequency of dance activity per week; 4) time of a single dance session.

### 2.4. Data Analysis

All data were analyzed by using the SPSS 26.0 software system (SPSS Inc., Chicago, IL). Mann-Whitney nonparametric tests were used for categorical variables between the two groups. The independent t-test was used to compare continuous variables between the two groups.

## 3. Results

### 3.1. The Baseline Demographic Profiles of DG and CG

The baseline demographic profile of DG and CG were presented in Table 1. The age, weight, height and BMI were similar between DG and CG groups.

**Table 1.** The baseline characteristics of the subjects (Mean  $\pm$  SD or n).

	Dance group (n=71)	Control group (n=73)
Age (years)	63.3 $\pm$ 5.8	62.7 $\pm$ 7.3
Height (cm)	158.8 $\pm$ 5.5	158.6 $\pm$ 4.5
Weight (kg)	58.6 $\pm$ 8.2	60.3 $\pm$ 8.6
BMI (kg/m <sup>2</sup> )	23.2 $\pm$ 3.1	23.9 $\pm$ 3.2
Education background (number)		
primary and junior high schools	10	9
High school	36	27
Undergraduate (including junior college)	25	35
Master degree and above	0	2
Dance activity habits (Number)		
$\leq$ 1 years	6	0
2-3 years	14	0
3-5 years	20	0
>5 years	31	0
Time of dance activity per week (min)	304.9 $\pm$ 334.7	0

### 3.2. QoL Scores for Physical Dimensions Comparisons Between DG and CG Groups

**Table 2.** QoL scores for physical dimensions comparisons between DG and CG groups (Mean  $\pm$  SD).

Scale or component summary	Dance group (n=71)	Control group (n=73)
Physical Functioning	83.6 $\pm$ 18.0	79.5 $\pm$ 16.2
Role-Physical	85.6 $\pm$ 30.4	64.0 $\pm$ 43.1**
Bodily Pain	80.5 $\pm$ 16.5	75.5 $\pm$ 17.7
General Health	72.7 $\pm$ 18.4	61.2 $\pm$ 17.2**
PCS	50.2 $\pm$ 0.87	49.8 $\pm$ 0.89**

\*\* $p < 0.01$ 

Table 2 displays the QoL scores for physical dimensions of DG and CG groups. For Role-Physical (85.6 $\pm$ 30.4 VS. 64.0 $\pm$ 43.1,  $p < 0.01$ ) and General Health (72.7 $\pm$ 18.4 VS. 61.2 $\pm$ 17.2,  $p < 0.01$ ) domains in SF-36, higher score was found in the DG than the CG. No significant difference was detected between the two groups for the 'Physical Functioning' and 'Bodily Pain' domains in SF-36. The DG group presented higher Physical Component Summary (PCS) score than the CG group (50.23 $\pm$ 0.87 VS. 49.78 $\pm$ 0.89,  $p < 0.01$ ).

### 3.3. QoL Scores for Mental Dimensions Comparisons Between DG and CG Groups

Table 3 displays the QoL scores for mental dimensions of DG and CG groups. No significant difference was detected in mental dimension between the two groups except for 'Vitality' domain (79.1 $\pm$ 15.0 VS. 72.9 $\pm$ 15.7,  $p < 0.05$ ) in SF-36, the DG group presented similar Mental Component Summary (MCS) score to the CG group (50.1 $\pm$ 0.93 VS. 49.9 $\pm$ 0.99,  $p > 0.05$ ).

**Table 3.** QoL scores for mental dimensions comparisons between DG and CG groups (Mean  $\pm$  SD)

Scale or component summary	Dance group (n=71)	Control group (n=73)
Vitality	79.1 $\pm$ 15.0	72.9 $\pm$ 15.7*
Social Functioning	88.3 $\pm$ 18.8	84.3 $\pm$ 18.0
Role-Emotional	79.3 $\pm$ 33.0	69.4 $\pm$ 40.4
Mental Health	77.3 $\pm$ 15.5	73.3 $\pm$ 14.8
MCS	50.1 $\pm$ 0.93	49.9 $\pm$ 0.99

\* $p < 0.05$ 

### 3.4. The Baseline Demographic Profiles of High-level DG and Low-level DG

The baseline demographic profile of high-level DG and low-level DG were presented in Table 4. The age, weight, height and BMI were similar between high-level DG and low-level DG groups.

**Table 4.** The baseline demographic profiles of high-level DG and low-level DG (Mean  $\pm$  SD or n)

	Low-level (n=29)	High-level (n=42)
Age (years)	63.6 $\pm$ 6.3	63.2 $\pm$ 5.4
Height (cm)	158.1 $\pm$ 6.5	159.2 $\pm$ 5.1
Weight (kg)	59.0 $\pm$ 8.7	58.3 $\pm$ 8.0
BMI (kg/m <sup>2</sup> )	23.5 $\pm$ 2.9	23.0 $\pm$ 3.2
Education background (number)		
primary and junior high schools	5	5
High school	14	22
Undergraduate (including junior college)	10	15
Master degree and above	0	2
Time of dance activity per week (min)	89.8 $\pm$ 33.5	453.3 $\pm$ 367.8**

\*\* $p < 0.01$ **Table 5.** QoL scores for physical dimensions comparisons between high-level DG and low-level DG (Mean  $\pm$  SD).

Scale or component summary	Low-level (n=29)	High-level (n=42)
Physical Functioning	76.0 $\pm$ 21.8	88.8 $\pm$ 12.7**
Role-Physical	72.4 $\pm$ 39.7	94.6 $\pm$ 17.1**
Bodily Pain	76.6 $\pm$ 18.0	83.3 $\pm$ 15.0
General Health	68.0 $\pm$ 17.6	76.0 $\pm$ 18.4
PCS	49.8 $\pm$ 0.96	50.5 $\pm$ 0.69**

\*\* $p < 0.01$

### 3.5. QoL Scores for Physical Dimensions Comparisons Between High-level DG and Low-level DG

Table 5 displays the QoL scores for physical dimensions of high-level DG and low-level DG groups. For ‘Physical Functioning’ ( $88.8 \pm 12.7$  VS.  $76.0 \pm 21.8$ ,  $p < 0.01$ ) and ‘Role-Physical’ ( $94.6 \pm 17.1$  VS.  $72.4 \pm 39.7$ ,  $p < 0.01$ ) domains in SF-36, higher score was found in the high-level DG than the low-level DG. No significant difference was detected between the two groups for the ‘Bodily Pain’ and ‘General Health’ domains in SF-36. The high-level DG group presented higher Physical Component Summary (PCS) score than the low-level DG group ( $50.5 \pm 0.69$  VS.  $49.8 \pm 0.96$ ,  $p < 0.01$ ).

### 3.6. QoL Scores for Mental Dimensions Comparisons Between High-level DG and Low-level DG

Table 5 displays the QoL scores for physical dimensions of high-level DG and low-level DG groups. For ‘Physical Functioning’ ( $88.8 \pm 12.7$  VS.  $76.0 \pm 21.8$ ,  $p < 0.01$ ) and ‘Role-Physical’ ( $94.6 \pm 17.1$  VS.  $72.4 \pm 39.7$ ,  $p < 0.01$ ) domains in SF-36, higher score was found in the high-level DG than the low-level DG. No significant difference was detected between the two groups for the ‘Bodily Pain’ and ‘General Health’ domains in SF-36. The high-level DG group presented higher Physical Component Summary (PCS) score than the low-level DG group ( $50.5 \pm 0.69$  VS.  $49.8 \pm 0.96$ ,  $p < 0.01$ ).

**Table 6.** QoL scores for mental dimensions comparisons between high-level DG and low-level DG (Mean  $\pm$  SD).

Scale or component summary	Low-level (n=29)	High-level (n=42)
Vitality	76.7 $\pm$ 13.9	80.7 $\pm$ 15.7
Social Functioning	85.8 $\pm$ 21.6	89.9 $\pm$ 16.6
Role-Emotional	67.8 $\pm$ 40.3	87.3 $\pm$ 24.4*
Mental Health	77.9 $\pm$ 13.8	76.9 $\pm$ 16.7
MCS	50.1 $\pm$ 0.90	50.1 $\pm$ 0.97

\* $p < 0.05$

## 4. Discussion

To our best knowledge, this is the first study to determine the effects of dance activity habits on health-related QoL by using the SF-36 survey in a sample of middle-aged and older Chinese women. The main findings of the current cross-sectional survey were that DG group who had regular dance habits of at least once a week with a minimum of 3 months duration had a better physical health status (sub-scales of Role-Physical and General Health, PCS) and mental health (sub-scale of Vitality) than CG group; and a minimum of 150 min/week dance activity participation was more effective for improving physical health.

Declined physical fitness are the main challenges for middle-aged and older adults. It has been previously reported that dance intervention was suggested to improve physical fitness, such as muscular strength, cardiopulmonary function, balance, agility, and gait. In addition, non-interventional studies have shown that regular dance participation is also associated with physical health benefits. Shanahan et al. [10] showed that regular Irish set dancers had significantly better

balance, functional capacity and quality of life compared to age-matched controls. Kattenstroth et al. [23] found that multi-year dance activity elderly group had advantage in posture and balance parameters, and had a better cognitive and motor performance than non-dance group. In the present study, significant difference was detected in two out of four physiological domains and PCS of SF-36.

Despite the physical improvements in this population is important, psychological health and increasing the QoL is another important goal. Previous studies have demonstrated that dance was more effective than other types of physical activity on psychological health [24]. A study of “Dancing for life” showed that community-based dance activities significantly promoted a sense of well-being, new friendships and enjoyment of women over 50 [13]. Several have investigated the effects of dance on QoL in middle-aged and elderly adults. Some [9, 25, 26] showed significant improvement of QoL was found after different dance program intervention, however, some [27] reported no significant changes was found in QoL after dance intervention. Our cross-sectional study showed significant mental improvement was found only in ‘Vitality’ sub-scale in dance activity habit group, which is correlated with mental and physical

health function [21]. It is important to note that there are some differences between intervention studies and the present study, which makes it difficult to compare the results. However, no matter it is interventional or cross-sectional, it is confirmed that those who participate dance activity regularly have a better quality of life [28].

It is important to note, however, that the level of physical activity is a key factor influencing the effects of dance activity. It is recommended to achieve at least 150 min of moderate physical activity (MPA) or at least 75 minutes of vigorous physical activity (VPA) during the week to achieve some health benefits [19]. Consequently, this study examined the level of dance activity induced health differences on QoL. Some researchers have demonstrated that higher level of physical activity is significantly associated with better both physical and psychological health-related QoL [29, 30]. It was recognized that level of physical activity increases well-being significantly [31]. On the contrary, the results of this study showed that dance activity duration had a closer relationship with physical fitness parameters, rather than mental ones. Laforge et al. [32] found that exercise stage was weakly related to mental health-related QoL and strongly related to physical health-related QoL, which are remarkably consistent with our findings. Similarly, High and moderate intensity physical exercise have benefits for physical health was reported by Đošić [33]. Based on the results of these study, higher level of physical activity seems to be more effective on health-related QoL.

There are some limitations in our study. First, this study mainly used self-reported measures of dance activity without measurement. It has been acknowledged by some researchers that subjective measures of physical activity are subject to overestimation. Secondly, quality of life was only evaluated by SF-36 questionnaire, no other additional variables were used to better investigate the effect of dance activity habits. A further possibility for future studies is that measurement data can be evaluated.

## 5. Conclusions

This is a cross-sectional study about dance activity and QoL among middle-aged and older women in China. The results of the current study indicate that maintaining dance activity habits have benefits for improving both physical and mental health related QoL, especially for physical health QoL. High level dance activity (>150 mins/week) seems to be more effective in physical dimensions of QoL. Based on the present results, it is recommended that middle-aged and older people could have a regular dance activity at least 150 mins per week to improve their health-related quality of life.

Though our study provides evidence that dance activity has the potential to improve quality of life among aging women. However, researches considering how the frequency, intensity, time and type of dance habits could affect the QoL in a larger sample size seems to be particularly important to

capture the effects of dance habits. Furthermore, there is a need for more studies in the field to further evaluate the findings and to gain a deeper understanding of the possible benefits of dance activity habits in different populations.

## Abbreviations

QoL	Quality of Life
SF-36	36-Item Short Form Survey
PF	Physical Functioning
RP	Role-physical
BP	Bodily Pain
GH	General Health
VT	Vitality
SF	Social Functioning
RE	Role-Emotional
MH	Mental Health
PCS	Physical Component Summary
MCS	Mental Component Summary
DG	Dance Group
CG	Control Group

## Author Contributions

**Jingjing Xue:** Data curation, Formal Analysis, Funding acquisition, Project administration, Writing – original draft

**Rou Wen:** Conceptualization, Data curation, Funding acquisition, Project administration, Writing – review & editing

## Data Availability Statement

The data that supports the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy of ethical reasons.

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## Conflicts of Interest

The authors declare no conflicts of interest.

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