THE ROLE OF SUPINE SLEEPING AS A FAMILY-BASED EARLY INTERVENTION FOR SPASTICITY IN CEREBRAL PALSY

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Abstract

This study aims to explore the application of the supine sleeping position as a form of family-based early intervention to reduce spasticity in children with severe cerebral palsy (CP). The research was driven by limited access to professional therapy services, especially among low-income families. A qualitative approach with a case study design was used. Data were collected through in-depth interviews with parents, observation of sleeping position practices, and family documentation over two months of intervention. The findings show that the family consistently implemented the supine sleeping position using simple household materials. Parents reported improvements in the child's sleep comfort, reduced morning muscle stiffness, and easier daily care routines. Despite challenges such as shifting sleep positions, uncomfortable room temperature, and caregiver fatigue, the family demonstrated adaptive and reflective capabilities. This study concludes that home-based simple interventions like the supine sleeping position have the potential to strengthen the family's role in supporting independent care for children with severe CP.

Keywords: *early intervention; cerebral palsy; family; supine sleeping position; case study*

INTRODUCTION

Cerebral palsy (CP) is a permanent and nonprogressive motor development disorder resulting from brain damage in the prenatal, perinatal, or early postnatal period (Afifah, 2024). Children with severe CP generally experience extreme limitations in mobility and muscle control, including spasticity or muscle stiffness that inhibits movement (Qamar et al., 2024). Spasticity itself is an increase in muscle tone that causes stiffness and resistance to passive movements, associated with disorders of the central nervous system, particularly the corticospinal pathway (Novak et al., 2013; Sanger et al., 2003). If not treated early, this condition can worsen posture, hinder mobility, and lead to orthopedic deformities such as scoliosis and contractures (Matthews, 2000).

Previous studies have shown that adjustments to body position, particularly during sleep, can be an effective strategy in reducing muscle tension. Physiotherapy approaches involving body orientation and sleep positioning have been shown to improve postural tone and better sleep patterns (Abdullah et al., 2021). One form of regulation is the supine sleeping position, which is considered strategic because it helps maintain body alignment, evenly distributes muscle stress, and reduces abnormal proprioceptive input that triggers stiffness (Hill, 2010; Pountney et al., 2009; Casey et al., 2022).

According to neurodevelopmental treatment theory (Bobath, 1984), proper body positioning plays an important role in stimulating normal motor control. In practice, this approach does not have to be done clinically with sophisticated tools but can be developed as part of home-based rehabilitation. The community-based rehabilitation (CBR) model, as proposed by Helander et al. (1989), also emphasizes the great potential role of families in designing low-cost, affordable, and contextualized care using local resources.

However, most of the research supporting sleep positioning still centers on hospital contexts or structured professional therapies, which are not always accessible to families with economic limitations. In reality, many families cannot afford regular therapy, even though early intervention is crucial to prevent more serious complications. This gap indicates the need for studies on simple, family-based interventions that can be implemented independently at home.

Family-centered early intervention has been shown to improve the quality of care for children with special needs. This approach makes parents active partners in the rehabilitation process, not just implementers of professional instructions (Guralnick, 2005; Dunst et al., 2007). Studies by Balqis et al. (2022) and Astuti & Rochyadi (2023) also support the important role of families in optimizing the growth and development of children with developmental disabilities through educational and emotional strategies.

Some studies, such as Peng et al. (2014), Novak et al. (2013), and Ayuningtyas (2020),, have examined the impact of sleep position on sleep quality and spasticity, but not many have emphasized the aspect of the family's role directly in its application. This study seeks to bridge the gap by exploring families' experiences in implementing the supine sleeping position as a feasible and impactful early intervention.

This study aims to examine in depth how families with limited access to professional therapy services implement the supine sleeping position as a form of early intervention, understand their perceptions of its benefits, and identify challenges faced during the process of implementing the intervention at home.

Using a qualitative case study approach, this study aimed to understand in depth how families implemented the practice of supine sleep positioning, their perceptions of its benefits, as well as the challenges faced during the intervention process. The novelty of this study lies in its focus on the experiences of families with limited access, as well as in emphasizing that simple intervention strategies without professional tools still have significant rehabilitative value. This research is expected to expand the study on the role of families in the care of children with severe CP and inspire realistic, contextualized, and affordable home intervention models.

METHOD

This study used a qualitative approach with a case study design to explore the practice of supine sleep positioning as a form of family-based early intervention in children with severe cerebral palsy (CP). The main focus of the study was directed towards an in-depth understanding of how families implement simple home-based interventions, as well as their perceptions of the benefits and challenges during its implementation. The subject of the study was one family who had a child with severe spastic CP and did not undergo regular professional therapy due to economic limitations. The main informant in this study was the mother as the main caregiver of the child, with additional supporting informants such as health cadres or neighbors who are familiar with the condition of the child and family. The determination of informants was done purposively, based on the inclusion criteria that had been previously determined.

The main instrument in this study was the researcher herself, who has a specialized educational background and experience in the field of intervention for children with special needs. Supporting instruments included semi-structured interview guidelines, observation sheets, field notebooks, voice recorders, and the family's cell phone camera to document sleeping position practices. Data collection techniques consisted of in-depth interviews with parents, limited observations of sleep position practices and the child's environment, and simple documentation

that included the family's daily records of bedtime, the child's position, and the child's response to waking up in the morning.

The data obtained were analyzed using a thematic approach through a process of interview transcription, data coding, categorization, and inductive drawing of main themes. To maintain data validity, researchers applied triangulation techniques by comparing data from interviews, observations, and documentation, as well as member checking by confirming data back to informants and peer debriefing by discussing interim results with colleagues. The study was conducted in a high-density urban area in Bandung City, where many families experience limited access to therapy services. The intervention process and data collection took place over two months, from April to May 2025, and were conducted directly in the subject's living environment. The focus of this study was not to evaluate children's postural changes medically, but rather to understand the contextual and cultural experiences of families in implementing the intervention independently at home.

RESULTS AND DISCUSSION

This study produced four main findings obtained through the process of in-depth interviews, observation of family practices in implementing the supine sleeping position, and routine documentation during the two months of intervention implementation. These findings are presented in four major themes: the practice of the supine sleeping position by families, perceptions of benefits, implementation challenges, and family reflections and adaptations.

Figure 1. Sleeping position of children before intervention

First, families were able to implement the supine sleeping position consistently every night. The intervention was conducted from 8 p.m. until morning, with the duration of the supine position lasting an average of 6-8 hours after the fourth week. Previously, this position only lasted about 2-3 hours because the child shifted easily. With the modification of simple tools such as sofa cushions

and blanket rolls, the child's position became more stable. The subject's mother showed understanding in keeping the head in a neutral position, hands symmetrical at the sides, and legs straightened with support. This is in line with the neurodevelopmental treatment approach (Bobath, 1984), which emphasizes the importance of proper body placement to stimulate normal muscle tone.

Table 1. Child's Back Sleeping Position Arrangement

Styling Elements	Description
Body side pillow	To prevent the body from rolling to the side
Under-knee pillow	Reduces pressureon thigh and knee muscles
A soft hardest	Helps maintain a neutral position
Flat and stable sleeping mat	Ensures body posture remains symmetrical

Figure 2.Children's Sleeping Position after Intervention with Home Appliance Support

Second, parents' perceptions of the benefits of the intervention were strong. Parents noted that the child was calmer at bedtime, woke up less often at night, and had decreased muscle stiffness in the morning. The child also no longer cried when awake, and nighttime sleep time increased. These findings are in line with the study by Abdullah et al. (2021), which showed that proper body positioning can improve the sleep patterns of CP children. Improved child comfort also has a positive impact on the psychological condition of parents, who feel calmer and more confident. As stated by Törnbom et al. (2021), parents' confidence in carrying out household care contributes to the long-term sustainability of intervention practices.

Third, the study also noted a number of implementation challenges. The child often shifted position during deep sleep, especially at the beginning of the implementation, which led to parents having to wake up several times to correct the position. In addition, the uncomfortable room temperature and the presence of mosquitoes aggravated the situation. The subject's mother also had to stay with the child until the child was completely asleep, as the child became restless when the position of the wedge was not correct. These findings indicate that the success of the intervention depends not only on the positioning technique but also on the readiness of the environment and the resilience of the caregiver. Novak et al. (2020) emphasized the importance of the fit between the intervention program and the family's social reality as a key success factor in home-based practice.

Fourth, families showed reflective and adaptive abilities that developed over time. They replaced uncomfortable devices, recorded their children's sleep routines, and rearranged nightly activity patterns to make them calmer. The subject's mother became more conscientious in paying attention to the position of the child's head and hands and expressed a desire to continue this practice independently. According to Rosenbaum and Gorter (2021), family involvement as the primary decision-maker is a principle in the family-centered early intervention approach, and reflective practices such as these are indicators of successful empowerment.

These results reinforce the view that simple interventions, such as sleep positioning, can be a viable strategy in the household context, especially in families who do not have access to professional therapy. In line with the study by Demeke et al. (2023), active involvement of the family in home-based care contributes to the improvement of the CP child's quality of life and emotional stability of the family. This study also confirms that in situations with limited resources, simple actions done consistently can provide significant benefits.

Therefore, the results of this study not only demonstrate the effectiveness of the intervention in improving the comfort of a child with severe CP but also underscore the importance of an adaptive home-based approach that empowers the family. Going forward, training for families on safe and effective sleep positioning techniques needs to be developed in the form of modules or community training. Further research is recommended to objectively evaluate the impact of the intervention on muscle tone and sleep quality using clinical measurement tools, as well as to develop sleeping position guidelines that are applicable and easily accessible to the general public, especially in areas with limited health services.

CONCLUSIONS AND RECOMMENDATIONS

This study crystallized that supine sleeping can be a feasible and effective form of family-based early intervention for children with severe cerebral palsy (CP), particularly in the context of families who experience limited access to professional therapy services. This practice was shown to be consistently implemented by families using simple aids modified as needed and promoted increased parental understanding, skills, and confidence in caring for the child.

The results confirmed that families not only act as recipients of interventions but also as active subjects who are able to design, implement, and reflect on adaptive child care practices. Regular application of the supine sleeping position showed the potential to reduce spasticity, increase children's sleep comfort, and ease daily care.

However, the limitations of this study lie in the qualitative approach, which is subjective and contextual and has not clinically measured physiological changes in children. Therefore, the results of this study cannot be widely generalized but are an important foothold for the development of a more systematic home intervention model.

Based on the results and implications of the findings, it is recommended that this recumbent sleep intervention model be developed on a wider scale through practical training for parents, preparation of simple intervention modules, and integration with basic health service programs such as posyandu and puskesmas. Local governments and community rehabilitation institutions need to provide systematic support through the provision of family-based home intervention guidelines and the involvement of health cadres in mentoring.

In addition, it is important to conduct further research using quantitative or mixed-methods approaches to objectively measure the impact of interventions, such as the effect on muscle tone, sleep quality, and comfort levels of children with cerebral palsy. Longitudinal studies are also needed to assess the sustainability of the practice and its impact on the quality of life of the child and family. This approach is expected to strengthen the framework for early intervention that is contextualized, affordable, and puts the family at the center of the rehabilitation process for children with special needs.

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