

Effectiveness of microkinesitherapy session on psychological well-being among community-dwelling adults – a pilot study

Sebastian Rutkowski¹, Władysław Batkiewicz², Renata Batkiewicz², Henryk Racheński¹, Bartosz Radosz³, Paweł Jakubiec⁴, Daniel Grosjean⁵

¹ Faculty of Physical Education and Physiotherapy, Opole University of Technology, Opole, Poland

² Private Practice Renata i Władysław Batkiewicz, Zabrze, Poland

³ Center for Effective Rehabilitation REHARADOSZ, Żory, Poland

⁴ Physiotherapy Practice Paweł Jakubiec, Cracow, Poland

⁵ Dorothée, Grosjean-Lefèbvre, Nilvange, France

Correspondence to: Sebastian Rutkowski, email: sebrutkowski@gmail.com

DOI: <https://doi.org/10.5114/phr.2024.136487>

Received: 23.12.2023 **Reviewed:** 18.01.2024 **Accepted:** 18.01.2024

Abstract

Background: New therapeutic methods are being proposed for community management of the aging process toward "healthy aging". An example of a holistic approach to the patient could be microkinesitherapy.

Aims: This study aimed to investigate the effectiveness of microkinesitherapy treatment in community-dwelling adults.

Material and methods: The research included 24 individuals aged 52 to 95 years, who underwent a single therapy session. This study implemented a single-group pre-post study design with a 1-month follow-up. Assessment of mental health using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) and General Health Questionnaire – 28 (GHQ-28) was the primary outcome.

Results: The analysis of the data showed a significant improvement regarding mental health, specifically in the domain of physical function of the WHOQOL-BREF questionnaire, with a score increase of 5 points. The GHQ-28 questionnaire exhibited statistically significant improvements in all domains, indicating a reduction in psychopathology disorders after the intervention. Before the intervention, 45.83% of the participants had psychopathology disorders, while after the 1-month follow-up, only 16.67% of them had such disorders.

Key words

microkinesitherapy; adults; quality of life; micro-physiotherapy.

Conclusions: This study on microkinesitherapy in community-dwelling adults demonstrated potential benefits in mental health, particularly in the physical function domain of the WHOQOL-BREF questionnaire and all domains of the GHQ-28 questionnaire, indicating a decrease in psychopathology disorders. However, it's important to note limitations, including the single-group pre-post design without a control group, a small participant number, and a lack of specific medi-

cal indications or ICD diagnoses. Additionally, no comparison was made with standard physiotherapy methods, which limits the ability to generalize the findings or apply them in broader clinical contexts. Therefore, the current strength and level of evidence supporting microkinesitherapy are considered limited, indicating a need for more extensive research to validate its efficacy as a clinically recommended treatment.

Introduction

In the life of every human being, three periods are present: childhood, adulthood, and old age. Aging is a natural, long-term process that affects all human beings. By definition, it begins in middle age and is defined as old age at the final stage of aging. Each of these stages is characterized by different processes taking place in the body [1].

The first is a time of growth, differentiation, and development of functions. In the second, the body has the greatest adaptability to changes in time and environment, maintains internal environmental equilibrium (homeostasis), and responds easily to combat disease or physical effort. In old age, these abilities gradually deteriorate. According to World Health Organization (WHO) guidelines, several age categories can be found, including mature age: 45-59 years of age, followed by early old age (the third age) up to 74 years of age, then late old age up to 89 years of age, and longevity - people over 90 years of age. Whereas it is difficult to define a maximum life limit, the metrically documented longest lifespan is 122 years for a woman and 115 for a man [2].

Many specialists stress that the aging process is individual; its course, severity, and occurrence of disease are not the same for all seniors. A common process referred to as aging includes: metabolism slowing down, changes in body compo-

sition (an increase in body fat, and a decrease in muscle and bone tissue), a decrease in the body's ability to cope with increased physical exertion, the disease process, sleep and wakefulness rhythm changes, endocrine disruption, as well as hearing loss and digestive disorders [3].

While the psychological processes of aging are associated with the weakening of memory, selectivity, and concentration of attention, difficulty in learning new skills, reduced emotionality and emotional reactivity, weakening of motivation, and, based on the difficulty of acceptance of disease processes in the body, aggression, impatience, and irritability [4]. The main aging-related disease units are also identified: sarcopenia, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), cancer, Alzheimer's and Parkinson's diseases, and type 2 diabetes [5]. Although the term successful aging (SA) exists in the literature, shedding some optimism on the possibility of counteracting unfavorable changes [6,7].

The studies indicate that SA should be conceptualized as a process, using developmental trajectories of functioning as component parts, and can take several forms. The nature of "successful" trajectories varied from limited decline over time (e.g., cognitive and physical functioning), stability over time (e.g., self-perceived health) to

recovery (from social loneliness), and growth (in life satisfaction and emotional support provided). It appears that the determinants of successful SA include the high initial levels of functioning that can be maintained over time and the extent to which recovery from undesirable functional states can be achieved [8]. It has also been shown that even the most successful trajectories have sometimes been characterized by decline, which supports the idea that SA should not be equated with "non-aging" [9].

Individuals who require care due to age, illness, or disability can receive support, mainly directed towards single people. This assistance can be provided in various forms: at the client's place of residence, in the form of daytime residence in a support center, or permanent residence in a social care home. Community care homes are public or non-public facilities for the elderly and sick, whose role is to provide constant care, living, and material assistance.

The concept of integrated care in community-dwelling elders has gained wide acceptance. This acceptance is primarily supported by research on integrated care, based on the Chronic Care Model (CCM) approach [10]. Key elements of CCM include patient empowerment, decision support with access to a multidisciplinary team, clinical information systems, and coordination of the care process. However, there is limited recent evidence to support the effectiveness of integrated care for the elderly in the community.

Not surprisingly, new therapeutic methods are being proposed that can be used in the community to steer the aging process toward "healthy aging." An example of a holistic approach to the patient can be found in microkinesitherapy, also interchangeably referred to as "micro-physiotherapy" in various literature sources. However, in this specific context, the term "microkinesitherapy" will be predominantly used. This approach encapsulates a broader perspective on treatment, emphasizing the interplay between various physical and physiological aspects in patient care, and is distinguished by its comprehensive consider-

ation of individual patient needs and conditions. The focus of microkinesitherapy is to find and restore areas of the body that have lost their vitality and mobility, using gentle touches on various body tissues with specific body maps [11].

Microkinesitherapy is based on locating information in the patient's body about previous traumas—both physical and emotional—that the body could not eliminate. Microkinesitherapy is a relatively new technique; the first studies were conducted in the 1980s, the first evaluations in 1982, and the beginning of teaching dates back to 1983. The purpose of this treatment is to trigger the repair mechanisms present in every living being to eliminate the dysfunctions, conditions, and afflictions from which the patient suffers. To trigger the repair mechanism, the therapist must re-inform the body by relating the origin of the dysfunction with the pathological features that result from it. This is done in an extremely gentle way to avoid reactivating or exacerbating the condition [12].

In the available literature, only three scientific articles are present that indicate the therapeutic effectiveness of this method on patients. The first two works by Baconnier et al. [13] were focused on the effectiveness of microkinesitherapy in treating post-traumatic neck pain. These were conducted as randomized double-blind clinical trials and revealed significant improvements in pain levels and range of motion in patients who received microkinesitherapy, as compared to the control group.

The second work represents a secondary analysis of data from a previous study, applying the Minimal Clinically Important Difference (MCID) concept to evaluate the effectiveness of microkinesitherapy. The outcomes demonstrated a clinically significant difference in the impact of microkinesitherapy on post-traumatic neck pain when compared to a sham treatment [14].

The third study aimed to assess the impact of microkinesitherapy on intraocular pressure in glaucoma patients [12]. However, the results did not

demonstrate statistically significant changes, indicating that microkinesitherapy has potential in reducing intraocular pressure but cannot yet be conclusively considered an alternative treatment for glaucoma.

Therefore, it seems important to undertake further research on this new therapeutic method due to the lack of evidence-based medicine (EBM) to date.

Aims

The aim of this study was to investigate the effectiveness of microkinesitherapy treatment in community-dwelling adults. It was decided to evaluate the impact of a single therapy session on mental health.

Materials and Methods

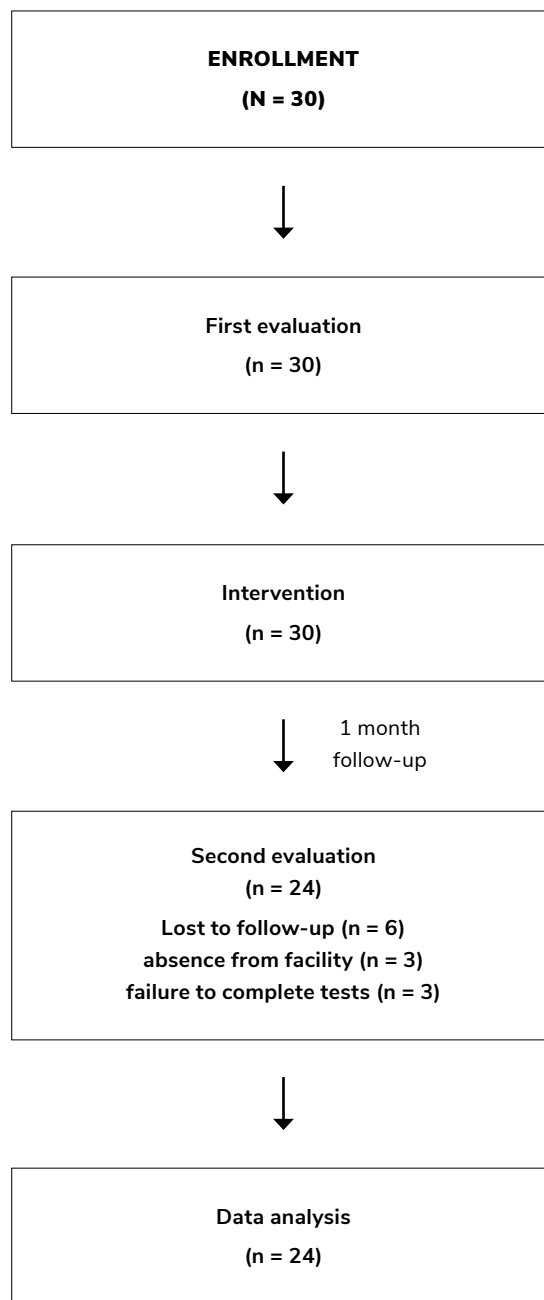
Study participants

This study implemented a single-group pre-post study design. It enrolled 24 individuals aged 52 to 95 years (14 females, 10 males, age = 78.7±11.3 years) (Figure 1). All participants signed a written informed consent prior to their participation in the study. The study included seniors from the Nursing Home in Poznan, Poland. The inclusion criteria comprised informed consent to participate in the study, while the exclusion criteria included pneumonia, tuberculosis, and another respiratory inflammatory disease in all stages and forms, less than 6 months after a heart attack, state after thoracic and cardiac surgery, uncontrolled hypertension, insulin-dependent diabetes, lung cancer, cognitive impairment, or Mini-Mental State Examination < 24. The study was conducted at the turn of August and September 2022. It adhered to the Declaration of Helsinki [15], and the study was registered in ClinicalTrials.gov (NCT05494879).

Measured outcomes

Two questionnaires were used to assess the quality of life: The WHOQOL-BREF and General Health Questionnaire-28 (GHQ-28).

Figure 1. Flow diagram.



The WHOQOL-BREF's questions stem from multiple statements about the quality of life, health, and well-being of people with and without disease, and health professionals. The questionnaire was validated [16] and identifies four major domains: Physical health, Psychological, Social relationships, and Environment. Each individual item of the WHOQOL-BREF is scored from 1 to 5 on a response scale, stipulated as a five-point ordinal scale. The scores are then transformed to a 0–100 or 4–20 scales. The cut-off point for clinical significance was set at 24 points, as described by Makowska and Merecz [17].

The GHQ-12 enables the identification of people whose mental state has broken down temporarily or over the long term as a result of difficulties experienced, problems, or mental illness, and those who are at significant risk of mental health disorders. A version of the GHQ-28 consists of 28 questions divided into four categories of symptoms: severe depression, anxiety and insomnia, disorders of social functions, and somatic symptoms [17].

Intervention

Microkinesitherapy is based on the premise that every living being has a biological mechanism for self-repair (homeostasis), which enables recovery from experiencing various types of aggressions. The therapy begins with an initial assessment, where the therapist conducts a thorough examination of the patient's body. This step is crucial for identifying specific areas that might be contributing to the patient's symptoms or overall discomfort. This examination is often performed in areas of the body (diagnostic zones) distant from the reported pathology. The zones in which certain types of blockages appear are the same for everyone, as previously described [11].

Following the assessment, the therapist employs gentle palpation techniques. This part of the procedure is pivotal, involving locating micro lesions—subtle, often imperceptible points in the body that might be causing imbalances or hindering the natural healing processes. The skill

and sensitivity of the therapist play a significant role in effectively identifying these points. The core of the therapy lies in the targeted treatment that ensues. The therapist applies precise, yet gentle manipulations at the identified points. The hypothesis of microkinesitherapy assumes that simultaneous manual stimulation with specific therapeutic stimuli of areas affected by pathology and specific diagnostic zones (body memory – etiology) activates the repair mechanism. Microkinesitherapy treatment lasts from 20 to 30 minutes. During the treatment, the patient remains on a couch, and palpation of the disorders takes the form of gentle touch on specific areas of the body (**Figure 2**).

The different diagnostic areas were described in detail in previous articles [11,18]. The interventions for the study participants were administered by six physiotherapists who had undergone training in the therapy course and possessed significant clinical experience in the application of microkinesitherapy. Throughout these interventions, the employment of other physiotherapeutic techniques was prohibited to maintain clarity in evaluating the therapeutic procedure's effectiveness.

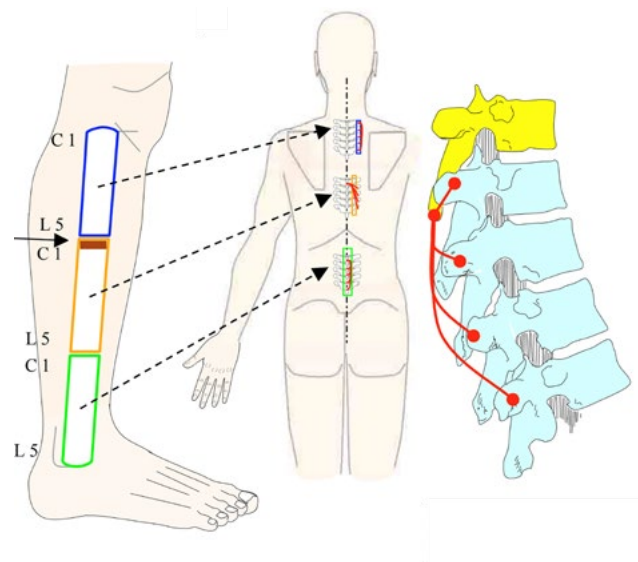


Figure 2. Example of palpation of intervertebral muscle disorders.

Statistical analysis

Data were analyzed using STATISTICA 13 software (StatSoft, Cracow, Poland) and JASP 0.16.1 software (University of Amsterdam, Netherlands). Differences between the analyzed parameters were compared using the Wilcoxon signed-rank test. Continuous variables were presented as mean ± standard deviation and median with the lower (Q1) and upper (Q3) quartile, according to the Shapiro-Wilk test. The statistical significance of the results was accepted at $p < 0.05$. The Rank Biserial Correlation has been incorporated to assess effect size. The sample size was calculated based on previous studies, considering the effectiveness of the rehabilitation program used to improve mental health assessed with the use

of GHQ-28, with an effect size of 0.628 [19]. The G*power 3.1.9 software was used to calculate the sample size. The calculation was based on the Wilcoxon signed-rank test (matched pairs): the type I error rate was set at 5% (alpha-level 0.05), the effect size of the main outcomes was 0.628, and the type II error rate gave 85% power. It was determined that 21 patients should be enrolled.

Results

Analysis of pre-post-intervention data on the WHOQOL-BREF test showed statistically significant changes in the Physical health domain, analyzing the 0-100 score value. The other domains showed no statistically significant changes one month after therapy (**Table 1**).

Table 1. Results of the WHOQOL-BREF.

WHOQOL-BREF (n=24)	Pre-	Follow-up	W	z	p	ES
Physical health	51 (10.9) 56 [44-56]	54.1 (10.8) 56 [44-63]	15.000	-2.132	0.035*	-0.670
Psychological	54 (11.6) 56 [44-66]	54.5 (12.9) 56 [44-63]	104.500	-0.019	1.000	-0.005
Social relationships	51 (18.3) 50 [37.5-69]	57 (13.9) 56 [50-69]	63.500	-1.268	0.210	-0.332
Environment	56.2 (15.7) 56 [50-69]	61.8 (13.5) 63 [53-69]	60.500	-1.661	0.097	-0.424

Notes: Wilcoxon signed-rank test; ES: effect size; * $p < 0.005$.

In contrast, analysis of GHQ-28 questionnaire data showed statistically significant improvements in all domains (**Table 2**). This indicates that eleven participants (45.83%) were presenting

psychopathology disorders before the intervention, while only four (16.67%) after the 1-month follow-up (**Figure 3**).

Table 2. Results of General Health Questionnaire-28.

GHQ-28 (n=24)	Pre-	Follow-up	W	z	p	ES
Somatic symptoms	5.4 (3.2) 5 [3-7]	3.3 (2.5) 3 [2-4.25]	206	3.146	0.002*	0.545
Anxiety and insomnia	7.0 (3.4) 7 [6-9]	5.4 (2.6) 5.5 [3-6]	214.5	3.441	0.008*	0.725
Social dysfunction	3.8 (3.3) 3 [1.75-4.5]	1.7 (2.1) 1 [0-3]	171	3.724	0.002*	0.895
Severe depression	7.3 (3.3) 7 [4.75-9]	4.5 (3.3) 4 [2-7]	222	3.702	< 0.001*	1.000
Total score	24.5 (10.2) 23 [17-27]	15 (9.6) 13 [8-18.25]	275	4.167	< 0.001*	0.986

Notes: Wilcoxon signed-rank test; ES: effect size; * p < 0.005.

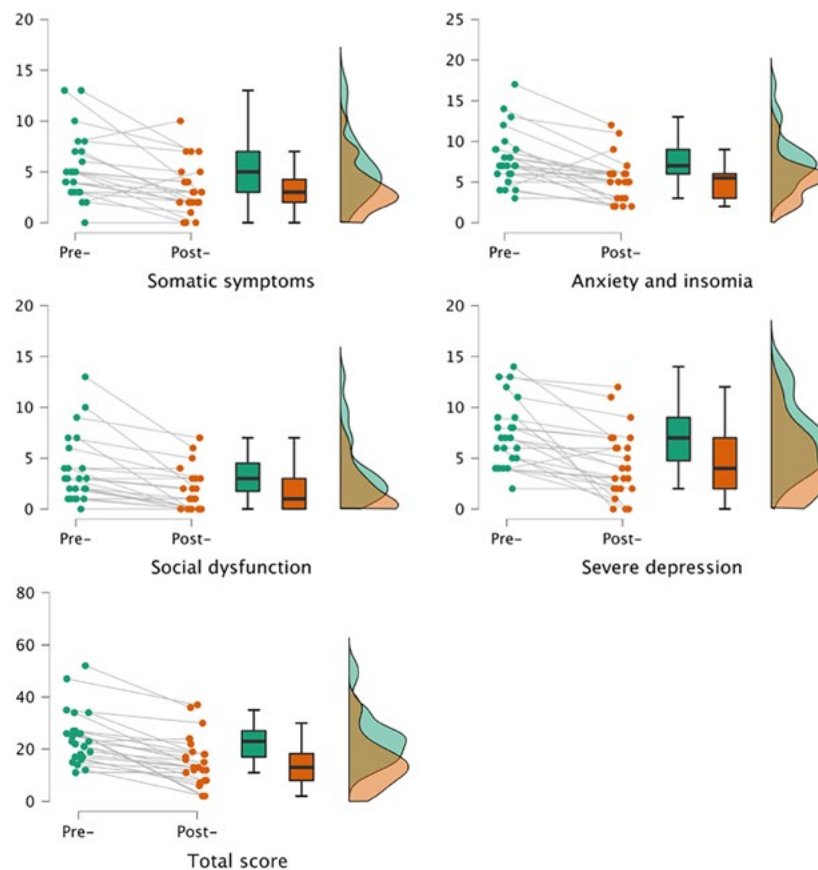


Figure 3. Variation in GHQ-28 component values.

Discussion

The aim of this study was to investigate the effectiveness of microkinesitherapy treatment in community-dwelling adults on mental health factors. Analysis of the WHOQOL-BREF questionnaire results showed a statistically significant improvement only in the physical health domain. According to the analysis of the GHQ-28 questionnaire results, both domains describing somatic health and mental health were improved. From a clinical point of view, it is worth noting that the changes were observable by the subjects in terms of anxiety, social dysfunction, as symptoms of depression. The overall result of the questionnaire showed an increase in the number of people who, according to the author of the questionnaire, should be classified as non-psychiatric (from 13 to 20). Therefore, it can be inferred that microkinesitherapy treatment has the potential to enhance the mental condition of seniors.

To the best of our knowledge, the presented study is the first to describe the effectiveness of microkinesitherapy in adults considering a mental health outcome. Due to the brief history of the clinical application of the method, only a few scientific studies are available. Earlier microkinesitherapy studies have focused on therapeutic efficacy for specific conditions: post-traumatic cervicalgia [13], bowel syndrome [20], glaucoma [12], and low back pain [21].

In light of this, the authors would like to propose a hypothetical model of changes within the nervous system that may be stimulated through the application of microkinesitherapy. The goal of microkinesitherapy is to reinitiate, as far as possible, repair mechanisms. Embryology indicates that the nervous system has its origin in a second tissue that appears in the development of the embryo around the second week of life. This is the ectoblastic tissue, which, as the name suggests, will cover the embryo, producing epidermal cells.

Around the third week, densities of cells appear at the thoracic level called the neural plate, which then develops into the neural groove forming the

neural canal, the origin of the spinal cord. This system further follows the phylogenetic evolution and forms various parts of the nervous system, from sensory and motor circuits, the parasympathetic system, the sympathetic system with spinal reflexes, through the formation of the brain and its three levels: archeocortex, paleocortex, and neocortex.

The hypothesis of microkinesitherapy assumes that communication may still exist between the epidermis and the various formations of the nervous system, as well as with organs and tissues being supplied by the nervous system. Thus, an event having led to stimulation of the nervous system can result in psychosomatic problems, which can be read on the patient's body. It is worth emphasizing that the precise identification of these zones required more than 20 years for the developers of the method.

The idea involves finding the disturbance and showing it to the body, triggering the body's reactions. Stimulation of precisely found points on the patient's body triggers the repair mechanism. Therefore, it seems that this scheme of interaction can stand as an explanation for the psychosomatic changes of patients after microkinesitherapy treatment. The hypothesis should be further investigated, although this study suggests the rationale for its formulation.

On the other hand, research on rats indicates that microkinesitherapy treatment has an effect on lowering the levels of pro-inflammatory and anti-inflammatory cytokines. Thus, the technique affected the immune system in terms of treating the acute stress mechanism [22].

Another study by Grosjean et al. investigated the impact of micro-physiotherapy on symptoms of the irritable bowel syndrome (IBS) [20]. In this double-blind, randomized, sham-controlled trial involving 61 patients, the researchers evaluated the effectiveness of microkinesitherapy in comparison to a sham procedure. The participants,

who had a history of recurrent IBS symptoms and unsatisfactory results from conventional therapy, were divided into two groups. The experimental group underwent two sessions of microkinesitherapy, while the control group received a sham procedure. The results indicated a significant difference in improvement between the groups, with 74% of the patients in the microkinesitherapy group showing improvement after the first session, compared to 38% in the sham group. This improvement was maintained after the second session, although no further gains were noted.

Among the small base of scientific studies in the field of microkinesitherapy, a study on the analysis of heart rate variability in fibromyalgia after a microkinesitherapy session was also noted [23]. The research engaged 15 participants aged between 35 and 40 years, all diagnosed with fibromyalgia. They underwent two microkinesitherapy sessions separated by a 45-day interval. The study's findings demonstrated that microkinesitherapy significantly influenced sympathicotonia, as evidenced by notable shifts in low-frequency heart rate variability (HRV) and average heart rate metrics, indicative of enhanced sympathetic nervous system activity post-treatment. This suggests a potential therapeutic role of microkinesitherapy in modulating autonomic nervous system functions in fibromyalgia patients.

Another study illustrating the effectiveness of microkinesitherapy is the research conducted by de Matos and de Carvalho [24]. In this study, twelve female fibromyalgia patients underwent a series of three microkinesitherapy sessions spread over three months. The primary objective was to assess the impact of this therapeutic approach on a range of psychological and physical parameters, including anxiety, depression, sleep quality, dysbiosis, and tender point count. However, post-treatment assessments revealed no statistically significant alterations in these parameters. Consequently, the findings suggest that microkinesitherapy may not exert a substantial impact on fibromyalgia symptoms. This underscores the

necessity for further research to comprehensively explore the efficacy of microkinesitherapy in this particular context.

Limitations of study

While this study presents encouraging results, it is crucial to acknowledge several limitations. Firstly, the study's design was a single-group pre-post format, lacking a control group for comparison. Secondly, the research involved a relatively small study group. Additionally, the absence of specific medical indications, International Classification of Diseases (ICD) diagnoses, and the failure to compare with standard physiotherapy methods are significant limitations. This lack of comprehensive medical context and benchmarking hinders the extrapolation of findings and limits the applicability of results across various clinical settings, ultimately impacting the study's generalizability. Furthermore, the study's assessment could benefit from incorporating a follow-up, providing additional valuable insights into the sustained effectiveness of microkinesitherapy over time. As a consequence of these limitations, the current strength and level of evidence supporting microkinesitherapy can be considered minimal within the realms of scientific evidence and clinical recommendations. This assessment implies that, at present, there is insufficient robust scientific data to endorse microkinesitherapy as a clinically recommended treatment modality.

Conclusions

The findings indicate that a single session of microkinesitherapy holds promise for enhancing mental health in community-dwelling adults, with a notable impact on the physical aspects of mental well-being, as evidenced by assessments using WHOQOL-BREF and GHQ-28. However, the study's design constraints, including the absence of a control group and a relatively small sample size, along with the lack of detailed medical classifications and comparisons to conventional physiotherapy techniques, constrain the broad applicability of these results.

Funding

This research received no external funding.

Acknowledgments

We would like to express our gratitude to all therapists who played a crucial role in delivering

therapy sessions: Bogumił Ochał, Irena Dubowik, Edyta Modrzejewska, and Anna Modrzejewska. Additionally, the authors extend their sincere appreciation to Prof. Mariusz Furgal for proposing the research methodology and evaluating the mental health results.

References

- Palmer KT, Goodson N. Ageing, musculoskeletal health and work. *Best Pract Res Clin Rheumatol*. 2015; 29 (3): 391–404.
- Beard JR, Officer AM, Cassels AK. The World Report on Ageing and Health. *Gerontologist*. 2016; 56 Suppl 2: S163–166.
- Franceschi C, Garagnani P, Morsiani C, Conte M, Santoro A, Grignolio A, et al. The Continuum of Aging and Age-Related Diseases: Common Mechanisms but Different Rates. *Front Med (Lausanne)*. 2018; 5: 61.
- McLaughlin SJ, Connell CM, Heeringa SG, Li LW, Roberts JS. Successful aging in the United States: prevalence estimates from a national sample of older adults. *J Gerontol B Psychol Sci Soc Sci*. 2010; 65B (2): 216–226.
- Collins LF, Palella FJ, Jr., Mehta CC, Holloway J, Storrer V, Lake JE, et al. Aging-Related Comorbidity Burden Among Women and Men With or At-Risk for HIV in the US, 2008–2019. *Jama Netw Open*. 2023; 6 (8): e2327584.
- Lacruz ME, Emeny RT, Bickel H, Cramer B, Kurz A, Bidlingmaier M, et al. Mental health in the aged: prevalence, covariates and related neuroendocrine, cardiovascular and inflammatory factors of successful aging. *BMC Med Res Methodol*. 2010; 10: 36.
- Bowling A, Iliffe S. Which model of successful ageing should be used? Baseline findings from a British longitudinal survey of ageing. *Age Ageing*. 2006; 35 (6): 607–614.
- Kok AA, Aartsen MJ, Deeg DJ, Huisman M. Capturing the Diversity of Successful Aging: An Operational Definition Based on 16-Year Trajectories of Functioning. *Gerontologist*. 2017; 57 (2): 240–251.
- Glass TA. Assessing the success of successful aging. *Ann Intern Med*. 2003; 139 (5 Pt 1): 382–383.
- Hoogendijk EO. How effective is integrated care for community-dwelling frail older people? The case of the Netherlands. *Age Ageing*. 2016; 45 (5): 585–588.
- Grosjean D. Microkinesitherapy: A Complementary Manual Therapy. *Physiother Rev*. 2020; 24 (4): 1–10.
- Chmist J, Racheniuk H, Batkiewicz W, Majorczyk E, Rutkowski S, Grosjean D. Evaluation of the effectiveness of microkinesitherapy in reducing intraocular pressure in patients with glaucoma. *ST-CEJ* 2022; 5 (2): 105–114.
- Baconnier P, Vial B, Vaudaux G, Vaudaux GF, Maindet-Dominici C, Poquin D, et al. Evaluation of the clinical effectiveness of microkinesitherapy in post-traumatic cervicgia. A randomized, double-blinded clinical trial. *Man Ther Posturology Rehabil J*. 2016; 0 (0): 1–6.
- Baconnier P, Vial B, Vaudaux G, Vaudaux G, Bosson J-L. Evaluation of microkinesitherapy effectiveness in post-traumatic cervicgia: a new approach applied to previous data. *Man Ther Posturology Rehabil J*. 2019; 0 (0): 1–4.
- World Medical A. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*. 2013; 310 (20): 2191–2194.

16. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychol Med.* 1998; 28 (3): 551–558.
17. Makowska Z, Merez D. Polish adaptation of David Goldberg's General Health Questionnaires: GHQ-12 and GHQ-28. Assessment of mental health status using David Goldberg's Questionnaires Guide for users of GHQ-12 and GHQ-28] Łódź: Nofer Institute of Occupational Medicine. 2001.
18. Grosjean D. Mikrokinesiterapia versus psychotherapy [Mikrokinezyterapia a psychoterapia]. *Psychol Prakt.* 2020; 19: 58–62.
19. Mortazavi SS, Shati M, Ardebili HE, Mohammad K, Beni RD, Keshteli AH. Comparing the Effects of Group and Home-based Physical Activity on Mental Health in the Elderly. *Int J Prev Med.* 2013; 4 (11): 1282–1289.
20. Grosjean D, Benini P, Carayon P. Managing irritable bowel syndrome: The impact of micro-physiotherapy. *J Complement Integr Med.* 2017; 14 (2).
21. Grosjean D, Poquin D. Assessment of a microkinesitherapie treatment on 300 low back pain sufferers. *Medycyna manualna.* 2006; 10: 35–46.
22. Grosjean D, Shiguemi Inoue Salgado A, Borges Parreira R, Ceci L, Carraro E, Hosni A, et al. A New Approach to Manual Therapy for the Immune System: an Experimental Study. *Int J Sci Res Methodol.* 2017; 8 (1): 137–148.
23. Pereira AP, Carvalho EMdS, Kerppers II, Furmann M, Pires JAW, Ribeiro LG, et al. Assessment of Heart Rate Variability in Fibromyalgia after Micro-physiotherapy. *Man Ther Posturology Rehabil J.* 2014; 0 (0): 1–5.
24. Fibromyalgia Treatment Using Microphysiotherapy: An Open-Label Pilot Study. *Integr Med Res.* 2022; 1 (1): 205–208.