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Original Article

DOI: 10.55735/s48ys138

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The Healer Journal of Physiotherapy and Rehabilitation Sciences

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Journal homepage: www.thehealerjournal.com

Assessment of Knowledge, Beliefs, and Attitudes Regarding Spinal Manipulation in Physical Therapists Practicing in Hyderabad

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KEYWORDS

Attitude
Beliefs
Knowledge
Physical therapy
Spinal manipulation

DECLARATIONS

Conflict of Interest: None
Funding Source: None

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ABSTRACT

Background: Manual therapy has long incorporated spinal manipulation as an integral technique practiced by physical therapists. Spinal manipulation involves the manual adjustment of vertebrae by passively moving them within their physiological range of motion. This procedure is widely used to restore mobility, and improve pain and functional outcomes in patients with musculoskeletal disorders. **Objective:** To assess the level of knowledge and awareness among physical therapists in Hyderabad regarding spinal manipulation. **Methodology:** This cross-sectional study was conducted after obtaining ethical approval from the Institutional Review Board of the Isra Institute of Rehabilitation Sciences. The study was carried out from January to December 2023. Data were collected from various clinical settings across Hyderabad, including hospitals and private physiotherapy clinics. A total of 150 physiotherapists participated in the study, recruited through convenience sampling due to population accessibility. Inclusion criteria were limited to practicing clinical physiotherapists with at least a bachelor's degree in physiotherapy. This criterion was set to ensure that respondents possessed sufficient academic and clinical knowledge to provide meaningful input regarding spinal manipulation. Exclusion criteria included non-clinical physiotherapists, physiotherapy technicians, and diploma holders, as the focus was specifically on qualified clinicians actively engaged in patient care. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were used for continuous data. Chi-square tests were used to evaluate associations between categorical variables, such as practice setting and use of spinal manipulation. Independent t-tests and one-way ANOVA were applied. **Results:** The study revealed that only 5.3% of participants had completed orthopedic manual physical therapy specialization, while 94.7% had not received such advanced training. The majority of respondents demonstrated good knowledge of spinal manipulation techniques. Most therapists reported being familiar with clinical prediction rules and acknowledged their use in practice. **Conclusion:** This study concluded that physical therapists in Hyderabad possess a sound level of knowledge regarding spinal manipulation. The undergraduate physiotherapy curriculum appeared to be the primary source of this knowledge, underscoring its influence on professional practice.

How to cite the article: Ghani D U, Moin J, Fatima D E. Assessment of Knowledge, Beliefs, and Attitudes Regarding Spinal Manipulation in Physical Therapists Practicing in Hyderabad. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2025; 5(1): 201-208.

INTRODUCTION

Since the beginning of manual therapy, spinal manipulations have been used by physical therapists.[1] spinal manipulation refers to manually adjusting the vertebras by passively moving them in their physiological limits. It is a technique in which a high velocity thrust is applied to the vertebrae, which rapidly adjusts the joints, often along with a popping sound.[2] While there is still no common consensus among practitioners about the popping sounds, studies have shown that they are not associated with pain, but rather with the pain-relieving effects of the therapy.[3] Studies have revealed that the amount of force that is applied during the manipulative treatment varies depending upon two factors: the area on which the manipulation is being applied and the clinician applying the manipulation.

Studies also showed that even though the forces are directed at the joint produced effects on areas further away from the site.[3] It is thought that when passive force is applied to the joints, it induces some neurophysiological effects on both the central and peripheral nervous systems. Current studies have shown that spinal manipulation is quite efficient in relieving back and neck pain.[1] Most studies done earlier showcased that the pain-relieving effects of the manipulative therapy were of biomechanical origin. However, recent studies have shown that the analgesic effects of the therapy are of neural origin, and the studies have started to focus on the neurophysiological effects of spinal manipulation, stating that following the manipulation, there is a series of neurochemical changes in the nervous system that lead to alleviation of pain. Hence, it is hypothesized that the pain modulation by spinal manipulation is neurophysiological in nature.[4]

In 2019, neck pain was the most common complaint of patients categorized under musculoskeletal conditions, with a prevalence ratio of approximately 27:1000. As of this data, it presents as a significant problem in current-day society.[5] Nonspecific neck pain is the main reason that leads to healthcare visits and medical leaves.[6] This is only succeeded by lower back pain, which 50-80% of the population experiences in their lifetime. The working class is thought to have a higher risk of developing lower back pain. Lower back pain is considered the most frequent causative factor for pain-related disability.[7] There are multiple potential harms associated with spinal manipulation; some may be mild, such as headaches and fatigue, but there can be major drawbacks of the therapy, such as fracture or paralysis, and even death. Numerous studies have been conducted on the adverse effects of spinal manipulation, but the information is still not sufficient because every study differed in conclusion.[8] Spinal manipulation can also be responsible for vertebral artery dissection, concluding that the patient should be informed regarding draw backs such as stroke and paralysis.[9] though the variation continues as some studies show that even though cervical manipulation causes noticeable changes in the blood flow velocity of opposite side vertebral artery it still isn't majorly responsible for increasing risk of stroke as there aren't any major changes in brain perfusion.[10]

Worldwide, physical therapists have shown different attitudes and perceptions towards the manipulative therapy, concluding that anxiety is the key hurdle in the use of said therapy.[1] A physical therapist of the United Kingdom, in a study, concluded that exclusion of spinal manipulation was mostly based on anxiety. They reported that the thoracic region was most frequently manipulated, and the most complications were seen in manipulation of the cervical spine[10] similar study in the United States also yielded that the physical therapists felt most safe performing manipulation on the thoracic spine, then on the lumbar spine, and felt least comfortable performing it on the cervical spine.[11]

South African physical therapists applied both manipulation to both the cervical and thoracic region comparatively frequently, and then to the lumbar region. They also used some sort of dizziness test before the therapy.[12] Canadian physical therapists most frequently use thoracic spine manipulation, followed by lumbar sacroiliac and cervical regions, respectively. They used manipulation either for a stuck joint or to increase joint mobility and refrain from the therapy when the patient's condition was irritated by the manipulative procedure.[13] The manipulative techniques are thought to be an entry-level skill by senior practitioners.[14] Hence are included in the curriculum of entry-level physiotherapy educational programs the techniques are then advanced with specialization in orthopedic manipulative physical therapy (OMPT).[15] While the thrust manipulation is now more integrated into the educational programs, there is still room for

betterment of teaching strategies, as the study showed cervical spine thrust manipulation is still being taught less frequently than other regions of the spine.[16] There are certain contraindications regarding the use of spinal manipulation.

These can be categorized under absolute contraindications and relative contraindications. The absolute contraindications can be further classified as (a) bone related such as tumor, bone infections, dysplasia, long term corticosteroid use, arthritic condition, fracture and osteomalacia, (b) neurological conditions as cord compression, nerve root compression and cauda equine, (c) vascular conditions including aneurysms and hem arthrosis other absolute contraindications are incomplete diagnosis, forbiddance form the patient and lastly intolerable pain. Relative contraindications include, but are not limited to, gestation, overstretched ligaments, arterial calcification, spondylolysis, spondylolisthesis, and osteoporosis.[17]

For centuries, the methods used to manipulate the spine have been modified and passed down to newer practitioners. What is to be kept in mind is that at the basic level, to produce the manipulative effect, the force is to be applied directly to the targeted segment's vertebrae, and the body's anatomy doesn't allow direct access to the spinal regions except for the cervical spine, and to manipulate these regions therapist has to apply force from the posterior aspect. In order for the manipulation to work, the force must be perpendicular. The cervical spine is rather easier to manipulate as it is most accessible. A general model for cervical manipulation includes side rotation along with opposite side lateral flexion. The thoracic spine is rather different than other regions, as in this region, the transverse rotation is not blocked.

The general model of manipulation for the thoracic spine suggests that while the patient is lying prone, the palms of hands of the therapist apply posterior-anterior force at the caudal vertebra that allows for the separation of zygapophysial joints, hence producing the manipulation. In the lumber segment, the joint surfaces are only kept from sliding off of each other by the restriction provided by the joint capsule. To manipulate the lumber spine, it is generally suggested to use the transverse rotation while going slightly outside of the physiologic range of the joints. This causes the axis of rotation to change its position and relocate to the impacted joint distraction of the opposite side zygapophysial joints, while the joint capsule provides resistance. This is how the mechanism of lumber manipulation works.[17] The study was designed to assess the level of knowledge and awareness among physical therapists in Hyderabad regarding spinal manipulation

METHODOLOGY

This research was conducted as a cross-sectional study after obtaining ethical approval from the Isra Institute of Rehabilitation Sciences. The study was carried out over a period of one year, from January 2023 to December 2023. Data were collected from a variety of clinical settings across Hyderabad, including hospitals and private physiotherapy clinics, to ensure that the sample reflected a wide range of professional environments. A total of 150 physiotherapists participated in the study, recruited through convenience sampling due to population accessibility. Inclusion criteria were limited to practicing clinical physiotherapists with at least a bachelor's degree in physiotherapy. This criterion was set to ensure that respondents possessed sufficient academic and clinical knowledge to provide meaningful input regarding spinal manipulation. Exclusion criteria included non-clinical physiotherapists, physiotherapy technicians, and diploma holders, as the focus was specifically on qualified clinicians actively engaged in patient care.

The data collection tool was a structured questionnaire adapted from the survey developed by Mourad et al. (2022), which investigated Italian physiotherapists' knowledge, beliefs, and attitudes toward spinal manipulation. For the present study, only minor modifications were made, specifically in the demographic section, to align with the local context while maintaining the original tool's validity. The final questionnaire consisted of 42 questions. It was structured to explore the utilization of spinal manipulation in daily practice, physiotherapists' awareness of clinical prediction rules (CPRs), and their beliefs and attitudes regarding safety, effectiveness, and applicability of spinal manipulation. Additionally, demographic and professional background factors such as years of experience, practice setting, and educational level were recorded to determine their potential influence on practice trends.

Data collection was conducted both in person and electronically to maximize accessibility and

participation. All participants provided informed consent, and confidentiality of responses was assured. Completed questionnaires were compiled and prepared for statistical analysis. For data analysis, descriptive statistics were first employed to summarize demographic information and overall response trends. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were used for continuous data. To assess relationships between variables, inferential statistics were applied. Chi-square tests were used to evaluate associations between categorical variables, such as practice setting and use of spinal manipulation. Independent t-tests and one-way ANOVA were applied where appropriate to compare mean differences across groups based on education level or years of experience. A p-value of less than 0.05 was considered statistically significant. Data were analyzed using SPSS version 25, ensuring accuracy and reliability in interpretation.

RESULTS

A total of 150 physiotherapists participated in the survey. The demographic characteristics are presented in Table 1. The gender distribution was 53.3% female, 46.7% male. Most participants were between 23–26 years old (59.3%), followed by 27–33 years (30.7%), and 35–48 years (10%). The majority held a Doctor of Physical Therapy (DPT) degree (82%), while a smaller proportion held M.Phil. (13.3%), bachelor's (3.3%), or other postgraduate qualifications (1.4%). Only 5.3% reported specialization in Orthopedic Manual Physical Therapy (OMPT). Most respondents had less than 5 years of clinical experience (80%), with 18% reporting 6–10 years and 2% more than 10 years. The majority were hospital-based (68.7%), while 31.3% worked in private practice. Direct access to patients was reported by 90% of participants.

As shown in Table 2, the main influence on spinal manipulation (SM) practice was undergraduate education (61.6%), followed by continuing professional development (25.8%) and musculoskeletal specialization (5.3%). Awareness of CPRs was high, with 84% reporting familiarity. Participants were most familiar with CPRs for lumbo-pelvic manipulation (68.9%) and cervical manipulation (61.5%). Notably, 81% indicated that they actively used CPRs in clinical decision-making. Attitudes and practices regarding SM are summarized in Table 3. Participants demonstrated a generally positive attitude toward the use of spinal manipulation (SM), though confidence

Table 1: Statistics of participants

Variables	Categories	Frequency	Percentage (%)
Gender	Male	70	46.7
	Female	80	53.3
Age (years)	23–26	89	59.3
	27–33	46	30.7
	35–48	15	10.0
Qualification	DPT	123	82.0
	M.Phil.	20	13.3
	Bachelor	5	3.3
	MSc/PPDPT	2	1.4
Experience (years)	<5	120	80.0
	6–10	27	18.0
	>10	3	2.0
Practice setting	Hospital	103	68.7
	Private practice	47	31.3
Direct access practice	Yes	135	90.0
	No (referral)	15	10.0
Influences on SM practice	Undergraduate education	93	61.6
	CPD course on SM	39	25.8
	Musculoskeletal specialization	8	5.3
	Other programs	6	4.0
	None	5	3.3
Awareness of CPRs	Yes	126	84.0
	No	24	16.0
CPRs familiar with	Lumbo-pelvic manipulation	102	68.9
	Cervical manipulation	91	61.5
	Thoracic manipulation	69	46.6
	None	20	13.5
Routine CPR use in practice	Yes	121	80.7
	No	29	19.3

varied across spinal regions. A large majority reported routinely screening patients before SM, particularly for the cervical and upper cervical spine, where more than 80% indicated that they always performed pre-manipulative testing. Screening was also highly reported for thoracic and lumbar manipulation (>85%), reflecting strong adherence to safety practices. When asked about their actual use of SM, responses revealed regional differences. Thoracic (88%) and lumbar (92%) regions were most frequently treated with manipulation, while cervical (67%) and upper cervical (65%) areas were less commonly addressed. These findings highlight that although clinicians recognize SM as effective for all spinal regions, caution is greater for the cervical spine.

Confidence levels mirrored this trend: the majority of participants expressed comfort in performing SM for thoracic (91%) and lumbar (91%) regions, but confidence declined for cervical (63%) and upper cervical (67%) manipulation. This hesitancy was consistent with safety concerns commonly associated with cervical interventions. In terms of patient communication, most respondents (87.3%) reported that they always explained side effects of SM, at least in summary form. Only a small proportion (8.7%) admitted to doing so occasionally or rarely. These results indicate strong awareness of ethical practice and informed consent obligations among participants. Barriers to SM practice varied according to spinal region but followed a consistent pattern overall. The most commonly reported challenges were lack of practical training (≈20–27%) and fear of adverse patient reactions (≈40–50%).

Safety concerns were particularly pronounced in cervical manipulation (17%), reflecting clinicians' caution toward potential risks. Lack of education and insufficient experience were also cited, though less frequently. Interestingly, a small proportion indicated that "none" of these barriers applied, particularly for thoracic (35.9%) and lumbar (36.4%) regions, suggesting higher confidence in these areas compared to the cervical spine. Clinical indicators guiding the decision to perform SM were largely functional. The vast majority (82.7%) reported reduced range of motion as the primary reason for applying SM, followed by pain relief (14.7%).

Few clinicians cited patient request, manual testing, or CPRs as their main indicators. These findings suggest that therapists rely more on observable impairments rather than external pressures or diagnostic frameworks. The success of SM was predominantly defined by correction of dysfunction or positional fault (78%) and symptom improvement (15%), with fewer

Table 2: Attitudes, confidence, and safety practices in SM

Domain	Description	Agree (%)	Neutral (%)	Disagree (%)
Pre-manipulative testing	Upper cervical	84.6	6.0	9.3
	Cervical	84.6	5.3	10.0
	Thoracic	92.7	4.7	2.7
	Lumbar	90.6	6.7	2.7
Routine SM practice	Upper cervical	64.7	8.0	27.3
	Cervical	66.7	5.3	27.5
	Thoracic	88.0	6.0	6.0
	Lumbar	92.0	5.3	2.7
Confidence in performing SM	Upper cervical	66.7	8.7	24.7
	Cervical	62.7	11.3	26.0
	Thoracic	90.6	7.3	2.0
	Lumbar	91.3	8.0	0.7
Patient communication	Always explain adverse events	92.0	4.0	4.0

Table 3: Barriers, indicators, and perceptions regarding SM

Domain	Description	Frequency	Percentage (%)
Barriers	Fear of patient response	86–93	42–59
	Lack of training	36–49	18–27
	Lack of experience	23–33	11–23
	Safety concerns	9–37	5–17
	None	71–72	34–36
Clinical indicators for SM	Reduced ROM	124	82.7
	Pain	22	14.7
	Others	8	5.3
Indicators of success	Dysfunction correction	117	78.0
	Symptom improvement	22	15.0
	Others	15	7.0
Perception of "popping sound"	Intra-articular gas release	55	66.3
	Disc/tissue repositioning	18	21.7
	Other explanations	10	12.0
Preferred technique	Manipulation with thrust	123	82.0
	Mobilization without thrust	27	18.0

clinicians considering multiple or single "popping sounds" as critical markers. Nonetheless, most respondents associated the popping sound with joint gas release, while others attributed it to disc or soft tissue repositioning. In terms of preferred technique, 82% favored thrust manipulation over mobilization without thrust. This reflects the profession's recognition of manipulation as a core skill, considered both effective and integral to physiotherapy practice.

DISCUSSION

In the present study, the knowledge, beliefs, and attitudes of physiotherapists in Hyderabad regarding spinal manipulation were explored. Comparable investigations have been carried out internationally. For instance, Mourad et al. (2022) conducted a cross-sectional survey among Italian physiotherapists, while Puentedura et al. examined the use of thrust joint manipulation among physiotherapists in the United States. In the current findings, 84% of respondents reported awareness of CPRs. This aligns closely with the results of Puentedura et al., where 83.7% of U.S. physiotherapists indicated familiarity with CPRs.

In contrast, Mourad et al. found a slightly lower proportion, with 72.7% of Italian physiotherapists acknowledging awareness of CPRs. When asked about familiarity with specific CPRs, 68.9% of participants in the present study recognized the lumbar manipulation rule for low back pain, 46.6% were familiar with thoracic manipulation for neck pain, and 61.5% knew the cervical manipulation rule for neck pain. Mourad et al. reported similar but slightly lower values: 61.9% for lumbar, 41.4% for thoracic, and 44.4% for cervical manipulation rules. Meanwhile, Puentedura et al. observed higher familiarity rates among U.S. therapists, with 78.3% for lumbar, 61.4% for thoracic, and 52.8% for cervical manipulation CPRs.

Safety perceptions were also assessed. In this study, most participants (94%) considered thoracic manipulation to be both safe and effective, followed by lumbar and lower cervical regions, while the fewest (66.6%) regarded upper cervical manipulation as safe. Similarly, Mourad et al. reported that 74.1% of Italian physiotherapists considered thoracic manipulation safe and effective, with lumbar and cervical regions rated lower, and only 56.8% expressing confidence in upper cervical techniques.

Puentedura et al. also highlighted that U.S. physiotherapists viewed thoracic manipulation as more effective than lumbar or cervical approaches, with lumbar rated higher than cervical. Regarding utilization, the majority of respondents in the current study reported regular use of lumbar manipulation (92%), followed by thoracic (88%), cervical (66.7%), and upper cervical manipulation (65.7%). By comparison, Mourad et al. found lower reported use among Italian physiotherapists, with 52.2% using thoracic, 46.2% lumbar, 39.8% cervical, and 27.5% upper cervical manipulations. Similarly, Puentedura et al. observed that U.S. physiotherapists tended to prefer thoracic manipulation over lumbar and cervical techniques, with lumbar more frequently used than cervical. One limitation of the current study is its

geographical scope, as data were collected only from physiotherapists practicing in Hyderabad. Future research should extend to other provinces of Pakistan with a larger and more diverse sample size to provide broader generalizability.

CONCLUSION

It concludes that physiotherapists in Hyderabad demonstrate a satisfactory level of knowledge regarding spinal manipulation. The undergraduate physiotherapy program was identified as the primary factor influencing clinical practice in this area. A majority of participants reported awareness of clinical prediction rules and their regular application in practice. Furthermore, most respondents expressed confidence in both the effectiveness and safety of spinal manipulation, routinely performing pre-manipulative testing and ensuring that patients were informed about possible adverse effects before the intervention.

Several barriers to optimal utilization of spinal manipulation were identified. The most prominent challenges were a lack of practical training opportunities and limited clinical experience. Additional concerns included patient fears, safety considerations, and to a lesser extent, inadequate educational exposure. These barriers highlight the need for greater emphasis on hands-on skill development within undergraduate programs, as well as structured continuing professional education to enhance clinical competence and practitioner confidence. The results of this study have important implications for both physiotherapy education and clinical practice in Pakistan.

Strengthening training in manual therapy and spinal manipulation at both undergraduate and postgraduate levels could improve practitioner confidence and patient outcomes. Moreover, addressing safety concerns through standardized guidelines and evidence-based teaching may help reduce hesitation among clinicians and patients alike. Future research should be conducted on a larger and more diverse population of physiotherapists across different provinces of Pakistan to validate these findings and provide broader generalizability. Expanding such studies will also enable a clearer understanding of regional variations in knowledge, attitudes, and utilization patterns, thereby informing curriculum development and clinical guidelines for physiotherapy practice nationwide.

DECLARATIONS

Consent to participate: Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.
Availability of Data and Materials: Data will be made available upon request. The corresponding author will submit all dataset files.
Competing interests: None
Funding: No funding source involved.
Authors' contributions: All authors had read and approved the final manuscript.

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