

## Research Paper

## Analyzing the Effectiveness of Communication Skills on Sibling Relationship of Adolescents With Down Syndrome



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**ABSTRACT**

**Objectives:** Sibling relationships are often among the long-lasting relationships and more than two-thirds of adolescents with siblings introduce their siblings as the most important people in their life. Therefore, this study aims to evaluate the effectiveness of communication skills on sibling relationships among adolescents with Down syndrome.

**Methods:** This is a quasi-experimental study based on a pre-test-post-test design with a control group. A total of 60 adolescents were members of the Iranian association for Down syndrome in Tehran City, Iran. From this population, 30 adolescents were selected based on the inclusion and exclusion criteria and were divided into two groups (experimental and control). At first, the adolescents' parents responded to the sibling relationship questionnaire. Then, the experimental group attended 10 sessions on communication skills. Following the tenth session, parents completed the sibling relationship questionnaire once more. The data were analyzed using a multivariate analysis of covariance.

**Results:** The results showed that the experimental group experienced a significant increase in two dimensions of warmth/closeness and conflict following the intervention program compared to the control group ( $P < 0.01$ ). However, the difference between the two groups was not significant in the other dimensions, namely relative status/power and rivalry.

**Discussion:** It seems that communication skills training is an appropriate intervention to improve sibling relationships of adolescents with Down syndrome.

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## Highlights

- Individuals who have siblings with Down syndrome have difficulty communicating with each other.
- Training communication skills reduces communication problems between siblings of adolescents with Down syndrome.

## Plain Language Summary

Studies have demonstrated that siblings of adolescents with Down syndrome have communication problems from an early age because a child with this disorder is born with clinical symptoms and mental problems, regardless of their age. Therefore, training communication skills improves sibling relationships.

### 1. Introduction

Intellectual disability as a type of neurodevelopmental disorder is identified by deficiencies in general mental functioning, such as reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and learning from experience [1]. Down syndrome (DS), the most eminent intellectual disability, is frequent with approximately 700 births worldwide [2]. DS is an intellectual and developmental disability with some physical and linguistic problems that can cause mild to moderate disabilities [3]. Although children with DS are characterized as being highly sociable [4], research indicates that they perform cognitively weaker than normal children, and their communication skills should be trained in an early age because of their deficiencies in this area [5]. Considering communication skills, it is either a brother or sister that plays an important role in every person's life given that it is the most long-lasting relationship an individual can experience [6]. More than two-thirds of adolescents with siblings enumerate their sister or brother as the most important person in their life. This is a critical component in the process of a child's development, family atmosphere, and patterns of interaction among family members [7, 8]. A sibling's role varies during different developmental stages from a companion and role model in childhood to a resource of help and support in adulthood [9].

Sibling relationship provides a strong source of knowledge about how to get along with others, how to express emotion, thoughts, and opinions, how to resolve conflicts, and how to understand the social and cognitive world in general. Meanwhile, individuals can engage in sympathetic and prosocial behaviors through this relationship, and also they become more capable of self-regulation [10]. However, the impact of siblings on individuals' lives takes on specific characteristics when a

brother or a sister has an intellectual and developmental disability (IDD). Although compared to other characteristics of IDD, siblings of children with DS reported more positive outcomes in personal strength, relationships with others, and low adjustment difficulties [11]. In addition, studies show that siblings of children with special needs are to a greater extent exposed to emotional, psychological, social, and behavioral problems than siblings of normal developing people [12, 13]. As a result, study findings that compared IDD siblings to the normal group show inconsistencies because of mixed results [9, 14]. Despite the inconsistencies, language and communication are the key impairment areas; accordingly, training them can make considerable changes in their relationships, especially with their siblings [15]. Considering this fact, and to assess the impact of such training and improvements in communication skills, this study aims to investigate the relationship between these two factors and their influence on one another.

### 2. Materials and Methods

#### Study population

This is a quasi-experimental study based on a pre-test-posttest design with a control group. A total of 60 adolescents were members of the Iranian association for Down syndrome in Tehran City, Iran. Based on the sample size formula (standard deviation [SD]=15, mean error [ME]=11,  $\alpha=0.05$ , test power=0.8), 30 adolescents were selected following the inclusion and exclusion criteria. The sampling was done via the convenience sampling method because of the availability of adolescents with DS in the Iranian association for Down syndrome. Then, they were equally divided into two groups (experimental and control). All adolescents who participated in the research were Persian speakers.

The inclusion criteria comprised the following items: being 10 to 18 years old, moderate level of intelligence, anxiety symptoms (according to their medical records the counselors of the association for Down syndrome, not having physical problems, such as cardiovascular or kidney diseases and motor and sensory problems (blindness, deafness), behavioral disorders (conduct disorder, oppositional defiant disorder), and not participating in similar programs. By applying the exclusion criteria, 15 adolescents were excluded. After obtaining their informed consent letter, 30 adolescents' parents completed the sibling relationship questionnaire [16] as they took the adolescents to the Iranian association for Down syndrome. All participants lived with their families along with their parents. Their birth order was the first, second, and third children. They were all full siblings and had normal siblings.

### Research instruments

The sibling relationship questionnaire (parental form) is a self-report questionnaire used to measure the relationship between siblings [16]. The questionnaire includes 47 questions and should be completed by one of the parents. The questions are scored based on the Likert spectrum from "Never" to "A lot." The original questionnaire is in English. At first, it was translated into Persian by a professional translator. The Persian translation was back-translated into English by an individual holding PhD in English. Then, a native English speaker contently adapted the original questionnaire and the retranslated version. Finally, a Persian version of the questionnaire was finalized.

Furman and Buhrmester's study (1985) showed that the dimension of warmth/closeness consists of seven basic qualities, including intimacy, prosocial behavior, companionship, affection, similarity, admiration of the sibling, and admiration by the sibling; meanwhile, the dimension of conflict can be divided into three main qualities, including quarreling, antagonism, and competition. In addition, the dimension of rivalry comprises two qualities of paternal and maternal partiality, and the dimension of relative status/power comprises four qualities, namely nurturance by a sibling, nurturance of a sibling, dominance by a sibling, and dominance over a sibling. The items of the scale are scored based on a 5-point Likert scale (1=hardly at all, 5=extremely much). The score for each scale is obtained from the calculation of the mean value of the three items in each scale except the parental partiality scale whose score is obtained based on the calculation of scores' deviations from the midpoint. Moser & Jacob reported the internal reliability of warmth/closeness and conflict to be 0.90 and 0.68, respectively [17]. The validity and reliability of the sibling relationship questionnaire (parent form) were obtained from 317 parents of children with special needs in Iran. The Cronbach  $\alpha$  for the warmth/closeness scale was obtained at 0.97, for the conflict ratio at 0.96, for the power scale at 0.77, and the rivalry scale at 0.97 [18].

### Data collection

The experimental group participated in ten 60-minute communication skills sessions (one session per week), whereas the control group received only the programs implemented by a specialist researcher, a PhD candidate

**Table 1.** Results of univariate analysis of covariance

Sessions	Procedures
1	Introduction and familiarity with adolescents with Down syndrome, painting of a heart, and familiarity with animals, such as giraffes that have a big heart;
2	Familiarity with different ways of expressing emotions and preparing the glossary about emotions;
3	Empathy with the self and others and the relationship between needs and emotions;
4	Several ways of listening to ourselves and others and the possibility of choosing the hearing method;
5	The relationship between anger and unmet needs, awareness of the difference in causes and stimulation of anger, and different reactions in the face of rage and anger;
6	Acceptance of feeling of shame as a feeling and finding the needs behind this feeling;
7	The expression of fear and coping strategies with fear, and empathy with the feeling of fear;
8	Attention to the needs behind the answer "no," as well as saying and hearing "no";
9	Introduction of positive action language and the difference between negative and positive action language;
10	Creation of a happy life; doing something to make others' lives happier will make our own life happier.

at the Iranian association for Down syndrome (communication skills training, anger management, and life skills training). This interventional training program was designed based on the non-violent Communication program of Rosenberg [19-23], and only adolescents with DS in the experimental group participated in the intervention, not their siblings or their parents. At the end of the tenth session, the parents of the control and experimental groups completed the sibling relationship questionnaire once more. Then, the obtained results were analyzed using a multivariate analysis of covariance (MANCOVA). The content of the training sessions is provided in Table 1.

### 3. Results

The demographic characteristics of participants are provided in Table 2 and Table 3.

In the study, the mean age of the participants was 16 and their parents held bachelor's degrees. The sample included 18 girls and 12 boys.

The descriptive statistics, including the Mean±SD for the variable of sibling relationships and its dimensions, including warmth, power, conflict, and rivalry are provided in Table 4 for both groups in pretest and post-test.

The results provided in Table 4 show a change in the mean values of the subscales of sibling relationships in the experimental group in the posttest; however, the significance of these changes is not known to us. In addition, some limited changes occurred in the mean value of the control group's posttest compared to their pretest scores in some subscales. An appropriate test should be used to compare the differences between the experimental and control groups.

**Table 2.** Gender distribution between the experimental and control groups

Groups	Gender	Frequency	Frequency Percentage
Experimental	Girl	8	53.33
	Boy	7	46.67
	Total	15	100.0
Control	Girl	10	33.3
	Boy	5	67.7
	Total	15	100.0

**Table 3.** Age distribution between the experimental and control groups

Age	Groups		No. %
	Experimental	Control	
10-11	1(6.7)	3(20.0)	
11-12	2(13.3)	3(20.0)	
12-13	1(6.7)	0(0)	
13-14	1(6.7)	2(13.3)	
14-15	3(20.0)	3(20.0)	
15-16	3(20.0)	3(20.0)	
16-17	2(13.3)	0(0)	
17-18	2(13.3)	1(6.7)	

**Table 4.** Descriptive characteristics of the variables between the experimental and control groups

Variables	Mean±SD			
	Experimental		Control	
	Pre-test	Post-test	Pre-test	Post-test
Warmth/Closeness	52.50±4.14	56±5.49	52.90±4.07	52.76±4.08
Power	37.40±3.92	37.70±3.88	37±2.83	36.34±2.56
Conflict	23.80±2.85	28.20±3.70	25.50±3.46	24.20±3.66
Rivalry	25±2.71	24.70±2.79	25±3.98	24.20±2.78

Iranian Rehabilitation Journal

As we aimed to compare the groups at more than one dependent variable (for subscales), we used MANCOVA. According to the tables that provide the descriptive specifications of the experimental and the control group, there are some differences within and between the groups regarding the pretest and posttest stages in both groups; however, their significance is unclear. To analyze the study's hypotheses about the mean differences, MANCOVA was used because of an external source of the dispersion values with a minimum interval scale that does not meet the possibility of the direct experimental control of variables (pre-test) as well as the presence of multiple dependent variables.

According to Table 5, the normality assumption was met for all the subscales of sibling relationships. This means that the subscales follow a normal distribution and the represented skewness is not statistically significant. Moreover, the Levene test was used to assess the equality of error variances. The results show that the equality of error variances is available for both groups in all research variables. The results of the null hypothesis regarding the absence of any significant difference between the covariance matrices of the two groups showed the acceptance of the null hypothesis and the homogeneity of covariance matrices ( $P>0.05$ ,  $F_{1549.004}=0.88$ ); therefore, this condition has been met. The Kolmogorov-Smirnov test was used to check the normality of the data, showing the normal distribution of the data.

Thus, the normality, equality of error variances, and homogeneity of covariance matrices have been met and the use of MANCOVA model is permitted.

Following the exclusion of the pretest effect via the Hotelling test ( $\eta^2=0.54$ ,  $P>0.05$ ,  $F_{11,4}=4.20$ ), the MANCOVA results show a significant difference in at least one of the dependent variables ( $P>0.01$ ) and the effect size of  $\eta^2=0.54$  is desired. Similarly, univariate analysis

of covariance (ANCOVA) was performed to determine the significance of each of the subscales. The slope of the regression line is also established as another assumption of analysis of covariance.

Based on Table 6, the findings regarding sibling relationships were examined through ANCOVA after excluding the effects of the pretest. The results of the ANCOVA test showed that the subscales of warmth and conflict experienced a significant increase after receiving the intervention in the experimental group compared to the control group. In other words, the increase in the mean value of warmth/closeness and conflict for the experimental group in the posttest is due to the therapeutic interventions and the change is statistically significant. Therefore, the research hypothesis is confirmed and the null hypothesis is rejected. However, the impact of life skills training on the subscales of power and rivalry is not significant in sibling relationships.

#### 4. Discussion

Children with special needs impact on their families emotionally, socially, and economically.

There are often many similarities between the problems and family needs of these children. One of the important issues for families who have children with special needs is the effect of the presence of these children on their normal siblings. The most important issues that affect the relationship between children with special needs and their siblings are more negative emotional, cognitive, and behavioral experiences toward their sibling relationship and less close relationship behaviors with their disabled sibling [24, 25].

**Table 5.** Results of normality and homogeneity of variance

Variables	Normality		Homogeneity of Variance	
	ZK-S	P	F	P
Warmth/Closeness	0.51	0.95	1.83	0.19
Power	0.72	0.68	2.12	0.16
Conflict	0.54	0.93	4.16	0.06
Rivalry	1.23	0.10	2.25	0.15

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The first finding of this research represented that communication skills training has been effective in the dimensions of warmth/closeness and conflict. This finding is consistent with the results of Floyd et al. [26].

Siblings may benefit from the presence of their brother or sister with a disability through the selection of positive patterns in their lives [27, 28]. In this regard, the conclusion has been reached that when the siblings of

children with special needs are compared with typically developing brothers and sisters in terms of gender, personal strengths, relationships with others, and low adjustment difficulties [11, 29]. According to the research done by Hodapp [30], families of children with DS have higher coping skills and enjoy warmer and more coordinated environments than families with children with various disabilities. Hodapp [30] believes it is likely that the cause of this positive outcome returns to the current

**Table 6.** Results of univariate analysis of covariance

Variables	Sources	SS	df	MS	F	P	$\eta^2$
Warmth/Closeness	Pretest	254.74	1	254.74	69.42	0.01	0.83
	Group	49.20	1	49.20	13.41	0.01	0.49
	Error	51.37	14	3.67			
	Total	59765	20				
Power	Pretest	110.87	1	110.87	32.89	0.01	0.70
	Group	0.15	1	0.15	0.05	0.83	0.07
	Error	47.20	14	3.37			
	Total	28111	20				
Conflict	Pretest	36.86	1	36.86	3.78	0.07	0.21
	Group	64.75	1	64.75	6.65	0.02	0.32
	Error	136.32	14	9.73			
	Total	14585	20				
Rivalry	Pretest	68.95	1	68.95	26.59	0.01	0.65
	Group	1.01	1	1.01	0.39	0.54	0.03
	Error	36.31	14	2.59			
	Total	12487	20				

Iranian Rehabilitation Journal

type of sociable and happy character of children with DS. However, Shivers, Jackson, and McGregor published a meta-analysis on siblings with autism spectrum disorder [31]; their results indicated that siblings with autism spectrum disorder reported significantly worse psychosocial outcomes than typically developing siblings of people without IDD, especially in terms of negative sibling relationships, internalizing behavior problems, and social functioning [31]. Another contrasting issue in this research field is the role of gender in adult IDD sibling relationships [32]. Indeed, if some research indicates that sister-sister pairs have a closer relationship and that sisters more often provide sibling support than brothers [9, 33-35], other literature findings indicate no differences because of participants' gender [11, 24, 36] or differences because of the disabled sibling's gender [37]. Longitudinal analysis shows strengthening of emotional bonds and general reductions in conflict across the developmental period. The present findings suggest that examining the components separately can provide a more nuanced view of closeness in these relationships. Consistently, a recent study [24] supports the value of distinguishing between positive feelings and closeness behaviors, as these two qualities diverged when adults reported on their relationship closeness with a sibling who has a developmental disability as compared to a sibling without a disability [26].

## 5. Conclusions

However, the training package for communication skills emphasizes different ways of expressing emotions. Preparing the glossary about emotions has established a relationship between needs and emotions and has provided some methods to control anger for adolescents with DS. Thus, this package improves warmth/closeness and conflicts among these adolescents and siblings. The second finding of this study was that communication skills training has not been effective in the power and rivalry subscales in sibling relationships. Considering that the application of the communication skills program is based on the active participation of adolescents, it is possible that students have not paid the required attention to the assigned tasks and homework during the intervals between sessions, as the researcher did not have any direct supervision over the completion of tasks and assignments during between-session intervals. Therefore, there is the possibility that the participants have not been sufficiently motivated to do the exercises and homework and have not made enough efforts to achieve an appropriate understanding of the assignments.

## Limitations

One limitation of the study was its small sample size. Another limitation of this study was related to the difficulty in controlling all the confounding variables in this program simultaneously and the impossibility of a complete match of the samples. In this study, it was attempted to control the confounding variables as much as possible; however, the lack of control of all the confounding variables can be regarded as a limitation. In addition, the distribution of 10 sessions of the communication skills program is considered another limitation of this study because of the lack of cooperation by school officials. In the end, it is suggested that the communication skills program be taught to parents in family education classes; meanwhile, the communication skills program can be used by beneficiary centers and specialists as a protocol because of the wide range of health problems in adolescents with DS. In this way, the period of training can be prolonged and the responsibility of parental education is transferred to specialists in these centers. It is also recommended that this intervention be done on other groups of children with special needs and that a larger number of participants be used in future studies.

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of the [University of Social Welfare and Rehabilitation Sciences](#) (Ethical Code: IR.USWR.REC.1393.2).

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### Authors' contributions

All authors equally contributed to preparing this article.

### Conflict of interest

The authors declare no conflict of interest.

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