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Original Article

Pain Assessment and Management of Neurologic Impairments by Pediatric Physical Therapists; A Cross-Sectional Survey

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Abstract

Background: Physical therapists indicated the use of standardized pain assessment instruments like subjective measures, self-reported scales, behavioral and physiological measures to assess pain in children with neurological impairments. Indicators such as diminished attention, retreat, and changes in sleeping and feeding patterns were also reported along with facial expression, sobbing, and vocalizations. Therapists' perspectives on behavioral pain expressions may be significantly different from the perspectives of the children's parents or caregivers. **Objective:** To determine the methods of pain assessment and management for children with neurologic impairments used by pediatric physical therapists. **Methods:** A cross-sectional survey in which the data was collected from different public hospitals in Faisalabad, Pakistan. Convenient sampling was applied to recruit physiotherapists for this study and data was gathered through a structured questionnaire after taking their written informed consent. **Results:** Frequently used behaviors included facial expression, vocalizations, and irritability. Cues that were rarely used included changes in sleeping, withdrawal, eating behaviors, and decreased attention. Physiotherapists prefer to use pain interventions that were supported by research like praise and distraction as well as distress-producing potentially harmful measures such as reassurance and procedural talk. About 84% percent of the respondents used subjective measures to assess pain, 60% used self-report scales, and 32% used behavioral and physiological measures. The results regarding procedural explanation showed that 41.1% of physiotherapists had very often done procedural explanation and 58.9% had often done it. **Conclusion:** A well-structured practice pattern of pain assessment and treatment of neurologic deficits was observed among pediatric physical therapists. Praise, distraction, and procedural explanation were often used to ease discomfort and pain while doing physiotherapy treatment sessions. Overt signs such as vocalizations, weeping and facial expressions were used to measure pain more often than subtle markers such as lower attention, disengagement, and disturbed sleep and feeding habits.

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Introduction

Pain has been reported to occur at rates as high as 83 percent among kids with cerebral palsy (CP), with more than half of those affected reporting pain all or part of the time daily. Families of cerebral palsy children regard physical therapy's physiological discomfort and suffering as roadblocks to their children achieving a great quality of life. Despite increased knowledge of pain among children, there has been little research led by a physical therapist on pain evaluation and treatment during physical therapy procedures in children.[1,2] There is little information available on physical therapists' practice patterns on this topic. Before making recommendations for best practices and doing research to support successful therapies for this demographic, it is critical to gather basic information on how pain and discomfort are evaluated and treated in this community. The International Pain Association describes the pain as "an unpleasant emotional and sensory experience linked with potential or actual damage of tissues".[3,4]

Ache is also defined clinically as "a disorganized feeling that causes sorrow or misery." Both definitions agree that pain is a subjective experience that cannot be described. As a result, It may be hard to evaluate, especially in youngsters and kids who have linguistic or cognitive difficulties, and people's perceptions of it can be impacted by a wide range of external factors.[5] The age of a child, communication and cognitive skills, former pain experiences, emotional state, ethnicity, culture, and sensorimotor capabilities must all be taken into consideration throughout the pain examination to produce an accurate diagnosis.[6,7]

Methods for evaluating pain must meet various requirements, including their psychometric qualities, target population, availability, and convenience of administration. In therapeutic settings, a range of pain and distress assessments are available, including self-report, physiological, and behavioral measures.[8] The gold standard for pain evaluation has been self-reported measures. This gives an overview of the various measures as well as their psychometric features. However, another study's findings include that the following have limited their usage in children: Repost of pain in children may be impacted by their awareness of the rating significances.[9,10]

A comprehensive evaluation is required to give the best possible treatment and to plan the most successful therapy for the patients. As the most crucial stage of the rehabilitation process, it helps clinical thinking and decision-making whenever the need to make wise decisions regarding the rehabilitation process itself is there.[11] In a study it is mentioned that evaluation should be an ongoing and continuous process to improve and manage treatment plans while also recognizing and treating patients' problems.[12,13]. A neurological evaluation focuses on the nervous system to detect and identify any anomalies that may be interfering with the function and everyday activities. It should enable us to develop customized, patient-centered objectives and eventually a treatment plan tailored to the client's specific requirements.[14] The objective of visual pain signals in the child is required for behavioral evaluation of pain in children.

Vocalizations, facial expressions, tone shifts, gestures, sleeping patterns, emotional changes, and feeding habits are examples of these. These measurements often need substantial observational research.[15,16] The efficacy of behavioral evaluations, on the other hand, has been questioned whether or not children who have neurologic impairments and aberrant pain reactions, such as laughter, convulsions, and self-destructive behavior, can feel pain. Moreover, the validity and dependability of these protocols as a method of pain assessment by a therapist who is actively tangled in the rehabilitation of children were not shown.

A variety of physiological indicators, including vagal tone, heart rate, oxygen saturation, blood pressure, neuroendocrine response, and palmar sweat may be used in the process of evaluating pain responses.[17,18] The following are some of the difficulties connected with analyzing these measures separately: numerous studies have shown that physiological reactions to different forms of stress are comparable, that physiological response to

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chronic pain become habitual, and those factors such as gestational age, medicine, general health, and environment may all impact responses. Furthermore, most studies imply that children with a neurologic disability may have physiological responses to pain that differ from those of normally developing children in other ways.[19,20]

Baseline characteristics like age, development, and gender, as well as other factors like psychological, environmental, sensory, and social factors, may all have an impact on pain perception and experience.[21] Many of these influencing conditions are beyond the physical therapist's control and cannot be altered. Changing the psychosocial background of the physiotherapy setting, as well as the manual therapist's reaction to the pain behaviors of the child, is possible if physical therapists are appropriately trained to recognize pain in children and give appropriate pain management approaches.[22,23] The purpose of this study was to determine the methods of assessment of pain and management of neurologically impaired children used by pediatric physical therapists.

Methods

A cross-sectional survey in which the data was collected from different public hospitals in Faisalabad, Pakistan. Convenient sampling was applied to recruit 151 physiotherapists for the study and a structured questionnaire was used to gather data after taking their written informed consent form. The sample size was calculated using this formula, where P for population proportion anticipated, d for absolute precision required and 1-α is the confidence level and the estimated sample size was 151. Data was collected after approval of the study from the ethical committee from November 2021 to February 2022. Pediatric physiotherapists working in clinical setups with experience of more than two years, of both gender and aged between 25 to 50 years were included in the survey. However, physiotherapists of other disciplines or novice therapists, those in academics were excluded. Standardized pain assessment tools were divided into self-report, behavioral, and physiological measures. Data was entered and analyzed by SPSS version 26.0. Descriptive statistics including percentages and frequencies were evaluated to check demographic data and use pain evaluation tools and pain management outcomes.

$$n = \frac{z^2_{1-\alpha/2} P(1-P)}{d^2}$$

Results

Frequently used behaviors included facial expressions, vocalizations, and irritability. Cues that were rarely used included changes in sleeping, withdrawal, eating behaviors, and decreased attention. Physiotherapists prefer to use such pain interventions that were supported by studies like praise and distraction as well as distress-producing potentially harmful measures such as reassurance and procedural talk. Baseline characteristics of pediatric physical therapists were given in Table-I. About 84% percent of the respondents used subjective measures to assess pain, 60% used self-report scales, and 32% used behavioral and physiological measures.

Table-I: Baseline characteristics

		Frequency	Percent
Gender	Male	57	37.7
	Female	94	62.3
Qualification	DPT	72	47.7
	M.Phil.	58	38.4
	Masters	21	13.9
Area of clinical practice	Rural	72	47.7
	Urban	79	52.3
Sector of clinical practice	Public	72	47.7
	Private	79	52.3
Experience (years)	0 to 10	73	48.3
	11 to 20	67	44.4
	>21	11	7.3
Working hours	3 hours	15	9.9
	4 hours	30	19.9
	5 hours	50	33.1
	>5 hours	56	37.1

The results regarding procedural explanation showed that 41.1% of physiotherapists had very often done this and 58.9% had often. Regarding praise, it was shown that 50.3% were praising very often and 49.7% were doing that often. The findings

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regarding child rest showed that 29.1% let the child rest very often, 35.8% physiotherapists often, 18.5% sometimes and 16.6% rarely do so. Relaxation techniques showed that 17.2% used very often, 17.2% often, 18.5% sometimes, 24.5% rarely and 22.5% never used these techniques (Table-II).

Table-II: Frequency and percentages of different variables

		Frequency	Percent
Distraction	Very often	76	50.3
	Often	75	49.7
Procedural Talk	Very Often	62	41.1
	Often	89	58.9
Praise	Very Often	76	50.3
	Often	75	49.7
Encourage	Rarely	76	50.3
	Never	75	49.7
Reward	Often	42	27.8
	Sometimes	27	17.9
	Rarely	39	25.8
	Never	43	28.5
Reassurance	Sometimes	51	33.8
	Rarely	44	29.1
	Never	56	37.1
Recommend pharmaceutical intervention	Sometimes	52	34.4
	Rarely	48	31.8
	Never	51	33.8
Refusal to participate	Very often	50	33.1
	Often	54	35.8
	Sometimes	47	31.1
Decreased attention	Often	42	27.8
	Sometimes	53	35.1
	Rarely	56	37.1
Relaxation techniques	Very often	33	21.9
	Often	38	25.2
	Sometimes	30	19.9
	Rarely	27	17.9
	Never	23	15.2
Massage	Very Often	44	29.1
	Often	51	33.8
	Sometimes	23	15.2
	Rarely	24	15.9
Withdrawal	Very Often	9	6.0
	Often	31	20.5
	Sometimes	71	47.0
	Rarely	40	26.5
Transcutaneous electrical nerve stimulation	Very Often	65	43.0
	Often	34	22.5
	Sometimes	37	24.5
	Rarely	15	9.9
Irritability	Very Often	51	33.8
	Often	51	33.8
	Sometimes	39	25.8
	Rarely	10	6.6
Change in muscle tone	Very Often	11	7.3
	Often	81	53.6
	Sometimes	58	38.4
	Rarely	1	0.7
Crying	Very Often	50	33.1
	Often	61	40.4
	Sometimes	40	26.5
Vocalizations	Very Often	40	26.5
	Often	59	39.1
	Sometimes	52	34.4
Thermal agents	Very often	38	25.2
	Often	38	25.2
	Sometimes	39	25.8
	Rarely	36	23.8

Discussion

When compared to occupational therapists who took part in the survey conducted more than a decade earlier, PT in the current study indicated better use of standardized instruments for pain assessment in children, mainly self-reported procedures. The physiological and behavioral methods were applied by 41% of the respondents. It would appear that PT relies on subjective evaluation to estimate pain in this group, even though rigorous behavioral assessments are available. This is likely due to the difficulties and inaccuracies associated with using self-reported measures in children who have poor cognitive and communicative abilities. This phenomenon may be explained by individuals

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having little information as well as insufficient behavioral strategies. Alternately, one may make the case that the behavioral tools that are now available were not appropriate to use during actual physical therapy treatment sessions. Indicators like diminished attention, retreat and changes in sleeping and feeding patterns were reported less often than signs such as vocalizations, facial expressions and sobbing. Even while obvious procedures may be suitable for many impaired children, a study reveals that some youngsters who have neurological impairments do not convey their discomfort in overt and typical behaviors.

This is the case even if overt measurements may be acceptable for many children. Youngsters with lower muscle tone and depleted reserves of energy may not have the vital possessions necessary for crying, contracting facial muscles to convey pain, or vocalizing their distress. On the other hand, children with significant cognitive deficits may laugh in response to agony. Children who have nonverbal, motor, or cognitive impairments may express their pain in nonverbal, motor, or cognitively impaired ways that therapists are unaware of. Additionally, therapists' perspectives on pain expressions have significantly different from the perspectives of the parents of younger children or caretakers. A previous study showed that most of the physical therapists respond that they need to take extensive attention to take care of CP children.

The postoperative evaluation and management of pain in CP children with surgeries to decrease the complications, lower the intensity of pain and improve lifestyle. The results of this study were also similar to the previous one, the current study also showed that they have to take some additional care for managing the pain of neurologically impaired children.[24] During physical therapy sessions, non-pharmaceutical methods of pain management such as relaxation, distraction, reward, praise, and soothing techniques were used by physical therapists to lessen patients' levels of discomfort. As the answers to many open-ended questions have shown, some of the therapists employed the aid of a caretaker to give diversion during unpleasant events and encouraged the youngsters to develop skills of seeking their own rather than relying on external support. However, in addition to these, we also made use of interventions that had the potential to cause anxiety. These included procedural discourse, apologies for the procedure, pain-dependent rest, and reassurance. According to a study, those who suffer from cerebral palsy who are reliant on rest for pain relief have lower levels of coping abilities and more signs of depression. One thousand, three hundred and ninety-three in answer to the study's open-ended questions, several physical therapists reported no discomfort throughout physical therapy sessions.

Patients with cerebral palsy and their caretakers have expressed dissatisfaction with this outcome. According to this, one of the most prominently painful childhood memories for individuals with cerebral palsy was the discomfort associated with physical therapy techniques such as stretching and bracing throughout puberty. In a survey, it was found that assisted stretching was the activity with the highest frequency and intensity of discomfort for youngsters with cerebral palsy. In addition to independent standing, assisted walking/sitting, and wearing braces, the following activities were characterized as uncomfortable. In that study, it was confirmed that 58 percent of 95 children and adolescents with developmental impairments felt discomfort during physical or occupational treatment.[25]

Further study is required to check the viability of using behavioral measures for the assessment of pain during physical therapy sessions. Physical therapy and ongoing education concerning non-pharmaceutical pain interventions is indicated.

Conclusion

A well-structured practice pattern of pain assessment and treatment of neurologic deficits was observed among pediatric physical therapists. Praise, distraction, and procedural explanation were often used to ease discomfort and pain while doing physical therapy treatment sessions. Overt signs such as vocalizations, weeping and facial expressions were used to measure pain more often

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than subtle markers such as lower attention, disengagement, and disturbed sleep and feeding habits. However, those therapists who participated in this review were using such habits that were supported by research treatment protocols to contribute children deal with discomfort and pain, potentially and inappropriate harmful treatment methods were used as well. A study to check effective methods for continuing education to overcome this gap is indicated. Most of the participants used subjective procedures to evaluate pain, many used self-reporting methods while some used physiological and behavioral measures.

Declarations

Consent to participate: Written consent had been taken from patients. All methods were performed following the relevant guidelines and regulations.
Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.
Conflict of interests: None
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