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A pilot holistic exercise protocol for improving quality of life

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Original article

Abstract

This study aimed to investigate the effects of a new HMP method, a mind–body exercise protocol, on health-related Quality of Life(QoL) in adults and to explore possible differences by gender and age. A pilot longitudinal study was conducted involving 171 adults (female: 151, male: 20) who completed a 10-week exercise program consisting of one supervised session per week. The protocol integrated self-body awareness, postural control, breathing regulation, muscle activation–relaxation, and multisensory stimulation exercises. Quality of life was assessed before and after the intervention using the Italian version of the SF-36 Health Survey. A two-way ANCOVA was used to evaluate pre-post changes, accounting for the interaction between gender and age categories.Significant improvements were observed across several SF-36 domains following the intervention. Notable gains were observed in physical functioning, role-physical, bodily pain, general health, vitality, and mental health, with medium to large effect sizes in the physical domains. Improvements were independent of gender and age, although an interaction effect between gender and age emerged for physical functioning in the oldest participants.The proposed method appears to be an effective, low-dose HMP, suggesting that it may enhance multiple dimensions of adult QoL. These preliminary findings support the potential role of mind–body practices as accessible health-promotion strategies.

Approval of ethics committee

University of Bologna, protocol n. 0157696, 2024

Keywords

- health
- body awareness
- posture
- wellness
- holistic therapy

Contribution

A – Preparation of the research project
B – Assembly of data
C – Conducting of statistical analysis
D – Interpretation of results
E – Manuscript preparation
F – Literature review
G – Revising the manuscript

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Introduction

The Quality of Life (QoL) concept encompasses various definitions worldwide of general health status, including mental, physical, and psycho-emotional well-being, as well as life satisfaction.[1] Its complexity lies in the individual's life context, requiring the validation of multiple questionnaires for patients[2] or for adult populations.[3] To date, the Short Form 36 (SF-36) Health Survey is widely used worldwide due to its psychometric validity and extensive use in both clinical and research settings.[4,5] In 1998, Apolone and Mosconi validated it across different Italian samples, including patients and healthy individuals.[6] Since then, the SF-36 has been applied to evaluate and monitor the QoL of Italian citizens,[7,8] identifying social factors that affect perceived well-being, such as occupational stress and work role, social and emotional exhaustion, and an inactive lifestyle.[9,10] Although SF-36 has been shown to be a valid and reliable QoL health-related survey in several populations, norms have evolved differently over time by age and gender due to societal changes (economy, culture, etc.).[11]

From this perspective, the World Health Organisation (WHO) promotes the Sustainable Development Goals, which encompass several strategies for health promotion, self-care, and overall health and well-being for all at all ages.[12] Of these, the promotion of physical activity (PA) and the prevalence of active habits positively affected people's QoL.[13] Strong associations have been found between QoL and active behaviours in more than 20,000 subjects.[14] Whilst it is evident that 150-600 minutes per week of moderate PA or 75-300 minutes per week of vigorous PA are the best dosing to enhance QoL,[15] it is not clear how the specific exercise affected QoL, or whether a rational exercise plan could reduce the PA amount needed to be healthy. A recent study found that different long-term exercise plans, including aerobic, resistance, or traditional Gong, are effective in improving both physical and mental components, with significant effects on physical role and function in aerobic and resistance training, as well as body pain and vitality in Gong.[16] Relevant evidence highlighted the benefits of aerobic and resistance, or combined, exercises on the QoL of cancer patients[17] and sedentary individuals.[18]

However, the mind-body exercises, described as a holistic approach that combines postural and breathing control, and balance, such as Traditional Gong and Yoga, have been reported to have a positive effect on the Mental health of patients[19] and workers.[8] Additionally, Tai Chi and Qigong have been shown to induce several benefits for mental health.[20] The exercise psychologists described them as holistic movement practices (HMPs), which held all the well-being dimensions through distinctive techniques.[21] However, country and cultural habits can create barriers that lead participants to underestimate the role of social and mental functions, thereby omitting crucial spheres needed to improve QoL.[22,23] Behind the territorial and cultural influences that gave rise to numerous nomenclatures, the nature of HMPs revealed standard references, including posture, breath regulation, meditation, and consciousness.[24] Whilst meditation and consciousness exercises exhibited a strong association with mood and emotional regulation, helping to foster mental responses, postural control and breathing activities reduced musculoskeletal pain and discomfort, thereby enhancing body well-being.[25,26]

Despite their widespread use in Western and Oriental cultures, a significant portion of the world refuses to recognise their benefits due to a lack of empirical evidence (Vergeer et al., 2021). Additionally, it is unclear whether the HMPs' benefits apply to the entire population, encompassing both gender and age heterogeneity.

In light of this, the study aims to examine whether a new exercise protocol, based on Italian habits, could affect participants' quality of life and whether any differences are observed between Italian females and males of varying ages.

Materials and methods

Study design and sample

The project was a pilot longitudinal study with two factors (gender and age) and a single group of participants. The study lasted eleven weeks, of which ten included the proposed exercise treatment. All participants were enrolled via email or social network invitations and recruited if they expressed interest in the project. Exclusion criteria were the presence of any metabolic syndrome, cancer, musculoskeletal disorders, recent musculoskeletal and joint injuries, psycho-emotional disorders, and involvement in any other physical exercise program. Only adults' demands were considered. Research risks were presented, and each participant filled out an informed consent form. The study was conducted in accordance with the Helsinki Declaration ethical guidelines for human treatment (protocol n. 0157696, March 2024). All data were collected concerning participants' sensitive information, and no metadata was linked to the participants.

A priori sample size calculation was estimated by the following parameters: statistical test = two-way ANCOVA, Type I error = 5%, Type II error = 20%, Statistical power = 80%, number of raw factors = 2 (gender), number of

column factors = 4 (age category), delta = 0.25 (effect size). The requested sample size was 171 participants.

Exercise protocol

One one-hour-long exercise session per week was proposed, totalling ten sessions. All sessions were conducted in a quiet room at approximately 24°C and 40-50% humidity. Participants completed the session on a mat, transitioning from lying to sitting and standing position. Participants completed the sessions in groups of six. Two trained kinesiologists conducted each session.

The exercise protocol aimed to improve participants' QoL by combining different kinds of exercises, as usually encompassed in holistic movement practices (HMPs).[21] It includes exercises that enhance participants' self-body awareness by identifying internal muscle tension and postural alterations that could contribute to pain and discomfort, by activating sensorial and proprioceptive feelings, tension and relaxation, and promoting adequate breathing by triggering the neuro-muscular pathways. A well-balanced posture is the cornerstone of improving quality of life.

Each session covered a specific focus:

1. Reducing the psycho-physical stress. Aimed to feel psycho-emotional stressors through all the senses, and learn how to use one's own body for ameliorating them.
2. Perceiving and acting on postural discomfort. Aimed to discover the body posture and main muscles involved in tone maintenance, perceiving their movement and recruitment.
3. Back muscle tension. Aimed to feel the back muscles' action, perceiving how to contract and relax them, how to reduce their tension and altered tone.
4. Discovering the breathing. Aimed to teach the appropriate breathing for involving all the muscles from the thorax to the diaphragm, and feel the flow during inhalation and exhalation.
5. Back muscle tension (as in session 3).
6. Mobilising ankle and waist. Aimed at the perceived muscles involved in ankle and waist balance and stability, from stronger to stabilisers.
7. Perceiving and working on the spine. Aimed at the perceived spine balance and how the back and anterior muscles could alter or balance it.
8. Relaxing through movement. Aimed to teach how to encompass all the previous phases to relax the whole body.
9. Enforcing through movement. Aimed to perform static and easy movements to strengthen the main muscles involved in postural balance.
10. Posture and new balance. Aimed to encompass all the previous phases to feel the new postural assessment and become aware of the new balance.

Also, each session included four main phases:

a) Listening, feeling and perceiving. It focused on individual learning of the body consciousness. In this phase, all participants' senses were stimulated through listening, visual, olfactory, and tactile exercises, using relaxing sounds, room scents, and small tactile tools. This phase lasted about 15 minutes.
b) Body structural work. It consisted of three different parts, equally timed during each session. The first part consisted of relaxing exercises, particularly for the abdomen and joint insertions. Breathing exercises were then proposed in both standing and lying-down positions. Finally, slow, long, isotonic, and isometric contractions were proposed to increase joint range of motion and to increase muscle tension. This phase was about 20 minutes.
c) Feedback and postural consolidation. It consisted of proprioceptive exercises, focusing on joint mobility and static posture adaptation. This phase lasted about 10 minutes.
d) Social interaction and relaxation. It focused on sharing feelings and the benefits achieved during the session. This phase lasted about 10 minutes.

Table 1 presents exercises that can be performed in various positions and with small instruments within each session.

Quality of life

The quality of life was measured by the Italian SF-36 Health Survey.[6] The SF-36 was self-administered during a person-to-person interview in a private room at the gym where participants performed the protocol. Each participant completed the survey without social interaction or external influences. One trained psychologist administered the survey. The validation criteria on healthy people (n = 50) were scale completeness = 96%, response consistency index = 86%, item internal consistency = 91.4%, discriminant validity = 99.6%, internal consistency reliability = 70-90%.6The scale consisted of eight items: physical functioning (PF, reliability = 93%), role-physical (RF, reliability = 89%), bodily pain (BP, reliability = 85%), general health (GH, reliability = 77%), vitality (VT, reliability = 78%), social functioning (SF, reliability = 77%), role-emotional (RE, reliability = 85%), mental health (MH, reliability = 85%).

Table 1. Examples of the exercise, their aims and applications

Exercise	Position	Focus	Supportive instrument
Breathing with one hand on the chest and one on the abdominals, prolonging each breathing phase for at least three seconds, feeling how the muscles act	Lying on the back	Global breathing. Perceiving the flow in inhalation and exhalation	A mat and a towel for laying the head down
Breathing using the anterior muscles for enhancing relaxation, perceiving how the shoulder, thigh and leg are involved in inhalation and exhalation	Lying on the back	Anterior breathing	A mat and a towel for laying the head down
Breathing using the anterior muscles for enhancing relaxation, perceiving how the head, back, thigh and leg are involved in inhalation and exhalation	Lying on the back	Posterior breathing. Head movement for better perception of the back muscles	Mat
Tilting the pelvis in the anterior and posterior direction, perceiving the action of the glutes, abdominals, and anterior thigh muscles	Lying on the back	Pelvis discovery	Mat; small ball* for better perceiving specific muscle action
Mobilising the pelvis through slow ankle intra or extra-rotation, thigh flexion and extension	Lying on the back or sitting	Pelvis discovery and mobilisation	Mat; small ball* for better perceiving specific muscle action
Mobilising the pelvis through thigh, leg and foot actions	Lying on the back, sitting or standing	Pelvis discovery using the lower limbs	Mat; small ball*
Perceiving back role in lying, moving the weight from the low back to the dorsum and scapula, using head rotation for muscle perception	Lying on the back	Back discovery	Mat; small ball* for better perceiving specific muscle action
Mobilising the shoulders through slow arm intra or extra-rotation, arm flexion and extension, abduction and adduction	Lying on the back, sitting or standing	Shoulder discovery and mobilisation	Mat; small ball* for better perceiving specific muscle action
Mobilising the shoulders through arm, forearm and hand actions	Lying on the back, sitting or standing	Shoulder discovery using the upper limbs	Mat; small ball*
Mobilising the spine through slow thorax and head movements on all the planes	Lying on the back, sitting or standing	Shoulder discovery, mobilisation and strengthening	Mat; small ball* for better perceiving specific muscle action
Stretching back muscles	Lying on the back, sitting or standing	Relaxation	Mat; small ball*; big ball**
Stretching anterior muscles	Lying on the back, sitting or standing		
Stretching lower limb muscles	Lying on the back, sitting or standing		
Stretching upper limb muscles	Lying on the back, sitting or standing		

Note: *small ball is 10 cm in diameter; **big ball is 25 cm in diameter

Investigation and statistics

The main goal of the study was to evaluate the impact of the proposed method on the participants' quality of life. To understand the effect and its dimension, we treated the SF-36 items at post as dependent variables, the SF-36 items at pre as covariates, and gender and age categories as factors.

The mean described the measure of central tendency, while the standard deviation represented the dispersion. Categorical variables were expressed as frequencies, and their hypotheses were tested by the chi-squared (χ^2). The Kolmogorov-Smirnov test was used to check the distributions of continuous variables. The White and Durbin-Watson tests tested for error sphericity, and when residuals were heterogeneous, a weight based on the reciprocals of predicted residuals was computed.[27] Additionally, the variance inflation factor was used to assess the correlation among the model's variables. The two-way ANCOVA model tested simple (general effect), main (gender or age category effect, separately), and interaction effects of gender and age categories, where the variable value at pre-represented the covariate, and its value at post-represented the dependent variable. The type I error probability (p-value) was set at 0.05. Partial eta-square (η^2) represented the effect size of each variable. All analyses were conducted using SAS 9.[4] (English version, Windows edition; Cary, North Carolina, USA).

Results

Females represent 88.3% of participants, with the majority aged 45–54 years (43.71%). Males reported a similar distribution across the 55-64 and 65+ age groups (25%), with no significant difference between the groups ($\chi^2(3) = 1.74$, $p = 0.627$). The Cochran-Mantel-Hansel statistics reported no significant association between gender and age scores (CMH $\chi^2(3) = 1.73$, $p = 0.629$).

Table 2 presents summary statistics categorised by gender and age, while Figure 1 displays adjusted mean plots with 95% confidence intervals for the interaction between gender and age category.

Physical functioning reported an increased mean value at post (95% CI of η^2: 0.261, 0.472; F(1, 170) = 142.83, $p < 0.001$), with an interaction effect of gender and age-categories ($\eta^2 = 0.032$; F(3, 170) = 3.33, $p = 0.021$). Generally, PF increased by 2.41% (95% CI: 0.3%, 4.48%). The adjusted mean contrast between female and male was −1.56 (95% CI: 4.67, 1.53, $t = -1.41$, $p = 0.161$), while the adjusted age-category's means were lowest in 45–54 (85.92, F(2, 170) = 0.31, $p = 0.737$) and highest in younger (88.01, F(3, 170) = 0.27, $p = 0.848$). The interaction effect was significant only for the oldest group ($t = -3.63$, $p < 0.001$), in which females reported a lower mean (95% CI of the contrast: −14.95, −4.91).

Role-physical increased by 0.34 (95% CI: 0.22, 0.45; $\eta^2 = 0.158$, F(1, 170) = 30.71, $p < 0.001$) at post per each level of pre-treatment, but did not report any interaction effect (F(3, 170) = 0.29, $p = 0.831$). RP increased by 14.97% (95% CI: 7.48%, 22.44%). Additionally, no significant differences were found between genders ($t = -1.02$, $p = 0.308$) or age categories ($t = 0.51$, $p = 0.853$). However, the 45–54 female and male groups reported the lowest mean difference (95% CI: −34.42, 34.41), whereas the widest was observed between the youngest females and males (95% CI: −72.72, 37.48).

The bodily pain score at post reported a regression coefficient of 0.46 ± 0.06 (95% CI of η^2: 0.143, 0.349; F(1, 170) = 52.42, $p < 0.001$), with no interaction or main effect. BP improved by 4.24% (95% CI: 0.1%, 9.37%). However, adjusted means showed an overall contrast of −4.77 (95% CI: −12.96, 3.42) with the most significant difference in 45–54 females vs. males (contrast = −9.34 ± 8.11, $t = -1.15$, $p = 0.25$), while the youngest groups exhibited the highest means (95% CI female: 61.46, 73.13; 95% CI male: 55.38, 93.48).

Concerning general health, it increased by 0.53(95% CI: 0.41, 0.65; $\eta^2 = 0.314$, $t = 8.87$, $p < 0.001$) per each pre-treatment level, with the most remarkable absolute improvement in the youngest males (+16.75%). However, the general improvement was not significant (95% CI: −2.38%, 5.46%).The gender contrast was 4.67 ($t = -1.53$, $p = 0.127$), with the widest absolute difference observed in the 55-64 years age range (contrast = −10.71; $t = -1.46$, $p = 0.148$).

Regarding vitality, a significant effect was detected from baseline (95% CI of η^2: 0.18, 0.388; F(1, 170) = 81.05, $p < 0.001$), while no interaction or main effects were detected. However, the overall gender contrast was −4.28 ($t = -1.29$, $p = 0.199$), with the most significant difference among the youngest participants (contrast = −4.47, $t = -0.85$, $p = 0.398$).

Of all SF-36 domains, the social functioning slope of the pre-treatment effect was the smallest ($\eta^2 = 0.10$; $\beta = 0.34$, $t = 4.35$, $p < 0.001$) with no gender effect ($t = -0.60$, $p = 0.549$), groups (F (3, 170) = 0.16, p = 0.923) and interaction (F(3, 170) = 0.29, $p = 0.835$).Although the role-emotional slope of the pre-treatment was similar ($\eta^2 = 0.122$; $\beta = 0.358$, $t = 4.9$, $p < 0.001$), the youngest group reported the widest effect (F(3, 170) = 1.14, $p = 0.335$), whereas the interaction of gender within the 55–64 years category ($t = -1.47$, $p = 0.284$).

Table 2. Summary statistics for gender and age category

	Female (n = 151)								Male (n = 20)							
	<45 years (n = 32)		45–54 years (n = 66)		55–64 years (n = 28)		≥65 years (n = 25)		<45 years (n = 3)		45–54 years (n = 7)		55–64 years (n = 5)		≥65 years (n = 5)	
Var	mean	std	mean	std	mean	std	mean	std	mean	std	mean	std	mean	std	mean	std
PF1	89.84	9.37	83.94	14.95	84.11	13.88	76.20	20.58	91.67	2.89	80.71	13.05	85.00	9.35	87.00	8.37
PF2	90.31	12.37	86.36	13.37	88.21	10.56	79.40	13.10	95.00	0.00	81.43	17.25	85.00	11.73	94.00	6.52
RP1	80.47	28.21	70.45	37.44	69.64	37.49	68.00	39.21	58.33	38.19	50.00	47.87	80.00	27.39	30.00	44.72
RP2	83.59	28.83	84.47	25.10	84.82	20.79	83.00	28.61	100.0	0.00	71.43	41.9	85.00	33.54	80.00	44.72
BP1	61.72	20.57	61.24	19.59	55.61	18.78	63.56	23.57	62.00	21.52	43.71	24.19	58.40	19.65	63.60	28.01
BP2	68.06	21.13	66.02	18.86	60.79	16.50	65.48	17.91	75.33	29.96	60.71	19.27	71.40	17.71	65.40	25.26
GH1	62.16	17.04	62.35	17.07	72.39	12.35	60.00	15.29	65.67	18.45	58.43	16.00	70.40	6.07	63.20	20.24
GH2	64.09	16.19	65.77	13.93	68.96	15.50	65.32	12.24	76.67	21.57	67.00	20.39	68.40	14.88	71.20	12.48
VT1	52.81	17.87	54.47	17.76	58.57	14.07	58.00	19.95	61.67	7.64	51.43	12.82	60.00	12.75	70.00	15.41
VT2	54.69	16.26	57.80	17.93	61.07	13.50	62.80	11.64	61.67	7.64	60.71	21.49	67.00	10.37	74.00	12.45
SF1	69.00	21.36	68.11	21.30	81.04	16.14	77.64	17.82	74.67	12.5	44.43	23.94	67.20	19.06	82.20	18.86
SF2	74.81	22.91	71.56	22.83	81.07	16.45	81.80	16.56	78.67	14.43	71.29	25.63	82.20	19.19	79.80	22.76
RE1	76.91	32.29	71.06	37.90	78.43	34.28	81.16	30.65	44.33	50.95	47.29	37.65	80.00	44.72	93.20	15.21
RE2	77.97	32.47	76.62	33.17	84.43	29.49	83.84	27.56	100.0	0.00	61.71	35.81	73.20	43.49	100.0	0.00
MH1	62.88	18.32	64.18	17.46	70.00	15.64	69.44	18.61	62.67	6.11	57.71	14.58	76.80	21.05	76.80	13.08
MH2	63.88	15.22	67.03	17.81	72.43	10.91	70.72	14.18	74.67	16.65	72.00	12.44	74.40	16.15	80.80	z

Note: Var – variable; PF – Physical functioning; RP – Role-physical; BP – Bodily pain; GH – General health; VT – Vitality; SF – Social functioning; RE – Role-emotional; MH – Mental health, 1 – pre-treatment; 2 post-treatment.

Finally, the mental health status reported a slope of 0.477 (95% CI: 0.36, 0.59; $\eta^2 = 0.27$, F(1, 170) = 65.29, $p < 0.001$), with no significant interaction or main effects. However, the female vs. male contrast was −6.06 ($t = -1.86$, $p = 0.065$), with the most significant difference observed between the youngest groups (contrast = −8.05, $t = -1.55$, $p = 0.124$).

Discussion

The following study is a pilot investigation that proposes a new holistic movement practice for improving participants' quality of Life, taking into consideration its benefits across different gender and age groups of 171 Italian participants. The follow-up lasted 10 weeks, during which participants practised one session per week of combined exercises, including sensorial patterns, postural control, breath regulation, muscular consciousness through activation and relaxation, and joint mobility. We found that the Bio-gymnastic method improved the general QoL of participants, independently of specific items, sex, and age, with the most significant benefits in physical health than in mental health. The SF-36 has been demonstrated to be a valid tool for assessing physical health in exercise treatment, with no difference in validity compared to other scales.[28] This provides good reliability and extendibility to our results, enabling general considerations. However, the study protocol needs further confirmation to achieve full validity.

The Bio-gymnastic method was conceived as a brief, low-dose intervention to examine whether targeted mind–body exercises could improve Quality of Life (QoL) within a limited timeframe. Determining the time required to improve general health through physical exercise is challenging, as numerous factors must be considered. Generally, a recent systematic review found that 59–66 days are required to develop healthy habits induced by physical activity.[29] When specific physiological adaptations are sought, humans can improve their aerobic capacity after only three weeks, regardless of age,[30] their muscle hypertrophy after three weeks,[31] and their strength after four weeks, regardless of gender.[32] Wernbom and colleagues[33] highlighted that the training frequency (days per week), intensity and volume also played key roles in inducing the desired benefit. Although HMPs usually lack standardised intensity and volume, such as in endurance and strength training, we assessed one training session per week, lasting about an hour each, for a total of 10 sessions and hours, comparable to the 8 and 9 previously reported. The choice of a 10-session program over ten weeks was informed by evidence showing that mind–body interventions can yield measurable psycho-physical benefits even with low-frequency sessions, provided that breathing, postural awareness, and sensory engagement are integrated.[34,35] Additionally, the protocol was designed to be feasible for adults with diverse schedules, supporting adherence and minimising dropout. All the factors mentioned below could justify the expected improvement in physical health, as indicated by physical functioning (up 2.41%) and role-physical (up 14.97%). Although additional variables, such as lesson duration, costs, environment, and facilitations, affected the HMPs' spread and adherence, our exercise plan aligns with many previous theoretical principles, which pique the interest of a wider female sample in comparison to the male sample.[36] Motivation and psychosocial differences usually affect gender behaviours. Research found that males are less likely to participate in activities perceived as highly feminine, which is often stereotyped as focusing primarily on flexibility and stress reduction rather than strength and athleticism[37]; also, women generally possess greater joint mobility, which leads to greater focus and attention during HMPs' sessions, reflecting significant effects on psycho-social than physical spheres. It justifies the unbalanced sample size, and it is also expected that older women were already accustomed to practising HMPs, reducing the magnitude of variation compared to men.

Similarly, mental health is widely affected by many features such as gender, age, lifestyle behaviours, chronic disease, and physical exercise habits.[38] In general, the effects of physical exercise are recognised to affect many human systems and psychological-emotional aspects, and holistic practices are expected to lead to improved global and mental health.[39] HMPs involve several mental, emotional and cognitive components that require an adequate environment, concentration, pedagogical contents and exercise, such as breathing and relaxation.[21] We found a medium effect size (>0.25) for mental health variation, adjusted by gender and age, suggesting that our proposal may be compared with popular HMPs such as Yoga, Tai Chi, and others, which showed magnitudes ranging from 0.2 to 0.8.[40,41] Our protocol is grounded in HMPs, which conceptualise posture, breathing, and body awareness as interconnected determinants of physical and psycho-emotional well-being.[42] Similar to Yoga, Tai Chi, and Qigong, Bio-gymnastic adopts a holistic, unitary approach to psychophysical well-being, viewing the individual as a complex system striving for balance across physical, emotional, and psychological dimensions. Within this framework, the practice aims to enhance interoceptive and proprioceptive awareness in order to reorganise motor patterns, reduce

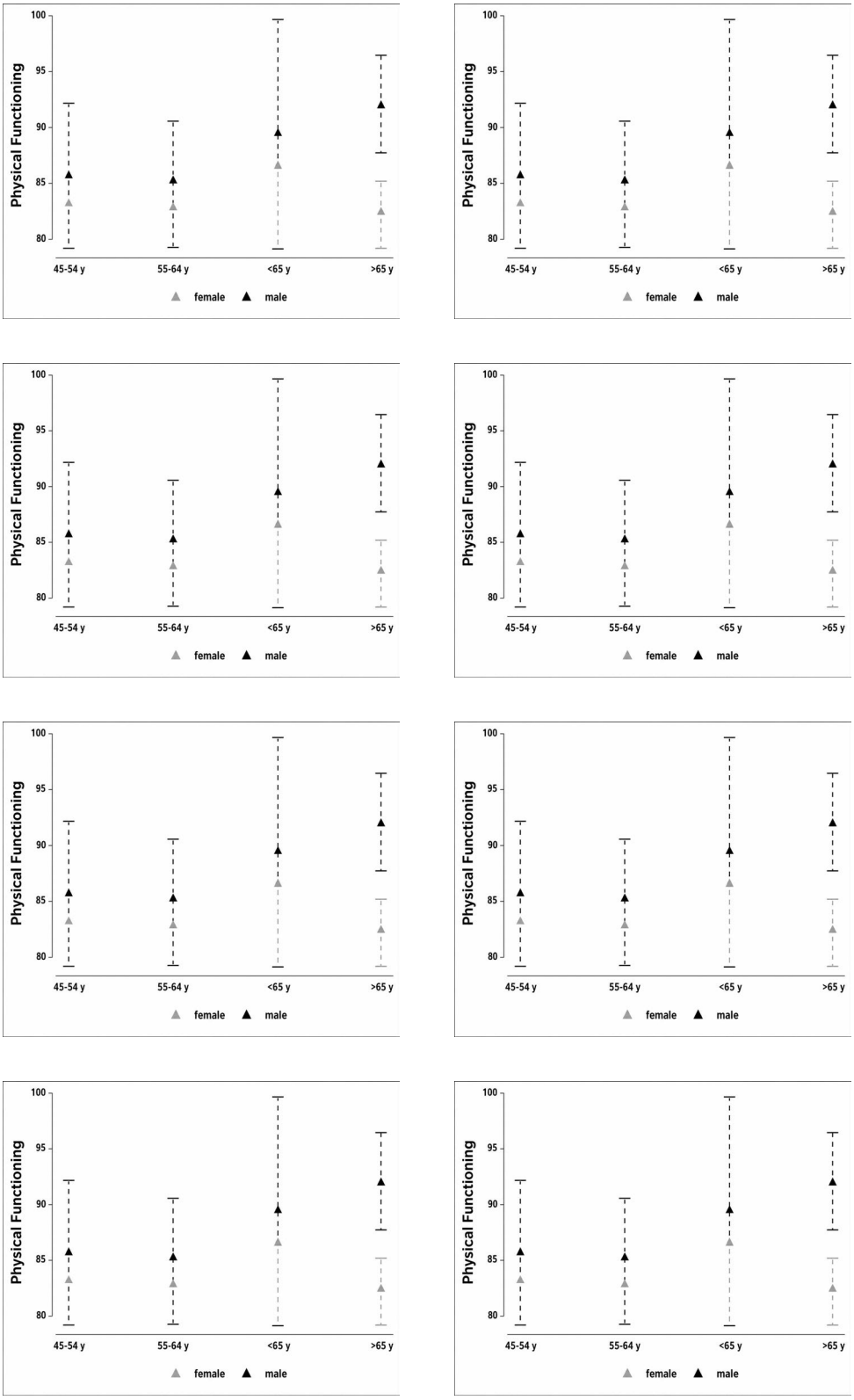

Figure 1. Means plots with 95% CI of adjusted estimation for gender and age categories, considering the pre-treatment effect

maladaptive muscle tension, and support emotional regulation.[35] Breathing exercises target autonomic modulation and stress reduction, mechanisms widely associated with slow and regulated breathing patterns.[43] Postural exploration and slow isotonic–isometric contractions addressed musculoskeletal imbalances, stiffness, and discomfort, consistent with movement-based approaches to pain modulation and neuromuscular relaxation. The inclusion of multisensory cues aimed to reinforce attention focus, a core component of embodied awareness processes linked to improvements in pain perception, vitality, and general well-being.[42] However, it seems that there exists an intrinsic relationship between the baseline mental health burden and the percentage of variation, where clinical and severe conditions reported the widest effects. When healthy people are considered, previous HMPs demonstrated heterogeneous variations among mental health components such as anxiety and depression, but only in the elderly.[44] We found no difference between younger and older adults, but we investigated mental health as a separate item; specific results are needed. It is crucial to be aware that the role-emotional sphere is also strongly related to mental health, while social functioning, vitality and general health require more insight.[45] Whilst we found the smallest effect sizes in role-emotional and social functioning, general health showed the most considerable effect, suggesting that the proposed protocol may be a valid method for improving health. Previous studies have examined the relationship between physical activity and emotional and community well-being, showing that people who are more physically active (in terms of the number of hours spent engaging in physical activity) tend to be better off.[46] Considering that our protocols lasted 1 hour per week, this could explain the small effect size observed. However, given that many investigators debated the role of cultural factors in improving QoL, the effect we found may be a source for further investigation that involves an occidental method breaking the barriers posed by oriental habits.[22]

This study presents several limitations. The absence of a control group limits causal inference, as placebo effects and expectancy effects cannot be ruled out. The sample was strongly unbalanced by gender, with a predominance of female participants, reducing the generalizability of gender-related findings. Moreover, outcomes relied exclusively on self-reported QoL measures, such as the SF-36,[47] without objective assessments of physical or postural changes. Small subgroup sizes and the relatively short intervention duration further limit the ability to draw conclusions regarding between-group differences and long-term effects.[45] Finally, the authors selected a statistical design that detects changes in participants' behaviour before and after the treatment, but cannot identify specific trends. The selection was mandatory because the authors cannot measure lifestyle habits that affect quality of life (such as nutrition).

Conclusions

This pilot study suggests that the Bio-gymnastic method may enhance multiple dimensions of Quality of Life in adults, particularly physical functioning, vitality, general health, and mental health. These results support the potential role of mind–body exercises as accessible, low-intensity strategies for promoting well-being, consistent with the existing literature on holistic movement practices. Future studies employing randomised controlled designs, larger and more balanced samples, objective outcome measures, and follow-up assessments are needed to confirm and extend these preliminary findings.

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