Original Research Article
Journal of Kathmandu Medical College, Vol. 14, No. 2, Issue 52, Apr.-Jun., 2025

Pain assessment in cerebral palsy children during stretching session of hamstring muscle

K.C. S,[1] Lakhey M[2]

[1]Smita KC, Department of Physiotherapy, Kathmandu University School of Medical Sciences, Nepal; [2]Manisha Lakhey Self Help Group for Cerebral Palsy, Dhapakhel, Lalitpur Nepal; Revitalize Physiotherapy and Sports clinic, Vancouver, Canada

ABSTRACT

Introduction: Pain is defined as disturbed sensation that causes suffering or distress. Repeated and prolonged experience to pain can alter future responses to painful stimuli. Pain is common in children with cerebral palsy which may be unrecognized and not managed on time. children with cerebral palsy have difficulty in communicating their own pain experience. Pain related to stretching is one of the most salient negative memories in childhood, as pain has negative impact on health outcomes.

Objective: To assess the pain during stretching session of hamstring muscle among children with cerebral palsy.

Methodology: A cross-sectional study design was carried out among 35 children with cerebral palsy aged 3 to 18 years using purposive sampling technique . Children were assessed for pain during stretching of hamstring muscles in both passive stretching and positioning stretching using Non-Communicating Children's Pain Checklist-Post-operative Version scale at Bhaktapur Community Rehabilitation Center, Patan Community Rehabilitation Center and Special Education and Rehabilitation Center. Data collection was done from April to July 2018. Data analysis was done using SPSS Inc. SPSS Statistics for Windows Version 16.0. Chicago, IL: SPSS Inc.; 2007. Frequency and percentage were used to interpret descriptive findings and Chi-square test was used to find out the association.

Results: In passive stretching 5.71% children experienced mild pain and 94.29% experienced moderate/severe pain. In positional stretching 17.14% experienced mild pain and 82.86% experienced moderate/severe pain.

Conclusion: Children with cerebral palsy experienced more pain in positional stretching than passive stretching, there was no association between pain and severity level of cerebral palsy.

Key Words: Cerebral palsy; Pain; Stretching

Access this article online

Website: www.jkmc.com.np

DOI: https://doi.org/10.3126/jkmc.v14i52.94889

HOW TO CITE
K.C. S, Lakhey M. Pain assessment in cerebral palsy children during stretching session of hamstring muscle. J Kathmandu Med Coll. 2025;14(2):43-7.

Submitted: Jan 18, 2026
Accepted: Feb 26, 2026
Published: May 25, 2026

Address for correspondence
Smita K.C.,
Lecturer, Department of Physiotherapy,
Kathmandu University School of Medical Sciences,
Dhulikhel, Kavrepalanchok, Nepal
E-mail: smitakc5@gmail.com

ISSN: 2019-1785 (Print), 2091-1793 (Online)

INTRODUCTION

Pain as a disturbed sensation that causes suffering or distress. Prolonged or repeated exposure to pain can alter responses to future painful as well non-painful stimuli.[1] Children are not able to accurately rate its severity which makes pain assessment more challenging.[2] American Academy of Pediatrics and the American Pain Society recommend that pain should be recognized and treated more aggressively in children.[3]

Pain is common in children with neurological problems such as Cerebral Palsy (CP). They are at risk for unrecognized and unmanaged pain because of their chronic physical and more frequent injuries and medical procedures. [3-5]

Stretching is given as part of treatment to prevent shortening of muscles and to gain normal range.[6] Studies have shown that 45% of children experienced pain during therapy session.[7-8] Pain related to stretching and bracing is considered as one of the most salient negative

memories of childhood in children with cerebral palsy (CWCP).[9]

Both passive and positional stretching is mostly practiced in therapy for CWCP and commonly used in Nepal for therapeutic purpose as well as for home-based interventions. Difficulty assessing pain is considered as primary reasons for infrequent and inadequate assessment for CWCP. [9-10] So this study aims to asses pain in cerebral palsy children during stretching session of hamstring muscle.

METHODOLOGY

This is a cross sectional study conducted in three different center of Kathmandu valley i.e. Bhaktapur Community Rehabilitation Centre, Patan Community Rehabilitation Centre and Special Education and Rehabilitation Centre. A total 35 children with cerebral palsy were recruited using non-probability purposive sampling. Ethical approval was taken from Institutional Review Committee of Kathmandu University School of Medical Sciences (82/16). All the parents of the children with cerebral palsy provided both verbal and written informed consent. Clinically diagnosed CP children of age 3- 18 years tested for positive Straight Leg Raise (SLR) test were included in the study. Study was conducted from April to July 2018 Then for passive stretching an external force was applied to limit tolerated by children as decided by SLR angle up to P1 point and position was maintained for 30 seconds and during stretching Non-Communicating Children's Pain Checklist-Post-operative Version (NCCPC-PV) scale was administered. For positioning stretching, children were kept in supine on the floor. Stretching leg was kept on the wall with knee extended and other leg flat on the floor. Distance from the wall was adjusted so hamstring stretch is perceived as decided by SLR test up to P1 point. The position was maintained for 30 seconds and during stretching NCCPC-PV scale was administered.

Data analysis was done using SPSS Inc. SPSS Statistics for Windows Version 16.0. Chicago, IL: SPSS Inc.; 2007. The baseline characteristics of study population were analyzed using Descriptive statistics i.e. frequency, percentage and mean± Std. Deviation. Chi-square test was used to assess association of pain and severity level according to gross motor function classification system (GMFCS) level. P value of <0.05 was chosen for statistical significance.

RESULTS

Among total of 35 children with cerebral palsy,18 (51.4%) were male and 17 (48.6%) were female. Age of children ranged from three to 18 years where mean age was 9.54 ± 4.16 years (Table 1). In gross motor function of the children most children were of level I i.e 12 (34.3%) and 11 (31.4%) were fully dependent and had to use wheelchair for mobility were of level V (Table 2). In the result during passive stretching, 2 (5.71%) have mild pain and 33 (94.29%) have moderate to severe pain. And during positioning stretching, 6 (17.14%) had mild pain and 29 (82.86%) had moderate to severe pain (Table 3).

There was no significant association between GMFCS level (motor level) and passive pain intensity as p value=0.397, but level I and level V had moderate to severe pain and level III has the lowest pain experience as level III has the minimum number of children.

There was no significant association between GMFCS level (motor level) and positioning pain intensity as p value=0.807 . Though there was no significant association Level I and level V had more pain intensity (Table 4).

Table 1: Sociodemographic characteristics of children

Variables	n (%)
Sex	
Male	18 (51.4)
Female	17 (48.6)
Age	
3-5	6 (17)
6-10	16 (45.7)
11-15	10 (28.5)
16-18	3 (8.5)
Mean ± SD	9.54 ± 4.16

Table 2: Distribution of respondents according to gross motor function classification system (GMFCS) level.

GMFCS level	n (%)
GMFCS Level I	12 (34.29)
GMFCS Level II	4 (11.43)
GMFCS Level III	2 (5.71)
GMFCS Level IV	6 (17.14)
GMFCS Level V	11 (31.43)

Table 3: Types of pain perception during stretching

Passive stretching	n (%)
Mild Pain	2 (5.71)
Moderate and severe pain	33 (94.29)
Positional stretching	
Mild Pain	6 (17.14)
Moderate and severe pain	29 (82.86)

Table 4 : Association between GMFCS level and pain

Type of pain	GMFCS Level					p-value*
Passive pain	I	II	III	IV	V	
Mild	1	1	0	0	0	0.397
Moderate/Severe	11	3	2	6	11	
Positioning pain						
Mild	3	1	0	1	1	0.807
Moderate/Severe	9	3	2	5	10	

p – value significant at <0.05, *=chi square test

DISCUSSION

The main purpose of this study was to investigate the pain intensity by doing pain assessment during stretching sessions which is considered as one of the painful procedures in children with cerebral palsy and to know about the association of motor level with the pain intensity.

In the present study total 35 CWCP were included out of which 18 were male and 19 were female; mean age of the children was 9.54 years. 34.29% children fall under GMFCS level I and 31.43 children fall under GMFCS level IV.

Result of this study reported that all the children went through 30 seconds of stretching session both passive and positioning where passive stretching, 5.71% have mild pain and 94.29% have moderate to severe pain during passive stretching .As some of the previous study has proven that there is pain during passive stretching in CWCP.[3,6] The result is in line with the study done by Ki where 93% of CP children reported pain in all domains of NCCP scale and 58% complains of pain during therapy session like range of motion and 93% of them reported pain during assisted stretching [12] Study conducted by López-Bedoya ,medium pain but no severe pain perception on visual analogue scale while doing hold and relax , the difference in the pain perception might be due to the use different outcome measure. [11-13]

In our study 17.14% have mild pain and 82.86% have moderate to severe pain during positioning stretching ,as some of the previous study has proven that there is pain during passive stretching in CWCP.[3,6]

The findings of this study also indicate that the CWCP have pain during passive stretching sessions as well as during positioning stretching sessions also.

As we had hypothesized that pain intensity level will be different between passive and positioning stretching, this study does not show such difference in mean values between passive and positioning stretching. This might be because in this study the stretching is given according to the children's hamstring tightness measured by Straight Leg Raise (SLR) test so the stretch was maintained up to P1 level in both passive stretching and positioning stretching.

However, the pain intensity in positioning stretching is less i.e. mild pain is more in positioning stretching than in passive stretching. The reason behind this result might be the passive stretching is given by therapist in which children were more stable and the stretch was hold properly which will be sustained and hold for certain time but in positioning stretching the position was maintain according to SLR angle where the leg was only positioned for certain amount of time.[14] One of the objectives of this study was to find association of pain intensity and severity level of the CWCP according to GMFCS level. Some of the previous study have shown no association between pain intensity and severity level in CWCP, this study also supports the same result. This might be because all the children went same procedure like operative procedure, rehabilitative intervention .[1] Even if the level of contracture, spasticity or tightness is associated with motor level, the stretching procedure is not related with the factors so the pain is not related with the motor level. And CWCP with different GMFCS level were not equal in number so this might show no significant association between GMFCS level and stretching pain. But this is contrast with the study of Melanie Penner, Wen Yan Xie et al, 2013 where result shows fair relation between GMFCS level and pain as more severe CP leads to potential sources of pain and higher musculature deformity .[15]

Study conducted in 2003 showed the pain was also not associated with the gender of the children as proven in previous study because all the children has to go through the same procedure and management due to their condition and other problems they have to go through

like operative management, clinical management and therapeutic management .[16] In contrast to Roger B. Fillingim et al, 2009 suggest that female has greater pain sensitivity than male.[17] Parkinson KN, 2013 study shows that girls report more severe pain than boys.[8]

The result of this study shows that there is association between age and positioning stretching but not with the passive stretching. The study of Akinpelu AO, Bakare U et al, 2005 suggest that hamstring tightness increases with the age.[18] and according to Mary Swiggum et al, 2010 pain experience will change the coping strategy in children and with more pain experience there will be changes in their behaviors.[1]

Though stretching is one of the most practiced procedures in physical therapy intervention[9,20] and most preferred treatment by parents as they feel they are doing something for their children to help prevent contractures[19], most of the centers in Nepal don't have advanced level physiotherapist. So, the working therapist used traditional way like stretching to manage the contracture, tightness and prevent future complications.[20] It is considered as one of the painful physical therapy management procedures which cause salient negative memories in CWCP in future [10]. Almost all children with CP report pain during treatment,92% the cerebral palsy children reported pain in the study done by Penner, M., et al. [21] Even though we are aware of the pain during stretching session, therapist are not able to assess pain and manage the pain timely which might be due to unawareness of any behavioral tool to recognize and quantify the pain. NCCPC-PV scale was able to assess and quantify the pain during physical therapy procedure, this scale is appropriate to use pain in cerebral palsy children and can be easily used by physiotherapist in clinical setting .[22,23,24]

CONCLUSION

There will be pain during stretching session in CWCP. There was no significant difference in pain intensity between passive and positioning stretching. Also, there was no association between severity level of CP with the pain intensity.

Conflict of Interest: None
Source of support: None

REFERENCES

1. Swiggum M, Hamilton M., Gleeson P, Roddey T, Mitchel K. Pain assessment and management in children with neurologic impairment: a survey of pediatric physical therapists. Pediatric Physical Therapy. 2010; 22(3): p. 330-335.[PubMed | Full Text | DOI]
2. Koch K. Paediatric pain management in general practice. South African Family Practice. 2012; 54(4):292-295. [Full Text | DOI]
3. Hadden KL, C.L. Von B. Global and specific behavioral measures of pain in children with cerebral palsy. The Clinical journal of pain. 2005; 21(2):140-146. [PubMed | Full Text | DOI]
4. Breau LM, Burkit C. Assessing pain in children with intellectual disabilities. Pain Research and Management. 2009;14(2):116-120. [PubMed | Full Text | DOI]
5. Breau LM, Camfield CS, McGrath PJ, Finley GA. Risk factors for pain in children with severe cognitive impairments. Developmental Medicine & Child Neurology. 2004; 46(6): 364-371.[PubMed | Full Text | DOI]
6. Hadden KL, LeFort S, O'Brien M, Coyte PC, Guerriere DN. A comparison of observers' and self-report pain ratings for children with cerebral palsy. Journal of Developmental & Behavioral Pediatrics. 2015 Jan ;36(1):14-23.[PubMed | Full Text | DOI]
7. Lauren Schwartz JME, Mark P. Jensen. Pain in Persons With Cerebral Palsy.Arch Phys Med Rehabil. 1999; 80:1243-6. [PubMed | Full Text | DOI]
8. Parkinson KN, Drewett RF, Jones AR, Dale A, Pearce MS, Wright CM, et.al. Pain in young people aged 13 to 17 years with cerebral palsy: cross-sectional, multicentre European study. Arch Dis Child. 2013; 98(6): 434-440.[PubMed | Full Text | DOI]
9. Wiart L, Darrah J, Kembhavi G . Stretching with children with cerebral palsy: what do we know and where are we going? Pediatric Physical Therapy. 2008;20(2): p. 173-178. [PubMed | Full Text | DOI]
10. Von Baeyer CL, Tupper SM. Procedural pain management for children receiving physiotherapy. Physiotherapy Canada. 2010;62(4): 327-337. [PubMed | Full Text | DOI]
11. Voepel-Lewis T, Malviya S, Tait AR, Merkel S, Foster R, Krane EJ, et.al. A. comparison of the clinical utility of pain assessment tools for children with cognitive impairment. Anesthesia & Analgesia. 2008;106(1): 72-78 [PubMed | Full Text | DOI]
12. Kellie Hadden, Carl L von Baeyer. Pain in children with cerebral palsy : common triggers and expressive

behaviours, Journal of pain. October 2002; 99(1-2):281-8 [PubMed | Full Text | DOI]

13. López-Bedoya J, Vernetta-Santana M, Lizaur-Girón P, MartínezPatiño MJ, Ariza-Vargas L. effectiveness and pain perception with holdrelax stretching technique and electrostimulation. revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol; 20(80): 623-640 [Full Text | DOI]
14. Pin T, Dyke P, Chan M. The effectiveness of passive stretching in children with cerebral palsy. Developmental Medicine & Child Neurology. 2006;48(10):855-862. [PubMed | Full Text | DOI]
15. Penner M, et al., Characteristics of pain in children and youth with cerebral palsy. Pediatrics, 2013. 132(2):e407-e413.[PubMed | Full Text | DOI]
16. Krigger, K.W., Cerebral palsy: an overview. Am Fam Physician. 2006;73(1): p. 91-100.[PubMed | Full Text]
17. Banskota, B., et al., A Snapshot of 1001 Children Presenting with Cerebral Palsy to a Children's Disability Hospital. Journal of Nepal Health Research Council. 2013 Aug;132(2):e407-13 [PubMed | Full Text | DOI]
18. Oskoui M., Xie WY., Binepal N., Switzer L., Fehlings D. An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. Developmental Medicine & Child Neurology. 2013;55(6): 509-519. .[PubMed | Full Text | DOI]
19. Kirby, R.S., Wingate MS., Van Naarden Braun K., Doernberg NS., Arneson CL., Benedict RE et al., Prevalence and functioning of children with cerebral palsy in four areas of the United States in 2006: a report from the Autism and Developmental Disabilities Monitoring Network. Research in developmental disabilities. 2011; 32(2): 462-469. [PubMed | Full Text | DOI]
20. Schellack, N. and M. Matimela, Paediatric pain management. South African Family Practice. 2016;58(3):42-47. [FullText]
21. Breau LM., Camfield CS., McGrath PJ., Finley GA. The incidence of pain in children with severe cognitive impairments. Archives of pediatrics & adolescent medicine. 2003;157(12):1219-1226. [PubMed | Full Text | DOI]
22. Fillingim R.B., King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL III. Sex, gender, and pain: a review of recent clinical and experimental findings. The journal of pain. 2009;10(5):447-485. [PubMed | Full Text | DOI]
23. Theis N., Korff T., Kairon H., Mohagheghi AA. Does acute passive stretching increase muscle length in children with cerebral palsy? Clinical biomechanics. 2013;28(9):1061-1067. [PubMed | Full Text | DOI]
24. Breau, L.M., McGrath PJ., Camfield CS., Finley GA . Psychometric properties of the non-communicating children's pain checklist-revised. Pain. 2002; 99(1): 349-357 [PubMed | Full Text | DOI]
25. Zabalia, M., Breau LM., Wood C., Lévêque C., Hennequin M., Villeneuve E.,et al., Validation of the French version of the non-communicating children's pain checklist-postoperative version. Canadian journal of anaesthesia. 2011;58(11):1016-1023. [PubMed | Full Text | DOI]