



Impact of Traditional Oriental Medicine and Physical Activity on Bone Mineral Density and Quality of Life of Elderly

KEYWORDS

Quality of Life (QOL); Traditional Medicine; Physical Activity; Bone Density; Aging.

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ABSTRACT

BACKGROUND: Physical activity plus traditional oriental medicine spread as a possible easy way to deal with healthy ageing. **OBJECTIVE:** establishing the impact of Physic Activity (PA) and Traditional Oriental Medicine (TOM) on Bone Mineral Density (BMD) and Quality of Life (QOL) of elderly. **DESIGN:** Inquire analytical descriptive ex-post-facto research. **SAMPLE:** Elderly both genders non-selected, volunteers, in Rio de Janeiro, Brazil, randomly selected from two groups: served with TOM techniques in ABACO/Sohaku-in; non-served by TOM. **METHODS:** QOL evaluation via WHOQOL-Old questionnaire, and PA evaluation via Baecke. Baecke subdivided the two initial groups (TOM/non-TOM) in four (active/sedentary): g1. TOM+PA; g2. TOM+nonPA; g3. nonTOM+PA; g4. nonTOM+nonPA. A posteriori, BMD was evaluated using dual-energy X-ray absorptiometry (DXA) – presented by the elderly. Descriptive and inferential statistical techniques compared the BMD and QOL ($p < 0.05$). **RESULTS:** Evaluating the QOL total score (TS) the ANOVA test showed higher scores in intergroup comparisons at g1-g2: $p < 0.001$; g1-g4: $p < 0.001$; and g3-g4: $p < 0.001$. The BMD evaluation presented intergroup comparisons higher values in L2-L4: g1-g2: $p < 0.001$; g1-g4: $p < 0.001$; g1-g3: $p = 0.023$. G1 presented highest values for both BMD and QOL, followed by g3, to which follows g2. **CONCLUSION:** Physical Activity presented predominant gain of BMD and QOL, with strong influence of Traditional Oriental Medicine.

Introduction

The elderly population triplicate last 50 years (1) and should duplicate on next 50 years, with elderly population now turning from 11% to 22% of worldly population (2). The World Health Organization (WHO) defines elderly as over sixties individuals (1, 3). Effects of population aging are dealt all around the world (4) as elderly represent a wide group predicted by demographic trends to increase substantially (5), and this predictions are important components of public policy to decide regulations related to elderly (6). Population aging being a whole new phenomenon – referred to change in the age structure of population (7) occurring worldwide (8), brings substantial challenges to public policies executors (9), and guarantees a profound impact in socio-economical conditions in broad aspect (10). Not only elderly are more numerous but they don't integrate spontaneously in society, that is obliged to decide their statute (11). The United Nations Organization is coordinating innumerous Conferences on Aging stimulating worldwide nations to develop and implement healthy aging aligned with WHO (12), in order to promote quality of life increasing healthy living years (13). Quality of Life (QOL) is defined by WHO as the individual perception of one's life position within the cultural context and value system in which one is inserted, related to one's goal, expectations, patterns and concerns (14). QOL is a complex individual concept of one's level of satisfaction: hoping human being can live independently, longer and with quality (8, 15), conducting to a consensus that elderly

satisfaction involves objective and subjective dimensions (16), where broad perspective is essential for its understanding (17). With that purpose the WHOQOL Group - World Health Organization Quality of Life Group - developed a WHOQOL-Old elderly QOL scale in a transcultural perspective (18). At the primordial moment the elderly define priorities the medium in which they're inserted notices and interprets this unique singular act (7, 19).

A aging limitation that withdraws elderly of most activities, driving toward pathological conditions is the lack of knowledge of aging process natural changes (20). Between the pathological conditions one of the most frequent is fractures related to osteoporosis, contributing substantially to elderly morbidity and mortality: a matter of Public Health (21); skeletal disease characterized by loss of bone resistance predisposing to risk of fractures with consequent functional loss. Bone resistance is a interaction resulting between the bone quality and the bone mineral density (BMD). BMD contributes to 70% of bone resistance and is measured with a type of X-ray (22) - the bone densitometry using dual-energy X-ray absorptiometry (DXA) - the gold standard to its diagnose and monitoring (23).

Traditional Oriental Medicine (TOM) comes up offering smooth ways to administrate elderly chronicle diseases (24). In 2002 the WHO launched its first global strategy on Traditional Medicine, that proposes TOM national policies development and imple-

mentation - giving priority to promoting its safety, quality and efficacy - as well as improving researches quality and quantity (24), for the general quality of researches so far presented is low (25). TOM's origin is 2500 ago (26), being nowadays taught and practiced all around the world. In Brazil the ABACO-Sohaku-In connected to acupuncture societies in China and Japan serve a large population for over forty years, and embrace worldwide cause of identifying cure agents of TOM according to high standards in research (25-31).

Aging seems to be connected to reduction of required energy that emerges from reduction of physical activity (5). Physical activity (PA) is a complex behavior that involves multiple areas (leisure, transportation, occupation, home care) and characteristics (frequency, intensity and duration) and that must be properly measured (32). The Baecke questionnaire modified to elderly rigorously validated (33, 34), is one of the most frequently utilized to access the level of regular physical activity, as it is short and simple (35).

Investigate on the impact of physical activity and traditional oriental medicine on the elderly bone mineral density becomes of great relevance. It is necessary to understand the needs of the elderly individuals that became a great parcel of worldly population (36).

Material and Methods

Sample: Composed by elderly - defined as individuals over sixties - (12), volunteers, both genders, living in Rio de Janeiro municipality, Brazil, that presented their bone densitometry using dual-energy X-ray absorptiometry (DXA) bone done within the last two years. One group had also the inclusion criterion of being randomly selected between the elderly individuals served for over five years with Traditional Oriental Medicine (TOM) at ABACO/Sohaku-in. To keep the sample homogeneous, considering that ABACO/Sohaku-in serves people at popular prices, there was an exclusion criterion for the group non-served with TOM, for elderly of extreme socio-economical condition, either superior or inferior. Therefore the sample was divided by in two groups: a group non-served with TOM (n=67); and a group served with TOM (n=60). From each group two more groups had been generated, according to practice of physical activity, defined by Baecke questionnaire, resulting therefore in the following sample groups: a. served with TOM and PA practitioners (g1); b. served with TOM and PA non-practitioners (g2); c. non-served with TOM and PA practitioners (g3); d. non-served with TOM and PA non-practitioners (g4). The sample "n" by group resulted then in: g1= 30; g2 = 30; g3= 36; and g4 = 31.

Design and Ethics in Research: This descriptive inquire analytical observational ex-post-facto research attending the Helsinki Declaration (37, 38) had been approved by the Euroamerican Net of Human Kinetics Research Ethics Committee.

Methods: Both questionnaires WHOQOL-Old for QOL and Baecke for PA were applied. As multicultural researches require using a general protocol to compare results (39), WHOQOL-Old elaborated as a specific instrument for elderly (40) translating peculiarities of their preferences (41) was properly validated (42), containing six facets: 1: sensorial functioning; 2: autonomy; 3: past, present and future activities; 4: social participation; 5: death and dying; 6: intimacy. Each facet pos-

esses 4 items - in a Likert scale from 1 to 5 - resulting in a set of facet scores plus a total score (TS) as a combination of the six facet scores that oscillates from 4 to 20. The Baecke questionnaire divided in three activities groups: home, sports and leisure, pondered according intensity and frequency, resulting in a summed up score (22), was adopted to split sedentary from active, as not precisely measuring PA would contribute to lack its association with health and risk factor (23) hence its effective influence in improving elderly QOL (24).

Concerning the BMD presented by the elderly, the most significant regions were observed: lumbar between L2-L4, femoral neck, femur greater trochanter. The mean and standard deviation of these regions were compared and the p-value calculated via Shapiro-Wilk. It was observed that all groups presented normality. Therefore the Lévène test was applied to the three studied regions (lumbar, femoral neck, femur greater trochanter) and it was observed that the three variable presented homogeneity of the variance. At this point it was performed the intergroup comparison in terms of Δ and p-value.

Neither the elderly nor the students that applied the questionnaire or the independent statistic that processed the data didn't know that were being divided in four groups or even the research hypothesis. Therefore, this research qualifies as triple-blind, where neither researchers nor surveyed have access to group distribution nor to research's hypothesis (43).

Data Analysis: Descriptive statistical dispersion and localization measures were utilized: mean and standard deviation. Inferential analysis adopted the Shapiro-Wilk and Levene tests to analyze respectively the normality and homogeneity of sample data variance. Aiming to contemplate the comparison total possibilities, $\alpha = 5\%$ was adopted for ANOVA one-way test followed by Scheffé post hoc identifying possible differences in intergroup comparisons. The PASW Statistics 18 was the statistical program utilized.

Results

The descriptive statistical (mean and standard deviation) and p-value according to Shapiro-Wilk (SW) test for age in group g1, g2, g3 and g4 are presented in table 1.

Table 1 – Age descriptive statistical and p-value according to Shapiro-Wilk (SW)

Groups	n	Age	p-value (SW)
g1	30	70.00 \pm 9.43	0.216
g2	30	69.40 \pm 6.17	0.179
g3	36	68.83 \pm 7.33	0.002
g4	31	71.52 \pm 8.23	0.024

Obs: g1 = served with TOM and practitioners of PA; g2 = served with TOM and PA non-practitioners; g3 = non-served with TOM and PA practitioners; g4 = non-served with TOM and PA non-practitioners; (SW) = p-value according to Shapiro-Wilk test.

The descriptive statistical (mean and standard deviation) of QOL facets plus total score for subgroups - g1 = served with TOM and PA practitioners; g2 = served with TOM and PA non-practitioners; g3 = non-served with TOM and PA practitioners; g4 = non-served with TOM and PA non-practitioners - is presented in Table 2.

Table 2 – Descriptive Statistical and comparison analysis of QOL in groups g1, g2, g3 and g4

	Fac. 1	Fac. 2	Fac. 3	Fac. 4	Fac. 5	Fac. 6	TS
g1	18.4 \pm 2.18	17.7 \pm 1.63	16.3 \pm 2.49	15.5 \pm 2.81	16.6 \pm 3.57	16.4 \pm 2.32	17.0 \pm 1.21
g2	14.6 \pm 4.18*	15.8 \pm 2.43	13.7 \pm 1.62*	12.8 \pm 2.98*	13.6 \pm 3.65	13.8 \pm 2.79*	14.0 \pm 1.54*
g3	15.1 \pm 3.19*	14.9 \pm 3.38*	15.8 \pm 3.15#	14.6 \pm 3.23	15.9 \pm 4.37	17.0 \pm 3.14#	15.5 \pm 2.43#
g4	12.2 \pm 2.76*#§	11.1 \pm 3.42*#§	11.9 \pm 2.60*§	11.7 \pm 3.87*§	10.1 \pm 3.44*#§	13.0 \pm 3.65*§	11.7 \pm 1.65*#§

Obs: Fac. = Fac. et; Fac. 1 = sensorial functioning; Fac. 2 = autonomy; Fac. 3 = past, present and future activities; Fac. 4 = social

participation; Fac. 5 = death and dying; Fac. 6 = intimacy; TS = total score; g1 = served with TOM and practitioners of PA; g2 = served with TOM and non-practitioners of PA; g3 = non-served with TOM and practitioners of PA; g4 = non-served with TOM and non-practitioners of PA; intergroup comparison per facet: * p<0.05 for G1; # p<0.05 for G2; § p<0.05 for G3.

Concerning QOL, Scheffé multiple comparison tests in table 2 - allowing simultaneously examining sample mean pairs to identify which are the ones with significant differences - verified that: elderly practitioners of PA served (g1) and non-served (g3) with TOM had significance above 0.05 in facets 3, 4, 5, 6 and TS. Therefore it is possible to infer that g1 presented more significant differences with the highest significance magnitude in relation to other groups for every analyzed variable. Showing the highest QOL, g1 was successively followed by g3, g2 and g4. Comparing with g4, both g1 and g3 presented significantly superior results. This way g1 and g3, both composed by active elderly obtained significant superiority (p-value<0.05) with higher absolute deltas - absolute variation of mean difference, presented in table 3 - showing that PA practitioners elderly presented higher QOL.

Table 3 – Groups g1, g2, g3 and g4 total score (TS) mean difference absolute variation analysis

group	group	Δ	p-value
g1	g2	2.71	0.000
g1	g3	1.25	0.063
g1	g4	5.11	0.000
g2	g3	-1.46	0.020
g2	g4	2.40	0.000
g3	g4	3.86	0.000

Obs: TS = total score; g1 = served with TOM and PA practitioners; g2 = served with TOM and PA non-practitioners; g3 = non-served with TOM and PA practitioners; g4 = non-served with TOM and PA non-practitioners; Δ: mean difference absolute variation.

Concerning BMD presented by the elderly, the most significant areas were observed: lumbar (between L2-L4), femoral neck, femur greater trochanter. The mean and standard deviation of these regions were compared and the p-value calculated via Shapiro-Wilk, where all the groups presented normality. Therefore the Lévène test was applied to those three regions (lumbar, femoral neck, femur greater trochanter) and it was observed that all three variable presented homogeneity of the variance. At this point the intergroup comparison of BMD - in terms of Δ and p-value - was performed, as presented in table 4.

Table 4 –BMD intergroup comparison analysis in terms of Δ and p-value

	group	group	Δ	p-value
L2L4	g1	g2	.1141*	0.000
	g1	g3	.0663*	0.023
	g1	g4	.1194*	0.000
	g2	g3	-0.05	0.166
	g2	g4	0.01	0.996
	g3	g4	0.05	0.096
femoralneck	g1	g2	.0601*	0.037
	g1	g3	0.02	0.710
	g1	g4	0.04	0.328
	g2	g3	-0.04	0.308
	g2	g4	-0.02	0.745
	g3	g4	0.01	0.900
Great Trochanter	g1	g2	.0630*	0.024

	group	group	Δ	p-value
	g1	g3	0.03	0.562
	g1	g4	.0588*	0.038
	g2	g3	-0.04	0.344
	g2	g4	0.00	0.998
	g3	g4	0.03	0.448

Obs: g1 = served with TOM and PA practitioners; g2 = served with TOM and PA non-practitioners; g3 = non-served with TOM and PA practitioners; g4 = non-served with TOM and PA non-practitioners; Δ= mean difference absolute variation.

The highest values of all groups for L2-L4 region was presented by g1, with statistical significance. Also, g1 was higher than g2 for femoral neck and higher than g2-g4 in femur greater trochanter, with statistical significance (table 4), concluding that being simultaneously submitted to TOM and PA the elderly present higher BMD.

This research therefore concluded that elderly individuals simultaneously submitted to TOM and PA present higher values of BMD and QOL. This elderly group is followed by the PA practitioners not submitted to TOM, to which follows the sedentary elderly submitted to TOM. In conclusion the practical of PA presented predominant gains in BMD and QOL, with strong influence of TOM in raising QOL and BMD.

Discussion

With sound philosophical experimental and experiential basis, TOM is a tradition of renewed public interest (24) being recognized as secure and effective (44). Nowadays a variety of studies present its effectiveness as a treatment option (45, 46), although its singular exclusive characteristics in clinical practice make it difficult to translate its models (47). TOM culture places a high value on old age (48), emphasizing that children should treat their parents with filial piety or absolute obedience, showing respect at all times, performing acts of ancestral worship, including deference to all elderly people (49).

The WHO considers health as a state of complete physical, mental and social well-being (50), therefore the WHOQOL group definition of QOL (51) suggests an inferior QOL to those elderly that did not reach its life goals and expectations (20). Comparing results found in this research concerning evaluating QOL of elderly as a function of applying TOM plus PA, with worldwide results of researches, it is found that:

In China (52) 360 elderly reported their QOL to be around 75%, that is equivalent to TS=77.25% of this research experimental group (g1,g3) served with TOM. In Brazil elderly women PA practitioners reported TS=72.3% (53), still around this research PA practitioners. But in Brazil wealthy sedentary elderly (54) reported TS=58%, and poor sedentary elderly (20) informed TS=49%, and in other research the whole poor elderly population of a specific municipality reported TS=60.76(55). Also in Brazil, two elderly group researched (17, 56) informed TS between 50 and 72 and in Turkey (41) a researched elderly population informed TS=54.29%. Exception made to the China elderly, all these other elderly were not served with neither TOM nor PA practitioners presenting an inferior total score if compared to the PA practitioners and/or served with TOM elderly of this research.

Concerning intimacy - facet 6 of WHOQOL-Old – presenting highest QOL in this research it's a frequent finding in elderly researches (15, 19), as elderly individuals being recognized as human beings accept interpersonal relationships as a vital area of their lives (57, 58). And the high QOL found in facets 1 and 2 - sensorial functioning and autonomy - confirm the impact of sensorial functioning losses on the elderly QOL (59) and the most often quoted healthy aging components: phys-

ical deficiency (60), physical and cognitive functioning (61). This association is directly or indirectly connected to QOL through PA effects over health (62). Ancient texts over 5000 years (63) in TOM present regular PA, encouraged by emperors and spread throughout the ancient world.

Comparing results found in this research concerning measuring elderly BMD as a function of applying PA, with worldwide researches, it is found that: nowadays it is scientific consensus that PA influences positively aging process through its impact in physiological functions (64) and impacting in reducing the risk of chronic diseases and other morbidities (65, 66) including osteoporosis (67) being PA associated with well succeeded aging (61) health (68) and QOL (69). These evidences are confirmed by this present research where g1 and g3 reported the higher QOL and BMD, with statistical significance.

This result presents that as elderly simultaneously served with TOM and PA presented the highest QOL and BMD values, followed by PA practitioners, to which follows the sedentary group submitted to TOM, the PA practice showed predominant gains in BMD and QOL with a strong influence of TOM on this raising of QOL. That is a unique singular conclusion, as a similar research has not been yet published, although the fabulous results of TOM in many areas of health are stimulating a large variety of researches (70-73).

Older people engage in society bestowing the wealth of knowledge, expertise, skill and wisdom to educate and inform younger generation; that encourages and facilitates the fullest participation of older people in family, neighborhood and society (58). Social participation contributes to better health and has been regarded as an important component of QOL (16, 74-76). Elderly people can progress and enjoy living despite ageing effects (15), that aggravates with physical inactivity (77), with ageing-related reduction of flexibility as a factor for functional decline (78). Maintaining physical and functional autonomy throughout aging (79) protects elderly against developing physical disabilities and becoming clinically institutionalized (80).

Conclusion

This research concluded that Physical Activity results in predominant gain of Bone Mineral Density and Quality of Life. It adds that there is strong influence of Traditional Oriental Medicine in that Physical Activity raising of Bone Mineral Density and Quality of Life.

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