



## Original Article

## The Impact of Teaching Communication Skills to Mothers on Reducing Behavioral Problems in Children with Cerebral Palsy: A Quasi-Experimental Study

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## ABSTRACT

**Background:** Cerebral palsy (CP) affects different aspects of children's development. Some of these negative effects, such as behavioral issues in children, could be mitigated by teaching mothers, as the primary caregivers, the proper skills. The study aims to explore the impact of instructing communication skills to mothers as primary caregivers of children with cerebral palsy (CP) in mitigating behavioral problems exhibited by these children.

**Methods:** In this semi-experimental study, we recruited 42 mothers with children aged 4-10 years diagnosed with cerebral palsy. The mothers were required to be literate, aged between 20 and 40, and their children's mobility score should be at or below 3 in the Gross Motor Function Classification System (GMFCS). Convenient sampling was used for participant selection. The Rutter Children's Behavioral Questionnaire was administered to assess the children's behavioral problems before and after the training. The experimental group participated in nine 90-minute training sessions to improve their communication with their children. In contrast, the control group received no intervention for children's behavioral problems. The collected data were analyzed using Multivariate Analysis of Covariance (MANCOVA).

**Results:** Comparing the mean scores of the two groups in five sub-tests of the Rutter Children's Behavioral Questionnaire revealed significant differences in the following domains: Aggression & hyperactivity, Social incompatibility, Anti-social behaviors, Anxiety & Depression, and General Behavioral problems before the training, indicating variations between the groups ( $p = 0.001$ ). Following the training, the experimental group significantly reduced all five subtests of Rutter's questionnaire ( $P=0.001$ ).

**Conclusion:** The study suggests that equipping mothers with effective communication skills can lead to changes in their interactions with children who have CP and potentially reduce behavioral problems in these children. Consequently, rehabilitation teams may want to consider incorporating communication skills training programs into their overall therapeutic strategies for children with CP.

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## Introduction

Children with cerebral palsy (CP) face a range of

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challenges, including not only physical issues but also psychosocial concerns such as behavioral problems [1]. These behavioral problems are more prevalent in children with CP than in their typically developing peers and can persist throughout their lives. Research indicates that one in four children with CP experiences behavioral

issues [2], whereas in typical children, the prevalence is only one in ten [3].

These behavioral problems encompass a spectrum of issues, including aggression, antisocial behavior, emotional instability, and difficulties in peer interactions, all of which can significantly impact an individual's social interactions, experiences, and overall quality of life [4]. Moreover, these behavioral problems in children with disabilities can have far-reaching consequences, affecting the child's social development, family dynamics, and the well-being of both the child and family members, particularly mothers [5-9].

Various psychological therapies have addressed these behavioral problems in children, including cognitive-behavioral therapy, communication skills training, counseling, and positive parenting programs [10, 11]. Studies have sought to determine which approach is most effective in reducing behavioral problems in children, both those with CP and those without [10]. Nevertheless, research has consistently shown that mothers of children with CP encounter unique challenges in communicating with their children. These challenges are compounded by factors such as an authoritarian parenting style, unrealistic beliefs about themselves and their child stemming from the child's physical and motor characteristics [12], reduced positive interactions with their children, communication difficulties, and tension, leading to misunderstandings, non-listening, and interpersonal conflicts compared to mothers of typically developing children [13].

Furthermore, these mothers often experience pessimism and reduced participation in social activities [14, 15]. Some studies have characterized these strained and inappropriate parent-child relationships as common features of families with children with CP [16].

Given this understanding, it's apparent that a strained and ineffective relationship has developed between mothers and their children with CP. Both parties require appropriate intervention: children can benefit from communication interventions provided by speech therapists, and mothers need to learn how to understand their children and respond effectively to manage their behavioral problems, either through the guidance of a psychologist or a speech therapist. Establishing a communication bridge between parents and children will likely be instrumental in resolving conflicts between parents and children with CP [17].

As of now, Stepping Stones Triple P (SSTP) and Acceptance and Commitment Therapy (ACT) have demonstrated effectiveness in managing behavioral issues in children with CP, as supported by [10]. However, there is a need for a more practical and multidisciplinary approach to assist mothers in communicating effectively with their children.

Studies have consistently shown that parents' ability to establish effective communication with their children is a critical factor in preventing the development of behavioral disorders [18, 19]. A systematic review by [10] revealed a striking lack of randomized clinical trials in studies from 1950 to 2010. Instead, three studies with a pre-posttest design evaluated behavioral changes in children with CP following the implementation of various programs,

including parenting interventions, oral motor therapy, and functional communication training. These limited studies suggested that parenting interventions might effectively address behavioral problems in children with CP and their parents [20].

Weaknesses in parents' communication skills can significantly heighten the risk of exacerbating behavioral and emotional issues in children and impeding their social interactions [12, 21]. If rehabilitation teams do not consider parents' communication skills when intervening with children with CP, the heightened risk of psychological and behavioral problems in these children becomes inevitable [22]. Consequently, this study, the first of its kind, aimed to investigate the effectiveness of teaching communication skills to mothers with children with CP through an evaluation of the children's behavioral problems.

## Methods

### *Participants*

This study employed a semi-experimental design with pretest and posttest evaluations conducted in Semnan city. Forty-two mothers with children with CP aged between 4 and 10 years and displaying behavioral problems were recruited through convenient sampling. They were then randomly divided into experimental and control groups, with odd-numbered participants assigned to the experimental group. Inclusion criteria required that the mothers had signed a consent form and had a child with CP. They also needed to be literate, aged between 20 and 40, and have children aged between 4 and 10. The children's mobility scores had to be at level 3 or lower, based on the Gross Motor Function Classification System (GMFCS) scale. Confirmation of the children's behavioral problems was obtained using the Persian version of Rutter's Children's Behavior Questionnaire. Mothers who expressed physical or psychological illnesses during initial encounters were absent for more than two educational program sessions or had children under specific treatments for their behavioral problems were excluded (Figure 1).

### *Tools*

#### *Rutter Child Behavior Questionnaire*

The research team employed an adapted version of the Rutter Children's Behavioral Questionnaire to collect data. This questionnaire, originally developed by Michael Rutter in 1967 and revised in 1975, comprises two forms: one for parents (Form A) and one for teachers (Form B). The parents' form comprises 30 questions commonly used to identify children's behavioral disorders. The questionnaire employs a scoring method based on a three-point Likert scale ranging from zero to 2. Parents can select "zero" when a question does not apply to their child's behavior at all. Option 1 is chosen when the question describes the child's behavior to some extent, and if the question is a good match for the child's behavior, parents can select option 2 [23]. Regarding the scoring system, a child's total score will fall within the range of 0 to 60, with higher scores indicating more severe behavioral disorders.

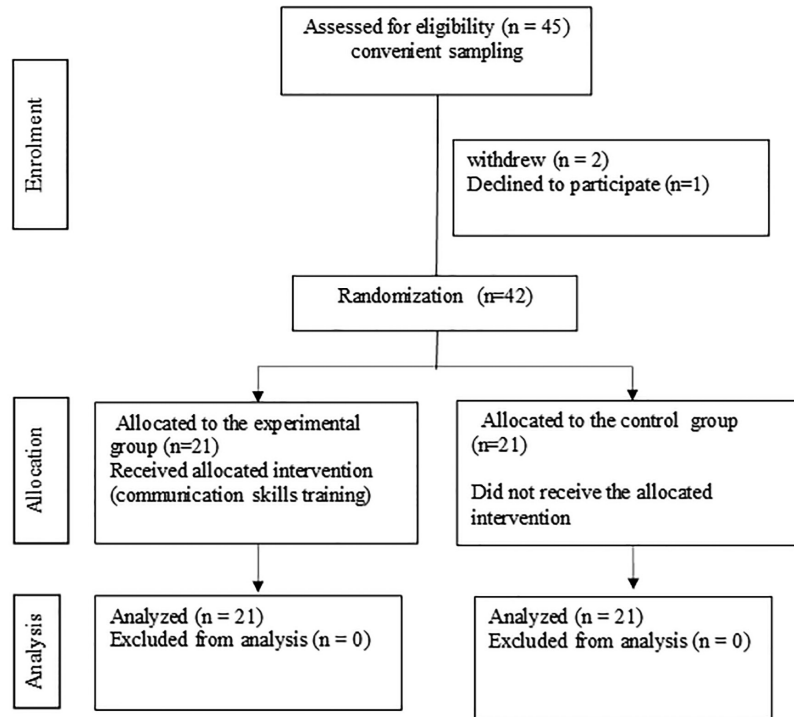


Figure 1: The flow diagram of the intervention

The reliability of the test-retest method and the internal reliability of the original questionnaire were reported in a study with a two-month time interval, resulting in a coefficient of 0.74 at a significance level of  $P < 0.001$ . Additionally, the retest reliability, conducted with 91 patients at a time interval of 13 weeks, was reported to be 85% [24]. In Iran, Minaei obtained validity coefficients using the internal consistency method ranging from 0.73 to 0.87, and based on Cronbach's alpha, they ranged from 0.38 to 0.97 [25].

#### Ethical Consideration

The research team obtained signed consent forms from the principals of the centers involved in the study. Subsequently, all eligible mothers were invited to participate in the study voluntarily, without compulsion. The examiners individually explained the concept of behavioral problems, their potential impact on their children, the research's objectives, and the importance of communication skills training. They also assured the parents that their responses would remain confidential and there would be no penalties for choosing not to participate.

**Ethical approval:** This study has received ethical approval from the ethics committee of Department of Special Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret (Ethics Code: IN.2022.0813).

#### Procedure

An independent evaluator, unaware of the group assignments, assessed the experimental and control groups before and after the training sessions at a university clinic. The experimental group received communication skills training, while the control group did not receive any training.

The intervention program was delivered as group

therapy, with each group consisting of 3 to 5 members. The intervention included a communication skills training program, which spanned eight 90-minute sessions (one session per week) conducted by an experienced psychologist specializing in communication skills training. It's important to note that children were absent during these sessions. The content of these group training sessions encompassed teaching and practicing skills related to sending and receiving messages, effective communication, conflict resolution, constructive communication methods, practicing speaking skills, active listening, problem-solving, stress recognition, acknowledging differences, requesting feedback, showing appreciation, and taking responsibility for one's role. The program's structure and time management were based on educational programs used in previous studies for various disorders. [26-29].

#### Statistical Analysis

Descriptive statistics, including mean and standard deviation (SD), were computed using SPSS 24. The Kolmogorov-Smirnov test was employed to assess the normal distribution of the data. The scores between the two groups before training were compared using the Independent Samples T-Test. For comparing the changes before and after training between the groups, Multivariate Analysis of Covariance Tests (MANCOVA) was employed. MANCOVA is a statistical test particularly useful when researchers intend to control for covariates and examine the significance of the effects of one or more independent variables on two or more dependent variables.

#### Results

Forty-two mothers with children comprising 26 boys and 16 girls with cerebral palsy agreed to participate

in the study. The children had a mean age of  $7.40 \pm 2.68$  years, while the mothers' mean age was  $34.40 \pm 5.72$  years.

Table 1 provides descriptive statistics for the children's scores in both groups before and after the training program in the subscales of Rutter's questionnaire.

Table 2 presents the results of the Kolmogorov-Smirnov test. All subscales displayed P values greater than 0.05, indicating that the data had a normal distribution.

Table 3 shows the results of Levene's test, which demonstrated that the variances were equal across the groups, as indicated by P values greater than 0.05.

Given the significant differences between groups in the subscales of Rutter's questionnaire before training and the equality of variances, a MANCOVA was conducted to assess the impact of communication skills training. Table 4 shows the results of the MANCOVA conducted to investigate the effectiveness of communication skills training. The table reveals that the experimental group reported significantly fewer behavioral problems in four of the five subscales of Rutter's questionnaire than the control group. This indicates that the training program had a positive impact on reducing behavioral problems in the experimental group.

**Table 1:** Descriptive Statistics for Children's scores in subscales of Rutter's questionnaire before and after training

| Group              | Variable                     | Pre-test |                    | Post-test |                    |
|--------------------|------------------------------|----------|--------------------|-----------|--------------------|
|                    |                              | Mean     | Standard deviation | Mean      | Standard deviation |
| Experimental group | Aggression and hyperactivity | 5.25     | 0.69               | 4.18      | 0.69               |
|                    | Social incompatibility       | 6.02     | 1.1                | 4.96      | 0.73               |
|                    | Anti-social behaviors        | 5.96     | 0.74               | 4.21      | 0.81               |
|                    | Anxiety and depression       | 4.23     | 0.96               | 3.21      | 0.61               |
|                    | Attention deficit            | 4.20     | 0.67               | 3.8       | 0.91               |
|                    | General Behavioral Problems  | 25.66    | 1.8                | 20.36     | 1.65               |
| Control group      | Aggression and hyperactivity | 4.90     | 0.81               | 4.75      | 0.89               |
|                    | Social incompatibility       | 6.12     | 0.92               | 6.08      | 0.71               |
|                    | Anti-social behaviors        | 5.48     | 0.96               | 4.9       | 0.69               |
|                    | Anxiety and depression       | 4.6      | 0.83               | 4.58      | 0.66               |
|                    | Attention deficit            | 4.11     | 0.75               | 4.02      | 0.63               |
|                    | General Behavioral Problems  | 25.21    | 1.81               | 24.23     | 1.52               |

**Table 2:** Measures of Kolmogorov-Smirnov to assess normality

| Variable                     | Z Smirnov | P value |
|------------------------------|-----------|---------|
| Aggression and hyperactivity | 1.07      | 0.21    |
| Social incompatibility       | 1.18      | 0.16    |
| Anti-social behaviors        | 1.16      | 0.15    |
| Anxiety and depression       | 1.03      | 0.23    |
| Attention deficit            | 1.14      | 0.18    |
| General Behavioral Problems  | 1.28      | 0.07    |

**Table 3:** Levene's Test to measure the equality of data

| Variable                     | F    | Degree of freedom 1 | Degree of freedom 2 | P value |
|------------------------------|------|---------------------|---------------------|---------|
| Aggression and hyperactivity | 0.08 | 1                   | 2                   | 0.76    |
| Social incompatibility       | 0.06 |                     |                     | 0.81    |
| Anti-social behaviors        | 0.07 |                     |                     | 0.78    |
| Anxiety and depression       | 1.40 |                     |                     | 0.25    |
| Attention deficit            | 0.45 |                     |                     | 0.51    |
| General Behavioral Problems  | 0.16 |                     |                     | 0.71    |

**Table 4:** Comparison of post-test children's scores in subscales of Rutter's questionnaire with control of pre-test effect

|          | Variables                    | df | F     | P value | Effect Size | Statistical power |
|----------|------------------------------|----|-------|---------|-------------|-------------------|
| Pre-test | Aggression and hyperactivity | 1  | 13.95 | 0.001   | 0.37        | 0.90              |
|          | Social incompatibility       | 1  | 15.42 | 0.001   | 0.39        | 0.95              |
|          | Anti-social behaviors        | 1  | 16.02 | 0.001   | 0.41        | 0.95              |
|          | Anxiety and depression       | 1  | 12.28 | 0.004   | 0.33        | 0.88              |
|          | Attention deficit            | 1  | 2.67  | 0.23    | 0.70        | 0.25              |
|          | General Behavioral Problems  | 1  | 60.34 | 0.23    | 0.16        | 1.00              |
| Group    | Aggression and hyperactivity | 1  | 6.96  | 0.012   | 0.25        | 0.77              |
|          | Social incompatibility       | 1  | 4.21  | 0.05    | 0.14        | 0.51              |
|          | Anti-social behaviors        | 1  | 14.49 | 0.001   | 0.36        | 0.95              |
|          | Anxiety and depression       | 1  | 10.32 | 0.002   | 0.34        | 0.90              |
|          | Attention deficit            | 1  | 3.61  | 0.96    | 0.10        | 0.35              |
|          | General Behavioral Problems  | 1  | 45.59 | 0.001   | 0.64        | 1.00              |
| Error    |                              | 35 |       |         |             |                   |
| Total    |                              | 42 |       |         |             |                   |

## Discussion

This study demonstrated the significant effectiveness of teaching communication skills to mothers of children with CP in reducing their children's behavioral problems. Since there is limited prior research on the effects of this specific technique on behavioral problems in children with CP, it isn't easy to compare the current study's findings with similar studies. However, studies in the context of children with autism spectrum disorders have shown the positive impact of teaching communication skills to caregivers. These findings suggest that enhancing communication skills in caregivers can yield positive effects not only on children's behavior but also on various aspects of their families [30-32].

Children with cerebral palsy often face challenges in managing their daily needs and routines as effectively as their typically developing peers. Consequently, they typically rely on assistance from a second party to help them navigate their daily activities and tasks. A study found that among mothers with children with cerebral palsy, their highest priority in occupational performance was focused on their children's self-care needs mobility-related concerns ranked as the second most important area of attention for these mothers [33].

Indeed, the primary needs of children with cerebral palsy often align with the top priorities of their caregivers, especially their mothers. Mutual understanding and effective communication between children with CP and their caregivers, particularly mothers, are crucial. In addition to the physical and movement challenges associated with cerebral palsy, these children may also face other disabilities and difficulties, emphasizing the importance of clear and effective communication to address their multifaceted needs [34].

Therefore, while teaching children with cerebral palsy to communicate effectively with others can be challenging due to their multiple disabilities, a comprehensive rehabilitation program should encompass interdisciplinary interventions that cater to each child's unique needs. This approach should involve the child, family, caregivers, and educational staff [33]. As demonstrated in the present study, teaching communication skills to mothers of children with cerebral palsy can be a valuable component of such a rehabilitation program. It serves as an effective solution to foster better understanding between the child and the mother, consequently reducing the occurrence of behavioral problems in the child.

A lack of proper communication skills and low levels of maternal self-confidence, especially among parents of children with disabilities, can contribute to the use of harsh, coercive, and harassing disciplinary methods. These ineffective parenting practices, in turn, can perpetuate children's behavioral problems. Communication skills training programs, which are integral components of life skills, serve as powerful tools to prepare individuals to meet the challenges of everyday life [21].

Participating in educational programs equips parents with the necessary skills and knowledge to communicate effectively with their children. According to Dalsgaard and colleagues, the mutual relationship between children and

their parents and how they treat each other is one of the most fundamental factors influencing children's development. In this context, empowering families, particularly mothers, plays a vital and constructive role in preventing or addressing children's behavioral problems [27].

Teaching communication skills can be regarded as a supportive measure to address a child's behavioral problems, offering benefits such as increased self-confidence, improved social functioning, and reduced psychological-behavioral issues [28]. Through communication skills training, mothers gain valuable insights into understanding their children, their behaviors, and the root causes of behavioral problems.

These training programs empower mothers with the knowledge and skills to enhance or establish desirable behaviors in their children by strengthening positive communication skills. It's important to recognize that children's behavioral problems often stem from their parents' behavior, including irregular communication and disciplinary styles, which can exacerbate such problems [29]. By learning effective communication skills through this program, mothers are better equipped to pay attention to their children and engage in meaningful, constructive communication. This study focused on mothers of children with CP within a specific age range. While it demonstrated the program's effectiveness, further research is warranted to explore its impact on different age groups. The constraints of time and financial resources limited our ability to assess the program's long-term effects and compare it to other therapeutic interventions. Future studies should investigate the immediate and enduring impacts of communication skills training. These studies can also explore the effectiveness of communication skills training when used in conjunction with other therapeutic approaches. Furthermore, our study did not involve an analysis of child-mother interactions. Future research employing a similar approach should consider including this analysis. Understanding the dynamics of child-mother interactions would provide valuable insights and help us reach more definitive conclusions about the efficacy of communication training skills.

## Conclusion

The findings of this study highlight the significance of empowering mothers with effective communication skills, as it can lead to positive changes in their interactions with children with CP. Moreover, such training can significantly reduce behavioral problems in these children. Given these results, rehabilitation teams may want to consider incorporating communication skills training programs into their therapeutic plans for children with CP.

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