CHAPTER 3
METHODOLOGY

The study was conducted to understand the developmental problems among mentally challenged children and the effect of yoga to overcome the problems and its impact on family. The methodology adopted for the present study is discussed under the following headings.

3.1. Statement of the problem
3.2. Hypotheses
3.3. Operational definitions
3.4. Research design
3.5. Sample selection procedure
3.6. Tools used for the study
3.7. Pilot study
3.8. Duration of the study
3.9. Collection of data
3.10. Processing and analysis of the data

3.1. STATEMENT OF THE PROBLEM

In India, there is a dearth of research in the field of yoga for mentally challenged children and the studies are scanty. Hence, the present study was undertaken to see if yoga can alleviate the developmental problem of mentally challenged and improve the family life management of their parents.

3.2. HYPOTHESES

Depending on the availability of previous researches on the selected variables, alternate hypotheses were formulated.
Biological details of mentally challenged children

Research studies in the past has revealed that the incidence of mental subnormality is higher among first-born children than among later born children (Richardson, 1968). Rh incompatibility may affect the intellectual development of the first-born child (Reddy, 2007). Therefore, the alternative form of hypothesis is stated as:

**H(1):** There would be significant association between ordinal position of the child and degree of retardation.

Research studies indicated that age-related shifts in childbearing patterns may have implications on both immediate and long term pregnancy outcomes. Researchers have proved that babies conceived by women at the lower or upper ends of the age spectrum are at higher risk for a number of adverse outcomes, including fetal death, preterm birth, low birth weight, certain types of birth defects, and infant mortality (Croen & Shaw, 1995; Ventura, Martin & Mathews, 1996). Therefore, the hypothesis is stated as:

**H(2):** There would be a significant association between age of the mother at the time of delivery and degree of retardation.

Data on previous research revealed that mode of delivery is also associated with the risk of sensorineural hearing loss and other adverse birth outcomes that lie on the causal pathways for potential developmental deficits (Olusanya, 2009). Therefore, the hypothesis is stated as:

**H(3):** There would be a significant association between type of delivery and degree of retardation.

Many studies have established a relationship between physical injury at birth and retardation of the child. Difficulties in labor due to malposition of the fetus or other complications may irreparably damage the infant’s brain. Bleeding within the brain is probably the most common result of birth trauma. Anoxia – lack of sufficient oxygen to the brain, stemming from delayed breathing or other causes – is
another type of birth trauma that may damage the brain. Neglected obstructed labour may cause asphyxia leading to stillbirth, brain damage or neonatal death (Croen & Shaw 1995; Ventura, Martin & Mathews, 1996). Therefore, the hypothesis is stated as

\[ H(4): \text{There would be a significant association between nature of birth and degree of retardation.} \]

Previous investigation has indicated that children with mental retardation may learn to sit up, to crawl, or to walk later than other children, or they may learn to talk later (Daily, Ardinger & Holmes, 2000). Therefore, the hypothesis is stated as:

\[ H(5): \text{There would be a significant difference in the delayed milestones of mentally challenged children based on the} \]
\[ (a) \text{degree of retardation} \quad (b) \text{kind of disability} \]

Developmental problems of mentally challenged children

Investigation by Rarick (2000) has indicated that children suffering from cognitive disabilities are most likely to suffer from physical impairments as well. The degree of mental retardation is correlated with the degree of physical impairment in growth and motor control. Therefore, the hypothesis is stated as:

\[ H(6): \text{There would be a significant difference in the motor developmental problems of the mentally challenged children based on the} \]
\[ (a) \text{degree of retardation} \quad (b) \text{kind of disability} \]

A study conducted by Barkoukis, Staats and Dombeck (1995) reveals that Children with Developmental Coordination Disorder (sometimes referred to as Dyspraxia) show extreme clumsiness and/or significant impairment in motor coordination. In order to be diagnosed with this disorder, the child's performance in daily activities requiring motor coordination must be significantly below what is expected based on their age and intelligence level. Examples of delays include
problems with achieving motor milestones (e.g., walking), dropping things, or poor handwriting. Therefore, the hypothesis is stated as:

\[ H(7): \text{There would be a significant difference in the problems experienced by mentally challenged children in performing daily activities based on the} \]

\[ (a) \text{ degree of retardation} \quad (b) \text{ kind of disability} \]

Previous investigation by Bray, Fletcher and Turner (1997) shows that students with mental retardation have difficulty in remembering information. As would be expected, the more severe the cognitive impairment, the greater the deficits in memory. In particular, research has found that students with mental retardation have trouble retaining information in short-term memory Therefore, the hypothesis is stated as:

\[ H(8): \text{There would be a significant difference in the cognitive development problems of the mentally challenged children based on the} \]

\[ (a) \text{ degree of retardation} \quad (b) \text{ kind of disability} \]

Studies in the past show that children with retardation, particularly those with lower IQ, tend to exhibit articulation deficits (Rosenberg & Abbeduto, 1993). Many children with developmental disabilities manifest a variety of speech and communication deficit. About 40% of MR persons may have no speech; some have very basic levels of communication (SubbaRao, 1992). Muscle tone problems can influence oral motor control and also lead to difficulties in persons with CP (McCarthy & Betz, 2000). Therefore, the hypothesis is stated as

\[ H(9): \text{There would be a significant difference in speech and communication problems of the mentally challenged children based on the} \]

\[ (a) \text{ degree of retardation} \quad (b) \text{ kind of disability} \]

Behavioral problems of mentally challenged children

Findings of the study by Al-Qamash (2006) indicate that the most common problems with the mentally disabled are hyperactivity, social withdrawal, aggressive
behavior and self-hurt. The prevalence of behavioral problems in children with intellectual disability documented by studies carried out in developed parts of the world ranges from 31 to 41 percent (Einfeld & Tonge (1996); Dykens (2000); Einfeld, et al. (2006); Wallander, Dekker & Koot (2006); Hysing, Elgen, Gillberg, Lie & Lundervold (2007); Elhamid, Howe & Reading (2009). Therefore, the hypothesis is stated as:

\( H(10) \): There would be a significant difference in the behavioral problems (parent’s view) of the mentally challenged children based on the 
(a) degree of retardation (b) kind of disability

\( H(11) \): There would be a significant difference in the behavioral problems (teacher’s view) of the mentally challenged children based on the 
(a) degree of retardation (b) kind of disability

Effect of family life management of families with mentally challenged children

Previous investigation by Gallagher, Phillips, Oliver and Carroll (2008) reported that the parents of children with intellectual disabilities registered high depression and anxiety scores and the majority met the criteria for possible clinical depression and/or anxiety. They were more tired, desperate, and more displeased, sad, depressed, helpless, and embittered. Therefore, the hypothesis is stated as:

\( H(12) \): There would be a significant difference in the family life management problems of the mentally challenged children based on the 
(a) degree of retardation (b) kind of disability

Prior research on families of children with mental retardation have yielded mixed results: Some studies have noted increased problems among these families, other studies have indicated that families have tremendous resiliency and can mobilize resources to cope with their particular challenges (Abbott & Meredith,
1986; Bebko, Konstantareas & Springer, 1987; Trivette, Dunst, Deal, Hamer & Propst, 1990). Therefore, the hypothesis is stated as:

\[ \text{H(13): There would be a significant effect on the family life management problems of the mentally challenged children based on} \]

\( (a) \text{ Income of the family, (b) Ordinal position of the child} \]

\( (c) \text{ Type of the family and (d) Developmental and behavioral problems} \]

Effect of yoga on developmental problems of mentally challenged children and its impact on family life management

Previous analysis has revealed that yoga for children is a relaxation technique that reduces stress and tension, dissipate excess energy, relieve tiredness, lengthen attention span, improve physical health, sharpen concentration, enhance mental clarity and cultivate better interpersonal relationships (Seiler & Renshaw, 1978; Telles, Narendran, Raghuraj & Nagarathna, 1997; Peck, Kehle, Bray & Theodore, 2005). Yoga can produce a calming effect, which helps children get into a frame of mind conducive to learning. A recent study showed that children who participated in yoga training were more relaxed, active, and able to concentrate better. Compared with a group of students who only exercised, students who participated in yoga exhibited improved educational performance (Gates & Wolverton, 2007). Thus relationship between the practice of yoga and benefits related to mental health and overall wellness is apparent (Schaeffer, 2002). Based on the above researches, it was felt that yoga would significantly improve the overall development of the mentally challenged children. Therefore, the following hypotheses is stated in an alternative form as:

\[ \text{H(14): There would be a significant difference in the weight of the experimental and control group of the mild, moderate and severely retarded boys and girls} \]

\( (a) \text{ Before yoga therapy, (b) After 3 months of yoga therapy and} \]

\( (c) \text{ After 6 months of yoga therapy} \]
H(15): There would be a significant difference in motor development problems between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy

H(16): There would be a significant difference in cognitive development problems between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy

H(17): There would be a significant difference in speech and communication problems between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy

H(18): There would be a significant difference in behavior problems (parent’s view) between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy

H(19): There would be a significant difference in behavior problems (teacher’s view) between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy

H(20): There would be a significant difference in health problems between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and (c) After 6 months of yoga therapy
H(21): There would be a significant difference in family life management problems between the experimental and control group of the mild, moderate and severely retarded children
(a) Before yoga therapy,  (b) After 3 months of yoga therapy and
(c) After 6 months of yoga therapy

H(22): There would be a significant effect of yoga therapy on the weight of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(23): There would be no significant change in the weight during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(24): There would be a significant effect of yoga therapy on the motor development problems of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(25): There would be no significant change in the motor developmental problems during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(26): There would be a significant effect of yoga therapy on the cognitive development problems of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(27): There would be no significant change in the cognitive development problems during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children
H(28): There would be a significant effect of yoga therapy on the speech and communication problems of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(29): There would be no significant change in the speech and communication problems during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(30): There would be a significant effect of yoga therapy on the behavior problems (parent’s view) of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(31): There would be no significant change in the behavior problems (parent’s view) during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(32): There would be a significant effect of yoga therapy on the behavior problems (teacher’s view) of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(33): There would be no significant change in the behavior problems (teacher’s view) during the intervention period of the control group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children

H(34): There would be a significant effect of yoga therapy on the health problems of the experimental group of
(a) Mildly retarded children,  (b) Moderately retarded children and
(c) Severely retarded children
H(35): There would be no significant change in the health problems during the intervention period of the control group of
(a) Mildly retarded children, (b) Moderately retarded children and
(c) Severely retarded children

H(36): There would be a significant effect of yoga therapy on the family life management problems of the experimental group families of
(a) Mildly retarded children, (b) Moderately retarded children and
(c) Severely retarded children

H(37): There would be no significant change in the family life management problems during the intervention period of the control group families of
(a) Mildly retarded children, (b) Moderately retarded children and
(c) Severely retarded children

H(38): There would be a significant relationship between the developmental problems and family life management problems of the experimental group children after yoga therapy

H(39): There would be a significant relationship between the behavior problems and family life management problems of the experimental group children after yoga therapy

3.3. OPERATIONAL DEFINITIONS

Degree of disability

The DSM-IV (2000) classifies four different degrees of mental retardation: mild, moderate, severe, and profound. These categories are based on the functioning level of the individual.

Kind of disability

Developmental disabilities are a diverse group of severe chronic conditions that are due to mental and/or physical impairments. People with developmental disabilities have problems with major life activities such as language, mobility, learning, self-help and independent living. Developmental disabilities include mental retardation, autism, attention deficit disorder, cerebral palsy etc.
Mentally challenged

Mentally challenged children are unable to fulfill their intellectual potential, and have mental capacities that lag behind those of their peers. Mentally challenged children are those children with mental retardation, autism cerebral palsy and ADHD.

Mental retardation

Mental Retardation is a condition in which there is delay or deficiency in all aspects of development, i.e. there is a global and noticeable deficiency in the development of motor, cognitive, social and language functions.

Attention-deficit/hyperactivity disorder (ADHD)

Attention deficit-hyperactivity disorder (ADHD) is a neurobehavioral disorder characterized by either significant difficulties of inattention or hyperactivity and impulsiveness or a combination of the two.

Autism

A developmental disorder marked by the inability to relate socially to others and by severe withdrawal from reality. Language limitations and the extreme desire for things to remain the same are common symptoms.

Cerebral palsy

It is a disorder that affects muscle tone, movement and motor skills. Cerebral palsy can also lead to other health issues, including vision, hearing and speech problems and learning disabilities.

Developmental milestones

A developmental milestone is an ability that is achieved by most children by a certain age. Developmental milestones can involve physical, social, emotional, cognitive and communication skills such as walking, sharing with others, expressing emotions, recognizing familiar sounds and talking.
Developmental delay

A developmental delay is a significant and ongoing delay in a child’s development. Developmental delays may occur in any or all of the major areas of child development: cognitive, social, language, fine motor and gross motor.

Developmental problems in mentally challenged children

Mentally challenged children have a significant delay in physical, cognitive, behavioral, emotional and social development in comparison with normal children. This delay leads to the developmental problems among mentally challenged children.

Cognitive development problems

Mentally challenged children whose intellectual skills are sub average, are likely to be slower in reaching the levels of academic achievements. Other cognitive problems are like difficulties in understanding, lack of imaginative play etc.

Physical development problems

Physical development problems refers to biological changes that mentally challenged children undergo as they age. Important aspects that determine the physical development problems in mentally challenged children include physical changes; development of reflexes, gross and fine motor skills, sensations, spasticity etc.

Speech and communication problems

Speech and language impairments include articulation problems, voice disorders, fluency problems (such as stuttering), aphasia (difficulty in using words, usually as a result of a brain injury), and delays in speech and/or language.

Behavior problems of mentally challenged children

Behavior is considered problem behavior when they are of harm or cause inconvenience to the child or others. Behaviors that are age inappropriate, socially
inappropriate and that severely isolate the child from normal social activities and interfere with learning are problem behaviors. Some of this problem behavior may be odd behavior like gazing, self, or stereotyped behavior like body rocking; and some behavior may be destructive or aggressive and harmful to the child or others.

**Family life management of families with mentally challenged children**

Family life management is the management of physical, psychological and economic stress of families in upbringing their mentally challenged children.

**Yoga therapy**

Yoga therapy is the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of yoga, which is union of body and mind.

3.4. RESEARCH DESIGN

Research design is an arrangement of conditions of data in a manner that aims to combine relevance to the research purposes with economy in procedure (Gupta, 2011). The research is conducted with a conceptual structure. It constitutes the blue print for the collection, measurement and analysis of data (Kothari, 2004). The present study was conducted in two phases. Figure 2 shows the schematic representation of the research methodology of the present study.

**Phase I**

Descriptive research design was used to understand the developmental problems of mentally challenged children. This phase of study was cross sectional in nature. It involved relating the developmental problems of the selected children with the family life management of their families. This phase formed the basis to identify the children for the experimental study carried out in the second phase of this study. Children with more developmental problems in terms of physical activities and behavioral problems were chosen as the sample for next phase of the study.
Figure 2

Schematic Representation of the present study
Research Design

Phase I - Base line Investigation

Administer the interview schedule to determine the
- Cause of Mental Retardation
- Developmental problems
- Behavior problems
- Family life management problems

Purposive sampling

Selection of Mentally Challenged Children (n-297)

Identify children with
- High developmental problems
- Family Life Management problems of Families with MCC

Children with mental retardation (n -163)

Phase II – Experimental Study

Purposive sampling

Selection of the representative sample (n-80) for study

Experimental Group (n-40)
under yoga therapy
Mild (n=15) Moderate (n=15) Severe (n=10)

Pre- Test (Before Yoga) Post Test I (After 3 months) Post Test II (After 6 months)

Control Group (n-40)
without yoga therapy
Mild (n=15) Moderate (n=15) Severe (n=10)

Pre- Test (Before Yoga) Post Test I (After 3 months) Post Test II (After 6 months)
Phase II

Experimental research design was adopted for this phase. A pre-test, post-test experimental design was used to determine the effect of yoga on the developmental problems among mentally challenged children and its impact on family life management. The effect of various developmental problems like physical, cognitive, speech and communication and behavior problems found among mentally challenged children and its impact on family life management after yoga intervention were analyzed in the phase II of the study. Although yoga is historically a spiritual discipline, it has also been used as therapeutic intervention. Yoga therapy that best suits the mentally challenged children were investigated and set of yogasanas were selected to reduce the behavioral problems among mentally challenged children and to improve the physical, cognitive and speech and communication abilities. The selected yogasanas were administered to those mentally challenged children chosen with more developmental and behavioral problems in the phase I of the present study. Thus only mentally retarded children were selected for the experimental study.

3.5. SAMPLE SELECTION PROCEDURE

3.5.1. Selection of the area

According to Census of India (2001), there were 21.9 million people with disabilities, who constitute 2.13 percent of total population. In contrast, the National Sample Survey Organization (NSSO, 2002) estimated that the number of persons with disabilities in India was 1.8 percent (18.49 million) of the Indian population. About 10.63 percent of the disabled persons suffer from more than one type of disability (Table 8 and Figure 3). The population of differently abled in Tamil Nadu, a state in India is 16, 42,497. It was found that the cause for disability was due to serious illness during childhood, head injury in childhood and pregnancy in birth related causes.
Table 8

Prevalence of different types of disability in India

<table>
<thead>
<tr>
<th>Type of Disability</th>
<th>Census of India (2001)</th>
<th>NSSO (2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement (Locomotor)</td>
<td>25%</td>
<td>51%</td>
</tr>
<tr>
<td>Seeing (Visual)</td>
<td>49%</td>
<td>14%</td>
</tr>
<tr>
<td>Hearing</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Speech</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>Mental</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Figure 3

Percentage distribution of disabled persons by type of disability in rural and urban India

It was found by the researcher, facilities like physiotherapy, speech therapy, occupational therapy and special schools are available for early intervention for the disabled. In specific to different types of mental disability, health services, educational and life skill training services are available in good numbers in urban setup compared to the rural areas. According to the census of the India (2001) Tamilnadu, in particular accounts for 199,888 mentally challenged children. To provide interventional support, services pertaining to these children, nearly 210 government and private institutions are available. There are approximately 50 special schools in Chennai, which provides special education to the mentally challenged children. Therefore keeping in view the need, of the number of mentally challenged children and the availability of interventional services, Chennai city, capital of Tamil Nadu was selected for the study.
3.5.2. Selection of the mentally challenged children

Phase I

The sample selected for the Phase-1 study was mentally challenged children, their parents, either mother or father and their teachers. Purposive sampling procedure was adopted to select the mentally challenged children. Though, there are more than 50 special schools in Chennai, very few schools were willing to permit and facilitate research activities. Hence, the researcher collected the data from 15 schools in Chennai. The list of schools and the number of children who participated in the study are listed in Table 9.

Initially, with the consultation of the teachers in the special school, from a list of mentally challenged children who would be able to cooperate for the study, approximately 10 to 45 children from each school were selected. Parents, caretakers and teachers of the selected mentally challenged children were approached to explain the purpose of the study and know their consent to participate in the study.

Table 9

Number of mentally challenged children chosen from the selected special schools in Chennai

<table>
<thead>
<tr>
<th>Name of the Special School</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIKYA – Centre to Integrate the Different</td>
<td>10</td>
</tr>
<tr>
<td>Alpha to Omega Learning Centre</td>
<td>11</td>
</tr>
<tr>
<td>Balar Kalvi Nilayam</td>
<td>13</td>
</tr>
<tr>
<td>Madhuram Narayanan Centre for Exceptional Children</td>
<td>26</td>
</tr>
<tr>
<td>Maithree Special School – Perambur</td>
<td>13</td>
</tr>
<tr>
<td>Maithree Special School – T.Nagar</td>
<td>41</td>
</tr>
<tr>
<td>Maithree Special School - K.K.Nagar</td>
<td>16</td>
</tr>
<tr>
<td>Maithree Special School - Tambaram</td>
<td>33</td>
</tr>
<tr>
<td>Maithree Special School - Ullagaram</td>
<td>27</td>
</tr>
<tr>
<td>Mithra</td>
<td>13</td>
</tr>
<tr>
<td>Sankalp – The Learning Centre</td>
<td>10</td>
</tr>
<tr>
<td>Spastic Society of India</td>
<td>12</td>
</tr>
<tr>
<td>Sri Sakthi Academy</td>
<td>46</td>
</tr>
<tr>
<td>Srishti Shruthi Special School</td>
<td>12</td>
</tr>
<tr>
<td>Vijay Human Service</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>297</td>
</tr>
</tbody>
</table>
Though the researcher approached nearly 476 parents, due to various reasons, some of the parents were not willing to participate in the study. Therefore, a final sample of 297 mentally challenged children were chosen for the study.

**The inclusive criteria for the selection of the sample were:**

- Children from mild, moderate and severe degree of intellectual disability – mental retardation, cerebral palsy, autism, Attention Deficit Hyper Active Disorder (ADHD).
- Mentally challenged children above three years.
- Children going to special school.
- Willingness of the parents and teachers of the school to participate in the study.

**The exclusive criteria for the selection of the sample were:**

- Children less than 3 years
- Children with profound retardation

The selected mentally challenged children (n = 297) included 140 boys and 157 girls. Table 10, Figure 4 and 5 shows the distribution of selected sample based on degree and kind of disability. Considering the type of disability, majority of the mentally challenged children belonged to MR category (n = 163), followed by autism (n = 47). Almost an equal number of children belonged to ADHD (n = 39) and CP (n = 38). Based on the degree of retardation of the selected sample, majority of the children belonged to mild category (n = 142) followed by moderate category of children (n = 110). Only 45 children belonged to severe category.
Table 10

Distribution of the sample based on kind and degree of disability

<table>
<thead>
<tr>
<th>Kind of disability</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (n=56)</td>
<td>Girls (n=86)</td>
<td>Boys (n=58)</td>
<td>Girls (n=52)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>MR</td>
<td>34</td>
<td>60.7</td>
<td>53</td>
<td>62.0</td>
</tr>
<tr>
<td>CP</td>
<td>7</td>
<td>12.5</td>
<td>11</td>
<td>13.0</td>
</tr>
<tr>
<td>Autism</td>
<td>5</td>
<td>8.9</td>
<td>9</td>
<td>11.0</td>
</tr>
<tr>
<td>ADHD</td>
<td>10</td>
<td>17.9</td>
<td>13</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Figure 4

Distribution of mentally challenged children based on degree of retardation

Figure 5

Distribution of mentally challenged children based on kind of disability
Phase II

Among the 297 children selected for the study in Phase I, it was found that majority (n = 163) were MR children. The analysis of the variables in the first phase revealed that the developmental problems and behavioral problems were high among these children. This made the researcher to choose MR children as a sub population for the experimental study (Phase II). A sub sample of 80 mentally retarded children representing three degrees of retardation - mild, moderate and severe from Phase I were chosen for the Experimental study (Phase II).

Although children above 8 years can start practicing yoga as said by Swami Sathyananda Saraswathi (2008), the researcher and the yoga consultants felt that children above 13 years would be highly receptive for yoga training. Therefore, for the experimental study children above 13 years of age were selected. Out of the 15 schools selected for the first phase of the present study, only 2 schools catered to children above 13 years of age, having mild, moderate and severe degree of mentally retarded children. In addition, proximity, space and co-operation from the parents and the school authorities were other reasons for selecting these schools. Yoga intervention was conducted in two schools namely, Sri Sakti Academy and Maithree Special School, Chennai.

The sample included 40 mentally challenged children in the experimental group and 40 in the control group. A one-to-one matching was done with regard to chronological age, sex and degree of retardation. In the 40 matched pairs, one from each pair was randomly selected for training in yoga and the other served as a control. The control group was not exposed to yogic practices. Each group had 15 children of mild retardation, 15 of moderate and 10 of severe retardation selected through purposive sampling technique. The inclusive and exclusive criteria are shown in Table 11.
### Table 11

**Exclusion and inclusion criteria for selection of the mentally challenged children for experimental study**

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ MR children</td>
<td>➢ Mentally challenged children with co-morbid disorders - epilepsy, sensory deficit (like impairment of vision, hearing), Autism, ADHD, Cerebral palsy and other psychiatric disorders</td>
</tr>
<tr>
<td>➢ Age above 13 years</td>
<td>➢ Not willing to participate in yoga training</td>
</tr>
<tr>
<td>➢ Willingness to participate in the yoga training</td>
<td></td>
</tr>
</tbody>
</table>

### 3.6. DESCRIPTION OF THE TOOL FOR THE STUDY

Since the data to be collected for the study involved collecting confidential and personal information of mentally challenged children from the parents, the researcher felt the need for personal interactions with the parents. After careful examination of the available research techniques, the interview method was found to be the appropriate procedure for collecting the necessary data for the study. Questions simple and comprehensive in nature, keeping in view the objectives of the study were compiled to collect the pertinent information. The interview schedule comprised of closed ended questions to elicit information with relevant options.

For the purpose of measuring the selected variables, suitable standardized scales were used and for a few variables the scale was developed by the researcher. A copy of the Interview schedule is presented in the Appendix IV(A,B&C). The schedule consisted of the following sections.

3.6.1. Demographic information

3.6.2. Biological details of mentally challenged children

3.6.3. Development problems among mentally challenged children

3.6.4. Behavior problems among mentally challenged children

3.6.5. Management problems of families having mentally challenged children
3.6.1. Demographic information

Questions pertaining to personal data were prepared to collect information on certain demographic variables namely name, age, sex, ordinal position of the child and family details, which included type of family and family income.

3.6.2. Biological details of mentally challenged children

Biological details of mentally challenged children include the type of delivery, nature of birth, mother’s age during delivery, other associated conditions, opinion of the child’s handicap, health condition of the child and medication were collected from the parents. This background information of the mentally challenged children was considered essential for the purpose of sample selection of the experimental study defining the exclusive and inclusive criteria.

Birth details of the child

The details regarding the mother’s age at the time of delivery, type of delivery i.e., nature of birth of mentally challenged children were dealt under this section. This included whether the child was premature, full term or post mature baby and was it a normal, instrumental or caesarian type of delivery. The biological details sought here were regarded important to find out the causes of degree of retardation and kind of mental disability.

Cause of the child’s handicap

The details pertaining to the cause of the child’s retardation was obtained from the parents through interview schedule. Questions like whether the cause for the child’s handicap was due to hereditary, birth injury accidental injury, illness during pregnancy, lack of medical care during pregnancy were asked with options of ‘Yes’ and ‘No’.
Associated conditions of the child’s handicap

In addition to the above data collected, the researcher felt the need to know the associated conditions of the child’s handicap. Details like sensory impairments like vision and hearing, microcephaly, hydrocephaly were also obtained. These questions had answers with the choice of ‘Yes’ and ‘No’. The associated conditions sought here were found to be crucial for selecting the experimental group of children for the study.

Health problems of mentally challenged children

The information regarding health problems of the child were elucidated through the questions in this part of the interview schedule. Health problems like respiratory problems, digestive problems, sleep disorders epilepsy, fever, lack of appetite etc., were elucidated through the questions in this part of the schedule. Research has ample evidence to support the fact that health problems brings with it, increasing difficulties in physical and physiological functions of the mentally challenged children. Therefore, the health aspect was recognized as an essential indicator to be taken into account. ‘Yes’ and ‘No’ were the options given to these questions which gathered information about health problems and the problems for which the child was under medication.

Developmental milestones of mentally challenged children

Child development refers to the process in which children go through changes in skill development during predictable time, called developmental milestones. Developmental delay occurs when children have not reached these milestones by the expected time. Since milestones develop in a sequential fashion and the delay in them would be an indicator for mental disability the researcher gathered the information about the onset in delay from birth upto three years. Nearly 12 milestones were listed and the options for responding to these statements were yes or no. Each child is unique and will develop at his or her own pace and may meet the developmental milestones a little earlier or later than his peers. The milestones were considered to be delayed when it extended beyond the upper limit of the time mentioned in the milestone chart (Appendix V).
Degree of retardation of mentally challenged children

The degree of retardation have an impact on the overall development of the child and consequently affect the family members. Details regarding mental retardation and other co-morbid disorders were obtained as secondary data from the assessment by Psychiatrist given by the parents to the school. The IQ test done recently was taken into consideration.

3.6.3. Developmental problems faced by the mentally challenged children

Problems in physical development, cognitive development, speech and communication were assessed using the tool developed by Sharma (2002).

Physical Development

Growth in children with mental retardation differs from that of normal children.

Anthropometric measurements

Physical parameter such as height and weight of the mentally challenged children was assessed.

Height was measured using a stadiometer. The mentally challenged children was required to stand bare foot and stand on the platform of the stadiometer with heels together, arms hanging and ensured that the neck, shoulders, buttocks, heels were in the same plane and perpendicular to the ground. The measurement was directly read from the scale of the stadiometer. The height was recorded nearer to 0.1 cm, in upright standing posture (Jelliffie, 1966).

Body weight is the simplest measurement of growth and nutritional status (Swaminathan, 1985). Weight was operationalized as the exact body weight measured with minimal clothes, foot wear and marked in an erect standing posture with head, abdomen and legs in the same plane, using standard weighing machine, by Jellife method (1966). It was measured in Kilograms.
When the child was not able to maintain the erect position the MCCBW was assessed measuring the parent's weight with the child in their arms and subtracting the weight of parent and the MCCBH was measured using supine length (Lohman, Roche & Martorel, 1988).

**Physical problems faced in performing daily activities**

This scale was designed by the investigator. Several opinions on the problems faced by mentally challenged children were gathered from the available literature and day to day experiences. The gathered information was assembled into twenty day to day activities. Five of these were found to be repetitive and were removed. The rest of them were scrutinized for practicality resulting in the omission of two more items. The respondents were requested to answer questions in a 5-point scale of Always, Very Often, Often, Sometimes and Never. The scores 5,4,3,2,1 were given respectively. Total scores were determined, higher score shows more physical problems faced by the child.

**Motor skills problems**

This tool was designed by Sharma (2002) which consisted of 13 difficulties in motor development problems. Information about the motor functioning, to find out if the child had neck control, drooling, trunk control, sitting, standing and walking skills and movement control, balance, co-ordination of movement, muscle tone, plasticity and pain in movement were obtained from the parents. It is a 2 point scale having alternative ‘yes’ or ‘no’. A score of ‘1’ given for responses ‘yes’ and ‘0’ for ‘no’. The total score ranges from 0 to 13. Based on the degree of retardation the total motor problem scores were obtained and tabulated. Any other specific problems not listed in the schedule were obtained during the interview.

**Cognition**

Problems faced by the child in the area of cognitive development were assessed by the tool formulated by Sharma (2002). Information about the child’s alertness and participation in class, understanding of instructions, learning skills
taught, observational or imitational learning and any other areas affecting cognition that the parents or teacher considered as important were obtained. The options for responding to these statements were ‘yes’ or ‘no’. A score of 1 was assigned to “Yes” and ‘0’ was assigned to “No”. The total score obtained would denote the problems towards cognitive development. The higher the score, greater the problems towards cognitive development of mentally challenged children and lower scores indicate a lesser problem.

**Speech and communication**

This portion of the schedule was designed to evaluate the speech and communication problems found among mentally challenged children, which was formulated by Sharma, (2002). Information was sought about the child’s speech, whether he or she could speak, strength of voice and whether it was clear and understandable, if it was age appropriate etc. The child’s understanding of language was also asked for as well as any other speech related problems that the parent or teacher perceived as important. Therefore, questions pertaining to their difficulties in such matters were sought from the parents. Questions with option ‘Yes’ or ‘No’ were asked to the parents, to collect the details and the total scores was obtained. Table 12 depicts the developmental problems of mentally challenged children.

Table 12

**Developmental problems of mentally challenged children**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Developmental problems</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical developmental problems</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Cognitive developmental problems</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Speech and communication problems</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
3.6.4. Behavior problems among mentally challenged children

The investigator collected the data regarding behavioral problems of mentally challenged children from both parents and teachers using different tools. The investigator felt that the teachers would provide more information on the behavioral problems of the child compared to that of parents. Information about any deviant behaviors such as odd and stereo typed behavior, aggressive behavior or behavior injurious to others was obtained during the interview from parents using the tool developed by Sharma (2002). The data was collected from the teachers using the tool developed by Peshwaria (1990).

The problem behavior items from the BASIC MR, Part B (Peshwaria, 1990) formed the basis of the interview schedule. The problem behavior classified under eleven main headings - violent behavior, destructive behavior, temper tantrums, misbehavior, self injurious behavior, repetitive behavior, odd behavior, hyper active behavior, rebellious behavior, anti social behavior, and fear behavior were assessed.

The frequency of occurrence of the problem behavior was rated in a 3 point scale. The options for responding to these statements were “Very often”, “Often” and “Sometimes”. A score of 3 was assigned to “Very often” and ‘2’ was assigned to “Often” and ‘1’ was assigned to ‘Sometimes’. The total score obtained would denote the behavior problems of mentally challenged children. The higher the score, the greater the behavior problems of mentally challenged children and lower scores indicate a lesser behavior problems of children.

Table 13 shows the items included in various behaviour problems of mentally challenged children.
### Table 13

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Behavior problems</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Violent Behavior</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Destructive Behavior</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Temper Tantrums</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Misbehaviors</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Self Injurious behavior</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Repetitive Behavior</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>Odd Behavior</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Hyperactive Behavior</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Rebellious Behavior</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>Anti-social Behavior</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>Fear Behavior</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>61</strong></td>
</tr>
</tbody>
</table>

### 3.6.5. Management Problems faced by the family having mentally challenged children

Various problems faced by the family having mentally challenged children were assessed using Family burden scale (Pai & Kapoor, 1981). This scale was formulated to assess the burden placed on families of psychiatric patients living in the community. A project team at National Institute of Mental Health and neuro-sciences, Bangalore, India, modified the above scale. The researcher felt that almost all the burden listed in the scale were found in the families of mentally challenged children. The researcher did further modification. Certain items were modified to suit the families with mentally challenged children and certain items were merged into one. It measures the degree of burden in four areas namely.

- Financial
- Disruption of routine activities
Disruption of family interaction

Financial

Financial area covered the financial burden of the family having the handicapped child. This area indicates how far the families, financial position is affected to the upkeep of the handicapped child in the family. It includes Medical expenses, housekeeper expenses to look after the child, school fees etc.

Disruption of routine activities

This area covered how far the daily activities of the family are affected because of the handicapped child.

Disruption of family interaction

This area measured how far the interaction of family members is affected because of the handicapped child.

Family Health

This area covered both mental and physical health of the family members. It indicated whether the reactions of having a handicapped child have affected the family health or not.

For the present study, a modified version of this schedule was used. Further modifications were done by the researcher. Certain items were modified to suit the families with mentally challenged individuals and certain items were merged into one. The scale consisted of 15 items with a 5-point rating scale for each item ranging from very severe, severe, moderate, slightly, not at all. A weight age of ‘1’ is given to response ‘slightly,’ ‘2’ is given to ‘moderate’ burden, ‘3’ is given to ‘severe’ burden and ‘4’ is given to ‘Very Severe’ burden. Thus assessing the burden in four areas namely a) Financial b) Disruption in routine activities (c) Disruption of family interaction and d) Family Health.
The Family Burden Interview Schedule has been demonstrated to have good psychometric properties including inter rater reliability above 87% on all items and excellent concurrent validity ($r=0.72$) with an overall objective burden assessed by independent raters (Pai & Kapur, 1981).

### 3.6.6. Identification of the best and simple Yogasanas for mentally challenged children

Yoga has been defined by Swami Satyananda Saraswati as “a complete science of consciousness that provides mastery over all stages of consciousness.” Yoga is referred to in the Rig Veda, and particularly in the Atharva Veda where there is an elaborate discussion of the individual’s psyche and well-being. However, Patanjali in his Yoga Sutras made the most systematic presentation on yoga. From the beginning of the 20th century, medical scientists and therapists of other fields, including psychology, began verifying yogic principles and using its techniques for promoting health and human adjustment. The practices of yoga, particularly Raja yoga and Hatha yoga, have withstood scientific scrutiny and have been found useful in the treatment of many chronic disorders (Bhushan, 1998).

The second phase of the study involved identifying simple yogasanas appropriate for the mentally challenged children that would improve the overall development of the children. Swami Sathyananda Saraswathi (2008) said that the best age for a child to start practicing yoga is at the age of 8 years. Yoga science is not only useful for the body but also for mental health.

Pranayamas like Anulom–Vilom, Bhramri, Udgeeth and Yoga Nidra calm the nerves and the mind. It improves the mental health and capabilities of mentally challenged children (Ijbharti, 2012). Pranayama will help to develop the inner unseen faculties of the brain and mantra will give them the power of concentration. Chanting Pranav Mantra AUM makes mentally retarded children less aggressive, purifies the speech, calms the mind, and helps reduce distraction (Ramanathan, 2010). Raman, (1981) expressed the importance of yogasanas and breathing to increase the efficiency of the nervous system and thus helping in the rehabilitation of mental retardation.
Reviewing the various researches carried out on the impact of yoga and consultation with yoga school headed by Guruji Jeyagopal, disciple of Bihar school of yoga, Chennai, the researcher decided to adopt the yogasanas followed by Bihar school of Yoga, founded by Swami Sathyananda Saraswathi. Yogasanas to be imparted to the mentally challenged children were demonstrated to the school authorities, special educators, parents and other yoga consultants. Consent from the group was obtained to conduct the yoga training. The same schedule used for Phase I was used to observe the effectiveness of yoga on the selected subjects for the experimental study. The following yogasanas were taught to the mentally challenged children by the researcher along with the yoga expert of the Bihar school of yoga.

- Pawanmukthasana series (35 min)
- Pranayama - nadi sodhana pranayama / bhramari pranayama (10 min)
- Surya Namaskar (salutations to the sun by 12-count yoga postures) (10 min)
- Yoga Nidra - healing of the body and mind and the expansion of consciousness through conscious relaxation (5 min)

**Pawanmukthasana**

Pawanmuktasana (PM) is a combination of three Sanskrit words: Pawan, which means wind or prana; Mukta meaning release; and Asana meaning pose or physical posture. This is a subtle but immensely strong yoga practice. In Sanskrit, it is also known as Sukshma Vyayama, a subtle form of exercise, PM group of practices provide free flow of energy, resulting in a relaxed body and mind, toned autonomic nervous system, controlled hormonal balance, and neuromotor functioning.

The asanas were demonstrated by the yoga master and the researcher to the students. It was through repetition and imitation the children learnt the asanas. The various categories of asanas taught are:
Figure 6

Pawanmukthasanas

PADMASANA

PASCHIMOTTANASANA

TRIKONASANA

TADASANA

VAJRASANA
Standing Asanas

Since these children are beginners some basic standing poses like, Tadasana, Utthita Trikonasana, Virabhadrasana, Ardha Chandrasana and Utthita Parsvakonasana were taught so that they bring elasticity in joints and muscles and build up stamina and physical stability. This constitutes the most basic training in the early stages of yoga practice.

Forward Bending

Asanas, in these postures the posterior half of the body is stretched. These asanas prepared the children to proceed further in yoga and bring consistency in the development of physical and mental pliability. Examples of such asanas are, Upavisthakonasana and Paschimotanasana.

Sitting and Supine Asanas

Sitting upright and supine extending positions helped the child to prepare physically and mentally for pranayama. Some of the asanas taught are Padmasana, Vajrasana, Simhasana, Parambik Sthit Veerasana, Ardha Titali asana, Poorna Titali asana as shown in Figure 6.

Pranayama

‘Pranayama’ is a compound term (‘prana’ and ‘yama’) meaning the maintenance of prana (breath) in a healthy way throughout one's life. The following two Pranayama was felt safe and easy to teach the mentally challenged children namely Anulom Vilom Pranayam and Bhramri Pranayam.

Anulom Vilom Pranayam

It is one of the best easy breathing exercises for entire purification of body as well as mind. It completely cures most of the internal body diseases. It vanish stress of body and mind. It enhances the inner strength of body as well as the divine powers. The children were made to practice in anyone of comfortable poses of
yogasana like Padmasana, Siddhasana, Vajrasana or Sukhasana sitting on the floor on yoga mat. During this pranayam spinal cord must be straight. ‘Anulom’ is a Sanskrit word which means ‘alternate’. Therefore Anulom-Vilom is also called “Alternate Nostril Breathing Technique”. For closing nostrils alternatively you need to use ‘right hand thumb’ and ‘second and third fingers’ (Madhyama and Anamika). Keep the palm in front of face and above the nose to avoid interruption in flow of breath from nostrils (as shown in Figure 7).

**Figure 7**

*Anulom Vilom Pranayam*

![Anulom Vilom Pranayam](image)

The benefits of this pranayam are that the respiratory passage is cleaned. Breathing becomes easy and regulated. The mind becomes calm and heartbeat rhythmic. Also aids in enhancing concentration and memory.

**Bhramri Pranayam**

Bhramari yoga is a form of yoga that involves breathing while making a sound that is similar to that made by a buzzing bumblebee. The word bhramara stands for bumblebee. The characteristics of this pranayama are to create a sound like that of the bee. The children were made to sit in a circle and repeat it along with the yoga master.
Bhramari helps soothe the nerves, improve mental health and ease tension, depression, fears, anxiety, stress, insomnia and restlessness. It is also known to have positive effects on the ears, nose, eyes and mouth and, over time, gives a glowing complexion. The Pranayam is done as depicted in Figure 8.

Figure 8
Bhramari Pranayam

Suryanamaskar

Surya namaskar is a series of twelve physical postures. These alternating backward and forward bending postures flex and stretch the spinal column through their maximum range giving a profound stretch to the whole body. Surya Namaskar has a deep effect in detoxifying the organs through copious oxygenation and has a deeper relaxing effect. The different postures of Surya Namaskar are shown in Figure 9. The children were taught this gradually after attaining flexibility in muscles.

Suryanamaskar tones up the digestive system by the alternate stretching and compression of abdominal organs. It activates digestion and gets rid of constipation and dyspepsia.

- Strengthens abdominal muscles
- Thoroughly ventilates the lungs, and oxygenates the blood
- Tones up the nervous system and improves memory
- Promotes sleep and calms anxiety
- Normalizes the activity of the endocrine glands - especially the thyroid gland
- Refreshes the skin. Prevents skin disorders
- Eliminates unpleasant smells from the body
- Lends grace and ease of movements to the body

**Figure 9**

**Different postures of Suryanamaskar**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pranamasana (Prayer Pose)</td>
</tr>
<tr>
<td>2.</td>
<td>Hasta Uthanasana (Raised Arm Pose)</td>
</tr>
<tr>
<td>3.</td>
<td>Padahastasana (Hand to Foot Pose)</td>
</tr>
<tr>
<td>4.</td>
<td>Ashwa Sanchalanasana (Equestrian Pose)</td>
</tr>
<tr>
<td>5.</td>
<td>Parvatasana (Mountain Pose)</td>
</tr>
<tr>
<td>6.</td>
<td>Ashtanga Namaskara (Salute with 8 Parts)</td>
</tr>
<tr>
<td>7.</td>
<td>Bhujangasana (Cobra pose)</td>
</tr>
<tr>
<td>8.</td>
<td>Parvatasana (Mountain Pose)</td>
</tr>
<tr>
<td>9.</td>
<td>Ashwa Sanchalanasana (Equestrian Pose)</td>
</tr>
<tr>
<td>10.</td>
<td>Padahastasana (Hand to Foot Pose)</td>
</tr>
<tr>
<td>11.</td>
<td>Hasta Uthanasana (Raised Arm Pose)</td>
</tr>
<tr>
<td>12.</td>
<td>Pranamasana (Prayer Pose)</td>
</tr>
</tbody>
</table>
Yoga Nidra

Yoga Nidra is a powerful meditation technique where the mind remains conscious during the normally “unconscious” state associated with deep sleep.

Figure 10

Yoga Nidra

Practiced in the lying position, it is one of the most popular yoga meditation techniques because it induces a profoundly deep state of rest. It is effortless, enjoyable, soothing and recuperative.

The benefits of yoga nidra are: full relaxation of the nervous system thereby emotional balance is restored and improves learning and concentration. The method of performing, the above said asanas is depicted in Appendix VI.
Table 14

Performance of yoga therapy by experimental group

<table>
<thead>
<tr>
<th>Mentally challenged children</th>
<th>Yogasanas</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pavanmukthasana</td>
<td>Suryanamaskar</td>
<td>Pranayama</td>
<td>Yoga Nidra</td>
</tr>
<tr>
<td>Mild</td>
<td>Before 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 6 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Moderate</td>
<td>Before 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 6 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Severe</td>
<td>Before 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 3 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>After 6 months</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

3.7. PILOT STUDY

The pilot study helped the researcher to equip with an understanding of the overall objective of the study, the research question and objective of each schedule and what it is measuring precisely. The pilot study enabled easy and convenient elicitation of information from the representative sample.

Pre testing of the interview schedule was done to see if the respondents could comprehend the items and if there was any difficulty in following the directions for answering. Thirty parents of mentally challenged children belonging to three types of retardation were selected for the pilot study using stratified sampling technique. Initially, the children were stratified on the basis of age, sex, type of the family, income of the family. From each stratum, children were randomly selected. From the pre-test, the interview schedule was found to be too elaborate and slightly ambiguous; therefore some of the irrelevant details were either deleted or altered.
Slight modification of the items was done in the interview schedule so as to make it more clear and helpful in planning the major survey to be undertaken. After testing and retesting, the collected data was analyzed for the reliability and validity of the items in the interview schedule.

**Reliability of the tools**

The reliability of the tool used for the study was checked using Cronbach’s alpha coefficients (Kerlinger, 2001).

The Cronbach’s Alpha values were computed using the scores obtained in the test-retest and the values of Cronbach’s Alpha was found to be highly significant. The reliability scores are presented in the table below.

**Table 15**

<table>
<thead>
<tr>
<th>Tools</th>
<th>Authors</th>
<th>Cronbach’s Alpha (present study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems faced by MCC in daily activities</td>
<td>Researcher</td>
<td>0.721</td>
</tr>
<tr>
<td>Physical developmental problems among MCC</td>
<td>Sharma (2002)</td>
<td>0.791</td>
</tr>
<tr>
<td>Cognitive development problems among MCC</td>
<td>Sharma (2002)</td>
<td>0.787</td>
</tr>
<tr>
<td>Speech and Communication problems among MCC</td>
<td>Sharma (2002)</td>
<td>0.802</td>
</tr>
<tr>
<td>Behavior problems among MCC (parent’s view)</td>
<td>Sharma (2002)</td>
<td>0.725</td>
</tr>
<tr>
<td>Behavior problems among MCC (teacher’s view - BASIC MR, Part B)</td>
<td>Peshwaria (1990)</td>
<td>0.825</td>
</tr>
<tr>
<td>Family life management problems - Family Burden Scale</td>
<td>Pai and Kapoor (1981)</td>
<td>0.879</td>
</tr>
</tbody>
</table>
After the preliminary survey, since the reliability scores were highly significant, the researcher decided to use the selected tools for the study variables.

**Validity of the tools**

The construct validity (Carmines & Zeller, 1979) was used to check the validity of the tools used for the study. Based on the review of related studies used to substantiate the hypotheses was used to check the validity of the constructs (variables) used for the study. The validity was found to be highly significant as the testing of the hypotheses proved to be in line with the constructs used by the previous researches.

3.8. **DURATION OF THE STUDY**

The duration of the study extended over a period of nine months for Phase I and six months for Phase II - experimental study between 2010 and 2012.

3.9. **COLLECTION OF DATA**

The purpose of the study was explained to the respondents to elicit relevant information from them. The respondents were provided with a comfortable atmosphere with privacy as they could respond without hesitation. The interview was conducted with the parents and teachers separately by the investigator.

**Phase I - Administration of interview schedule**

Since the present research work was carried on mentally challenged children, the head of the institutions of special schools were contacted and permission was taken for approaching the parents and teachers. A consent letter was obtained from the school authorities and parents of the selected subject for the study after explaining the purpose of the research. A copy of the consent letters is given in Appendix I, II & III (A,B&C).

The data was collected by the investigator through interview schedule. It was administered to the parents and teachers of 297 mentally challenged children from
various parts of Chennai city. The researcher contacted them personally according to
their convenience and collected the required information. Height and Weight was
measured and recorded for the selected subjects by the researcher with the help of
physical instructor.

**Phase II - Yoga intervention**

The researcher established a rapport with these special children who were
selected for the study. Both Experimental and Control group consisted of 40
mentally challenged children. Experimental and Control groups were matched for
age, gender and degree of retardation. Experimental group was given training in
yoga for 6 months.

The yoga training group was given training in the selected asanas, one hour
daily for 5 days in a week. Competent and well-trained yoga instructors taught these
practices for a period of one hour on every working day at the school premises. The
children in the yoga group were taught five hours of yoga in one week for a period
of six months. During the yoga practice for one hour, the control group was engaged
in their usual school routine by one of their regular school staff in a different room
within the school premises. Apart from one hour of yoga, the experimental group
was exposed to the same school curriculum as the control group. Attendance was
recorded every day for both experimental and control groups and was found
satisfactory. It was taught in a simple and easy way for the children to practice. The
yoga instructor and the researcher with the help of the assistance of school teachers,
gave individual assistance to the children to get trained in the asanas and pranayam
which is enclosed in Appendix VII. For certain asanas, the children were made to sit
in a circle so that they can learn through observing others.

The data was collected from the parents and teachers regarding changes in
developmental and behavioral problems of the child after 3 months and again after 6
months of yoga training through interview schedule.
3.10. PROCESSING AND ANALYSIS OF THE DATA

In the present study, processing of data was done to determine the efficacy of yoga on anthropometric measurements, developments problems, behavior problems and the problems faced by the family of selected mentally challenged children. The data obtained through the Interview schedule were coded, classified and tabulated for further statistical analysis. A scoring method was developed and the scores were used for analyzing the data. Descriptive and inferential statistics was computed.

Descriptive analysis

Descriptive analysis was carried to study demographic details and to understand the developmental problems of mentally challenged children. Percentage analysis, mean and standard deviation were computed.

Inferential analysis

Analysis using Statistical Package for Social Science (SPSS) version 17 was used to compute the inferential analysis. One-way analysis of variance (ANOVA) was carried out to compare the developmental problems and family management problem of mentally challenged children based on degree of retardation and kind of disability. Chi-square test was calculated to associate the demographic details with degree of retardation and kind of disability of mentally challenged children.

Independent sample ‘t’ test was computed to compare the experimental and control group on the health, development and family life management problems.

Paired sample ‘t’ test was done to compare the effect of yoga therapy after three months and six months of the experimental and control group. Repeated measures ANOVA was also computed to support the paired sample ‘t’ test.

Pearson’s correlation analysis was carried out to relate the developmental and behavioral problems of mentally challenged children with the family life management problems.

The results were tabulated and presented in the following chapter.