Chapter III

METHOD
This chapter mainly describes the details of methods utilized for this research. Methodology in its narrowest sense is the collection of methods or rules by which a particular piece of research is undertaken. However, it is generally used in a broader sense to mean the whole system of principles, theories, and values that underpin a particular approach to research (Somekh & Lewin, 2005).

The method of the present study includes

1. Research design
2. Participants
3. Measures
4. Administration and scoring
5. Procedure
6. Data Analysis

**RESEARCH DESIGN**

A research design is a general plan for implementing a research strategy. A research design specifies whether the study will involve groups or individual subjects, whether the study will make comparisons within a group or between group, and how many variables will be included in the study (Gravetter & Forzano, 2003). Kothari (1993) opines that generally the design which minimizes bias and maximizes the reliability of the data collected and analyzed is considered a good design. Research design methodology in psychology follows the principles of research methodology in sciences.
In the present study two types of research designs, descriptive exploratory design and pre-/post test between-group design with follow-up are used (Asher, 1994).

PARTICIPANTS

The sampling of the present study has been drawn using purposive sampling method (Sapsford & Jupp, 1996). The present study consists of 60 children with Autism including both boys and girls, in the age range of 3-12 years with a mean age of 6.5 years. On the basis of GARS score, the group was divided into two-average Autism (90-110) and above average Autism (111-and above).

The autistic groups in the present sample are those who have been diagnosed and certified as cases of Autism from the Institute for Communicative and Cognitive Neurosciences (ICCONS), Shornur, Palakkad. Those who have been clinically diagnosed and are attending three Special schools in Calicut district of Kerala are also included in this study. Table 3.1 gives the distribution regarding sample characteristics.
Table 3.1: Distribution of Participants characteristics

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Boys</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Girls</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (in years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Age (in years)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3-5</td>
<td>6-12</td>
<td></td>
<td></td>
<td></td>
<td>3-5</td>
<td>6-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Autism (90-110)</td>
<td>12</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Above average in Autism (111 and above)</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>25</td>
<td>3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

Children belonging to the selected age group are likely to have many behavioural or physical/physiological problems other than autism or comorbid with autism (Gillberg & Coleman, 2000). Therefore, for enhancing the validity of the study, an inclusion-exclusion criterion is used for the screening of participants into the present sample.

**Inclusion criteria**

1. The children between chronological age of 3 to 12 years.
2. The identified, assessed, and diagnosed with autism by professionals in the institute.
3. Those who met the criteria of the DSM-IV (APA, 1994) for autism.
4. Those with a score above 30 on Childhood Autism Rating Scale (CARS).
5. Those with or without associate problems such as mild mental retardation, behavioural problems that are not listed under any psychiatric categories, and also children with seizure disorder are included. This could not be avoided because almost all the cases with autism had these problems with different levels of intensity.
Exclusion criteria

1. Children with other forms of developmental disabilities like sensory impairments, cerebral palsy, diagnosed psychiatric disturbances, and history of serious head injury

2. Children with inborn metabolic disorders associated with tuberous sclerosis, neurofibromatosis and phenylketonuria.

For employing parental training, a group of 20 children with autism who are attending in special schools were selected. Then these children were divided into experimental and control groups consisting of 10 each. Table 3.2 shows the distribution of selected parents of children with autism in experimental and control group.

Table 3.2: Distribution of sample characteristics of parents of children with autism in Experimental and Control group

<table>
<thead>
<tr>
<th>Particulars</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental group</td>
</tr>
<tr>
<td>Father</td>
<td>1</td>
</tr>
<tr>
<td>Mother</td>
<td>8</td>
</tr>
<tr>
<td>Caregivers</td>
<td>1</td>
</tr>
</tbody>
</table>

Caregivers were ladies other than the mother of the child, who took care of the child when the parents did not have sufficient time to spend either with their children or for the training.

MEASURES

The following measures are used for the present study.

1. Socio-demographic Data Sheet.
2. Childhood Autism Rating Scale (CARS).
5. Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR).

A brief description of each measure is followed.

1. **Socio-demographic Data Sheet**

   The socio-demographic data sheet (Appendix-I) was developed by the investigator for the purpose of collecting the demographic and the primary information related to the children with autism.

2. **Childhood Autism Rating Scale**

   Childhood Autism Rating Scale (Schopler, Reichler, & Renner, 1986) is the strongest, best-documented and most widely used clinical rating scale for behaviour associated with autism. It consists of 15 items on which children and adults are rated, generally after observation, on a 4-point scale. In the present study, it is used to make diagnosis in conjunction with DSM-IV criteria for autism and to rate severity of autism.

   **Reliability**

   The interrater reliability coefficients for individual items are somewhat variable, ranging from .10 to .93, most are above .50. Reliability coefficients for the CARS total score have been strong, ranging from .68 to .80 and above (Sevin et al., 1991).

   **Validity**

   It has also been proved good criterion related validity by attaining a .80 correlation coefficient with PEP’s pathology section.
3. Gilliam Autism Rating Scale (GARS)

The Gilliam Autism Rating Scale (Gilliam, 1995) was developed as a relatively easy, inexpensive aid in the surveillance and diagnosis of autism. It is intended for individuals between 3 and 22 years of age. The scale consists of 56 items across four subscales: Social Interaction, Communication, Stereotyped Behaviours, and Developmental Disturbances. The first three subscales listed are based on a child’s current behaviour and the final scale is based on a child’s developmental history.

**Reliability**

The reliability of the GARS is well within acceptable ranges. Internal consistency of the GARS subtests ranged from .88 to .93, with a coefficient of .96 for the autism quotient. Interrater reliability coefficients ranged from .83 to .99 for the autism quotient and from .55 to .99 for the subtest scores. Test-retest coefficients ranged from .81 to .86 for subtests, and the autism quotient was .88.

**Validity**

The validity of the GARS was demonstrated throughout several studies. These studies confirm that (a) the items of the subtests are representative of the characteristics of autism; (b) the scores are strongly related to each other and to performance on other tests that screen for autism and the GARS can discriminate persons with autism from other subjects with severe behavioural disorders; (c) the score are not related to age; (d) persons with various diagnosis will score differently on the GARS.

Vineland Adaptive Behaviour Scale (Sparrow, Balla, & Cicchetti, 1984) is a standardized caregiver interview instrument designed to evaluate children aged 0-18 years covering current adaptive behaviour in four areas like Communication, Daily Living Skills, Socialization, and Motor Skills. Communication refers to those skills required for receptive, expressive, and written language; Daily Living Skills include the practical skills needed to take care of oneself and contribute to a household and community; Socialization pertains to those skills needed to get along with others, regulate emotions and behaviour, as well as play; Motor Skills, comprising both fine and gross motor items, are typically assessed in individuals below the age of 6 years or when significant difficulty in motor development is suspected. The Vineland also contains a Maladaptive Behaviour Domain, which assess the presence of problematic behaviours that interfere with an individual’s functioning. The VABS has been reported to be a valid instrument in establishing the cognitive level for an individual functioning at an IQ-level below 70-75. It has been widely used to map the overall functioning of an individual, regardless of IQ in order to be used as a prognosis and intervention measures for habilitation.

Reliability

In general, domain internal consistency reliability is quite satisfactory for the interpretation of individual performance. The split-half reliability coefficient for the Adaptive behaviour Composite, ranging from .89 to .98 (median = .94) are excellent. The test-retest reliability coefficient for the domains and Adaptive Behaviour Composite are very good, with the majority
of the coefficients in the .80s and .90s. Based on representative samples, reliability for each of the four domains have ranged from .93 to .99.

**Validity**

VABS score exhibited higher correlations with other adaptive behaviour scores than with intelligence measures. The correlations between the Vineland and other adaptive scales were only moderately high, thus meeting another criterion of construct validity. Concurrent validity between Vineland and the AAMD Adaptive Behaviour Scale School Edition is good (Perry & Factor, 1989).

6. **Behavioural Assessment Scales for Indian Children with Mental Retardation**

The BASIC-MR (Peshwaria & Venketasan, 1992) has been designed to elicit systematic information on the current level of behaviours in children between 3 to 16 years. The scales are relevant for behavioural assessment and can also be used as a curriculum guide for programme planning and training based on the individual needs of each mentally handicapped child. BASIC-MR has been developed in two parts: A and B. Part A of the scales helps to assess the current level of skill behaviours in the child. The Part B of the scale helps to assess the current level of problem behaviours in the child.

The BASIC-MR, Part A, consists of 280 items grouped under the following seven domains: Motor, Activities of Daily Living (ADL), Language, Reading-Writing, Number-Time, Domestic-Social, Pre-vocational- Money. There are forty items under each domain.
The BASIC-MR, Part B, consists of seventy five items grouped under the following ten domains. Violent and destructive behaviours, Temper tantrums, Misbehaves with others, Self injurious behaviours, Repetitive behaviours, Odd behaviours, Hyperactive behaviours, Rebellious behaviours, Antisocial behaviours, and Fears.

The present study utilized Number-Time domain from the BASIC-MR, Part A and the whole scale in the BASIC-MR Part B.

**Reliability**

The interrater reliability for the test was very good. It was found to be .83 for the overall scores as well as within each domain on a sample of 46 schools going children with mental handicap and having them independently assessed concurrently by two raters.

**Validity**

The concurrent validity of the BASIC-MR, Part A, was established against social quotient of the mentally retarded children as derived on the Vineland Social Maturity Scale, Indian adaptation by Malin. Construct validity of BASIC-MR, Part A and B were also found to be statistically significant. And the face validity for BASIC-MR Part A & B as obtained from ratings was found to be high.

**ADMINISTRATION AND SCORING**

The administration procedures for the different measures are as follows:

1. Sociodemographic Data Sheet
With regard to the sociodemographic data sheet, the investigator has collected information from parents/caregivers by interviewing and by direct behavioural observation of the child. Before using various measures, the investigator explained the purpose of the present study and obtained an informal consent from their parents after initial probing.

2. Childhood Autism Rating Scale

The investigator established a good rapport with parents of the children with autism. The investigator completed the test as per the instruction given in the scale.

CARS item was scored based on direct behavioural observations in various settings, interview data, and/or chart review. Behaviour was analyzed in the light of chronological age, peculiarity, frequency, intensity, and duration.

Each CARS item was scored on a 7-point continuum from 1 to 4 (including mid-points), with scores of 1 indicating that the behaviour is appropriate for the chronological age of child and the score 4 indicating the behaviour is severely abnormal for the chronological age of the child. A total score is then calculated by summing all item scores, and total score of 30 or above are in the autism range. Scores of 30 to 36.5 suggest mild to moderate autism, while scores of 37 to 60 suggest severe autism.

3. Gilliam Autism Rating Scale

First the item wise information was collected from parents of the children with autism after explaining each item in the GARS to them. The
items on this subtest evaluate the participants’ ability to relate appropriately to people, events, and objects.

After completing the administration procedure, the investigator started to rate the frequency of each behaviour on a 4-point scale, from ‘never observed’ to ‘frequently observed’. The scores for all items in each scale are then summed and the total score converted into standard scores based on the reference sample (M = 10, SD = 3).

Typically, all scales of the GARS are completed. However, if a child is nonverbal and/or the parent does not have the knowledge of the early history of the child, then the Communication and Developmental History scales are omitted. A standard score or Autism Quotient can be based on 4, 3, or 2 scales of the GARS. An Autism Quotient is derived by summing relevant scale scores, yielding a standard score with a mean of 100 and a standard deviation of 15. The Autism Quotient is divided into seven ordinal categories for detecting autism in the child. A score of 90 or above specifies that the child is ‘Probably autistic’.

4. Vineland Adaptive Behaviour Scale

The investigator assessed the personal and social behaviour of the children with autism in a semi-structured interview with the primary caregiver. The investigator has always attempted to complete the administration within a single session of 20 to 60 minutes. The interview took place in a quiet room with comfortable seating arrangement.

The items in the communication, daily living skills, and socialization were scored in one of several ways, depending upon whether the activity is
usually or habitually performed (score 2); is performed sometimes or with partial success (score 1); is never performed (score 0); is not performed because of the limited external circumstances (score N for ‘No opportunity’); or either involves a behaviour or a skill of which the respondent has no knowledge of the individual’s performance (score DK for ‘Don’t know’).

Then the investigator computes the total score of each of the sub domain. From the combined sub domain scores of Communication, Daily Living Skills and the Socialization, the Adaptive Behaviour Composite is computed.

5. Behavioural Assessment Scales for Indian Children with Mental Retardation

The BASIC-MR, Part A, was administered individually on each child. The scale assesses whether the child can or cannot perform the target behaviour and employed direct observational techniques to determine actual performance of the child, i.e., how well the child can or cannot perform the said item. In rare cases, where information could be gathered through direct observation, the information from parents/caregivers was subsequently supplemented. The test administration within any domain is stopped after five consecutive failures by a child in that domain. The rest of the items are then not administered, and they will be scored ‘0’. In such case, maximum possible score for the child in each domain continues to be 200.

Children were rated on the basis of six possible levels of performance under which each item is scored, viz., “Independent”, “Clueing”, “Verbal Prompting”, “Physical Prompting”, “Totally Depended”, “Not Applicable”, respectively. On each of the items on the scale, a child may get any score
Method

ranging from 0 to 5 depending upon one’s level of performance for that particular item. The maximum possible score for a child within each domain of 40 items is 200 and the maximum possible score for a child in all the seven domains of the scale is 1400. The individual score of each item within a domain added gives the ‘Raw Score’ for that domain. Then these Raw Scores are converted into percentage for these domains. The BASIC-MR, Part A Score is then calculated from the total ‘Raw Score’ for all the seven domains. A higher score indicates the better skill behaviours of the child. Then the ‘Raw Score’ is converted into cumulative percentage.

PARENT TRAINING INTERVENTION

Parent training intervention is simply one component of early intervention for the children with autism. Parents are given advice about the behavioural management and promoting compliance. This includes the principles of reinforcement, interrupting unwanted behaviours and positively teaching alternative behaviours to the child. In the present study, parent training is focused on: 1) reducing disruptive behaviors, 2) improving learning readiness skills, 3) increase child communication skills, 4) increase child social skills, and 5) reduce parental stress through counseling and enhanced active involvement of parents in the intervention programme.

PROCEDURE

The present intervention programme is conducted in the following phases.
In the first phase, permission was sought from the institutions for intervention among the selected samples for this study. The participants are then divided into experimental and control groups each consisting of ten children with autism in a group. It then made sure that both these groups are matched on the basis of age, sex, and severity of the autistic disorder. The investigator then subsequently met each of the parents or caregiver of the autistic children in the experimental group and explained all the procedures, including the intervention programme.

In the second phase, the investigator administered each of the measures on all the children in the experimental and control group.

In the third phase of the study, parents/caregivers of ten children from the experimental group were selected based on informed consent for the intervention training. A matched group of 10 children are then also selected for the control group. The age range of the participants selected for this phase of the study is between 3 to 10 years. Table 3.3 shows the distribution of the selected participants for the intervention programme.

**Table 3.3: Distribution of sample characteristics for intervention**

<table>
<thead>
<tr>
<th>Children with Autism</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (in yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-6</td>
<td>7-10</td>
<td>3-6</td>
</tr>
<tr>
<td>Boys</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Girls</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>
Method

Parental intervention focused mainly on the individual sessions for each of the parent of the children with autism in the experimental group. The parent training intervention was conducted in the special school settings. The intervention training package included 15 individual sessions for each parent over a period of two months, consisting of 2 sessions in each week. Each session lasted for a maximum of 1 hour in a day. In this parent training, skills for improving the child’s behaviour were taught to them by the instructional methods. The instructional methods included: direct instruction, modeling and giving direct feedback during the training period.

A brief description of each focused area and mode of parent training intervention is as follows:

1. Reducing disruptive behaviours

Firstly, the parents are taught to identify the problem behavior of the child. This is especially important because children with autism frequently exhibit different types of disruptive behaviours that result in the interruption of their learning environments and training procedure. These behaviours range from hyperactivity, temper tantrums, self-injurious behaviours, aggression and to repetitive behaviours. That is, although the children’s behaviour may be uneventful for large period of time, they might engage in highly noticeable disruptive events with little provocation at seemingly unpredictable times. For reducing disruptive behaviours of the child, parents are taught how to decrease unwanted behaviours or behavioural excesses of the child through behavioural techniques like rewarding positive behaviours and imparting mild forms of punishments which includes saying ‘NO’ loudly, mild form of tapping, strapping the child in a chair, time out etc.
2. Improving Learning Readiness Skills

Learning readiness skills training to parents focused on improving the attention, concentration, imitation, and eye-hand coordination of the child by using different methods like the threading needle, stringing beads, stacking blocks, transferring liquid into containers with small mouths, rolling clay into a elongated strand, scribbling etc. It also includes how to maintain an eye-to-eye contact of the child with others and also teaching them to sit in a chair independently. Along with learning readiness skills, the parents of children with autism were also trained in how to implement pre-academic skills. The programme was integrated into everyday routines, such as mealtimes, tidying up, and independence skills such as dressing, washing and bedtime. This part was scientifically formulated based on the system followed by Schopler’s (1979) Psychoeducational profile (PEP). It is also productive and certainly more rewarding for all concerned to focus on developing child’s existing skills as well as attempting to overcome fundamental deficits.

3. Increase child communication skills

Communication skills training incorporates speech training, receptive labeling, expressive labeling, and incidental teaching. It also teaches the methods to increase the vocalization of the child through teaching the child to imitate sounds and words, through instilling the meaning of words, picture naming, teaching the child to use language expressively to label objects, make verbal requests, and express desires more spontaneously and more functionally in every day life situations. The programme focused
on the development of early precursors to social and communicative competence.

4. Increase child social skills

Social skill training included various methods that are used to improve the social behaviour of the child. The parents are educated in the areas related to how to improve their child’s imitation skills, social smile, group play, greeting skills, sharing skills and turn taking etc. They are also trained to express affection to their children. Additionally, parents are also advised to change the way they interact with their child, like maximizing the amount of continuous interaction with the child, giving enough chance to play with siblings and other children, utilizing the children’s parks, giving some simple responsibilities to their children and finally giving a chance to children to accompany their parents while they go for an outing. It also included an emphasis on non-verbal requests, object-function play, imitating actions, and turn-taking games.

5. Parental counseling

The training for the parents included giving appropriate counseling to reduce their stress and also encourage them to become an active partner in observing, and detecting the problems in their child; in developing the intervention plan and in its proper implementation for their child. The investigator was available for telephone support and advice to the parents throughout the intervention period.
At the fourth phase of the intervention, a post intervention assessment was done characterized by the following categories: (a) observation of child’s behaviour, (b) parent report about child’s functioning, and (c) child’s developmental functioning.

In the last phase, three months after the intervention, a follow up study was done in which all the measures were again administered on the children of both groups to assess the changes in their behaviour.

DATA ANALYSIS

The present investigation planned to study cognitive and behavioural analysis of autism in relation to parental training intervention strategies that formulates certain hypotheses presented in the second chapter. After scoring and tabulating the responses of each measure, the tenability of the hypotheses was tested statistically as follows.

Analysis of variance (3-way) was used to examine the group differences in the mean scores of the Cognitive skills and Behavioural skills for severity, age, and gender of the children with autism. Further, independent sample t-test was used to specify the nature of difference between age (preschool and school) and severity level (average and above average scorers) of children with autism. Same independent sample t-test was used for comparing the experimental and control groups for preintervention. Separate paired sample t-test was used to compare pre and post, post and follow-up assessment phases of experimental and control groups.

Pearson correlations are then used to examine the relations between the key predictive and outcome variables like Cognitive, Behavioural, and
Autism Quotient. Stepwise multiple regression analyses were also carried out to predict the Autism Quotient by Cognitive and Behavioural variables.