

## Original Research

### The Effect of Physiotherapy Education on Parents on Reducing Spasticity in Children of The Spastic Type of Cerebral Palsy

Nitaya Putri Nur Hidayati<sup>1\*</sup>, Triyana<sup>1</sup>, Noerdjanah<sup>1</sup>

<sup>1</sup> Physiotherapy Department, Health Polytechnics Ministry of Health Surakarta, Surakarta, Indonesia

#### ABSTRACT

**Background:** Cerebral Palsy is a group of children with movement and posture development disorders caused by brain nerve damage. The development of children with Cerebral Palsy is influenced by the role of parents in caring for and raising them daily. This ability must be based on good and specific knowledge and skills, because cerebral palsy children have many problems and disorders, both from physical, psychological, and social aspects. This knowledge and skills can be obtained from professional health workers.

**Objective:** To determine the effect of physiotherapy education for parents on reducing spasticity in children with spastic type of cerebral palsy.

**Method:** This is an experimental research with one group pre and post-test design with control which was carried out on parents of children with cerebral palsy at the Forum Buah Hati.

**Results:** The difference test between before and after providing physiotherapy education, obtained a value of  $p=0.157$ . Meanwhile, the analysis using different means for each group received a difference in the Modified Ashworth Scale (MAS) value in the treatment group of 0.33 and the control group of 0.17.

**Conclusions:** There is a less significant effect of providing parental education on reducing spasticity in spastic-type Cerebral Palsy children.

#### ARTICLE HISTORY

Received : September 13, 2023

Revised : February 10, 2024

Accepted : June 10, 2024

Available Online : August 20, 2024

Published regularly: August 31, 2024

#### KEYWORDS

Spastic Cerebral Palsy; Spasticity; Physiotherapy Education

#### CONTACT



Nitaya Putri Nur Hidayati

[nitayaputrin@gmail.com](mailto:nitayaputrin@gmail.com)

Physiotherapy Department, Health Polytechnics Ministry of Health Surakarta, Surakarta, Indonesia

Cite this as: Hidayati, N. P. N., Triyana, T., & Noerdjanah, N. (2024). The Effect of Physiotherapy Education on Parents on Reducing Spasticity in Children of The Spastic Type of Cerebral Palsy. *Gaster*, 22(2), 162-168. <https://doi.org/10.30787/gaster.v22i2.1284>

## INTRODUCTION

Cerebral Palsy (CP) is a group of disorders in the development of movement and posture caused by brain nerve damage that occurs during the fetal and infancy periods, causing activity limitations, sometimes accompanied by disturbances in sensation, perception, cognition, communication, oral function, behavior and sometimes secondary problems on the musculoskeletal system (Mcintyre, 2020). Cerebral Palsy is also caused by various factors. Risk factors that cause brain damage, malformation and dysfunction that occur in the womb (prenatal), during birth (perinatal), even after birth (postnatal) (Corrado, Di Luise, & Servodio Iammarrone, 2021).

The risk factors in babies that can cause CP include placental abnormalities, birth defects, low birth weight, meconium aspiration, assisted delivery with instruments, asphyxia, recurrent seizures, respiratory distress syndrome, hypoglycemia, and neonatal infections (Corrado et al., 2021). Cerebral palsy spastic diplegia is damage to the central nervous system which results in motor, sensation or sensory disorders, perception, cognition, vestibular, communication, behavior and musculoskeletal problems accompanied by muscle stiffness which mainly occurs in both legs (Duma, Hlongwa, Benjamin-Damons, & Hlongwana, 2023).

Cerebral palsy spastic diplegia is usually caused by damage to the superior medial white matter cortex or white matter in the periventricular area and results in disturbances, especially in the two legs, which are more severe than the upper extremities, causing problems with balance, coordination in standing, and gait disturbances, apart from that when standing position is accompanied by disorders such as increased lumbar lordosis, pelvic tilting anteriorly, hips with internal rotation, both knees flexed, intoeing, and equinovalgus feet (Zanon, Porfírio, Riera, & Martimbianco, 2015).

The main problems in spastic cerebral palsy are difficulty standing and walking, balance disorders, muscle weakness, spasticity and deformity due to abnormal gait patterns. Apart from that, there are also sensory disorders, namely vestibular disorders. Where this disorder will affect the child's postural control and balance and will affect the development of the child's gross motor skills, including the ability to stand (Subbarayalu & Ameer, 2017).

Families of children with CP have an important role in caring for and raising children with CP so that it greatly determines the child's abilities in the future. Caring for and raising children with cerebral palsy requires special knowledge and skills, problems from the physical, psychological and social aspects are always very basic things to pay attention to so that children with CP can grow and develop optimally.

The development of children with Cerebral Palsy is influenced by the role of parents in caring for and raising them on a daily basis. This ability must be based on good and specific knowledge and skills, because cerebral palsy children have many problems and disorders, both from physical, psychological and social aspects. This knowledge and skills can be obtained from authorized and competent professional health workers (Novak et al., 2020).

Currently, there are still very few physiotherapist who involve family center therapy in the process of treating children with cerebral palsy. So it is necessary to optimize family involvement to cause synaptogenesis there was an increase in the prognosis of children with cerebral palsy.

Based on the above, the author conducted research to find out the influence of parental education on reducing spasticity in spastic type cerebral palsy children.

## MATERIALS AND METHOD

This research used a quasi-experimental method with a one group pre-test and post-test with control design. The aim of this study was to determine the effect of physiotherapy education for parents, defined family centered care as an approach to the planning, delivery and evaluation of health care that is grounded in mutually beneficial partnerships between health care on reducing spasticity in children with spastic type cerebral palsy. In this study, one group was used which was given physiotherapy education after basic physiotherapy therapy once a week for 6 weeks. Data collection was carried out from January to July 2023. Sampling technique used non-probability sampling as saturation sampling, total population was 14 subjects and all of them were used as samples.

The inclusion criteria for this study include: (1) Respondents are parents or caregivers of children with spastic type cerebral palsy, (2) the child is under 6 years old, (3) willing to take part in the research until completion, while the exclusion criteria in this study are: (1) Respondents objected to the research process and (2) respondent data was incomplete.

The criteria for dropping out are if: (1) The subject withdraws during the research, (2) The subject does not come back 3 times in a row or alternately.

To measure spasticity in children with cerebral palsy, you can use a measuring instrument called the modified Ashworth scale. The modified Ashworth scale is considered the primary clinical measure of muscle spasticity in subjects with neurological disorders. The modified Ashworth scale can be applied to the muscles of the upper or lower extremities. The modified Ashworth scale shows its reliability and validity results (Snehashri N Vaidya, 2014).

Based on the predetermined inclusion and exclusion criteria, 14 research subjects were obtained, divided into 2 groups, namely a control group of 6 people and a treatment group of 7 people. Subject grouping was carried out using a simple random sampling technique using a lottery in the form of drawing numbers by the subject's parents without replacement. The numbers listed are 1 and 2, if you get number 1 you will be included in the treatment group, while if you get number 2 you will be included in the control group. During the research, there were no subjects who met the dropout criteria.

Characteristics of research subjects based on age in the treatment group showed that 7 subjects had an average age of 5.16 years, with the majority age distribution ranging from 2-9 years and a standard deviation of 3.18. Meanwhile, the control group of 7 subjects had an average age of 5.83 years with the majority age distribution being 1-7 years and a standard deviation of 2.40.

Characteristics of research subjects based on gender in the treatment and control groups both consisted of 4 male subjects (57%) and 3 female subjects (43%). From the results of this study, it can be concluded that the gender characteristics of the treatment group and the control group are the same, so they have no effect on the results.

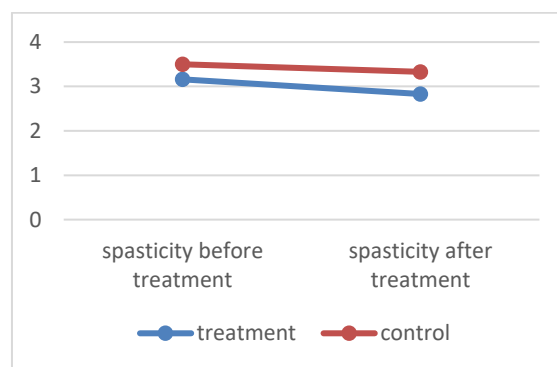
The spasticity value using the modified Ashworth scale before treatment was given to the treatment group showed an average spasticity value of 3.16. Meanwhile, in the control group, the average spasticity value was 3.50. So the difference in spasticity values in the treatment group was 0.33 and in the control group was 0.17 (Table 1).

**Tabel 1.** Spasticity score before and after treatment with modified ashworth scale

Group Type	Average before tretament	Average after treatment	Different
Treatment	3.16	2.83	0.33
Control	3.50	3.33	0.17

## RESULTS

In this study, 7 subjects were given treatment in the form of parent education for 4 weeks (3 times/week). After being given treatment, some subjects showed improvement in the form of decreasing spasticity values, but there were also those who showed constant spasticity values. Based on the results of statistical analysis using the Wilcoxon test, the results showed that there was no effect of providing education on reducing spasticity scores. However, based on the different means, it was found that the treatment group had a higher difference in spasticity scores compared to the control group. So it can be concluded that providing physiotherapy education to parents can reduce spasticity scores in Spastic Type Cerebral Palsy children, but the results of the reduction obtained are not very significant (Figure 1).



**Figure 1.** Spasticity value chart

## DISCUSSION

Activity-focused therapy includes structured practice and repetition of functional actions that are directed toward the learning of motor tasks to increase independence and participation of the child in daily routines. As a member of the intervention team, the therapist develops an activity-related goal in collaboration with the child's family. A restricted timed before-after study exploring the effects of an intensive, goal-directed and, activity-focused physiotherapy program reported significant improvements in basic motor abilities, self-care in home environments in and reduced need for caregivers' assistance in self-care and mobility. Goal directed functional therapy and cativity-focused tharay were compared in preschool childern with cerebral palsy in a propestive study. Childern receiving goal-directed functional therapy showed more gains in everyday activities and gross motor function than those receiving activity-focused therapy where the aims were more general (Aydin & Nur, 2012).

The emergence of family-centered philosophy in pediatric rehabilitation has influenced the menagement of the childern with spastic cerebral palsy. Family concerns

and needs are more considered. Parents are supported and empowered to make decisions and to direct the care for their children, although children with spastic cerebral palsy. The members of the family became equal members to decide about themselves and the intervention strategy. Trends towards interventions for children with cerebral palsy have changed from child-focused to function- and family-focused. The parenteral involvement and collaboration with the family became an important concept of the intervention. Within this framework, after the family has been empowered with all the necessary information and physio-social support, goals of the treatment are identified collaboratively with input from the treatment are identified collaboratively with input from the family as well as the child and the rehabilitation team. This transformation in approach brings the identification of the functional goals at the level of activity and participation rather than at the level of impairment (Aydin & Nur, 2012).

Family of a child with cerebral palsy has an important role in caring for and raising a child with cerebral palsy so that it greatly determines the child's abilities in the future. Caring for and raising children with Cerebral Palsy requires special knowledge and skills, problems from the physical, psychological and social aspects are always very basic things that must be considered so that children with Cerebral Palsy can grow and develop optimally (Hekne, Montgomery, & Johansen, 2021).

The role of the family in helping to optimize the development of children with Cerebral Palsy can always be pursued. It is hoped that these optimization efforts can be carried out or intervened as early and as early as possible by directly providing education to parents or caregivers so that it can increase the guarantee of program sustainability consistently and effectively, the involvement of people who are always changing - changing risks reducing the effectiveness of the home therapy program (Kammasandra, V, 2014).

The physiotherapy education that can be provided is health education related to physiotherapy services through promotive, preventive, curative and rehabilitative efforts targeting individuals, families and communities. The material provided is material that is appropriate for parents' knowledge in understanding children with cerebral palsy. During the data collection process, the content of the educational material is adjusted to the needs of the participants, in this case the parents, because this will influence the success of the information transfer process (Aydin & Nur, 2012).

Having a discussion, question and answer process, parents' knowledge can increase. The author's hope is that through the process of providing education to parents of children with cerebral palsy, parents will be able to know the movements and processes that can be carried out on their children and repeat them at home, this can help the process or stage of therapy for children with cerebral palsy, so that when the child has a schedule to do it therapy, then the therapy given does not repeat the program from the beginning, it can be continued to the next therapy program, therefore motor development in children with cerebral palsy can increase significantly (Kalisperis, Shanline, & Styer-Acevedo, 2019).

We have discussed conceptual and practical considerations in family-centered care for children with cerebral palsy and their families, focusing on the meaning of recent literature for pediatric neurology practice. In the last 5 years, there have been important advances in our understanding of the components of family-centered care, and initial attempts to understand the client change processes at play. Work on organizational culture and new practice models holds promise in bringing about cultures of family-centered care in health care organizations, enhancing the likelihood that caregiving practices will more

fully meet child and family needs, and the results in the best outcomes possible (Aydin & Nur, 2012)

## CONCLUSION

This study investigated the impact of parental education on spasticity reduction in children with spastic cerebral palsy. While a modest decrease in spasticity scores was observed in the intervention group compared to the control group, the effect was not statistically significant.

Future research should consider the following to enhance study rigor and generalizability: 1) Increase sample size to at least 30 participants to improve statistical power; 2) Extend the intervention duration due to the severe nature of spastic cerebral palsy; 3) Exclude children with behavioral disorders to minimize confounding variables; 4) Implement strict control over home activities and medication to reduce extraneous influences on outcomes.

## ACKNOWLEDGEMENT

This research expresses sincere gratitude to all parties who have contributed to the completion of this study. Special thanks to the parents of children with spastic cerebral palsy for their willingness to participate and their invaluable contributions. Without their support, this research would not have been possible.

Furthermore, the researchers would like to extend their appreciation to the Physiotherapy Department, Health Polytechnics Ministry of Health Surakarta, Surakarta, Indonesia, for providing the necessary facilities and support to complete this study.

## REFERENCES

- Aydin, R., & Nur, H. (2012). Family-centered approach in the management of children with cerebral palsy. *Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi*, 58(3), 229–235. <https://doi.org/10.4274/tftr.84429>
- Corrado, B., Di Luise, C., & Servodio Iammarrone, C. (2021). Management of Muscle Spasticity in Children with Cerebral Palsy by Means of Extracorporeal Shockwave Therapy: A Systematic Review of the Literature. *Developmental Neurorehabilitation*, 24(1), 1–7. <https://doi.org/10.1080/17518423.2019.1683908>
- Duma, N. E., Hlongwa, M., Benjamin-Damons, N., & Hlongwana, K. W. (2023, December 1). Physiotherapy management of children with cerebral palsy in low- and middle-income countries: a scoping review protocol. *Systematic Reviews*, Vol. 12. <https://doi.org/10.1186/s13643-023-02280-8>
- Hekne, L., Montgomery, C., & Johansen, K. (2021, June 1). Early access to physiotherapy for infants with cerebral palsy: A retrospective chart review. *PLoS ONE*, Vol. 16. <https://doi.org/10.1371/journal.pone.0253846>
- Kalisperis, F. R., Shanline, J.-M., & Styer-Acevedo, J. (2019). *Neurodevelopmental Treatment Clinical Practice Model's Role in the Management of Children with Cerebral Palsy* (C. Palsy, Ed.). [https://doi.org/10.1007/978-3-319-50592-3\\_216-1](https://doi.org/10.1007/978-3-319-50592-3_216-1)
- Kammasandra, V., N. (2014). *Cerebral Palsy and Early Stimulation*. <https://doi.org/10.5005/jp/books/12327>
- Mcintyre, S. et al. (2020). A Systematic review of risk factors for Cerebral Palsy in Children born at term in Developed countries. *Developmental Medicine and Neurology*, 55(7), 499–508.
- Novak, I., Morgan, C., Fahey, M., Finch-Edmondson, M., Galea, C., Hines, A., ...

- Badawi, N. (2020). State of the Evidence Traffic Lights 2019: Systematic Review of Interventions for Preventing and Treating Children with Cerebral Palsy. *Current Neurology and Neuroscience Reports*, 20(2). <https://doi.org/10.1007/s11910-020-1022-z>
- Snehashri N Vaidya, C. K. (2014). Effectiveness of Myofascial Release on Spasticity and Lower Extremity Function in Diplegic Cerebral Palsy: Randomized Controlled Trial. *International Journal of Physical Medicine & Rehabilitation*, 03(01), 1–9. <https://doi.org/10.4172/2329-9096.1000253>
- Subbarayalu, A. V., & Ameer, M. A. (2017). Relationships among head posture, pain intensity, disability and deep cervical flexor muscle performance in subjects with postural neck pain. *Journal of Taibah University Medical Sciences*, 12(6), 541–547. <https://doi.org/10.1016/j.jtumed.2017.07.001>
- Zanon, M. A., Porfirio, G. J. M., Riera, R., & Martimbianco, A. L. C. (2015). Neurodevelopmental treatment approaches for children with cerebral palsy. *The Cochrane Database of Systematic Reviews*, 2015(11). <https://doi.org/10.1002/14651858.CD011937>