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Research Article

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Improving Behavioural and Social Skills in Children with Down Syndrome through Parent-Child Interaction Therapy: Effects on Parenting Skills and Stress in Caregivers

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Abstract

This study aimed to shed light on the available intervention tools for children with Down syndrome and their caregivers. Based on evidence gathered from past research, four hypotheses were formed which were tested by four different standardized tests along with Dyadic Parent-Interaction Coding System (DPICS). The research is based on a randomized experimental design checking the pre-post efficacy of the treatment. Out of all of the hypotheses, two showed statistical significance, which showed the impact of Parent-Child Interaction Therapy (PCIT) on the disruptive behaviour of children with Down syndrome and the caregiver skills of their parents. However, it showed statistical significance in the subscales of autonomy and empathy in the social skills of Down syndrome and showed no statistical significance on parental stress.

Keywords: Down syndrome; Disruptive Behaviour; Social skills; Parental Stress; Parenting Skills; Parent-Child Interaction Therapy

1. Background

Down syndrome is one of the most common chromosomal aneuploidy in people that often takes place due to an abnormality in the 21st pair of the chromosome. The understanding and the management of the disorder have been improved vastly due to the research in this area. Recent chromosomal engineering has laid foundations for a better understanding of the disorder that has clarified more about the disorder [1]. This shows that it is a chromosomal disorder that takes place during cell division.

After exploring the genetic correlations, the researchers explored intellectual and behavioural correlations as well associated with Down syndrome. Children with Down syndrome showed symptoms of mild intellectual deficit and behavioural disturbances, which can make them difficult to handle [2]. These disruptive behaviours were also studied by Patel et al. (2018) where they found impairment in expressive language seriously impacting the problematic behaviours.

Social skills are also affected of the individuals dealing with disruptive behaviours. Behavioural techniques have not been yet established that may treat the issue at hand. However, it is found that the type of relationship the individual has with the people in his surrounding can have a major influence on his symptoms. Consequently, positive relationships can help in decreasing disruptive behaviours [3]. This link was further enhanced by another study by Webster-Stratton et al. where they studied compromised social skills in individuals facing behavioural challenges [4]. It has been shown that when lesser symptoms of disruptive behaviours are observed when social skills are increased.

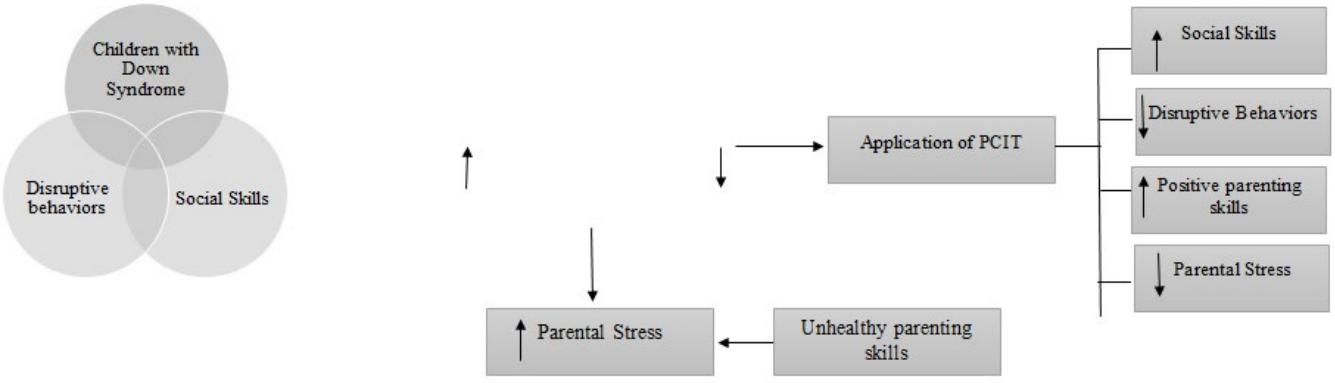
The social skills of Down syndrome need to be addressed to decrease their disruptive behaviours. One of the variables that contribute to the social skills of a child is the use of Autonomy. Autonomy is generally defined as the freedom to make choices. People can grow more which can contribute to their social skills when they are provided the freedom to express themselves. Learning can also take place when people are allowed to express themselves, which can further add to their social growth [5]. Another factor that can increase the social communication of children is social responsiveness, which works on increasing the attention of the

child. Through the use of empathy, the children can learn more, pay increased attention, and assess non-verbal and verbal social cues where they can demonstrate new social skills and can take another person's perspective socially [6]. Having enhanced motor skills can also aid in the social skills of the individuals while increasing their self-regulation. An increase in motor skills can also increase their attention and they will have lesser social difficulties and frustration [7]. All of these components combined can lead to strengthened social skills, which can be beneficial for the children with DS.

Due to the difficulties discussed above, the parents of children with Down syndrome have reported having higher levels of parental stress than the parents of typically developing children. Their parents showed a lesser use of parenting techniques, which was associated with their increased stress. To lower the parental stress among mothers with DS, the intervention can be focused on teaching them positive parenting techniques, which can help them, lower their stress. Due to the increase in positive parenting skills and a simultaneous decrease in stress, the children with DS will also continue to show long-term improvements in social, academic, and behavioral domains [8].

The intervention that can be best suited for children with disruptive behaviors is Parent-Child Interaction Therapy (PCIT), which is an Empirically Supported Treatment (EST). It has specific core features, which define the therapy [9]. Through the use of PCIT, the parents can learn important skills, which can help, lower their stress, increase their child's communication, and decrease their disruptive behaviors.

2. Theoretical Framework



Down syndrome children exhibit more problematic behaviours and weaker social capabilities due to the challenges they face. However, education has shown positive effects on their personal development [13]. Parents of children with Down syndrome experience more stress than the parents of typically developing children, where the mothers are usually the primary caregivers that creates heightened stress. The type of parenting skills that parents use also help in directing their children and lowering their stress [14]. Here, PCIT can be helpful as it is an evidence-based treatment that is specifically designed for children having externalizing behaviour problems. Thomas et al. explored the correlation further and found out that it has been effective in reducing externalizing

Further research was done on the efficacy of the treatment where Falkus et al. assessed the effectiveness of PCIT with children who had a delay in the speech where they designed a pre and post-therapy design to check the development of interaction between the children and the parents [10]. The results showed slight improvement from the baseline interaction that was measured at the start of the process.

However, the child learns their first communication patterns from their parents where Parent-Child Interaction Therapy (PCIT) can help teach healthier ways of communication to the parents. In a study by Cronin, it was found that PCIT was effective in developing social and communication skills in children [11]. Along with this, PCIT helped to increase child's attention and had a positive effect on the parenting styles of their parents where they figured out when to delay time, expand the playtime and take the lead of the child. The result of the intervention lasted for more than 6 months and helped both, the parents and their children with Down syndrome.

The parents' attitude towards therapy contributes to their understanding of the therapy that can aid in communication with their child. The Theoretical Framework of Acceptability consists of four constructs, which are a burden, attitude, affective, perceived effectiveness, and opportunity costs. All of these together can contribute to the acceptance of the intervention introduced [12]. The measure can show how much the parent has accepted the intervention and inclines with the values which can help in deciding if they would like to work on their skills or not.

problems, increasing child compliance, and decreasing parenting stress [15]. PCIT works on teaching the parent the right parenting skills, which can increase the social skills of their children, decrease disruptive behaviour and parental stress, and aid their growth and development.

3. Methodology

The present study had a randomized experimental design having control and experimental groups with pre and post-treatment plan where PCIT was implemented on the children with Down syndrome (n=20) to see its effect on the improvement of their disruptive behaviours, social skills, and parenting skills and parental stress on their caregivers. Only the children with Down syndrome aged 2-7 years were selected through snowball sampling through the use of social media platforms having caregivers without any serious physical and mental ailment. ECBI, IRSC, DPICS, and PSS were measured before initiating the treatment plan. Whereas, in mid assessment phase ECBI and PSS were administered again to reformulate the goals. ECBI, PSS, and IRSC then were evaluated again at the end to check the post-treatment effect. TAI was used after the intervention only on participants in the experimental group to check how the attitude of therapy of parents can affect the overall therapy. A quantitative analysis was carried out in the end.

4. Results

This chapter aims to describe the research data using statistical analysis done by Statistical Package for Social Sciences (version 21). The population sample consists of a total of 20 children with Down syndrome and their caregivers. The statistical analysis of data gathered through these participants further explained the research hypotheses where the significance for the analysis was set at $p > 0.05$.

4.1 Demographic Information of the Sample

Variables	f	%
Gender		
Male	11	55.0
Female	09	45.0
Birth Order		
Firstborn	07	35.0
Second born	13	45.0
Age		
02	01	05.0
03	02	10.0
05	05	25.0
06	08	40.0
07	04	20.0
Siblings		
02	08	40.0
03	07	35.0
04	05	25.0
Family System		
Joint	08	35.0
Nuclear	10	65.0
Mother's Information		
Education		
No education	02	10.0
Matric	03	15.0
Bachelors	07	35.0
Masters	08	45.0
Occupation		
Housewife	13	65.0

Dentist	01	05.0
Lecturer	01	05.0
Maid	01	05.0
Private Job	01	05.0
Remedial Therapist	01	05.0
Teacher	01	05.0
Vet	01	05.0
Father's Information		
Education		
Matric	06	15.0
Intermediate	04	30.0
Bachelors	04	20.0
Masters	07	35.0
Occupation		
Banker	02	10.0
Business	02	10.0
Private Job	02	10.0
Catering Job	01	05.0
Chef	01	05.0
Dentist	01	05.0
Designer	01	05.0
Fitness Trainer	01	05.0
Foodpanda Rider	01	05.0
IT Consultant	01	05.0
Navy	01	05.0
None	01	05.0
PAF	01	05.0
Pharmacist	01	05.0

Table 1: Demographic Information of Children with Down Syndrome (N=20)

Table 1 represents the main demographic variables of the present study. Out of 20 participants 11 (55%) were male and 9 (45%) were female, 7 (35%) were first born and 13 (45%) were second born, 8 (40%) of them were 6 year olds, 5 (25%) of them were 5 year olds, 4 (20%) of them were 7 year olds, 2 (10%) of them were 3 year olds, and 1 (5%) of them were 2-year-old. 8 (40%) of them had 2 more siblings, 7 (35%) of them had 3 more siblings, and 5 (25%) had 4 more siblings.10 (65%) of the families were living in a nuclear family set up, whereas 8 (35%) of them belonged to a joint family system. Out of all the mothers of the children included in this study, 8 (45%) had done a master's degree, 7 (35%) had gotten a bachelor's degree, 3 (15%) had done matric and 2 (10%) of them had received no education. 13 (60%) were working as a housewife, 1 (5%) of them was a dentist, 1 (5%) of them was a lecturer, 1 (5%) of them was a maid, other 1 (5%) had a private job, 1 (5%) of them was a remedial therapist, 1 (5%) of them was a teacher, and 1 (5%) was a vet. 7 (35%) of the father had a master's degree, 6 (15%) had a matric degree, 4 (20%) had an intermediate degree, and the other 4 (30%) had a bachelor's degree. Out of all the fathers, 2 (10%) of them were banker, businessman, and a private job. The others (5%) had catering job, chef, dentist, designer, fitness trainer, food panda rider, IT consultant, navy job, PAF job, and a pharmacist job. 1 (5) of them had no job.

4.2 Cronbach Alpha of the Scales

Scales	α
ECBI (Intensity)	0.900
ECBI (Problem)	0.840
PSS	0.537
TA	0.949
IRSC (Behavioral)	0.286
IRSC (Caregiver – Autonomy)	-1.496
IRSC (Caregiver – Responsiveness)	-1.243
IRSC (Caregiver – Empathy)	0.135
IRSC (Caregiver – Cognitive)	0.325
IRSC (Caregiver – Emotional)	0.568

Note. ECBI = Eyeberg Child Behavior Inventory, PSS= Parental Stress Scale, TAI= Therapy Attitude Inventory, IRSC= Interaction Rating Scale Between Children = IRSC, and $p < 0.05$.

Table 2: Table Showing Cronbach Alpha of the Scale and Subscales

Table 2 showing reliability coefficient of all of the scales used in the current study. It shows that both subscales of ECBI (0.900) and TA (0.949) have strong positive correlations. Whereas PSS has moderate positive correlation (0.537) and IRSC (Behavioral). IRSC (Caregiver – Responsiveness), IRSC (Caregiver – Empathy), and IRSC (Caregiver – Cognitive) have weak positive correlations (0.286, 0.135, 0.325, and 0.568, respectively). Lastly, IRSC (Caregiver – Autonomy) and IRSC (Caregiver – Emotional) have strong negative correlations (-1.496 and -1.243, respectively) with the treatment outcomes.

4.3 Descriptive Information of the Scales

Scales	N	M	SD	SK	K
ECBI (Intensity)	20	113.7500	37.76363	-0.237	-0.237
ECBI (Problem)	20	55.8500	6.68285	-0.658	-0.658
PSS	20	51.7500	12.44303	-0.155	-0.720
IRS Behavioral – Autonomy	20	9.8500	1.08942	-1.031	1.090
IRS Behavioral – Responsiveness	20	10.2000	1.32188	-0.407	0.219
IRS Behavioral – Empathy	20	101.1`4000	0.88258	1.102	2.955
IRS Behavioral – Motor	20	9.7500	1.40955	-0.133	0.970
IRS Behavioral – Emotional	20	10.5000	2.25948	-0.669	-0.038
IRS Caregiver – Autonomy	20	16.6000	1.09545	-0.416	0.104
IRS Caregiver – Responsiveness	20	17.7000	1.17429	-0.862	1.819
IRS Caregiver – Empathy	20	18.0000	1.62221	-0.822	-0.264
IRS Caregiver – Cognitive	20	19.4500	1.05006	1.661	2.136
IRS Caregiver – Emotional	20	16.8000	1.19649	0.631	-0.993

Table 3: Table showing descriptive statistics of scales.

4.4 Statistical Analysis of the Variables

Variables	*M*	*SD*	*t*	*p*	*95% CL*	
					LL	**UL**
ECBI – Intensity	24.10000	50.45676	2.136	0.046	0.48551	47.71449
ECBI – Problem	-4.80000	9.24292	-2.322	0.031	-9.12582	-0.47418

Note. df =19

Table 4: Table showing the difference between pre and post treatment in ECBI.

Table 4 Showing Paired Samples Test. It Shows Statistically Significant Difference Between Pre And Post Treatment Of Both The Groups In Ecbi – Problem, Ecbi – Intensity.

Variables	*M*	*SD*	*t*	*p*	*95% CL*	
					LL	**UL**
IRSC Behavioral- Autonomy	0.60000	1.04630	2.656	0.019	0.11032	1.08968
IRSC Behavioral- Responsiveness	0.200000	1.36111	0.657	0.519	-0.43702	0.83702
IRSC Behavioral – Empathy	0.40000	0.82078	2.179	0.042	0.01586	0.78414
IRSC Behavioral – Motor	0.10000	1.37267	-0.326	0.748	0.74243	0.54243
IRSC Behavioral – Emotional	0.4500	1.90498	1.05	0.304	-0.4415	1.3415

Note. df =19

Table 5: Showing The Difference Between Pre And Post Treatment In Irsc – Behavioral.

Table 5 Showing Paired Samples Test. It Shows Statistically Significant Difference Between Pre And Post Treatment In Irsc Behavioral – Autonomy And Irsc Behavioral – Empathy Only.

Variables	*M*	*SD*	*t*	*p*	*95% CL*	
					LL	UL
IRSC Caregiver - Autonomy	1.65000	1.78517	4.134	0.001	2.48549	0.81451
IRSC Caregiver – Responsiveness	1.65000	1.72520	4.277	0.000	0.84258	2.45742
IRSC Caregiver – Empathy	1.80000	2.58742	3.111	0.006	0.58905	3.01095
IRSC Caregiver – Cognitive	3.10000	3.27511	4.233	0.000	4.63280	1.56720
IRSC Caregiver – Emotional	1.40000	1.56945	3.989	0.001	0.66548	2.13452

Note. df =19

Table 6: Showing The Difference Between Pre And Post Treatment In Irsc – Caregiver.

Table 6 Showing Paired Samples Test. It Shows Statistically Significant Difference Between Pre And Post Treatment In Irsc Caregiver – Autonomy, Irsc Caregiver -Responsiveness, Irsc Caregiver – Empathy, Irsc Caregiver – Cognitive, And Irsc Caregiver – Emotion.

Variables	*M*	*SD*	*t*	*p*	*95% CL*	
					LL	**UL**
PSS	2.95000	13.20476	0.999	0.330	-3.23002	9.13002

Note. df =19

Table 7: Showing The Difference Between Pre And Post Treatment In Pss.

Table 7 Showing Paired Samples Test. It Shows No Statistically Significant Difference Between Pre And Post Treatment In Pss.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
ECBI – Intensity	41.785	-83.70000	14.17827	-5.903	0.000	-113.48744	-53.91256

Note. df =18

Table 8: Showing Differences Between Control Vs Experimental In Ecbi – Intensity.

Table 5 Showing Independent Samples Test. It Shows Statistically Significant Difference Between Control Vs Experimental Group In The Subscale Intensity Of Ecbi.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
ECBI – Problem	8.944	16.30000	2.57358	6.334	0.000	10.89310	7.14169

Note. df =18

Table 9: Showing Differences Between Control Vs Experimental In Ecbi – Problem.

Table 9 Showing Independent Samples Test. It Shows Statistically Significant Difference Between Control Vs Experimental Group In The Subscale Problem Of Ecbi.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Behavioral – Autonomy	1.688	1.10000	0.42817	2.569	0.019	0.20044	1.99956

Note. df =18

Table 10: Showing Differences Between Control Vs Experimental In Irsc Behavioral – Autonomy.

Table 10 Showing Independent Samples Test. It Shows Statistically Significant Difference Between Control Vs Experimental Group In The Subscale Autonomy Of Irsc Behavioral Subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Behavioral – Responsiveness	0.054	-0.40000	0.60000	-0.667	0.513	-1.66055	0.86055

Note. df =18

Table 11: Showing Differences Between Control Vs Experimental In Irsc Behavioral – Responsiveness.

Table 11 showing independent samples test. It shows statistically insignificant difference between control vs experimental group in the subscale responsiveness of IRSC behavioral subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Behavioral – Empathy	1.740	0.40000	0.39441	1.014	0.324	-0.42861	1.22861

Note. df =18

Table 12: Showing Differences Between Control Vs Experimental In Irsc Behavioral – Empathy.

Table 12 showing independent samples test. It shows statistically insignificant difference between control vs experimental group in the subscale empathy of IRSC behavioral subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Behavioral – Motor	2.333	-0.70000	0.62628	-1.118	0.278	-2.01576	0.61576

Note. df =18

Table 13: Showing Differences Between Control Vs Experimental In Irsc Behavioral – Motor.

Table 13 showing independent samples test. It shows statistically insignificant difference between control vs experimental group in the subscale motor of IRSC behavioral subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Behavioral – Emotional	0.001	-0.80000	1.02089	-0.784	0.443	-2.94482	1.34482

Note. df =18

Table 14: Showing Differences Between Control Vs Experimental In Irsc Behavioral – Emotional.

Table 14 showing independent samples test. It shows statistically insignificant difference between control vs experimental group in the subscale emotional of IRSC behavioral subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Caregiver – Autonomy	3.253	-2.50000	0.39016	-6.408	0.000	-3.31969	-1.68031

Note. df =18

Table 15: Showing Differences Between Control Vs Experimental In Irsc Caregiver – Autonomy.

Table 15 showing independent samples test. It shows statistically significant difference between control vs experimental group in the subscale autonomy of IRSC caregiver subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Caregiver – Responsivness	0.844	-2.70000	0.52175	-5.175	0.000	-3.79615	-1.6803851

Note. df =18

Table 16: Showing Differences Between Control Vs Experimental In Irsc Caregiver – Responsiveness.

Table 16 showing independent samples test. It shows statistically significant difference between control vs experimental group in the subscale responsiveness of IRSC caregiver subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Caregiver – Empathy	3.054	-4.00000	0.54975	-7.276	0.000	-5.15498	-2.84502

Note. df =18

Table 17: Showing Differences Between Control Vs Experimental In Irsc Caregiver – Empathy.

Table 17 showing independent samples test. It shows statistically significant difference between control vs experimental group in the subscale empathy of IRSC caregiver subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Caregiver – Cognitive	2.250	-5.30000	0.21344	-24.832	0.000	-5.74842	-4.85158

Note. df =18

Table 18: Showing Differences Between Control Vs Experimental In Irsc Caregiver – Cognitive.

Table 18 showing independent samples test. It shows statistically significant difference between control vs experimental group in the subscale cognitive of IRSC caregiver subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
IRSC Caregiver – Emotional	4.378	-2.20000	0.40277	-5.462	0.000	-3.04618	-1.35382

Note. df =18

Table 19: Showing Differences Between Control Vs Experimental In Irsc Caregiver – Emotional.

Table 19 showing independent samples test. It shows statistically significant difference between control vs experimental group in the subscale emotional of IRSC caregiver subscale.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	**UL**
PSS	0.529	-8.00000	7.10805	-1.125	0.275	-22.93347	15.57078

Note. df =18

Table 20: Showing Differences Between Control Vs Experimental In Pss.

Table 20 showing independent samples test. It shows statistically insignificant difference between control vs experimental group in parental stress scale.

Variables	*ECBI*		*PSS*		*Total*
	high	*low*	*high*	*low*	
Pre	03	07	06	04	10
Mid	01	09	04	06	10
Post	00	10	04	06	10
Total	04	26	14	16	30

Table 21: Showing Differences Between Ecbi And Pss Scores In Pre Mid Post Within Experimental Group.

Table 21 showing crosstabulation analysis. The scores changed significantly from pre mid post intervention phase in ECBI but not in PSS.

	Gender	**n**	**M**	**SD**	**SEM**
IRS Behavioral - Autonomy	Male Female	11 09	9.90 8.44	0.53 1.87	0.16 0.62
IRS Behavioral - Responsiveness	Male Female	11 09	9.90 10.0	0.70 1.16	0.21 0.38
IRS Behavioral - Empathy	Male Female	11 09	10.0 10.0	0.44 0.70	0.13 0.23
IRS Behavioral - Motor	Male Female	11 09	9.81 9.88	0.40 1.05	0.12 0.35

IRS Behavioral - Emotional	Male Female	11 09	9.81 10.3	0.40 2.12	0.12 0.70

Table 22: Showing Gender Differences In The Communication Subscale Of Irsc.

Out of 20 participants, 11 were males and 9 were females. Males showed more autonomy than females but the females were found to be more responsive and had better motor and emotional regulation. However, both of them showed same level of empathy.

Variables	*F*	*M*	*SD*	*t*	*p*	*95% CL*	
						LL	UL
IRSC Behavioral – Autonomy	24.944	1.46465	0.59110	2.478	0.023	0.22279	2.70650
IRSC Behavioral – Responsiveness	2.657	-0.20202	0.42108	-0.480	0.637	-1.08667	0.68263
IRSC Behavioral – Empathy	1.593	0.00000	0.25950	0.000	1.000	-0.54519	0.54519
IRSC Behavioral – Motor	1.488	-0.07071	0.34370	-0.206	0.839	-0.79279	0.65138
IRSC Behavioral – Emotional	4.627	-0.51515	0.64993	-0.793	0.438	-1.88060	0.85030

Note: df =18

Table 23: Showing Overall Significance In Gender Differences In Communication

Table 23 showing independent sample t-test. It shows statistically significant difference only in the subscale of autonomy while there is no difference in all the other subscales.

Variable	*F*	*M²*	*Sum*	*p*
Parenting Styles	0.228	19.802	19.802	0.650

Note: df =1

Table 24: Showing Effect Of Parenting Styles On The Overall Therapy.

Effect of parenting styles was observed using the DPICS coding system. Table 20 is showing the analysis of anova. No significant effect is observed.

Variable	*F*	*M²*	*Sum*	*p*
Therapy Attitude	0.044	5.755	17.265	0.986

Note. df =3

Table 25: Table showing effect of attitude of therapy on the overall therapy.

Table 25 showing analysis of anova. No significant effect was shown.

4.5 Summary

Statistical analysis of the demographics of the sample (n=20) is covered in this chapter along with the frequencies and the percentages of each variable in tabular form. The analysis is carried out later with reference to the hypotheses formulated above. Additionally, supportive analysis was done to further back up the findings. Statistical structure is formed through this section of the thesis.

5. Chapter 6

5.1 Discussion

The current study theorized on the implementation of Parent-Child Interaction Therapy to find out its impact on children with Down syndrome and their parents. For this, children with Down syndrome along with their caregiver (n=20) were selected through snowball sampling ranging through ages 2-7 years old. Techniques of the therapy were aimed to decrease disruptive behavior and increase social skills in children with Down syndrome and to increase parenting skills and decrease parental stress among their parents.

After gathering all of the information related to therapy, four hypotheses were formed where the first one stated that there would be an impact of Parent-Child Interaction Therapy (PCIT) on the disruptive behavior of children with Down syndrome. An independent T-test was used to analyze the impact and it was found out to be statistically significant for both the subscales (Eyberg Child Behavior Inventory – Intensity (0.046) and Eyberg Child Behavior Inventory – Problem (0.031)). PCIT has also shown its results in children having some sort of intellectual deficiency (which was the case in the current research). As a result of the therapy, the caregivers of children interact in a better manner with their children

and develop an understanding which helps them in disciplining their children and reduce the undesired behaviors. This also in return increased the compliance of the children. The reason behind these changes in the children's behavior was found out to be the increase in positive parenting from their caregivers. The caregivers also learned to ignore the problematic behaviors and started to give positive attention instead of negative attention along with how to provide parent-directed intervention, such as giving precise commands and have a follow through after that [16]. It was noticed in the current research that children follow through when they are provided with lesser and precise commands, especially when those are followed by positive reinforcement which could have helped in reducing the disruptive behaviors of Down syndrome children. PCIT has already been backed up by evidence and has shown promising results with children having any kind of developmental disability [17]. However, no such research had been conducted within Pakistan related to children with Down syndrome due to which the current research was conducted. This paper backs up the already provided data and represents how it works in Pakistan as well.

The second hypothesis stated that there will be an impact of Parent-Child Interaction Therapy (PCIT) on the social skills of children with Down syndrome which was found out to be statistically significant for two subscales which are, autonomy (0.019) and empathy (0.042), and statistically insignificant for all the other subscales, responsiveness (0.519), motor (0.748), and emotional (0.304) on the Behavioural subscale of Interaction Rating Scale between Children (IRSC) which measures social communication acquisition. Prior researches have stated that caregivers are able to fulfil the need of autonomy of their children through the adequate application of play therapy techniques when they spend time with them [18]. Additionally, a child needs autonomy as they transition from being completely dependent to exploring their environment [19]. Here, the therapy adequately fulfilled both these situations. The parenting styles of several mothers in the study were found out to be either withdrawn or intrusive/bossy. Their need of autonomy was fulfilled once their caregiver started giving them child-directed commands and allowed them the independence that they wanted. PCIT instructs the parents to allow the children to take their own lead which is why the children now exhibit increased autonomy and talk more than due to child directed intervention [20]. A study done by (Allen & Marshall, 2009) showed how the child to parent utterances increased after the implementation of PCIT. These results depict an increase in the autonomy as parents allowed the children to speak instead of talking over them. Another variable that increased through the help of therapy was empathy. Emotional issues may go hand in hand with behavioural issues in many cases, which is why difference in empathy was also noticed after the implementation of PCIT. Fleming et al. also reported an increase in empathy after PCIT among children who already had behavioural issues [21]. This study was primarily designed to observe a reduction in behavioural issues among Down syndrome children where increase in empathy was an added advantage and may have worked as a catalyst for the reduction of presenting problems. Additionally, parents were encouraged to use positive attention and labelled praise, which has been associated with increasing empathy [22]. PCIT was focused on child-directed play, as it was the first phase of intervention, which may have created a foundation for increasing empathy among children with Down syndrome. The children that came to the therapy already had adequate scores in rest of their subscales and they used to go to some facility for their speech and other form of therapies. This is the reason why no significant difference was shown in rest of the subscales as they already had a high score in the pre intervention phase. The implication of any therapy largely depends on the receptive level of the children where all of these children were already going to some facility for their speech therapy, which had increased their level of reception already [23].

The third hypothesis stated that there would be an impact of Parent-Child Interaction Therapy (PCIT) on the parenting skills of caregivers of children with Down syndrome. The parenting skills were checked by the second subscale (caregiver) of IRSC and it was found out to be statistically significant. All of the further subscales of the scale were significant, which are autonomy (0.001), responsiveness (0.000), empathy (0.006), cognitive (0.000), and emotional (0.001). Parent-Child Interaction Therapy has shown to increase positive parenting strategies as the parents learn how to provide their children with effective commands through the use of play [24]. There is a complete phase, Parent Directed Interaction, dedicated to only teaching the parenting skills to parents through which parents learn how to provide their children with effective commands and deal with their noncompliance.

The fourth hypothesis stated that there would be an impact of Parent-Child Interaction Therapy (PCIT) on parental stress of caregivers of children with Down syndrome (0.330) which came out to be statistically insignificant. This finding has contradicted with several prior researches. The reason behind this contradiction can be that most of the participants came from a lower socio-economic background and several researches have linked lower socio-economic background with stress and worse functioning (Satiago et al.2011). Even when, PCIT could have helped to decrease the stress of the participants, their current situations did not allow it. A country like Pakistan does not have many options available for children with Down syndrome, which further exacerbates the situation and adds to it, which is why parents had constant inevitable stress even when they had learned positive parenting strategies. In one of the studies, where PCIT was applied and it successfully worked on the concerned behaviours of the children, it showed no significant difference in the parental stress and it remained the same throughout. The parents reported how that stress was not directly related to their children with Down syndrome but was due to frequency of the appointments that they have to attend because of them which can also be the case here [25]. The parents again here reported how this stress is not linked with their children with Down syndrome but had different reasons attached to it. Most of

the caregivers that attended the intervention program with their children were mothers even when there was an option of either mothers or fathers attending the therapeutic program. 9 out of 10 caregivers were severely stressed about their financial situation as they believed that they were unable to execute a number of tasks for their child with Down syndrome due to the financial constraints they already had. Other 1 of them was stressed about the current situation in Pakistan where she could not find the right facility for her daughter even when she had the means to support her financially. Since this therapy was only catering to one aspect of their life, that is catering the needs of their children; their overall stress did not diminish as much as predicted initially. Additionally, the parents fail to apply the learned material in their homes and have difficulty in applying the therapeutic practices into their daily routine [26]. Due to this difficulty, the children continue to exhibit their problematic behaviour within the home setting only, which is why the caregivers stay stressed out about the disruptive behaviours. An example can be taken from the current research where one of the caregivers whose stress did not decrease at all in the post intervention phase did not apply any of the techniques at home and complained about the behaviour staying the same within the home settings even when it was different in the therapeutic setting. At times, parents do not report a decrease in their stress level even when there is a prominent positive affect throughout [27]. The reason behind this gap can be the difference between positive affect and parental stress, which means that the stress levels of parents may not decrease even when they may show a positive affect during the therapy. All of the above information leads towards the necessity of developing and implementing a different therapy altogether only for the parental stress while decreasing the disruptive behaviours of their children.

The intervention included two groups, control and experimental, where treatment was provided to the ones in experimental group and the ones in control group did not receive any treatment. The difference between two groups in Ecbi both subscales (intensity and problem) was found out to be statistically significant. These findings are backed by several researches; Timmer et al. found ECBI scores to be reduced in the post assessment phase where they used PCIT as a mode of intervention [28].

Whereas the difference between two groups on the parental stress level turned out to be statistically insignificant. The reason behind no statistical significance being observed in the post assessment phase can be due to factors outside of the clinical settings. Niec et al. documented no statistical changes in the parental stress, where one of the families reported an increase in the stress due to a change in their home environment, whereas the other two did not notice any changes in their stress levels [29]. The difference in their stress levels was due to different factors that were operating in their home settings. PCIT may have shown insignificance since it is only limited to clinical setting and did not directly work for the parental stress that could have controlled extraneous variables.

The social skill acquisition was found out to be statistically significant in only one of the subscale, between the groups, which is autonomy (0.019), but was statistically insignificant for the other four subscales responsiveness (0.513), empathy (0.324), motor (0.278), and emotional (0.443). These results showed that in out of all the social skills, autonomy was the only distinctive subscale between control and experimental group. One of the reasons behind this can be that the children already had increased empathy, responsiveness, motor regulation, and emotional regulation because they were taking speech and occupational therapies from other institutes. Usually, parents of children with special needs provide their children with less autonomy and are often seen to be talking over them. Providing children with autonomy is the foundation of the child-directed play, which is why PCIT therapists suggest the parents to take the child's lead. Through such type of play, PCIT allows the children to have increased autonomy [9]. Child-directed play was focused on this study, as it was the foundation for the next phase of the intervention, which was PDI, which can be a reason behind the increase of Autonomy among Down syndrome children.

However, the differences between two groups in the caregiver subscale of IRSC was analysed to be statistically significant on all of the further subscales having 0.000 as their significance level. The significance in the caregiver subscale shows the improvement in parenting skills from the baseline. PCIT has not only been proven to be effective in reducing the disruptive behaviour but also to improve the parenting skills, which was also documented by Leung et al. [30]. The researchers observed that the parents started using lesser criticism, questions, punishments, and commands in the post assessment phase. Similar observations were noticed in the current study where almost all of the parents started by providing the children with too many commands and not letting them play on their own. Such dynamic had also effected their relationship with their child, as they never indulge in an engaging play earlier. As the therapy proceeded, the parents started to intervene lesser and allow the child to play by themselves. This provided the children with increased independence and brought joy in their play, which was boring earlier. The parents also started to enjoy the play more as they let go of giving commands and criticism and started to enjoy the simple play. Many parents reported by the end of the therapy that they felt the bond to be stronger with their child now and they can understand them better after the child-directed play.

Further, gender differences between children with Down syndrome in social communication acquisition were tapped as the previous research has tapped differences in social skills in gender. The differences turned out to be statistically insignificant for four of the subscales responsiveness (0.637), empathy (1.000), motor (0.839), emotional (0.438), and statistically significant in one of them, which was Autonomy (0.023). In collectivist cultures, males tend to occupy autonomous roles regardless of their disability, which can be the case in the current study. It was also observed during the study that the males were given more autonomy than fe-

males and the caregivers were not too overprotective of them [31]. Gender-related inequalities exist in every society where males are usually provided with more dominance and are allowed to show autonomy. They can take the charge of social relationships through their autonomy and initiate more than females [32]. Daddis also reported that males tend to exhibit more autonomy than females which supports the finding of the current study backed up by the reasons provided above [33].

Moreover, differences in the experimental group were also noticed within its pre, mid, and post phase. The experimental group comprised of 10 people, out of which 3 children had high scores in ECBI and 5 parents had high scores in PSS. The scores lowered down to 1 in ECBI and 4 in PSS in the mid assessment phase. These scores remained the same in the post intervention phase for PSS but lowered down to 0 in ECBI. The results show that the change in disruptive behaviour among children with Down syndrome was one of the most drastic changes, while there were minimal changes in the parental stress level.

Parenting styles were also coded through the help of Dyadic Parent-Child Interaction Coding System (DPICS) where emotional availability was taken as a measure to define the parenting styles. Out of the 20 participants, 9 (45%) of them showed withdrawn parenting style, 7 (35%) of them showed intrusive/bossy style, 3 (15%) of them showed angry style, and 1 (5%) showed an optimal parenting style. The effect of parenting skills that the caregivers possessed in the beginning was noticed on the overall therapy, which was statistically insignificant as well (0.650). The reason behind this insignificance can be the changing nature of the parenting styles from the caregivers' end. The treatment focused on changing the parenting styles of the parents, which is why the parenting style that the parents may have in the beginning of the therapy may not matter much by the end of the therapy. Additionally, the behavioural problems exhibited by children with developmental disabilities may also shape their parental practices which could have been the case in the present study as well [34]. The parenting styles could have also changed during the therapy due to the decrease in disruptive behaviours displayed by their children, which is why no such effect was shown in the post assessment phase.

Additionally, the effect of the caregivers' attitude towards therapy was evaluated by the Therapy Attitude Inventory (TAI) that came out to be statistically insignificant as well (0.986). TAI was only applied to the experimental group, as they were the only ones who were provided with the therapy. 8 out of 10 people in the experimental group showed complete satisfaction towards therapy, while one of them showed a bit satisfaction, and the other one showed somewhat satisfaction. The ones who showed lesser satisfaction were also the ones who had difficulty in applying these techniques at home and reported minimal change in behaviours at the home setting. However, the scores were significantly high for almost all of them, which is why no prominent effect can be seen. The two being not as satisfied and facing difficulty in applying the therapeutic practices at home can show a relationship between negatively viewing their children's behaviour along with a negative view of therapy. Brestan et al. studied how the parent's attitude towards therapy and their subjective reports of their children's behaviour are moderately linked with each other [35]. This piece of information indicates that the attitude towards therapy may not have affected the therapy as a whole but instead, how the parents have dealt with the therapeutic techniques outside of the clinic.

Overall, there were several issues faced by other researchers in the implication of the therapy as it revolved around children with special needs. The children displayed their disruptive behaviours within the therapeutic setting, which fluctuated throughout the treatment program. However, the parent's attitude towards the problematic behaviours of the children was more difficult to handle as the problematic behaviours itself as the parents tend to talk about their children's behaviour negatively. The parents also faced difficulty in ignoring the disruptive behaviours and often gave in to the repeated attempts of child asking for negative attention [36]. The present study had to face same issues where the caregivers talked negatively about the problematic behaviours, which increased the frequency of those behaviours. The caregivers talking negatively also shifted their focus from working on their actions to blaming their children for the type disruptive behaviours they showed. As a result, they had difficulty in applying child-directed intervention and praise their children after every task. Subsequently, they were faced by the mother guilt when they were suggested to ignore the child when he indulges in any negative behaviour. They also thought that the frequency of disruptive behaviours would increase if they ignore them, which was the case with some of the children. The therapist informed them how the behaviours will decrease after they reach their peak but the caregivers had difficulty in understanding and applying that. Additionally, 9 out of 10 parents failed to complete the homework in the current study. Other researchers also faced this difficulty but it cannot be said whether the results were affected by the completion of the homework [37]. The population of the study was already quite difficult to find where unfortunately further attrition also took place, which had created some obstacles in successful completion of the treatment program. However, Danko et al. found out that higher education was negatively correlated with the dropout rate in the treatment of PCIT in clinics, which was not the case here [38]. Most of the participants who dropped out belonged to the higher educational background. The reason why they may have quit can be due to having other resources for their child where the current therapy was free which may have provided them with an outlook of the therapy not being as useful as it did not cost anything. Additionally, their children were already receiving several forms of therapy, which is why they had a chance to drop this free intervention program unlike the ones who did not have these many resources available [39-56].

6. Conclusion

In the light of above results, it can be concluded that the parent

child interaction therapy has an impact on disruptive behaviour of children with Down syndrome and parenting skills of their caregivers but showed little significance in social acquisition and no impact on decreasing the parent stress.

A total of 10-week training of PCIT under supervision was taken to perform the intervention to not only reduce disruptive behaviours but also to increase positive parenting strategies. The current research aimed to explore the impact of the therapy on decreasing disruptive behaviour and increasing social skills acquisition among children with Down syndrome and increasing parenting skills and decreasing parental stress among their caregivers. Out of 4 hypotheses, two was found out to be statistically significant.

8. Implications

This research will be helpful for everyone who may have to deal with a Down syndrome individual at any stage of their life. They would know what are the possible difficulties such people go through and how can they deal with them. The families of Down syndrome children will benefit the most, as they will figure out a tool for handling their children the right way. They will start understanding the links between their children's actions along with a treatment plan. Clinicians will also figure out the most suitable equipment to use with Down syndrome clients that may make their session plans more efficient. The children themselves are going to benefit majorly from this research as PCIT has long-term effects and help them in their day-to-day life. Through the findings of this research, the quality and the duration of life of Down syndrome children can also be improved.

Apart from the children, the parents can also learn a number of parenting skills, which may help them in providing their children with suitable commands. It can also be helpful in improving the home environment, as it will have positive outcomes for both children and parents. As a result of PCIT, the children also start sharing more with others, which will improve the relationship of siblings. This will also help the Down syndrome children in making friends. Additionally, it also works on the public behaviour of children, which means that the parents can easily handle the children whenever they go outside and will not have to keep them at home always.

8. Limitations of the Study

Implication of PCIT was done in the current study on children with Down syndrome aged 2-7 years old. The research was carried out on a relatively smaller sample size since finding such a population was difficult where attrition was another added factor. Moreover, the therapist had to translate the items to the parents as all of the measures were in English when the participants were more fluent in Urdu. This may have led to some errors in translation or comprehension, which could have caused inconsistent responses. There were also too many measures involved in the study which may have made few sessions boring for the caregivers and may have impacted their motivation to participate. This lack of motivation was also reported by one of the participants who suggested to change the first session as it included filling of measures and creating a baseline for future sessions. Lastly, the study required significant cooperation from the caregivers and highly depended on them to make changes. As a result, the parents who cooperated more had better results than the parents who did not and the therapist could not do anything else to make it better for the children involved. Few of the parents were also inconsistent which caused significant hurdles for the therapeutic program as children used to forget the previous practices that had taken place. Additionally, most of the parents were reluctant to start the child-directed intervention, as they were hesitant in letting go of their parental control, which could have affected the therapeutic practices. Caregivers could have also falsely report the child's behaviour or their stress level as the ones who used more negative talk reported more disruptive behaviours and more stress level than the ones who did not.

9. Recommendations for Future Research

There are many untapped variables left as this was the first ever research of PCIT on Down syndrome children in Pakistan. In future, it is recommended to use PCIT in context of other variables as well with greater population so that it can be generalized easily. Future research should endeavour how behavioural issues and emotional issues go together and how PCIT can help in reducing both. Different variables of social skills should be chosen as the children in Pakistan already have a better baseline with the variables that were selected in this study. Significant psychoeducation coupled with another stress-focused therapy should be used for parental stress levels, as PCIT does not seem promising to decrease it when used alone. Parents should also be coached separately and if possible, family sessions should be done so that the parents know the benefits of PCIT and how important it is to complete the homework during therapy. Both mothers and fathers should be encouraged to work through the therapeutic practices as only mothers came to clinic in the present study. Complete home environment can be changed if fathers also work through the intervention and apply these practices at home with their partners. Standardized bilingual measures should be used to tap these variables so that consistent responses can be obtained. There should not be any fixed weeks of intervention provided to the participants as some of them needed more sessions in one phase than the other. Follow ups should also be taken as PCIT has shown its effect in follow up appointments as well. The research could have been more detailed if a team of providers worked in this instead of a psychologist only. It is recommended to have a team of psychologist and speech therapist so that all aspects of the therapy can be covered and the participants can gain maximum benefits from it. Moreover, qualitative analysis should also be carried out along with quantitative analysis to provide with richer information.

Compliance with Ethical Standards

Conflicts of Interest

The author declare that they have no conflicts of interest related to this research.

Research Involving Human Participants and/or Animals

This study was approved by the review board at Bahria University Karachi Campus. The participation of the respondents was voluntary and hence of high significance. At any stage of the study, the participants had the right to withdraw from the experiment. A consent form was filled out by the participants included sufficient information to ensure them about the structure of this study. The confidentiality of the participants was maintained. The research respondents were not harmed in any way whatsoever. Information of any type regarding the study was given with truthfulness and transparency when asked. The objectivity of discussion and analyses was maintained throughout the research at its highest level. The data was used for scientific purposes only. The disposal of data was done properly within the ethical boundaries. The study followed the guidelines set by the Declaration of Helsinki for research involving human participants.

Informed Consent

Before administering the items of the selected questionnaire, the parents of the participants were requested to sign an informed consent form in which they were briefly informed about the purpose of the study and their right to withdraw from the research without any penalty. They were also assured that all their child's personal information and the findings of the study were kept confidential. The parents were asked to go through the informed consent themselves for more assurance.

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