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Research Article

Massage and Mobilization during Immersion - Development, Usability and Case Series with Health Older Women

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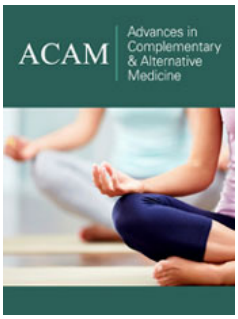
ISSN: 2637-7802



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Submission: August 13, 2024
Published: August 26, 2024

Volume 8 - Issue 2

How to cite this article: Santos FCL, Holovatino LB, Fermino RR, João SMA and Voos MC. Massage and Mobilization during Immersion - Development, Usability and Case Series with Health Older Women. Adv Complement Alt Med. 8(2). ACAM. 000684. 2024.
DOI: 10.31031/ACAM.2024.08.000684

Abstract

This study aims to develop and test the usability of the Relaxation by Massage and Mobilization in Immersion Technique (RMI). The clinical effects were analyzed in case series with healthy elderly women. The RMI was based on literature and described in a manual submitted to quality assessed by 20 referees. For usability analysis, 10 Physiotherapy undergraduate students performed the technique on volunteers. The effects of 10 RMI sessions were analyzed by relaxation indicators (heart rate, blood pressure, flexibility, mobility, pain, and quality of life) in 12 healthy older women. RMI program and manual are usable, reproducible, and suitable for self-learning. RMI improved shoulder and ankle mobility (range of motion), and the psychological domain of a quality-of-life questionnaire (WHOQOL-BREF) in older women. Participants reported relaxation, health behavioral changes, and satisfaction with RMI. It is a relaxation program that combines massage and immersion. RMI was considered usable and reproducible to promote relaxation in clinical practice.

Keywords: Hydrotherapy; Massage; Immersion; Relaxation; Aged; Women; Learning

Abbreviation: Massage and Mobilization Immersion (RMI)

Introduction

Hydrotherapy and massage therapy decrease muscle tension and pain and promote relaxation in physiotherapy sessions. Both strategies improve peripheral circulation and joint mobility, [1,2]. The association with slow and rhythmic passive mobilization can increase these effects [3]. In hydrotherapy, warm water immersion physical principles (floating, hydrostatic pressure, buoyancy, and heat exchange) produce decreased body weight support and movement facilitation. Simultaneously, immersion promotes physiological effects, such as peripheral vasoconstriction, temperature increase, cardiorespiratory adjustment, and optimized kidney function. As a result, muscle blood flow increases and muscle tension and pain decreases, therefore, patients may experience a larger range of motion during and after sessions. Consequently, balance, coordination, and daily life activities can improve [4]. Massage is an ancient resource, which has received recent attention from researchers. The most studied technique is the Swedish massage, which relaxes the skin and muscles and promotes better blood and lymph circulation. Besides muscle relaxation, pain and discomfort decrease, and body perception improves, as immunological responses [1].

The combination of massage and thermoneutral water body immersion effects (when massage is performed in immersion) can theoretically induce relaxation. Massage can

be associated with slow rhythmic and passive mobilization to improve the perception of limb, head, and trunk movements. Such intervention may improve joint mobility [5,6]. Massage therapy during body immersion, with the face out of water, is empirical and made intuitively, without standardized programs, in aquatic therapy sessions. The use of massage and hydrotherapy has been indicated for patients with low back pain [1], lymphedema [7], and chronic heart disease [8] to induce muscle relaxation. The development of a massage and mobilization in an immersion program aims to induce relaxation. Relaxation by Massage and Mobilization in Immersion Technique (RMI), is the program described in the present study. RMI was based on adapted sensory deprivation techniques during immersion [9], Swedish massage, and mobilization. This study aims to develop, describe, and test the usability of RMI. Relaxation responses were investigated in a case series with healthy older women.

Materials and Methods

This is a Research Article with convenience sampling, it was approved by the Research Ethics Committee of the Medical School of the University of São Paulo, process 528/13. This study was divided in four (4) Steps. The first step, RMI was developed, based on the association of massage and mobilization in immersion. Five physiotherapists organized procedures based on literature, experience, and group discussion. The technique was described and illustrated in a self-explanatory manual. During this process, twelve weekly one-hour meetings included two physiotherapists (one specialist in hydrotherapy and one university professor of hydrotherapy), and three one-hour meetings included the whole group (three physiotherapy graduate students). In the second step, the manual was submitted to the evaluation of 20 reviewers (chosen according to Fehring criteria) [10]. Reviewers received a questionnaire based on Likert scale [11]; answers ranged from very poor (1) to excellent (5).

Items about technical quality (theory, clinical viability, sequence, activities, verbal commands, maneuvers and feasibility), text and illustrations characteristics (clarity, terms, figures, general appearance and organization) were included. Reviewers also had a blank space for criticism and suggestions (Table 1). In the third step, ten physiotherapy undergraduate students (approved in aquatic therapy and manual therapy disciplines) participated. They studied the manual for two hours and practiced the application for two hours. They were unsupervised, in a student-student situation. The next day, they applied RMI to healthy volunteers. The activity was filmed and subsequently evaluated by two examiners (independently), who were familiar with the program and had expertise in massage and aquatic therapy. Examiners used a checklist, which involved physiotherapist-patient positioning, maneuvers, sequence, verbal command, safety, and time control. Students evaluated RMI by answering questions about satisfaction with the same topics and reporting criticisms and suggestions. These questions were also based on a Likert scale (1: very poor to 5: excellent) [11]. In the fourth step , the effects of RMI were investigated. Flexibility, mobility, motor function, quality of life, cardiovascular responses (blood pressure, heart rate), and physical/ behavioral responses were assessed. Twelve healthy active older women (60-65 years) participated. Relaxation can result in significant benefits in older adults. The intervention consisted of 10 one-hour-RMI sessions in SIMMM Integrated Clinic in a 6.0 x 4.0m pool (depth varying from 1.15 to 1.30m).

Table 1: Analysis of participants´ reports about Relaxation by Massage and Mobilization in Immersion Technique (RMI).

Question 1. How did you Feel during the Sessions?	
Relaxation	75%(n=9)
Sleepiness	58%(n=7)
Relaxed movements	92%(n=11)
Organized thoughts	58%(n=7)
Sensations related to childhood	42%(n=5)
Happiness	25%(n=3)
Motivation	75%(n=9)
Question 2. How did you Feel after the Sessions? (in the next 12 hours)	
Quiet	42%(n=5)
Calm	83%(n=10)
Optimist	67%(n=8)
Question 3. How did the Program Affect you?	
Better feeding habits	50%(n=6)
Better Sleep quality	67%(n=8)
Motivation	75%(n=9)
Better body perception	92%(n=11)
Mental tranquility	83%(n=10)
Patience	67%(n=8)
Better posture	92%(n=11)
Problem solving became easier	42%(n=5)
Better selfcare	50%(n=6)
Less pain	67%(n=8)
Less fatigue	83%(n=10)
Better circulation	50%(n=6)
Question 4: How do you Evaluate the Program?	
Very good/ excellent	83%(n=10)
Different from what I expected	67%(n=8)
Unique/ personalized	75%(n=9)
Self-knowledge providing	92%(n=11)
Calming and relaxing	100%(n=12)
Body and mind therapy	42%(n=5)

Flexibility, joint mobility (third finger to the ground test) [12], cervical spine, shoulder, hip, and ankle range of motion (goniometry) were assessed before and after the intervention. Disabilities of the Arm Shoulder and Hand (DASH) questionnaire [13] and Foot & Ankle Outcome Score (FAOS) [14], WHOQOL-BREF (physical, psychological, social and environmental quality of life) [15] also evaluated participants before and after an intervention. Cardiovascular responses (blood pressure and heart rate) were

measured before and after each session. Analysis of reports described the experience of participants with RMI. Four open questions were used:

a) How did you feel during the sessions?

b) How did you feel after the sessions?

c) How did the program affect you?

d) How do you evaluate the program?

The Statistical Analyses data showed normality and homoscedasticity, and repeated measures analysis of variance was used (α=0.05). Pre- and post-intervention data were compared. When a main effect was found, post hoc Tukey test was used. Reports were organized into categories. Interviews and questionnaires were administered by a trained and blind examiner.

Result and Discussion

RMI and referees' evaluation

The manual was divided into eight chapters describing the technique by body segment, including principles and foundations. The sequence was proposed in four steps, starting with immersion with sensorial restriction for one minute, followed by five minutes of global body massage, five minutes of each segment massage, five minutes of each segment mobilization, and one minute of immersion with sensorial restriction again. Reviewers' evaluations were categorized (Figure 1). Suggestions focused on sequence reorganization and better photos quality. Suggestions were accepted and incorporated into the manual.

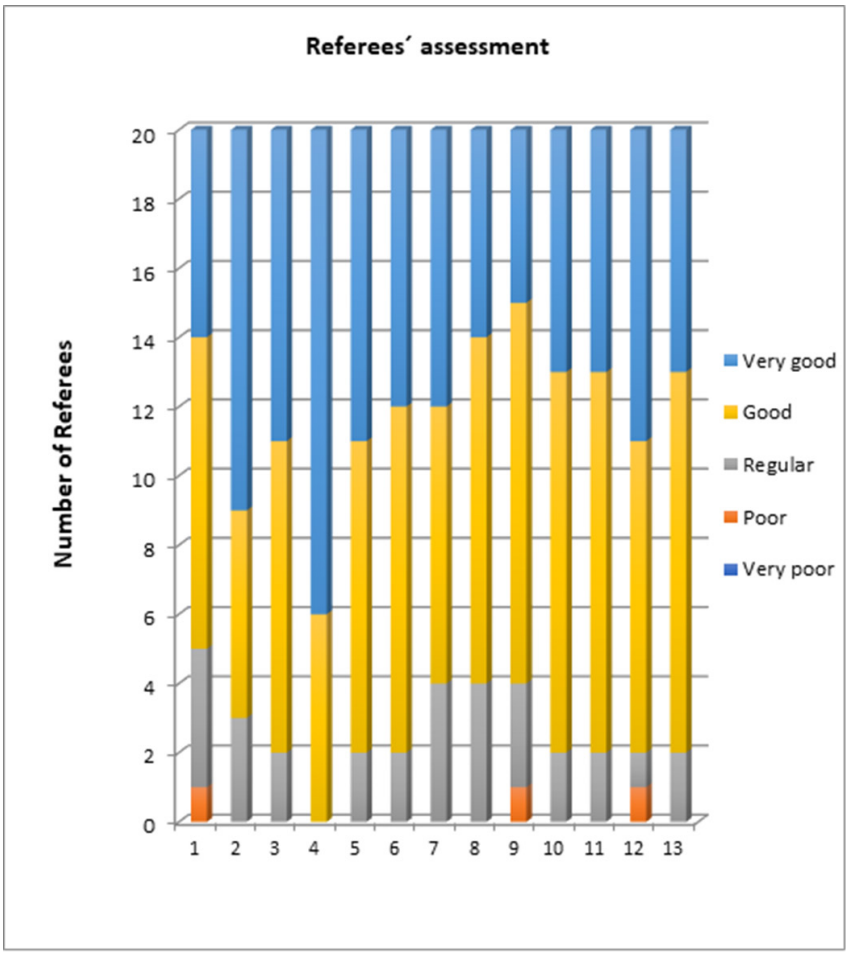

Figure 1: Referees evaluations of Relaxation by Massage and Mobilization in Immersion Technique (RMI).
Legend: Referees evaluated the following items: 1. Rationale; 2. Feasibility; 3. Sequence; 4. Perspectives of achieving therapeutic goals (relaxation); 5. Replicability; 6. Quality of images; 7. Quality of theoretic material; 8. Language; 9. Text clarity; 10. Actions descriptions; 11. Patient positioning description; 12. Therapist positioning description; 13. General impression about the manual.

Students´ evaluation (usability)

Students´ evaluation (usability) Students´ scores were grouped by categories. They suggested developing a demonstration movie (6/10 students), increasing the number of mobilizations (5/10), including breathing exercises (5/10), and relaxing music (4/10). These suggestions will be further considered for expanding RMI. The maximum score was given by eight students for images quality, by six for the idea and by ten for the manual organization. The mean score was 4.6±0.2. All students agreed that it is possible to apply RMI after reading the manual.

Case series

ANOVA showed no significant improvement in the third finger-to-floor test (F1,11=1.37; p=0.266), in cervical (F1,11=8.66; p=0.120) and hip mobility (F1,11=3.99; p=0.071). Shoulder mobility increased (F1,11=40.98; p=0.005). Tukey tests showed that elevation, depression, and internal and external rotation showed a significant range of motion increase (p<0.001). Ankle mobility increased (F1,11=23.93; p<0.001). Tukey tests showed that flexion and extension increased (p<0.001). Diastolic blood pressure did not change, and systolic blood pressure was lower after sessions (F1,11=12.53; p=0.004). Although there was an interaction between pre- and post-intervention evaluations (F9,99=39.90; p=0.007), Tukey test results varied from 0.093 to 0.999 in the sessions. Therefore, changes were considered as non-significant (Figure 2). Heart rate decreased after sessions (F1,11=39.90; p=0.001). There was an interaction between pre- and post-intervention measures and sessions (F9,99=2.28; p=0.022). Tukey tests showed p<0.005 in seven sessions, due to a significant heart rate decrease (Figure 3). In the daily routine item of DASH, the score decreased from 15.8 to 8.0. In the musical instrument/sport item, the score decreased from 37.5 to 15.0, and in the work item, from 14.8 to 5.0. Such improvement of upper limbs' motor function did not reach a significant level. Participants' scores did not show significant differences in FAOS, although the quality-of-life domain had some (non-significant) improvement (from 89 to 92). In all four domains of WHOQOL-BREF, an increase in the score was noticed. In the psychological domain, there was a significant difference, with higher quality of life after intervention. The answers to the four open interview questions were transcribed and organized into categories (Figures 2 & 3, Table 1).

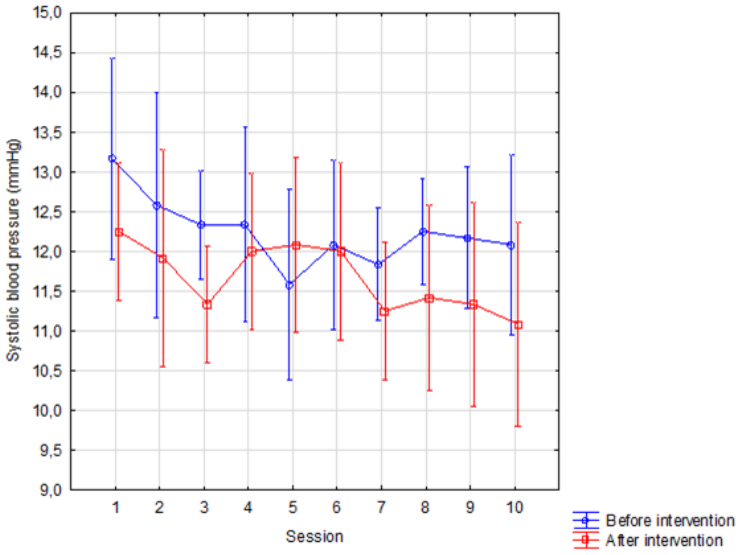

Figure 2: Variation of systolic blood pressure before and after each session of Relaxation by Massage and Mobilization in Immersion Technique (RMI).

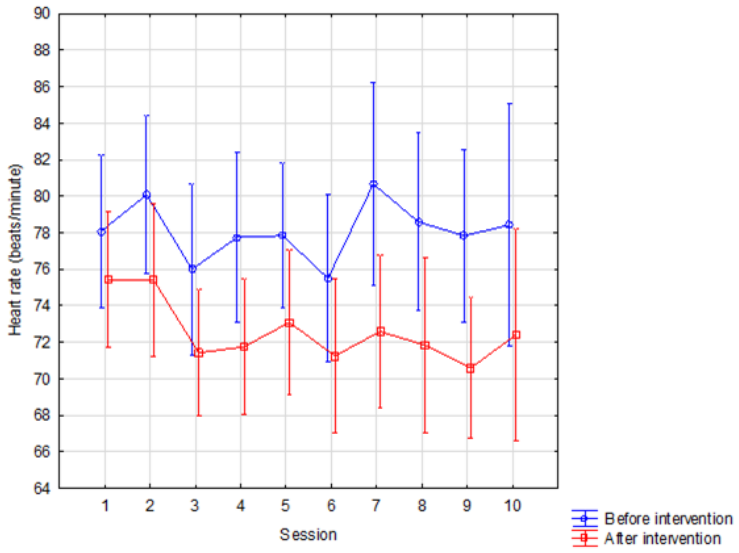

Figure 3: Variation of heart rate before and after each session of Relaxation by Massage and Mobilization in Immersion Technique (RMI).

This study showed that RMI achieved the technical and clinical goals, considering reviewers' reports and therapeutic effects. Reviewers refined the intervention program and the manual. RMI was considered viable for self-learning and replicable [16]. RMI was based on mREST, mobilization, massage, and hydrotherapy. The program can be applied as a complete sequence in a 40 minute-session, or some partial sequences can be applied in one or two body segments, in addition to a regular session of aquatic physiotherapy. The case series showed mobility improvement, indicating that the intervention produced physiological changes in the musculoskeletal system [17], credited to muscle relaxation. Performing massage and mobilization under the effect of immersion and heating were decisive in improving shoulders range of motion. Resende, et al. [18] reported increased circulation, collagen distensibility, and joint mobility after warm water immersion (34 ºC). The authors also mentioned decreased muscle tension due to decreased weight on joints. Such improvement may affect balance, such as ankle mobility, and imply health promotion and accident prevention, especially for older adults. Some participants reported higher motivation to start new activities. These results can be a consequence of shoulder and ankle mobility improvement, associated with lower muscle tension as a response to immersion in warm water, massage, mobilization, and induced relaxation [19]. Heart rate evaluations showed that the program had no negative impact on the cardiovascular system. Blood pressure values improved, which motivates the search for longer programs, as suggested by previous studies with massage.

The fluctuation provides three-dimensional body movements associated with body compression by hydrostatic pressure [20]. Body perception may be affected by the practice of activities in immersion, because of distinct sensory stimulation. This type of practice can be beneficial for older adults. WHOQOL-BREF showed improvement in the psychological domain, corroborating previous findings [21]. This may be attributed to the fact that participants met different people and occupied their mind and their time. Table 1 shows many reports of RMI positive impact, which can be associated with a higher quality of life. Reports analyses, organized by categories showed that the technique was well accepted and promoted relaxation (Table 1). RMI affected behavior in a positive way. The program was well tolerated and promoted relaxation and physical improvement. Future studies should use blind randomized clinical trials to explore relaxation effects produced by RMI in different populations, submitted to stress and/or postural overload. Longer periods of intervention may induce more intense effects. As a limitation, we must mention that no systematic follow-up was provided after the intervention and that future studies should include follow-up assessments.

Conclusion

RMI was viable and adequate for clinical and therapeutic purposes. The reviewers considered the manual didactic and self-explanatory, therefore, RMI was considered replicable. RMI produced physiological and behavioral responses that are indicative of relaxation.

Acknowledgement

Fabíola Carvalho Lopes dos Santos: conception and design, acquisition of data, analysis and interpretation of data, drafting of manuscript, critical revision.

Lillian Bondezan Holovatino: acquisition of data

Raíssa Ramos Fermino: acquisition of data

Silvia Maria Amado João: drafting of manuscript

Mariana Callil Voos: analysis and interpretation of data

Conflict of Interest

The authors below declare that there is no conflict of interest related to the article under consideration for publication.

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Lillian Bondezan Holovatino

Raíssa Ramos Fermino

Silvia Maria Amado João

Mariana Callil Voos.

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