

AWARENESS, KNOWLEDGE, AND PERCEIVED ROLE OF MATRIX RHYTHM THERAPY IN NEUROREHABILITATION: EVIDENCE FROM PHYSIOTHERAPISTS IN KARACHI

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Abstract

Background: Matrix Rhythm Therapy (MRT) is a new method of non-invasive physiotherapy that is being employed to enhance tissue metabolism and neuromuscular function. It is a method that uses mechanical vibrations of low frequency to create a physiological rhythm. Although there are increasing evidences from international literature that it plays a therapeutic role, physiotherapists in Pakistan have not explored this evidence in a great extent.

Objective: To find the awareness, knowledge and perception of physiotherapists about MRT in Karachi and the effectiveness and safety of MRT in neurological rehabilitation.

Methodology: A questionnaire based, cross-section survey was conducted among 60 licensed physiotherapists working in Karachi using a self-administered validated questionnaire. Descriptive statistics were obtained and chi-square tests, Fisher's exact tests, and binary logistic regression analysis were conducted in SPSS version 22 with $p < 0.05$ considered significant.

Results: 31.7% of physiotherapists had heard of MRT and 36.7% reported that they knew the principles and contraindications of MRT. Even though there was low awareness, the attitudes were generally positive; 51.7% thought that MRT could be used as an adjunct to conventional physiotherapy and the same percentage believed that it could improve patient outcomes. The number of years in clinical experience was a significant factor in awareness of contraindications ($p = 0.021$).

Conclusion: The physiotherapists showed limited awareness and knowledge about Matrix Rhythm Therapy, but had a positive perception of its role in neurological rehabilitation. There is a recommendation for structured educational programs and additional clinical studies for evidence-based use of MRT in physiotherapy practice.

INTRODUCTION

Matrix Rhythm Therapy (MRT) is a non-invasive therapeutic technique developed in Germany in the late 1980s by Dr. Ulrich Randoll. MRT is based on the principles of vibrotherapy and uses a handheld device featuring a resonating head which produces a low-frequency mechanical oscillation, between 8 Hz to 12 Hz. The MRT theory suggests that pathological conditions occur when physiological rhythmic processes (PRP) at the cellular level become dysregulated, or “off track” [1,2]. MRT aims to correct these disruptions to the biological rhythms, bringing about normal function of cells and tissues.

MRT is said to reduce pain, improve mobility and microcirculation due to its action on the dynamic biological frequencies. The therapy aims to improve the metabolic exchange between the cells in the body, with the help of rhythmic oscillations of the tissues that encourages the neuromuscular regulation and circulation [3]. In MRT, the handheld vibrating tool creates an uneven pressure distribution in tissues, resulting in a pumping and sucking action and activating mechanoreceptors and peripheral nerve endings. These mechanisms are thought to aid in tissue extensibility, circulation and neuromuscular coordination [4].

Previous work in the field of MRT has focused on studying its use in orthopaedics, gynaecology, neurosurgery and musculoskeletal diseases. While there has been emerging clinical interest in the use of MRT in CLBP, a recent review of the literature found that its use was relatively under-explored but that, when used alongside conventional physiotherapy, MRT was shown to be associated with a reduction in pain, disability and quality of life [5]. In the same way, a randomized clinical trial demonstrated the beneficial effect of combining MRT with a combined physiotherapy programme for the patients with CLBP in relation to pain scores, disability level and quality of life, with greater improvement in the general health perception than with physiotherapy alone [6].

Controlled trials in other musculoskeletal conditions suggest that MRT may have therapeutic applications, such as enhancements of

craniovertebral angle, strength, pain, and quality of life in people with forward head posture [7]. MRT has been identified as having beneficial effects in neurological rehabilitation, such as neurological disorders involving muscle tone alteration, mobility restriction and impaired circulation. In stroke survivors, a single blind, randomized controlled study showed that MRT with Bobath therapy resulted in greater improvements in muscle tone, balance, gait speed and pelvic movement symmetry when compared with Bobath therapy alone [8].

MRT is also under investigation in inflammatory and systemic musculoskeletal diseases. MRT combined with exercise therapy led to improvements in the mobility of the spine, sleep quality and exercise beliefs in patients with ankylosing spondylitis, suggesting that MRT may be a useful addition to rehabilitation programmes [9]. Several more clinical studies and case reports have examined the use of MRT in pain management for a wide variety of conditions such as radiation induced trismus [10], myofascial trigger points and trigeminal neuralgia [11] and facial nerve paralysis [12]. Overall, these studies highlight the increasing, but still developing, evidence base for the potential benefits of MRT as a therapeutic intervention.

MRT is a field that is underutilized in the realm of complementary rehabilitation therapies for pain and functional recovery, despite growing interest. There is limited awareness and rigorous scientific investigation of MRT. This is especially true in low- and middle-income countries, where access to new technologies and formal training is limited, and the evidence base on implementation is evolving [18]. The potential of MRT was further demonstrated in a recent study describing excellent results when MRT was used in conjunction with specific therapeutic exercises post-distal radius surgery [13].

Awareness and use of Matrix Rhythm Therapy are very limited in the field of neurological rehabilitation. MRT has shown promise in neurological disorders like stroke, MS and CP, such as improving muscle tone, balance, mobility and circulation, but is not currently accepted or

utilized in standard neurorehabilitation care. The knowledge about MRT among physiotherapists/clinicians is less, especially in Pakistan, where there are very few local studies exploring its clinical utility, perceived effectiveness and/or barriers to implementation.

A better understanding of the knowledge and perceptions of physiotherapists regarding MRT is important for supporting evidence-based practice and supporting rehabilitation services with international priorities such as the World Health Organization's Rehabilitation 2030 agenda [17]. Assessing the gaps in awareness can guide the design of specific education programs, training programs or workshops to support the integration of MRT in neurorehabilitation services. Better awareness of physiotherapists can eventually lead to better outcomes for patients, through increased access to evidence-informed therapies in clinical practice. Therefore, the aim of the present study was to assess awareness level, knowledge, and perceived barriers of Matrix Rhythm Therapy among physiotherapists of Karachi city, Pakistan; creating the base for future research and capacity building efforts in the healthcare sector of the city.

Methodology

This is cross sectional study that was done in Karachi, Pakistan, involving male and female physiotherapists in various clinical settings with a validated questionnaire. Participants were physiotherapists who had at least two years of clinical experience, but not exclusively academic. Physiotherapists who had at least two years clinical experience and who didn't practice Matrix Rhythm Therapy or were purely academic were considered. Collection of data was conducted for 3-4 months after IRB approval. A sampling approach was used as it was less than 100, and all physiotherapists who fulfilled inclusion criteria were approached for participation and a sample size of 60 physiotherapists was obtained. All those eligible were explained about the study in detail and written informed consent was taken before administering questionnaires.

Data was inputted and subjected to analysis in SPSS version 22. Demographic information including age, gender, education level,

professional sector and years of clinical experience was summarized using descriptive statistics (frequencies, percentages, mean $\pm$ standard deviation). The main outcome variable was awareness of Matrix Rhythm Therapy (MRT), (yes/no) which was analyzed as a categorical variable. Awareness was compared with the independent variables with the chi-square test, and if the expected cell frequencies were <5 , then Fisher's exact test was used. To determine the factors associated with awareness and to control for possible confounding variables, binary logistic regression analysis was conducted and presented in odds ratio with 95% confidence interval. The p-value of less than 0.05 was set as the criteria for statistical significance. The confidentiality and anonymity of the participants was ensured and the right to withdraw from the study without negative consequences was communicated.

Results

All 60 of the respondents answered questions about awareness and perception of Matrix Rhythm Therapy (MRT). Most of the respondents had little knowledge about MRT (41 respondents or 68.3%). Also, 36.7% (22 respondents) said they knew of MRT's guiding principles and procedures. Opinions on the value of the MRT, even if low, were largely positive. A majority (51.7%, $n = 31$) agreed that MRT can be used with physiotherapy and a majority (51.7%, $n = 31$) agreed that MRT has a positive effect on the patient's outcomes..

Awareness by educational qualification

The Fisher's exact test was used to compare the educational qualification (Doctor of Physical Therapy (DPT) vs Master of Science in Physical Therapy (MSP)) and awareness or perceptions of MRT (Table 1). The awareness of MSPT graduates was consistently higher than that of DPT graduates with no significant difference in any of the items. The MSPT graduates showed a higher level of awareness of MRT than the DPT graduates in reporting the awareness of underlying principles and mechanisms of MRT (37.5% vs. 25.0%, $p = 0.299$) and contraindications and limitations of MRT (46.9% vs. 25.0%, $p = 0.079$).

Perceptions regarding the need for further research were found, with 61.7% (n = 37) of respondents indicating that further studies are required to prove efficacy and safety of MRT in neurological conditions, while no difference was seen between DPT and MSPT practitioners (p = 0.887). As to the adjunct use, there was a consensus that it could be used in conjunction with traditional physiotherapy (51.7%, n = 31), with slightly higher percentage by MSPT graduates (59.4%) than by DPT graduates (42.9%) which were not significant (p = 0.201). Similar numbers (51.7%, n = 31) thought that MRT improves prognosis, but this was not significantly different by education level (p = 0.448).

Condition-specific familiarity followed the same trend: 36.7% (n = 22) of respondents reported knowledge of the neurological conditions for

which MRT is indicated, with MSPT graduates more familiar (46.9%) than DPT graduates (25.0%; p = 0.079). Perceived effectiveness of MRT in stroke rehabilitation was reported by 48.3% (n = 29) of respondents, with no significant difference between groups (p = 0.427); perceived effectiveness in Parkinson's rehabilitation was reported by 43.3% (n = 26; p = 0.544). For symptom-specific outcomes, 45.0% (n = 27) believed MRT could reduce spasticity and 36.7% (n = 22) believed it could relieve tightness and improve posture, with no significant differences by education level (p = 0.405 and p = 0.694, respectively). Finally, 48.3% (n = 29) of participants believed MRT could improve balance and mobility when combined with physiotherapy, again with no significant difference between groups (p = 0.809), as summarized in Table 1.

Table 1. Awareness and perceptions of MRT by educational qualification (DPT vs MSPT).

Question	DPT (n=28) n (%)	MSPT (n=32) n (%)	Total (n=60) n (%)	p-value
Awareness of MRT in neurological conditions	7 (25.0)	12 (37.5)	19 (31.7)	0.299
Awareness of principles and mechanism of action of MRT	7 (25.0)	15 (46.9)	22 (36.7)	0.079
Awareness of contraindications/limitations of MRT	7 (25.0)	15 (46.9)	22 (36.7)	0.079
Belief that further research is needed on MRT efficacy/safety	17 (60.7)	20 (62.5)	37 (61.7)	0.887
Belief that MRT can be an adjunct to conventional physiotherapy	12 (42.9)	19 (59.4)	31 (51.7)	0.201
Belief that MRT positively impacts prognosis	13 (46.4)	18 (56.3)	31 (51.7)	0.448
Familiarity with specific neurological conditions for which MRT is recommended	7 (25.0)	15 (46.9)	22 (36.7)	0.079
Perceived effectiveness of MRT in stroke rehabilitation	12 (42.9)	17 (53.1)	29 (48.3)	0.427
Perceived effectiveness of MRT in Parkinson's rehabilitation	11 (39.3)	15 (46.9)	26 (43.3)	0.544
Belief that MRT would reduce spasticity	11 (39.3)	16 (50.0)	27 (45.0)	0.405
Belief that MRT would reduce tightness and improve posture	11 (39.3)	11 (34.4)	22 (36.7)	0.694
Belief that MRT (as adjunct) would improve balance and mobility	14 (50.0)	15 (46.9)	29 (48.3)	0.809

Awareness by clinical experience

The relationship between clinical experience, awareness, and perception of MRT was also examined using Fisher's exact test (Table 2). Awareness of MRT in neurological conditions rose with years of clinical experience, from 26.7% in the 2–5-year group to 34.5% in the 6–10-year group and 100% in the single participant with more than 10 years of experience; this trend was not statistically significant overall ($p = 0.259$). Knowledge of MRT's underlying principles followed a similar, non-significant pattern (26.7% vs 44.8%, $p = 0.070$).

By contrast, a statistically significant association was found between clinical experience and awareness of the contraindications and limitations of MRT ($p = 0.021$): physiotherapists with 6–10 years of experience were considerably more aware

of contraindications (48.3%) than those with 2–5 years of experience (23.3%). A significant association was also observed for perceived effectiveness of MRT in stroke rehabilitation, which was higher among more experienced physiotherapists (58.6% vs 36.7%, $p = 0.021$). A majority of participants (61.7%, $n = 37$) believed further research is necessary to determine the effectiveness and safety of MRT in neurological disorders, with no significant association by experience level ($p = 0.351$). Similarly, 51.7% ($n = 31$) agreed that MRT could serve as an adjunct to traditional physiotherapy; agreement was higher among those with 6–10 years of experience (62.1%) than among those with 2–5 years of experience (40.0%), though this difference did not reach significance ($p = 0.055$), as detailed in Table 2.

Table 2. Awareness and perceptions of MRT by years of clinical experience.

Question	2–5 yrs (n=30) n (%)	6–10 yrs (n=29) n (%)	>10 yrs (n=1) n (%)	Total (n=60) n (%)	p-value
Awareness of MRT in neurological conditions	8 (26.7)	10 (34.5)	1 (100.0)	19 (31.7)	0.259
Awareness of principles and mechanism of action of MRT	8 (26.7)	13 (44.8)	1 (100.0)	22 (36.7)	0.070
Awareness of contraindications/limitations of MRT	7 (23.3)	14 (48.3)	1 (100.0)	22 (36.7)	0.021*
Belief that further research is needed on MRT efficacy/safety	17 (56.7)	19 (65.5)	1 (100.0)	37 (61.7)	0.351
Belief that MRT can be an adjunct to conventional physiotherapy	12 (40.0)	18 (62.1)	1 (100.0)	31 (51.7)	0.055
Familiarity with specific neurological conditions for which MRT is recommended	7 (23.3)	14 (48.3)	1 (100.0)	22 (36.7)	0.055
Perceived effectiveness of MRT in stroke rehabilitation	11 (36.7)	17 (58.6)	1 (100.0)	29 (48.3)	0.021*
Perceived effectiveness of MRT in Parkinson's rehabilitation	9 (30.0)	17 (58.6)	0 (0.0)	26 (43.3)	0.053
Belief that MRT would reduce spasticity	12 (40.0)	14 (48.3)	1 (100.0)	27 (45.0)	0.083
Belief that MRT would reduce tightness and improve posture	11 (36.7)	10 (34.5)	1 (100.0)	22 (36.7)	0.321
Belief that MRT (as adjunct) would improve balance and mobility	13 (43.3)	15 (51.7)	1 (100.0)	29 (48.3)	0.752

*Statistically significant at $p < 0.05$.

Discussion

The purpose of this study was to evaluate physiotherapists' knowledge and understanding on the Matrix Rhythm Therapy (MRT) in neurological rehabilitation in Karachi, Pakistan. The principal finding was the low overall awareness, with only 31.7% of the participants being aware of MRT and 36.7% being aware of the principles, mechanisms and contraindications of MRT. This is consistent with recent awareness surveys of physiotherapists in other contexts, which also reveal a lack of basic awareness of MRT compared to other modalities, meaning that MRT is still a relatively new modality for physiotherapists with limited penetration of the mainstream of physiotherapist education and practice [11,14].

Awareness was limited but in this study, the participants generally had favourable perceptions of MRT as an adjunct to conventional physiotherapy with 51.7% stating they thought MRT could be used as an adjunct and 51.7% had a positive perception about its impact on prognosis. The pattern of low awareness but positive attitude aligns with the broader literature on rehabilitation technology adoption, where clinicians generally open up to new technologies when they believe there is potential functional gain, regardless of their technical expertise or experience in using the new tool [20,21].

The perception of improvement of balance, mobility and tone with MRT compared to intervention evidence seems biologically plausible, and is supported by recent clinical research in neurological and musculoskeletal populations [7,9]. For instance, a single blinded randomized controlled trial showed that the combination of MRT with Bobath therapy was also found to have a beneficial effect on muscle tone, balance and gait parameters in stroke patients compared with Bobath therapy alone [8]. This is consistent with our sample, which found that there was some awareness of the potential benefits of MRT in neurological rehabilitation, albeit not a lot, with a significant portion of the participants supporting these benefits.

One of our results was that clinical experience was statistically significantly correlated with awareness of MRT contraindications ($p = 0.021$) and perceived effectiveness in stroke rehabilitation ($p = 0.021$), but not with general awareness or knowledge about MRT's principles. This indicates that the more a physiotherapist gains experience, he/she may become more aware of the risk and safety screening and knowledge of the limitations of newer modalities in the absence of formal training in these techniques. The result supports the overall call for a well-trained rehabilitation workforce, proficient in safety and continuously seeking new rehabilitation interventions [18].

Educational qualification (DPT vs MSPT), however, did not display statistically significant differences for any of the MRT awareness and perception variables of our data set. The same conclusion has been reported in other MRT awareness studies in which exposure seems to be dependent of course availability, course offered, and access to equipment, and not necessarily on degree level [14]. This underlines the need for greater awareness of the MRT to be targeted at the curricula and not simply presume that postgraduate qualification provides more awareness.

Lastly, our sample showed a high level of support for the need to continue studies in this area (61.7%), a sentiment echoed in the existing literature: although there are promising clinical trials and emerging case-based research on the effects of MRT across rehabilitation settings, the current evidence base – especially in neurological rehabilitation calls for further studies in this area that are broadly replicated, standardized, and better structured such as multicentre designs to promote routine integration [5,19]. It is important that this is a clinician's perception of a need for increased research as there are global calls to increase the evidence and workforce capability for rehabilitation [17,18] and this is echoed in Pakistan.

Strengths and Limitations

The study provides novel data on the awareness of MRT among physiotherapists in Pakistan which is

lacking in the existing literature. The approach of a cross sectional study does not allow us to conclude causation however, and the self-reported data may generate response bias. Further, the geographic limitation to a single metropolitan area and the small and unevenly distributed experience subgroups (particularly the single participant who had over 10 years of experience) may reduce the generalizability of the findings. Although there are some restrictions, the results are useful for future research and educational efforts.

Implications for Practice and Research

The outcomes underscore the critical need for structured education approaches and rigorous clinical studies to inform the safe and effective integration of MRT into neurological rehabilitation. Research with RCTs, longitudinal outcome studies, and implementation research should be a priority to assess feasibility, effectiveness, and clinician uptake in the future. Building the evidence base may make clinical decisions easier and more effective, leading to better patient-centred rehabilitation outcomes.

Conclusion

The perception was mostly favorable while awareness and knowledge of Matrix Rhythm Therapy was limited among the physiotherapists in Karachi who were involved in neurological rehabilitation. There was greater awareness of MRT contraindications and perceived effectiveness in stroke rehab among those with clinical experience than those with educational qualification. The findings are relevant to crafting educational programs and CPD avenues and activities based on evidence to encourage the use of MRT in physiotherapy practice in Pakistan..

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