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QUALITY OF LIFE IN SEDENTARY ELDERLY WOMEN AND THOSE WHO PRACTISE AQUATIC EXERCISES: A SYSTEMATIC REVIEW

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Resumo

O objetivo do estudo é realizar revisão sistemática da qualidade de vida de mulheres idosas sedentárias e praticantes de exercícios aquáticos. Os artigos selecionados foram publicados entre 2019 e 2023, nos idiomas espanhol, português ou inglês, totalizando 42 publicações. A meta-análise foi realizada utilizando o RStudio 2022.02.0+443 para Windows, para plotar o gráfico de Floresta e estimar os efeitos fixos e aleatórios, considerando o método da variância inversa e o intervalo de confiança estimado pelo método Q-profile. Os domínios físico, psicológico e social tiveram no modelo de efeitos fixos o melhor resultado (valor-p ≤ 0,00), mas sem significância da heterogeneidade (valor-p > 0,05). Em todos os domínios, as idosas praticantes de exercícios aquáticos conquistaram melhores resultados. A conclusão foi que a prática regular de exercícios aquáticos favoreceu a qualidade de vida daquelas mulheres.

Palavras-chave: Geronte. Senescência. Treinamento. Psiquismo. Social.

Abstract

The aim of the study is to carry out a systematic review of the quality of life of sedentary elderly women who practice aquatic exercises. The selected articles were published between 2019 and 2023, in Spanish, Portuguese or English, totalling 42 publications. The meta-analysis was performed using RStudio 2022.02.0+443 for Windows, to plot the Forest plot and estimate the fixed and random effects, considering the inverse variance method and the confidence interval estimated by the Q-profile method. The physical, psychological, and social domains had the best result in the fixed effects model (p-value ≤ 0.00), but without significance of heterogeneity (p-value > 0.05). In all domains, elderly women who practiced aquatic exercises achieved better results. The conclusion was that regular practice of aquatic exercises improved the quality of life of these women.

Keywords: Geront. Senescence. Training. Psyche. Social.

Introduction

According to WHO (2022), people worldwide are living longer and the pace of population ageing is much faster than in the past. Unfortunately, in the same way, health

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and social issues, including mental health among the elderly are becoming increasingly common, compromising the overall well-being and the quality of life of aging individuals. For some, quality of life has ceased to be characterized only as the absence of disease and is increasingly noticeable in people's daily lives through other forms, such as regular physical exercise, balanced diet and even in the time it is assigned. the leisure activity. Quality of life is a routine that needs harmony between responsibilities and pleasure, ensured by a healthy life, personal success, and the unimpeded execution of daily tasks (Neiva *et al.*, 2018).

Exercise, in its different modalities has been shown to be inversely proportional to mortality and an important component of lifestyle for quality of life improvements. Functioning and physical autonomy are associated with certain perspectives on quality of life. Thus, physical exercise has been presented as an important means for improving the quality of life of human beings, both for healthy individuals and for those who face some pathological condition.

Despite this evidence and apparent concern and awareness of the population regarding the need of improvement in the quality of life and the importance of physical activity, millions of individuals remain essentially sedentary, independent of age group (Zhou *et al.*, 2021).

Aquatic Exercise (AE) is an alternative form of physical conditioning and consists of specific aquatic exercises based on the use of water resistance force as an overload. Aquatic Exercise is an exercise modality which can be defined as a group of exercises performed in the water, mainly in the vertical position, with or without music, with or without equipment added and in shallow or deep water. Its main characteristics are the utilisation of hydrostatic and hydrodynamics properties to work on the aerobic and neuromuscular system (Yázigi *et al.*, 2013).

Due buoyancy action, AE presents less stress on the weight-bearing joints when compared to land exercises, providing a mechanical load protection for the joints. In this way, AE becomes a viable and safe exercise for diverse populations once research has been showing its positive effects of on the most varied conditions and ages (Tang *et al.*, 2022; Salse-Batan *et al.*, 2021), mainly for elderly (Sato *et al.*, 2009), pregnant women (Bacchi *et al.*, 2018), obese individual, for people with rheumatic diseases (Zamunér *et al.*, 2019) and for individuals suffering from arthritis and / or orthopaedics dysfunctions and have difficulty sustaining body weight (Rewald *et al.*, 2016). Actually, AE is recommended by major health, fitness, sports, and clinical guidelines (Fraenkel *et al.*, 2021; Aquatic Exercise

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Association, 2018) as well for people with different fitness levels who aim to maintain or improve their conditioning (Neiva *et al.*, 2018).

Understanding the beneficial effects of physical exercise is necessary for adopting a more active lifestyle, and the regularity of these exercises should be based on a training program. In this way, the aim of this study is to conduct a systematic review of quality of life in elderly women who practice aquatic exercise and compare with sedentary women.

Methodology

We included randomized clinical trials (RCTs) on the practice of water aerobics compared to a control group, considering the quality of life questionnaire, WHOQOL-bref. We only included women who were at least 60 years old and had practiced the sport for one year. All, active and sedentary, apparently healthy, with no diagnosed joint, muscular, physiological, metabolic or psychic limitations. Trials including used two groups, experimental and control, this one with sedentary people. The trials included only used water aerobics with two to five sessions per week. The outcome measures were those inherent to the WHOQOL-Bref, including the following set (Fleck *et al.*, 2000): physical domain, psychological domain, and social domain.

We searched the following databases until March 30, 2023: SciELO - Scientific Electronic Library Online, LILACS - Latin American and Caribbean Literature in Health Sciences, and MEDLINE - International Literature in Health Sciences In addition. We checked the catalogues of the Library of the University of São Paulo and the Library of the State University of Campinas to consider course completion works, monographs, dissertations, and theses. The search for academic works was guided by the keywords Hydrogymnastics, aquatic exercise, Quality of Life, Whoqol-bref, adult, and woman. And it considered works published between 2019 and 2023.

The articles were selected by the authors, initially based on the information contained in the abstracts and type of publication. Sequentially, by reading the full articles of all studies, choosing those used in the current study. There were a total of 42 articles in Spanish (three articles), Portuguese (10 articles) and English (29 publications), resulting in 1,266 observations.

Assessment of risk of bias considered: 1. Incomplete outcome data: How complete was the outcome data for the primary outcomes? Have dropout rates and reasons for dropout been reported? Were missing data appropriately imputed? We consider a minimum

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overall completion rate of 75.00% as a low risk of bias, as long as it is separately in the experimental and control; 2. Selective reporting of results: Were appropriate results reported and were some key results missing?

The meta-analysis was performed using RStudio 2022.02.0+443 Prairie Trillium Release (9f7969398b90468440a501cf065295d9050bb776, 2022-02-16) for Windows, aiming to estimate the Floresta chart (Rodrigues, 2010). The modelling considered:

• Fixed Effects: the effect of interest was the same in all studies and existing differences would be consequences of sampling errors, and intra-study variability (Fhon *et al.*, 2016; Fuchs and Paim, 2010; Mancuso, 2010).

• Random Effects: the effect of interest was not the same in all studies, but the variation would approach the Normal Distribution (Fuchs and Paim, 2010; Mancuso, 2010).

It should be noted that the meta-analysis was tested using the inverse variance method, with heterogeneity being investigated using the restricted maximum likelihood estimator for τ, with the confidence interval estimated using the Q-profile method.

Results and Discussion

The interpretation of the Forest Representation disregarded all studies whose importance (or weight = relative risk) was close to null, as these did not have statistical significance, which could be verified by the respective confidence interval (95.00%-CI) containing zero or precision (horizontal line) crosses or touches the Mean Difference. In addition, to the existence of close results between the fixed and random effects models, the second was discarded, given that the confidence interval estimates would tend to be less accurate (Rodrigues and Ziegelmann, 2010).

Based on the above, the Physical Domain (Figure 1) presented 11 studies with a positive outcome of the regular practice of water aerobics (A7, A8, A9, A14, A16, A20, A21, A22, A25, A28, A30, and A31). Such a finding would become particularly relevant considering that the importance of the study would indicate how many times the occurrence of the event in practitioners would be greater than that of non-practitioners. The Inferential outcomes (Fixed Effects: 1.85 [1.45; 2.26]) ratified the expectation achieved by the Fixed Effects Model (p-value < 0.00).

Madeira (2015) explained that heterogeneity can be 1) clinical, variability among participants; 2) methodological, variability between studies (designs, treatment, and tests, for example) and sample characteristics (age, sex, body mass, and trainability, among

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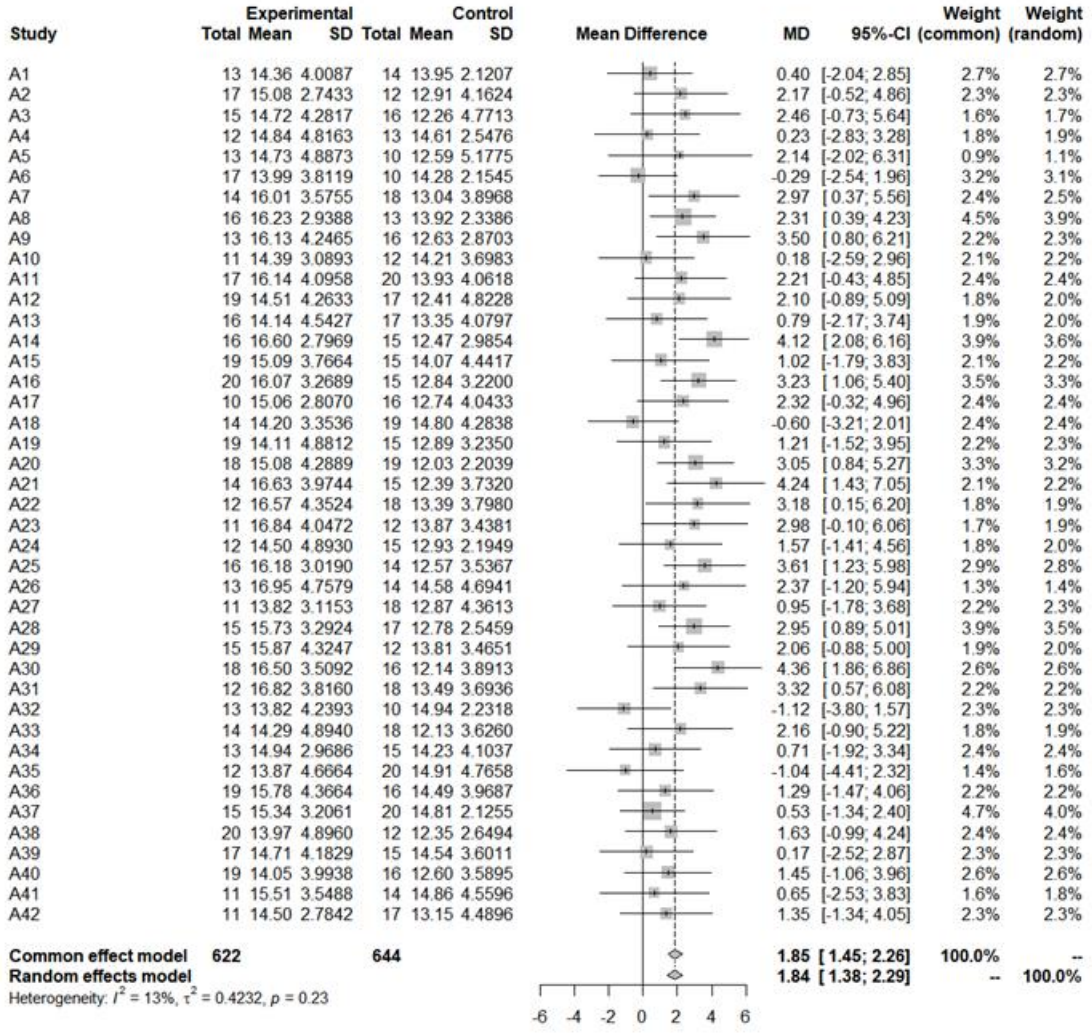
others); and 3) statistics, a consequence of the previous ones, reference to the variability in the measures of effect between the different studies. Despite this, the variability was not significant, p-value = 0.23 (Q = 47.38; τ^2 = 0.42 [0.00; 1.45]; I^2 = 13.50% [0.00%; 41.20]; H = 1.07 [1.00; 1.30]), so any of the models would be suitable for the situation.

Figure 1: Forest Plot – Physical Domain.



Source: The Authors (2025).

The Funnel Plot (Figure 2A) found the existence of publication bias, as three studies (≅ 7.14%) were positioned at the limit or outside the confidence interval (external dotted lines), which may have occurred due to the small number of investigated individuals. In this case, the studies would tend to show greater adherence to the intervention and allow the measurement of the outcome more precisely, however, they would be more susceptible to bias, especially when in the subjectivity of data collection. The Size Effect (Figure 2B) demonstrated that in the existence of statistical significance, its dimension would be very

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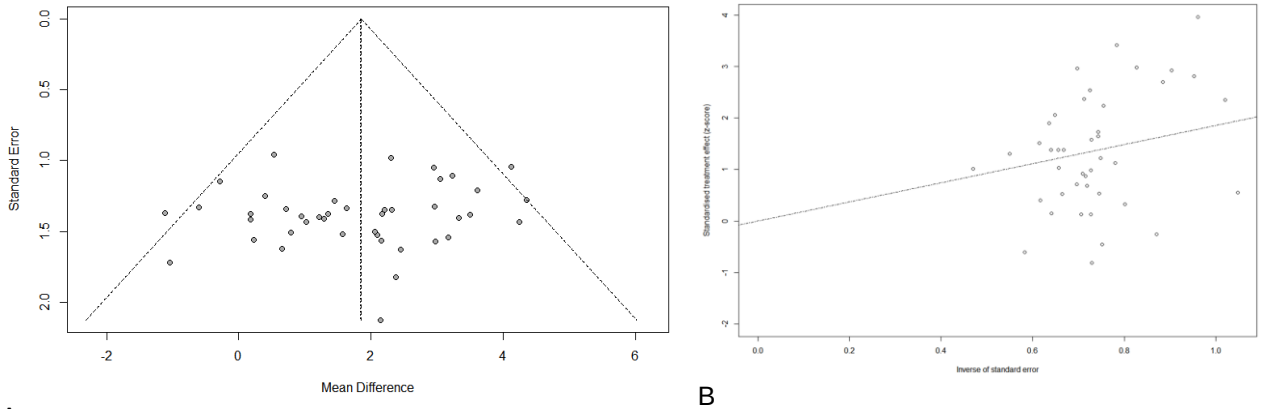
different, because if the groups (experimental and control) presented small standard deviations, then few people would be needed to identify large differences. However, if those variabilities were high, the study would require many participants, even if the difference between the means would also be high (Rodrigues and Ziegelmann, 2010).

The highlighted aspects were expected, as like any physical training, the effects of water aerobics would depend on the evaluation, prescription, and monitoring of the exercises, as well as on the attendance and execution by the internal client (Sanders et al., 2019; Rathore and Lom, 2017). The availability of adequate facilities for the intervention, as well as equipment (everything necessary for training) and instruments (everything that serves training, but is not mandatory), would impact the results of the stimuli offered to practitioners (Ribeiro *et al.*, 2021).

Figure 2: Variability – Physical Domain: A) Funnel Plot; B) Size Effect.



A B

Source: The Authors (2025).

In the Psychological Domain (Figure 3), only study A26 had a significant outcome. The result, perhaps, demonstrates the complexity of the subjective measurement, since in the context of quality of life there would be, essentially, an influence of the perception of the momentary context (two weeks) on the respective concerns and expectations, and the development of activities and objectives (Santos *et al.*, 2017). The variability was also not significant, p-value = 1.00 (Q = 14.79; τ^2 = 0.00; I^2 = 0.00% [0.00%; 35.50]; H = 1.00 [1.00; 1.24]). However, the fixed effects model was adopted (0.93 [0.51; 1.34]).

Commonly known would be the effect of physical exercises on the release of several hormones and neurotransmitters, particularly 1) serotonin, which would affect the occurrence of depression (Santos, 2019; Siqueira *et al.*, 2016); 2) endorphin, which would alleviate anxiety, hostility, tension and psychic confusion, and raise the mood level,

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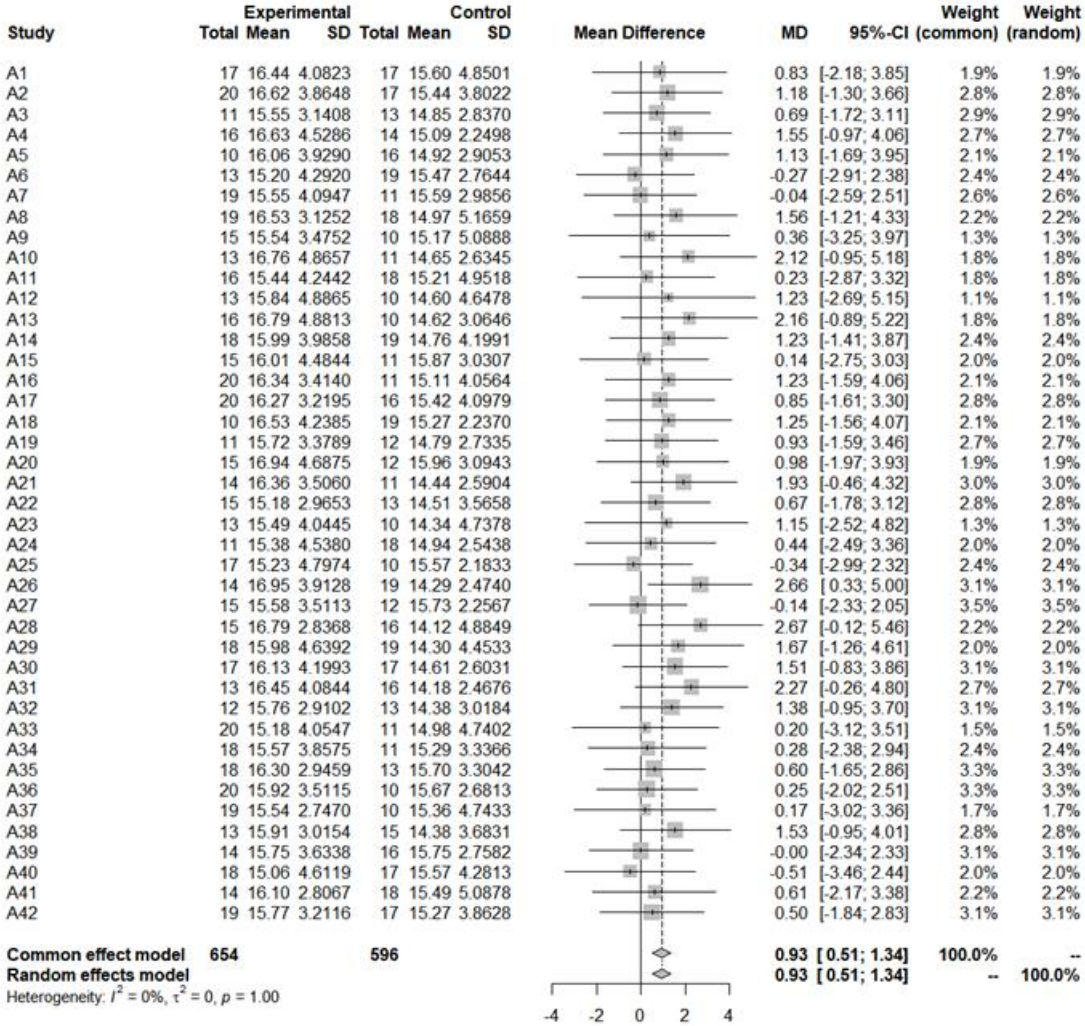
particularly through water aerobics (Sodré, Matos and Silva, 2023; Ferreira and Caldas, 2022); and 3) dopamine, whose influence occurs on the state of attention, learning, mood, emotions, and motor control (Borges, 2020). That is, the regular practice of physical exercises would provide a feeling of well-being, reducing levels of stress and anxiety, favouring memorization, and increasing the speed of reasoning (Mello *et al.*, 2005) and motor skills (Oliveira *et al.*, 2019).

Figure 3: Forest Plot – Psychological Domain.

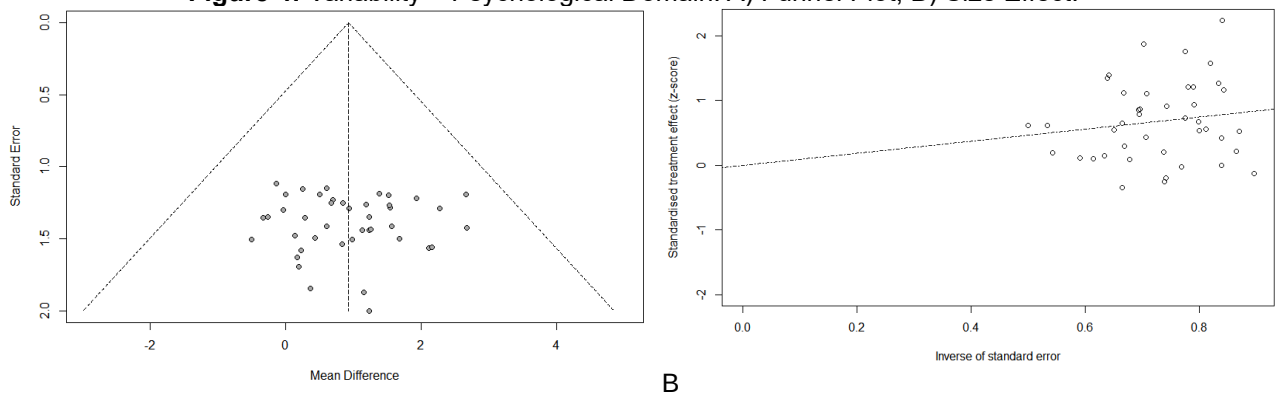


Source: The Authors (2025).

The isolated analysis of the Psychological Domain would reveal the absence of bias (Figure 4A) since all studies remained within the confidence interval, similar uniformity was identified in the effect of size (Figure 4B), possibly due to the high level of subjectivity previously mentioned, and the fact that physical training would chronically provide well-being or psychic comfort as a result of the combination of stimuli (in volume and intensity) in time

and frequency (assiduity), that is, the pleasant feeling at the end of the session of training will not last.

Figure 4: Variability – Psychological Domain: A) Funnel Plot; B) Size Effect.



A B

Source: The Authors (2025).

This psychic impact, longitudinally, would directly influence the Social Domain (Figure 5), and the intensity of the impact would be potentiated by the collective character of hydrogymnastics, which, was configured by the results, given that six studies were significant (A5, A11, A20, A33, A35, and A36), and only A8 had a negative outcome for sociability through water aerobics. The other results were similar to the Psychological Domain, since the fixed effects model was chosen, p-value = 0.00 (1.78 [1.37; 2.19]), and the variability was not significant (p-value = 1.00; Q = 17.86; τ^2 = 0.00; I^2 = 0.00% [0.00%; 35.50]; H = 1.00 [1.00; 1.24]). This similarity was also present in publication bias (Figure 6A) and size effect (Figure 6B), confirming the strong association between these domains. The immediate consequence resides in the professional's need to propose interventions that favoured the attenuation of suffering or psychic discomfort, perhaps existing, which perhaps could be carried out by stimulating the narrowing or intensification of social relationships, as well as the development of new relationships (Darela and Arakawa-Belaunde, 2024; Silveira, 2023; Oliveira *et al.*, 2019).

The results converged with Apparecido and Souza (2024) who carried out a bibliographic review with 17 scientific articles published between 2017 and 2021. They found that water aerobics enhanced the quality of life of the elderly through cardiovascular improvement, muscle strengthening, stress reduction, balance and reduced impact on joints. And, especially, because it is a practice that favors the social domain, stimulating the interaction of practitioners.

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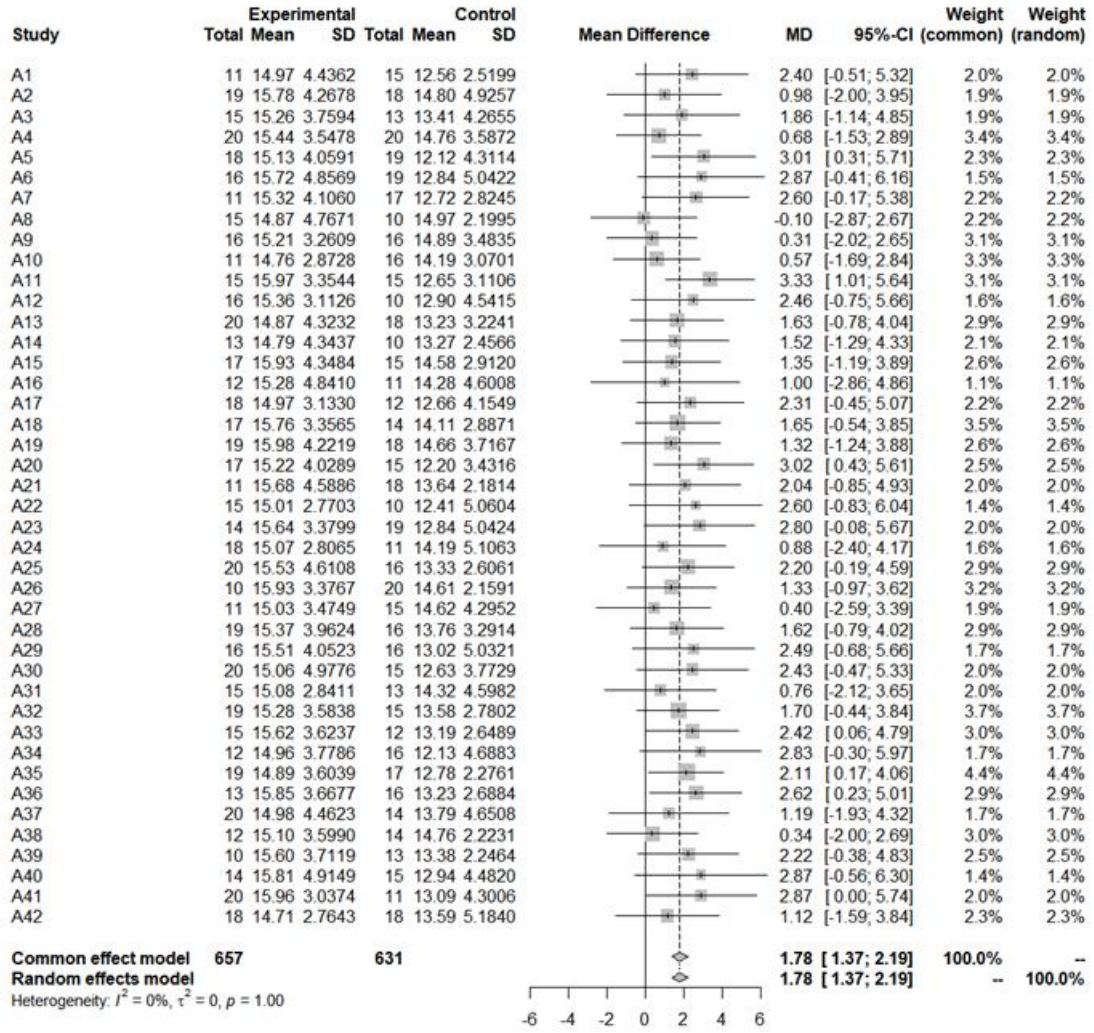
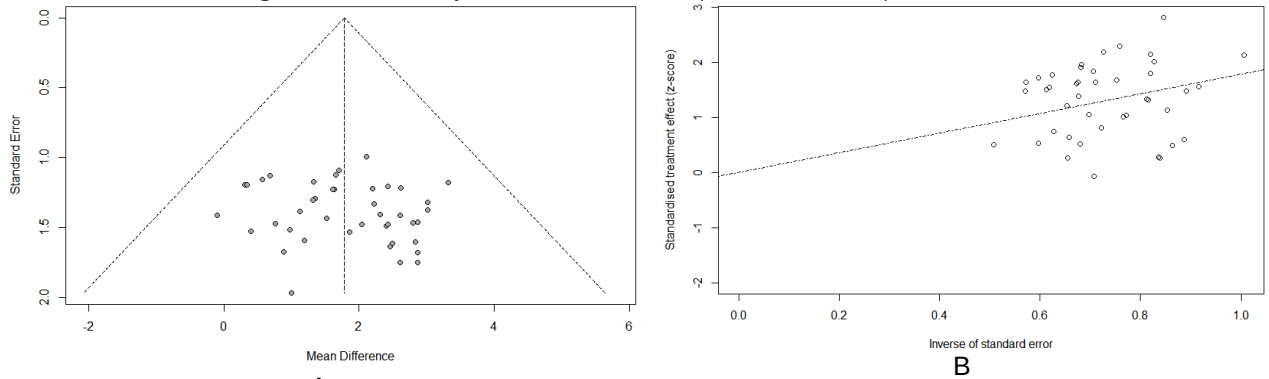
Figure 5: Forest Plot – Social Domain.



Source: The Authors (2025).

Figure 6: Variability – Social Domain: A) Funnel Plot; B) Size Effect.



A B

Source: The Authors (2025).

The results of Balbé *et al.* (2016) highlighted that the practice of exercises is not a guarantee of an increase in quality of life, since when evaluating 89 elderly women from

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Florianópolis (SC) using the Whoqol-old, they identified that the levels of quality of life were influenced by negative perception of health, health status that makes it difficult to practice physical exercise, presence of osteoporosis, heart disease and consumption of two or more medications daily. Therefore, they concluded that the risk of low quality of life in physically active elderly women was associated with unfavourable health conditions.

Final Considerations

The study aimed to develop a systematic review of the quality of life of elderly women, comparing sedentary women and those who practiced aquatic exercises. The results revealed that the quality of life levels were superior in those who were physically active. The set of articles used allowed us to conclude that the regular practice of aquatic exercises favoured the quality of life of these women.

The research should be replicated, but using elderly women with unfavourable health conditions, since this influences the perception of quality of life. This is influenced by local values and culture, so the selection of articles that studied only Brazilian women may present different results from the current ones in the meta-analysis, revealing peculiarities.

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