

Functional fitness and quality of life of elderly Lian Gong, Tai Chi, and Qigong practitioners

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Abstract

BACKGROUND

Long-term regular physical activity, such as body practices of Traditional Chinese Medicine, seems to be an important habit for maintaining the functional fitness, independence and quality of life of elderly individuals. However, scientific knowledge production concerning assessment of such practices, specifically for the elderly population, focusing on functional fitness and quality of life, is still modest. Moreover, there is a lack of studies with long-term follow-up and control groups. Therefore, this study aims to compare the parameters of functional fitness and the dimensions of quality of life of elderly participants and non-participants in the body practices of Traditional Chinese Medicine. Longer adherence time, shorter adherence time and control group have been considered.

METHODS

This is an observational epidemiological case-control study carried out with 118 elderly individuals (≥ 60 years). The case group was represented by 59 elderly people practicing the body practices of Traditional Chinese Medicine, and they were subdivided into two groups, according to their median adherence time (< 24 months and ≥ 24 months). The control group was composed of 59 participants who were not participating in physical activity programs or guided body practices. Collection was carried out in four Traditional Medicine Specialized Units of the Municipal Health Office of the city of São Paulo. Sociodemographic and functional variables were collected. Quality of life was measured by Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). For data analysis, a univariate logistic regression and the Kruskal Wallis test have been performed.

RESULTS

When assessing quality of life, favorable results were found for the case group, with longer (≥ 24 months) adherence time in the domains of bodily pain ($p = 0.003$), vitality ($p = 0.021$), role emotional ($p = 0.034$), and mental health ($p = 0.020$). A better result was observed in the case group, with longer (≥ 24 months) adherence time in the functional 30-second chair stand test ($p = 0.006$).

CONCLUSIONS

The body practices of Traditional Chinese Medicine can contribute to quality of life, functional fitness, and lower limb strength.

Background

The change in the world demographic profile showed a significant increase in the proportion of elderly individuals, and it is one of the most significant themes of the 21st century. This trend sets up a new epidemiological reality and creates challenges for public policy makers and for the Brazilian health system in terms of ensuring comprehensive care. Thus, the focus is directed to elderly people and their needs, especially those resulting from decreased physical, cognitive, mental/emotional and social autonomy^{1,2}.

Scientific literature emphasizes the importance of actions that encourage and provide elderly individuals with adherence and maintenance of a healthy and physically active lifestyle³ with quality of life². Regular physical activity, such as the body practices of Traditional Chinese Medicine (BPTCM), seems to be an important habit for maintaining long-term functional fitness, independence and quality of life⁴.

BPTCM are integrative and complementary health practices also called meditative movements, as they include, during their performance, meditation, body movement, breathing, and relaxation⁵. Studies show that such practices have contributed to promoting health and quality of life for elderly individuals⁶⁻⁸. There is evidence regarding the association of such practices in reducing stress, anxiety and depression⁹ and in increasing self-efficacy and social support¹⁰. Moreover, they seem to positively assist in improving physical function, balance and consequently preventing falls¹¹.

According to the Brazilian scientific literature, assessment of these practices, specifically for the elderly population, focusing on functional fitness, quality of life, and social support, is still minimal; and it represents a gap in the production of scientific knowledge. There is a lack of studies with long-term follow-up and control groups. Therefore, this study aims to compare the parameters of functional fitness and the dimensions of quality of life of elderly participants and non-participants in the body practices of guided BPTCM, considering longer adherence time, shorter adherence time, and control group.

The results support the development and implementation of strategies to promote healthy aging. BPTCM are associated with comprehensiveness of care, sensitivity and body awareness, and the opportunity to redefine the ways of dealing with health-disease-care of elderly individuals.

Methods

This is an observational epidemiological case-control study carried out with 118 elderly people aged 60 years and older; Traditional Medicine Specialized Units (TMSU) of the Municipal Health Office of São Paulo (SMS-SP) users; belonging to Eastern, Central, and Southeastern Regional Health Coordination Centers. TMSU offer a wide variety of service modalities in Integrative and Complementary Practices, including BPTCM, Lian Gong, Qigong, Tai Chi Pai Lin, Tai Chi Chuan, among others¹³.

All elderly users enrolled in one of the four TMSU, who met the eligibility requirements of the cases (a group known to have the outcome) and the controls (a group known to be free of the outcome), with conditions to respond to the research instruments, were invited to participate in the survey.

Of the 183 BPTCM participants, the case group (CA) comprised elderly people of both sexes enrolled in one of the four TMSU, practitioners of only one of the guided BPTCM (at least twice a week for at least six months without interruption)¹⁴. They could practice physical activity in their leisure time, but without guidance from a professional, totaling 59 participants subdivided into two groups according to their median adherence time < 24 months and ≥ 24 months.

The control group (CO) comprised 59 elderly users of both sexes enrolled in the four TMSU, not participating in guided physical activity programs or BPTCM in or out of the TMSU for at least six months. The eligibility criterion established they could practice physical activity in leisure time, but without guidance.

CA and CO were paired by sex and age, considering the 1:1 ratio between them, accepting an alpha error of 5% and power of the test ($1-\beta = 80\%$).

Sociodemographic data were collected through a questionnaire designed to the objectives of the study. Lower and upper limb strength was assessed by 30-second chair stand test¹⁵ and hand grip strength test¹⁶; lower and upper limb flexibility was measured by sit and reach test¹⁷, chair stand and reach test, and back scratch test¹⁵; mobility, speed, agility, and dynamic balance were assessed by 8-foot up-and-go test¹⁵.

Health-related quality of life was measured by the Medical Outcomes Study 36- Item Short-Form Health Survey (SF-36)¹⁸. The SF-36 is a multidimensional questionnaire consisting of 36 items that encompass the dimensions of physical and mental health and eight domains, namely: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. To assess the results, a score was assigned to each question, and the values were transformed into a scale from 0 to 100; zero was the least favorable score, and 100 was the most favorable score; each domain was analyzed separately¹⁸.

Statistical analyzes were performed using the statistical program R 3.3.2. (R Core Team, 2016)¹⁹, which initially performed a descriptive analysis of the dependent and independent variables using mean, median, minimum and maximum values, standard deviation and absolute and relative frequencies. Univariate Logistic Regression was used to compare CA and CO concerning quality of life and functional tests.

The Kruskal-Wallis test was used to compare CA and CO in relation to less (< 24 months), equal or greater (≥ 24 months) practice time, according to quality of life and functional tests. An alpha significance level of 5% was used in the inferential analyzes.

This study was conducted within the ethical standards of research with human beings. Elderly individuals participated voluntarily after agreeing and signing the Informed Consent Form (ICF). The research project was analyzed and approved by the Research Ethics Committee (REC) of *Universidade Federal de São Paulo* (Number: 1,207,437) and by the SMS-SP REC (Number: 1,237,453).

Results

The study sample consisted of 118 elderly people, with 59 (50.0%) cases and 59 (50.0%) controls. Of the total number of individuals shown in Table 1, most are female (91.5% of cases and 89.8% of controls); white (35.6% of cases and 35.6% of controls); with incomplete elementary education (35.6% of cases and 55.9% of controls); married (55.9% of cases and 47.5% of controls); and unemployed (89.8% of cases and 83.1% of controls). Among the diseases mentioned, systemic hypertension (SH) prevailed in 64.4% of cases and in 72.9% of controls. There was no statistically significant difference between the cases and controls in relation to sociodemographic variables and reported morbidities.

Table 1
Comparison of sociodemographic variables and related morbidities between the cases and the controls

Variable	Cases		Controls		Total		P value ^a
	n	(%)	n	(%)	n	(%)	
Sex							
Male	5	(8.5)	6	(10.2)	11	(9.3)	0.752
Female	54	(91.5)	53	(89.8)	107	(90.7)	
Skin color/ethnicity							
White	21	(35.6)	21	(35.6)	42	(35.6)	0.485
Black	15	(25.4)	7	(11.9)	22	(18.6)	
Asian	5	(8.5)	6	(10.2)	11	(9.3)	
Mixed-race	18	(30.5)	23	(39.0)	41	(34.7)	
Indigenous			2	(3.4)	2	(1.7)	
Education							
None	1	(1.7)	-	-	1	(0.8)	0.351
Complete elementary education	9	(15.3)	3	(5.1)	12	(10.2)	
Incomplete elementary education	21	(35.6)	33	(55.9)	54	(45.8)	
Complete high school	12	(20.3)	11	(18.6)	23	(19.5)	
Incomplete high school	11	(18.6)	7	(11.9)	18	(15.3)	
Complete higher education	3	(5.1)	4	(6.8)	7	(5.9)	
Incomplete higher education	2	(3.4)	1	(1.7)	3	(2.5)	
Marital status							
Married	33	(55.9)	28	(47.5)	61	(51.7)	0.596
Single	7	(11.9)	10	(16.9)	17	(14.4)	
Widow(er)	15	(25.4)	11	(18.6)	26	(22.0)	
Divorced	4	(6.8)	8	(13.6)	12	(10.2)	
Common-law marriage	-	-	2	(3.4)	2	(1.7)	
Employed							
Yes	6	(10.2)	10	(16.9)	16	(13.6)	0.287
No	53	(89.8)	49	(83.1)	102	(86.4)	
Morbidities reported							

^a Univariate Logistic Regression

Variable	Cases		Controls		Total		P value^a
	n	(%)	n	(%)	n	(%)	
Diabetes							
Yes	13	(22.0)	21	(35.6)	34	(28.8)	0.106
No	46	(78.0)	38	(64.4)	84	(71.2)	
Hypertension							
Yes	38	(64.4)	43	(72.9)	81	(68.6)	0.322
No	21	(35.6)	16	(27.1)	37	(31.4)	
^a Univariate Logistic Regression							

The median time of adherence to body practices (24 months) was used to subdivide CA into shorter adherence time (< 24 months) and longer adherence time (\geq 24 months). Therefore, comparisons of functional parameters and aspects related to quality of life were made between the three groups. In relation to functional tests, there was a better result in CA with longer adherence time (\geq 24 months) in the 30-second chair stand test ($p = 0.006$), when compared to CA with shorter adherence time (< 24 months) and the control group (Table 2).

Table 2

Comparison of performance in functional tests between the cases (< 24 months and ≥ 24 months) and the controls

Variable	Cases		Controls	P value*
	< 24 months (n = 16) (%)	≥ 24 months (n = 43) (%)	(n = 59) (%)	
8-Foot up and go (s)				
Mean	5.5	5.1	5.6	0.129
Median	5.2	5.1	5.4	
Minimum	4.5	3.7	3.9	
Maximum	7.8	7.1	8.3	
Standard deviation	0.8	0.8	1.1	
30-Second chair stand (rep)				
Mean	12.9	15.6	14.3	0.006
Median	13.0	15.0	14.0	
Minimum	9.0	.0	.0	
Maximum	16.0	23.0	33.0	
Standard deviation	2.0	3.8	4.8	
Sit and reach (cm)				0.134
Mean	21.7	25.0	21.1	
Median	23.0	26.0	19.0	
Minimum	6.0	2.0	5.0	
Maximum	37.0	41.0	45.0	
Standard deviation	10.5	9.6	10.3	
Chair stand and reach (cm)				
Mean	-20.0	0.0	-8.8	0.741
Median	-20.0	0.0	-2.5	
Minimum	-20.0	0.0	-29.0	
Maximum	-20.0	0.0	7.0	
Standard deviation	-	-	12.8	
Back scratch (cm)				
Mean	-21.9	-12.7	-13.2	0.075

s: seconds; kg: kilograms; rep: repetitions; *: Kruskal Wallis

	Cases		Controls	P value*
Median	-24.0	-13.0	-15.0	
Minimum	-42.0	-42.0	-40.0	
Maximum	4.0	14.0	21.0	
Standard deviation	14.5	13.4	13.1	
Right hand grip strength (kg)				
Mean	23.5	25.7	23.4	0.144
Median	22.4	24.3	22.0	
Minimum	14.3	10.0	10.3	
Maximum	33.7	56.7	45.0	
Standard deviation	5.4	7.5	7.9	
Left hand grip strength (kg)				
Mean	22.5	23.9	22.3	0.213
Median	22.9	23.0	20.0	
Minimum	14.0	1.0	6.3	
Maximum	32.3	45.7	45.6	
Standard deviation	5.7	7.3	7.3	
s: seconds; kg: kilograms; rep: repetitions; *: Kruskal Wallis				

Regarding quality of life, comparing CA and CO, statistically significant differences were found for *bodily pain*, *vitality*, *role emotional*, and *mental health* (Table 3).

Table 3
Comparison of SF-36 domains between the cases (< 24 months and ≥ 24 months) and the controls

SF-36 domains	Cases		Controls (n = 59) (%)	P value*
	< 24 months (n = 16) (%)	≥ 24 months (n = 43) (%)		
Physical functioning				
Mean	56.9	71.0	62.2	0.062
Median	60.0	75.0	65.0	
Minimum	15.0	10.0	10.0	
Maximum	90.0	100.0	100.0	
Standard deviation	23.6	21.4	25.3	
Role physical				
Mean	45.3	65.7	54.2	0.113
Median	37.5	100.0	50.0	
Minimum	0.0	0.0	0.0	
Maximum	100.0	100.0	100.0	
Standard deviation	31.9	41.9	40.0	
Bodily pain				
Mean	43.1	67.5	56.4	0.003
Median	41.0	72.0	51.0	
Minimum	12.0	22.0	12.0	
Maximum	100.0	100.0	100.0	
Standard deviation	25.4	24.7	25.9	
General health				
Mean	58.9	71.4	66.3	0.163
Median	57.5	72.0	65.0	
Minimum	20.0	30.0	22.0	
Maximum	97.0	100.0	100.0	
Standard deviation	24.3	18.1	22.3	
Vitality				
Mean	59.4	72.1	61.1	0.021

SF-36: Medical Outcomes Study Short Form 36; *: Kruskal Wallis

SF-36 domains	Cases		Controls (n = 59) (%)	P value*
	< 24 months (n = 16) (%)	≥ 24 months (n = 43) (%)		
	Median	62.5		
Minimum	0.0	10.0	5.0	
Maximum	95.0	100.0	100.0	
Standard deviation	27.7	18.7	21.8	
Social functioning				
Mean	67.4	80.1	74.5	0.217
Median	75.0	88.0	75.0	
Minimum	0.0	25.0	13.0	
Maximum	100.0	100.0	100.0	
Standard deviation	28.8	23.7	26.0	
Role emotional				
Mean	37.5	69.0	61.0	0.034
Median	33.0	100.0	67.0	
Minimum	0.0	0.0	0.0	
Maximum	100.0	100.0	100.0	
Standard deviation	40.2	38.8	42.5	
Mental health				
Mean	70.0	75.7	65.4	0.020
Median	76.0	80.0	64.0	
Minimum	8.0	8.0	24.0	
Maximum	100.0	100.0	100.0	
Standard deviation	25.5	19.5	20.1	
SF-36: Medical Outcomes Study Short Form 36; *: Kruskal Wallis				

The CA with longer adherence time (≥ 24 months) had a better score in *bodily pain* ($p = 0.003$), when compared to the CA with shorter adherence time (< 24 months) and the control group.

In *vitality*, the CA with longer adherence time (≥ 24 months) obtained a better score ($p = 0.021$), when compared to CO.

Concerning *role emotional*, CO and the CA with longer adherence time (≥ 24 months) had a better score ($p = 0.034$), when compared to the CA with shorter adherence time (< 24 months).

In *mental health*, the CA with longer adherence time (≥ 24 months) obtained a better score ($p = 0.020$) when compared to CO.

Discussion

The results of this study show that the CA with longer adherence time (≥ 24 months) performing BPTCM may have been a contributory factor for the improvement of lower limb strength ($p = 0.006$), assessed by 30-second chair stand test (SCT).

Tai Chi and Qigong practices have a broad theoretical framework^{20–22}, and show positive results regarding increased lower limb strength. This fact was observed in a research that assessed the long-term effects (≥ 3 years) of Tai Chi on lower limb strength of elderly individuals. The survey found better results among Tai Chi practitioners compared to physically inactive elderly individuals, although the assessment methodology was different²⁰.

However, in the case of Lian Gong (LG), our findings differ from the research that compared the functional fitness of elderly participants in water based exercise, hiking, and LG. Significant results were found for lower limb strength in relation to hiking, when compared to water based exercise and LG, indicating that LG practice generated the lowest performance result in the SCT²³.

Another study on LG, which compared physical fitness and health-related quality of life of practitioners and physically inactive elderly individuals, also found no statistically significant differences between the two groups for lower limb strength. Lower limb strength was assessed by the same test, although the intervention period has been smaller²⁴. Such disagreement may be related to the scarcity of studies on LG practice; to the methodological quality of the research; and to the different forms of participant assessment and intervention.

Regarding health-related quality of life, long-term BPTCM, although present in fewer studies^{25,26}, may indicate significant changes in their different domains. Proficiency in carrying out movements was achieved over time, promoting greater benefits²⁷.

With respect to the results, it was observed that the CA with longer adherence time (≥ 24 months) obtained higher scores in *bodily pain* ($p = 0.003$), *vitality* ($p = 0.021$), *role emotional* ($p = 0.034$), and *mental health* ($p = 0.020$) (SF-36 domains).

Long-term psychosocial and health benefits of Tai Chi and Qigong have been also found in a review study that found pain reduction and improvement in psychological well-being over time²⁸. Qigong practitioners with more than five years of adherence from a research, supporting the results of this research, attributed their permanence in practice to maintaining health and recovering from some comorbidity²⁹.

Although this study has limitations regarding the causal factor of the results found, such findings may be related to the characteristics of BPTCM. Practicing BPTCM includes synchronization of body movements, breathing, meditative mental state, and relaxation. When such components are carried out concurrently and correctly, there is a wide range of benefits to health, quality of life, and recovery and maintenance of physiological functions. BPTCM are being increasingly used as integrative and complementary approaches to health³⁰.

Conclusions

To briefly summarise, when comparing the parameters of functional fitness and the dimensions of quality of life of elderly participants and non-participants of guided BPTCM, considering longer and shorter adherence to activities and CO, it was found that participation in BPTCM can contribute to improving functional fitness, lower limb strength, and quality of life.

Abbreviations

BPTCM: body practices of Traditional Chinese Medicine; TMSU: Traditional Medicine Specialized Units; SMS-SP: Municipal Health Office of São Paulo; CA: Case group; CO: Control group; SF-36: Medical Outcomes Study 36- Item Short-Form Health Survey; ICF: Informed Consent Form; REC: Research Ethics Committee; SCT- 30-second chair stand test; LG: Lian Gong

Declarations

Ethics approval and consent to participate:

The Ethical Board were approved by the Research Ethics Committee (REC) of Universidade Federal de São Paulo (Number: 1,207,437) and by the SMS-SP REC (Number: 1,237,453), and we obtained signed informed consent from all participants prior to study inclusion.

Consent for publication:

Not applicable.

Availability of data and materials:

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests.

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Authors' contributions:

Conception, planning, analysis, interpretation and writing of the work: MRMT; Analysis, interpretation and writing of the work: TA; Conception, planning, analysis, interpretation and writing of the work: MF; Conception, planning, analysis, interpretation and writing of the work: KMJS.

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