



**A STUDY TO IDENTIFY  
SCHOOL READINESS IN  
PRE-SCHOOL CHILDREN  
(3 - 4 YEARS)**

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**By**

**REEBA GEORGE**

**DEVELOPMENTAL PAEDIATRICS UNIT**

**DEPARTMENT OF PEDIATRICS**

**CHRISTIAN MEDICAL COLLEGE**

**VELLORE**

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# 1 INTRODUCTION

**“Education is the kindling of a flame, not the filling of a vessel.”**

**-Socrates**

## **1.1 Background of the study:**

Children attend school to learn and to grow intellectually and socially. In the life of a child therefore, education is a key element. Going to school then becomes a social and cognitive developmental achievement and is the first transition of the child from home. To prepare the child for this transitional experience and offer support for the subsequent adjustment to the school environment is a challenge for most families. In our country, a child joins kindergarten at the age of 3 years and begins primary education at 6 years<sup>1</sup>. The kindergartens are a part of the mainstream school in India. India is one of the few countries that enrol children into the kindergarten at 3 years of age. Children who join kindergarten at 3 years are only 5 years old when they join Grade I but the Right to Education Act requires that children should be 6 years when they join primary schools (Grade I). The drive by UNICEF and other educational services have motivated families to enrol children in schools. The enrolment into schools has increased by 11% in Southern Asia over the last 5 years.<sup>2</sup>

Even when children are enrolled in a nursery, their curriculum has formal academic content.<sup>3</sup> The schools in India follow different curricula such as Central Board of Secondary Education, the State Board of Education and Indian Certificate of Secondary Education. Each curriculum is different and emphasizes on the academic

content. They have no specific subjects to cater to the social and emotional development of the child and hence developmental attainment in these domains are not monitored. The academic and social-emotional for school adjustment can be tremendous if the child is not prepared or ready for school. School readiness therefore is a crucial issue for parents, teachers and policy makers as it an important predictor of later school success in the later years.<sup>4</sup>

Statement of the Problem:

Considering that children have to learn academic concepts from the very beginning of school and there is lack of transition time to do so after they start raises the question whether all children who join school at 3 years are ready for school-socially, emotionally and intellectually.

### **1.2 Definition of readiness**

Readiness has been theorized differently over the years, some consider it as a specific chronological age, or as a stage of development that the young children need to reach, or as a group of skills, or processes, and relationships. Each of these theories has varying implications on the child, family and society at large with regard to their roles and responsibilities.<sup>5</sup> The policy makers and researchers have discussed readiness as an interactive process. In this process the child, family, neighbourhood, and school interact and then either facilitate, or fail to build, the child's development in cognitive, socio-emotional and physical domains. The child's abilities are usually the first to be examined to study readiness.<sup>6</sup> It is therefore necessary to clearly define domains that build the child's readiness for school.

Literature on educational theories and development of children has proposed 4 major concepts related to school readiness skills in children.



1. The “idealist/nativist” view which suggested that children are ready for school when they mature to have self-control, form relationships with others relations, and are able to follow instructions. This process is therefore endogenously determined and the role of the environment is minimal.<sup>7</sup>
2. In contrast, the “empiricist/environmentalist” view focuses on children’s knowledge of pre school concepts and information related to self and how they behave. This view understands school readiness as the result of what has been taught to the child. These theories reiterate that the child should be given adequate time to develop.<sup>8</sup>
3. A third perspective is a “social constructivist” model. This model rejects the endogenous skills or defined set of knowledge within the child that help him/her to be ready for school. Instead this model focuses on the community and its expectations and provisions for the development of a child, and do not advocate dependence on the child and his or her skills alone.<sup>9</sup>
4. The final construct is an “interactional relational” model. This model, focuses on the continuous interaction between the child and his environment. This theory emphasises on supporting all children to learn, and suggested that success in school performance is dependent on the interactional relationship of the school and child. This model emphasised the importance of the teacher is being a mentor. This fourth model has been greatly accepted by developmentalists, as it emphasises that experiences and interactions in early childhood fosters child development.<sup>10</sup>

The importance of the interactional–relational model of readiness caused researchers and policy makers in the United States of America to study the different domains that facilitate readiness for school during 1998-2000. The influence of environment

on the developmental abilities of the child brought about a need to firstly define School readiness. The National Education Goals Panel put forth the following definition of School Readiness.

“School readiness is defined as the:

1. Children’s readiness to enter school
2. School’s readiness for children, and,
3. Family and community supports that contribute to the readiness of children.”<sup>11</sup>

Considering the vastness of this definition the National Education Goals put down domains of development that foster children’s readiness for school. These domains need to be assessed regularly in order to state that a child is ready for school and to document the developmental trajectories of learning. The domains contributing to the child’s readiness for school are the following:

### **1.2.1 Physical health and development:**

Factors which promote health such as nutrition, cognitive stimulation and home environment have been the focus of several studies.<sup>12</sup> The child’s rate of physical and mental growth, and physiology of the body were classified as markers of health by the National Education Growth Panel. Regular developmental follow-up and early intervention programs such as Head Start promote health, while diseases and physical impairment impair health and development. Recurring impairments can impact on a child's self-concept and freedom in a detrimental way. This also leads to difficulty in making friends, and can lead to developmental and behavioral problems and poor response to school environment <sup>13</sup>. This in turn can affect school adjustment and academic performance.<sup>14</sup>

The physical development comprises of gross-motor, fine-motor, sensory- motor integration and oro-motor development. The *Gross motor skills* such as running, jumping, and climbing stairs are some of the developmental milestones observed by three years. The *Fine motor skills* involve precision and manual dexterity. Fine motor coordination is required for activities like turning the pages of a book, colouring, manipulating boxes and blocks. These are regular activities in the school environment which make the gross and fine motor skills essential for children to perform well in the kindergarten.

The sensory inputs through visual, auditory, tactile and kinaesthetic modes facilitate motor responses to different stimuli in the environment. The *integration of senses* and motor movements are important for various activities in the school environment such as playing with a ball and moving about in a crowd. One of the important tasks in the classroom is writing which is dependent upon eye and hand coordination.

*Oro-motor movements* are necessary for independence in eating and drinking. These movements are also important for clarity in speech. Functional Performance in activities of self-care is another component of physical development that makes a child ready for school. Indication of bowel and bladder movements, independent feeding are the different activities of self-care that are necessary for independent functioning in school.

### **1.2.2 Social and emotional development:**

This domain has been proved to be important for school readiness in children.<sup>15</sup> There has always been a difficulty in making objective assessments of these domains. There is a need to differentiate between what the child knows and feels and what the child does. The social and emotional skills are intertwined and need to be

separated for the purposes of definition and assessment. The NGEF guidelines defined the two domains separately.

*Emotional development* involves assessing the child's self-concept as this is an internal feeling state. Self-concept comprises of the traits, abilities, and ideas that promote daily functioning, social roles in different contexts, goals that motivate behaviour, and values that define how we perceive ourselves.

*Social development* involves interaction with two or three others- either peers or teachers, parents and others. The ability to form and sustain social relationships is important to children's preparedness for school. Children's skills in social interaction are dependent upon parent-child interactions and their early childhood experiences. Parents who have had a positive orientation towards school have a positive effect on child's social readiness for school<sup>16</sup>. Peer interaction has a long term implication towards school adjustment<sup>17</sup>. Children who had more friends were said to have made positive adjustment to school. They were able to continue their relationship with peers, and also form new friendships as the school year progressed.<sup>18</sup> Conversely, aggression in children, lack of awareness and empathy of the feelings of other children and poor social skills correlate with poor peer relationships. Peer relationships that are filled with problems in the early years have been shown to be related to problems in coping with emotions and leading to disturbances in mental health, discontinuing from school, and delinquent behaviour.<sup>19</sup> Such children are more likely to be less ready for starting school.

### **1.2.3 Approaches to learning:**

Acquisition of knowledge and skills is closely related to the child's approach to learning. Approach to learning is defined as the habits, predisposition and learning

styles that are expressed by the child. The predispositions may include: gender, personality traits, and beliefs and practices of the culture they live in. Some of these predispositions may be present at birth and determine how children would approach different learning situations. While gender, temperament and culture influence learning styles, the learning styles are malleable and change based on context and intervention.<sup>20</sup> The different learning styles as defined by NGEF are:

(1) Openness to and curiosity about new tasks and challenges: Tasks of learning and knowledge acquisition are of interest to children. They approach such tasks of learning with an enquiring mind, sense of inquisitiveness and with an interest in learning the novel and the unknown.

(2) Initiative, task persistence and attentiveness: The ability to start with an idea and plan and follow through with complete attention is called initiative. This helps them fare better in higher grades.

(3) A tendency for reflection and interpretation: This helps the child unlearn and re-learn and solve problems. This is also referred to as ‘socialisation of thought’(Wolf, 1992).<sup>21</sup>

(4) Imagination and invention: This consists of the ability to form images and develop representational thought.

(5) Cognitive styles: refers to the way children approach learning and the ways they process information. When the information is presented in ways that suit their cognitive style learning is facilitated.

#### **1.2.4 Language development and communication:**

Language is a highly valued skill for competent functioning in school. Children who are not ready for school have often lagged in this domain. Children need to be able to use language to communicate so that they can express their thoughts and emotions to others and also receive and understand the responses from others. Language is one of the tools used to develop and represent concepts, that aid in thinking and cognition.<sup>22</sup> The three components of language are semantics, syntax and pragmatics. These three components help to convey meaning, form sentences and comprehend and participate in social conversations. The categories of language which are associated with school readiness are verbal language and literacy.

I. *Verbal Language:* In early childhood children learn to listen, speak and, use language to establish and maintain social relations. During this period they also learn new vocabulary, how to raise and respond to questions.

II. *Emerging Literacy:* The whole education system involves literacy. Literacy or learning to read and write begins to develop before children learn to read in the formal context of a school. The emergent literacy competencies such as literature awareness, print awareness, understanding of stories and the process of writing are continually developing in young children.<sup>23</sup>

Language abilities help a child to engage in expressing and interpreting. This is a necessity for domains of cognition and learning so that children can read and write and gain knowledge about other subjects that are taught in school. Language helps children to understand and express their understanding of the world and to exchange this information. These skills of language help them to be successful in class and adding to their knowledge base about the world.<sup>24</sup>

**1.2.5 Cognition and general knowledge:**

The cognitive knowledge in early childhood includes at least three different kinds of knowledge- physical knowledge, logico-mathematical knowledge, social-conventional knowledge.<sup>22</sup> These three types of knowledge though interrelated are to be separated to understand the learning systems in children. The development and use of this knowledge is facilitated by the cognitive processes such as executive functioning, working memory and metacognition. Using this knowledge children develop representational thought, problem-solving skills, number skills and creative thinking.

**1.2.6 Environment:**

While a child's readiness for school depends on the child's maturity and competencies, research has shown different factors to influence readiness for school in a child<sup>5</sup>. Children's cognitive and/or social-emotional preparedness for school are associated with:

Socioeconomic status

Child's health

Family background characteristics

Home environment

Participation in some sort of preschool program

**Socio-economic status:**

Socio-economic studies have often been linked to ethnic factors and parental education. According to Shonkoff and Philips socioeconomic factors interact with

other factors making it difficult to assess the extent of their influence.<sup>13</sup> Poverty brings inequalities in living conditions, health and psycho-educational development. It was reported that poverty in early childhood is more detrimental than in late childhood.<sup>25,26</sup> Children's reading, mathematics, and general knowledge have been found to differ according to the age at which they begin kindergarten, their mother's educational achievement, the type of family they belong to, and the primary language that is spoken at home.<sup>16,27</sup> Children from lower income localities, children immigrating to developed countries and children with a socioeconomic disadvantage are found to be 'not ready for school.'<sup>28,29,30</sup> School readiness among children living in poverty is poor, with deficits in cognitive and socio-emotional indicators.

### **Child's Health:**

Healthy children have the freedom which allows them to get involved in experiences that facilitate learning. This is difficult for children with health needs such as physical or neuro-developmental concerns. They are forced to face or bear the discomfort, and live using the special arrangements or depend on others. They may begin to feel "different" from children in their class or school and this can cause to difficulty in adjustment to school. Their restrictions in movement may affect their ability be independent to the extent possible. Poor health leads to poor school performance and increased absenteeism from school.<sup>14,31</sup> The NGEF highlights that it is necessary to focus on the conditions under which children develop and thereby include: (1) perinatal context; (2) caring environment; and (3) use of health services in early childhood development programs.<sup>11,32,33</sup>



**Family interactions and behaviours**

In various studies two types of family interactions has been associated with various components of a child's school readiness. One of them is the strategies that families' use that stimulate cognition, and learning such as narrating or reading stories to the child, which has been noted in multiple studies.<sup>34,35</sup> The other family behaviour is the positive parenting practices, i.e parents' sensitivity in responding to their children's interactions and emotional states.<sup>36,37</sup> In the study on maternal stimulation and intervention in the rural areas of Hissar, in India it was found that in the pre test the mean scores on maternal stimulation was similar for the experimental and control groups. The groups had scores lesser than the average maternal stimulation score in the population. This shows the decreased awareness of ways to stimulate their infant<sup>38</sup>. Family interactions have an influence on the physical aggressive behaviour in children.<sup>39</sup> These studies point to the role of family characteristics in a child's early development and readiness for school.

A child's environment is also a crucial contributor to the child's readiness for school.

The five universal needs of all children are:

1. Proper healthy nutrition, monetary support for their needs, provision of clothing, and suitable living conditions, appropriate stimulating education and primary health services.
2. Children need relationships that promote security and nurture them. This can be made available in their homes by their family or by the community or peer group.
3. Children need opportunities to develop their skills and talents and contribute to their communities.

4. Children need protection from injury, abuse and neglect and exposure to violence.
5. Children need to receive healing when their parents or significant adults in their life have not been able to protect them. If they have suffered any harm they need to receive emotional support and their physical and mental health care needs have to be met.<sup>40</sup>

These needs of a child are mostly met by parents and a warm home environment. When children move from home to school there is the first big change that happens in the life of a child. There is therefore a need for the school to be ready to welcome young children and facilitate their learning.

The different components of readiness has been integrated in the definition by Mashburn (2006)<sup>9</sup> who defined school readiness as “a function of an organised system of interactions and transactions among people (children, teachers, parents and caregivers) , settings (home, school and other child care) and institutions (government, neighbourhood, community).”

### **1.3 Burden of Learning Needs in India:**

Poor school performance has been studied in India from 1980s. Reasons such as specific learning disabilities, borderline or low intelligence, medical difficulties, attention deficit hyperactivity disorder, psychiatric disorders , emotional difficulties, poor socio-cultural home environment, and neighbourhood causes have been associated with poor school performance.<sup>41</sup> The prevalence of intellectual impairment is 20 per 1000 of general population, while the prevalence of developmental delays is about 30 per 1000. This is further precipitated by the poor health status of Indian children where 31% are stunted and 42% are underweight.<sup>42</sup>

The poor nutrition and growth inhibiting factors further impact learning and cognition.

The incidence of specific learning disabilities is 5-15% in India. A study has shown that by availing the special provisions and educational support, these children score higher marks and cope better in the school environment.<sup>43</sup>

### **1.4 Rational for the present study:**

In India the educational system now includes all groups of children into regular school under the Sarva Shiksha Abhiyan. In 2009-2010 the number of children who were enrolled into schools in Tamil Nadu is 12,21,516 children.<sup>44</sup> A considerable proportion of these children were enrolled in pre-school and kindergartens. There is therefore a need to assess the readiness of children in all domains in order to identify and refer children for special services if not ready.

With the rise in the incidence of Learning Disability and better survival rates of high risk new-borns, the readiness in cognitive, social, emotional and literacy needs to be studied. Studies show that high risk new-borns are at risk for later academic difficulties

While some children avail early child care facilities and pre-school programs most children join school at three years. The transition from home to a school needs to be studied for this group of children as school is the first transition from home. The facilities in school, the teacher's competencies need to be examined to find out if they facilitate the transition.

The family and home environment have been shown to influence school readiness. Such influences have to be studied in India to offer better educational services for

children. The constitution of the home environment and its impact on school readiness needs to be understood in a developing country like India. This will help to plan for changes and enhancement of the home and school environment. This study proposes to methodically understand the readiness for school in children and study the impact of family and home environment factors.

These issues led to the birth of the research problem that the present study addressed. The present study aimed to find the answers to some of these pressing needs by having assessed the prevalence of children who are not ready in a small urban population. The study was also designed to find the predictive factors that contribute to this prevalence.

## **2 AIMS AND OBJECTIVES AND OPERATIONAL DEFINITIONS**

### **2.1 Aim**

The aim of this research was to study the school readiness of children at three years (36-48 months), when they are admitted to the schools in Vellore town.

### **2.2 Objectives**

1. To study if children are ready for school at three years in the five domains of physical development, language and literacy, number skills, arts and science, personal and social development. (Phase I- A Cross- sectional study to assess school readiness in children at three years in Vellore Town).
2. To study if the type of predictive factors associated with the children who are not yet ready for school is different when compared to children who are ready for school. (Phase II- Case-Control Study to study predictive factors associated with school readiness in 3-4 year old children)

### 2.3 Operational definitions

**Child:** The United Nations convention defined “child” as every human being below the age of 18 years.<sup>45</sup>

**School:** An institution for the instruction of children or people under college age.

**School readiness:** Children who have ‘proficient’ skills, as measured by Work Sampling System in the seven domains.

**Not ready for school:** Children whose average score is less than 2 on Work Sampling System.

The **independent variables** that were assessed in this study were defined as follows:

**Socio economic status:** Classification of a family based on education, occupation and family income as measured by Kuppuswamy’s socio-economic status.

**Antenatal Complication:** Any health/pregnancy related complication that required treatment/ hospitalisation for the mother during the antenatal period.

**Neonatal complication:** Any health related problem that required treatment/ hospitalisation during the neonatal period of the child.

**Intelligence:** cognitive ability of the child as indicated by the Intelligence Quotient (IQ) on Binet Kamat Test of Intelligence,(BKT) and Social Quotient (SQ) as measured on the Vineland Social Maturity Scale (VSMS).

**Home environment:** The environment in which the child lives most of the time when not in school.<sup>46</sup>

## AIMS AND OBJECTIVES AND OPERATIONAL DEFINITIONS

**Parent:** The child's primary caregivers with whom the child has been living for the past one year.

**Parental Involvement:** The scores obtained from parental involvement scale on the three dimensions- home involvement, school involvement and parent teacher association.

**Teacher:** The adult who teaches the child and is the class teacher for the child at school.

### **3 REVIEW OF LITERATURE**

The study on school readiness and early literacy of children started in 1997. These studies were aimed at finding the factors that predicted school readiness and school success. In 1998 the National Goals for Education Panel (NGEP) published their goal of getting all children ready for school by 2000. In their report they emphasized that preparedness went beyond academics.<sup>6</sup> This brought about extensive research work on the school readiness of children, its predictors, and the influence of family and schools

The literature review has classified its search into the following sections:

3.1 Definition and Prevalence of School readiness

3.2 Components of School readiness and their measurement

3.3 Predictors of School readiness

3.4 Influence of socioeconomic factors on school readiness

3.5 Factors of child development that influence school readiness

3.6 Impact of Home environment and parental involvement on school readiness

3.7 The teacher's and school's role in 'school readiness' of children

#### **3.1 Definition and prevalence of school readiness**

The definition of readiness has expanded over the years to accommodate aspects of the child, family and school.



Dockett and Perry (2009) highlighted that almost always there is a perception that readiness for school means that the characteristics of individual children have to be assessed against some set standard expectations. The authors concluded that a child's readiness for school, schools readiness for children and community support underpins readiness.<sup>10</sup> While school readiness in a child is dependent on the school, family and community, there is a need to know if children are ready for school, and what proportion of children are not ready for school.

Brown et.al (2007) conducted a meta-analytic review of 78 studies related to the assessment of school readiness and the results revealed the following<sup>47</sup>:

- The studies reviewed often assessed **eight domains** of child development: overall child development, development of cognition, language and communication, mathematics, health of the child.
- The assessment of *literacy skills* includes children's interest in books, their awareness of print, their recognition of letters and sounds. *Language/communication skills* were related to children's literacy skills. These measures focussed primarily on children's ability to comprehend and express. 28 studies assessed language and communication skills in a child apart from literacy.
- Forty-one studies reported assessment of children's mathematics/pre-mathematics skills. This included assessment of the child's skill in solving number based activities such as operations, awareness of numbers and shapes.

- Thirty-six of the studies collected data on *social and emotional development* in children. Assessment of social emotional development included behaviors such as children's social competence and pro-social behavior, and also children's negative or problem behaviors.
- Thirty studies examined children's *health/physical development*. This domain included measuring children's health and well-being; fine and gross motor skills; and their nutritional status, oral hygiene, and medical problems.
- *Type of school performance outcomes examined:* School outcomes were measured in a variety of ways, including report cards and grades, attendance, grade retention, school adjustment/attitude, special services, and standardized achievement tests.

The Minnesota School readiness study assessed the school readiness of a sample that represented the population that were admitted into the kindergarten of Minnesota State. 7,539 children in kindergarten from 126 selected elementary schools in the state were enrolled in the study. 73.3% of children were proficient in the Physical Health and development domain, 61.7% were proficient in the domain of Arts, 60.3% were proficient in the domain of Language and Literacy and 57.6% were proficient in the domain of Mathematical thinking. This study also found that the odds of children from lower-income households being not ready for school was 2 times more than children from higher income households. Gender was also a predictor of school readiness as boys were 1.5 times more at risk for being 'not ready' for school when compared to girls.<sup>48</sup>

In the Three year Minnesota School readiness study of 2004, 1,852 children were followed up for three years and assessed every year on school readiness domains. In

the Year 1 study, the children were most proficient in Physical development and health (62%), followed by the domain of personal and social development;( 49%) and the arts (48%) and least proficient, or average, in the areas of language and literacy (44%) and mathematical thinking (42%).<sup>49</sup>

Wen-Jui Han, et.al. (2012)<sup>30</sup> detailed the characteristics of school readiness of children of families who immigrated. These children were part of the Early Childhood Longitudinal Study which followed up children born in 1998. 6800 children's data was analysed for cognitive outcomes and parent reported socio-emotional outcomes of school readiness in foreign born Chinese, Asian, Mexican and Latin children immigrants with their native born white counterparts.

The authors found that socio-economic status (SES) and language used at home by the family had an effect on school readiness. This study reported that the English proficiency of parents accounted for the difference in reading skills and spoken language.

In the above study Chinese and Asians had advantaged family backgrounds and thus outperformed their White peers in early reading and mathematics. In the domain of expressive language the Asians did not show an advantage. Children of Mexican immigrants started school with the least advantaged family background, and this adversely affected the school readiness performance.

Despite being immigrants, children from advantaged Asian families performed significantly better on tests of school readiness when compared to their peers. The socioeconomic status and familiarity with the language significantly influenced the school readiness of immigrant children.

### **3.1.1 School readiness in India**

Missal (2012) conducted a survey on school readiness among the pre-schoolers in the community and determined the percentage of the children under various level of school readiness. A sample of 100 pre-schoolers between the ages of 3 to 5 years was selected. The Early Development Inventory (EDI) which is a developmental questionnaire was completed after interviewing the teacher about each child in the class. The analysis of EDI showed that 57% were school ready, 23% were vulnerable and 20% were at risk. The author summarised that 57% met the criteria for readiness while 43 % were not ready for school.<sup>50</sup>

In another study, association of school participation and school readiness was studied across the rural areas of three states of India. 12,000 children were assessed and the results showed that uniformly the school readiness scores were poor in all the three states. The results also showed that household affluence and income had positive associations with school readiness.<sup>51</sup>

## **3.2 Components of School readiness**

Studies have covered eight domains of a child that are an integral part of school readiness in children. The next section of the literature review consolidates studies that assessed these domains and reported the effects of these domains on child's readiness for school

### **3.2.1 Cognition**

Blair (2002)<sup>52</sup> examined the construct of emotionality, relations between cognition and emotion, and neural plasticity and frontal cortical functioning and proposed a developmental neurobiological model of children's school readiness. The author

proposed that the environment (home and school) that reduces stress and fosters positive emotional development enhances school readiness by promoting attention and cognitive self-regulation (both of which are required for social and cognitive readiness for school.)

Cantin Rachele(2012)<sup>53</sup> discussed the importance of executive functioning in enhancing school readiness. The authors stated that the executive functioning is an important predictor of school readiness, as it has a significant effect on academic, social and behavioural domains.

Welsh et.al (2010)<sup>54</sup> followed longitudinally 164 children enrolled in Head Start Programs to study developmental associations between cognitive processes of short term memory and attention and skills of emerging literacy and number skills across the pre-kindergarten years. The analyses revealed that general cognitive processes were predictors of growth in literacy and math abilities in the pre-kindergarten years. The results of this study also showed that executive functions were predictors of emergent literacy in the year before kindergarten ( $\beta = .29$ ).

Cognitive processes along with executive functioning influence the child's readiness for school. Vitiello, et.al (2011)<sup>7</sup> studied if approaches to learning mediated the relations between cognitive flexibility and school readiness. Assessment on 191 children who were part of 22 Head Start Classrooms was done. Multilevel mediation analysis revealed that the 'attention /persistence' component of learning methods, mediated relations between cognitive flexibility and school readiness.

These studies show that the different aspects of cognition such as working memory, attention control, cognitive flexibility and executive functioning have a strong

association with school readiness. This suggests that cognitive component of the child needs to be measured to study school readiness.

### **3.2.2 Language**

Foorman BR et.al (2002)<sup>23</sup> wrote that emergent literacy is secondary to oral language. They highlighted the importance of a language rich preschool and recommended that schools should teach phonologic sensitivity and letter knowledge ways that enhance development. The association between oral language and emergent literacy is significant. While oral language and emergent literacy is correlated, the difference in the native language and early reading has also been studied.

Erika Hoff et.al.(2014)<sup>27</sup> studied the expressive language trajectories between 3 groups of children in the ages of 22 month to 48 months- two native Spanish speaking parents, 1 native Spanish and 1 English speaking parent, and 2 English speaking parents. Children with 2 Spanish speaking parents had the steepest gains in total vocabulary with balanced bilingual vocabulary at 48 month. Their English vocabulary was lower than in children from homes where both parents spoke English. The authors encouraged exposure of the child to their heritage language and community as this fosters vocabulary development and indirectly, school readiness.

Using the Early Childhood Longitudinal Study, Kindergarten Cohort, Han et.al (2012)<sup>55</sup> examined how bilingualism impacted children's academic growth when they join school (n = 16,380). While the gaps in mathematics between the English dominant and non-english dominant group closed by fifth grade, the differences in scores on tests of English did not close. The scores of the non-english group was significantly lower than English speaking group.

Apart from the language at home, studies on children's phonological skills also showed that these skills are necessary for early reading.

Melby Lervag et.al(2012)<sup>56</sup> conducted a meta-analytic review of relationships among the components of phonological skills and word reading skills. Analyses of studies reported that phonemic awareness was correlated with the ability to read words. These findings reiterate the pivotal role that phonemic awareness plays as a predictor of reading development.

These studies show that children from bilingual homes have delays in mathematics and reading. The results show that children from bilingual home who begin schooling in English have a disadvantage unless adequate training is provided to bridge the gap in learning.

### **3.2.3 Social skills**

Research on school readiness has focused on the links among cognitive, social, and self-regulatory markers of readiness.

Meta-analytic work by LaParo and Pianta<sup>6</sup> showed that preschool and kindergarten assessments of cognition predicted, on an average, 25% of variance in the cognitive scores of the early elementary school (till second grade). This suggests that indicators of cognition are important in the early education. This also suggested that other factors accounted for most of the variance noted in early school outcomes. The other outcomes include a child's adjustment to the school socially as this has an association with their kindergarten achievement and participation in class. The children's skills in work such as following instructions in class were also significantly related to school success.

The Social-emotional behaviour of 3- and 4-year-olds(n=352) attending private childcare and Head Start Programs was observed by Denham et.al.(201)<sup>57</sup>. Age, gender, and differences of home environment were found in the social-emotional behaviours. Children who were younger scored lower on the social-emotional behaviours. Boys were found to be more at risk for poor emotional regulation. Children's awareness of emotions facilitated, appropriate emotional understanding and pro-social behaviour later. Negative/aggressive behaviour in children had an effect on school outcomes.

In a survey of 3500 kindergarten teachers, Pianta and Cox (2000) reported that 52% had successful transition, 32% experienced some problems and 16% had difficulties entering kindergarten (adapting to the requirement). Most common problem reported was 'teachability' such as interacting and getting along with children, cooperation and following directions.<sup>58</sup>

Ziv and Yair (2013)<sup>59</sup> examined the links among social information processing, social competence, and school readiness in a short-term longitudinal study with a sample of 198 preschool children. The authors reported that both understanding of social information and competencies to solve social problems were related to school readiness.

Jeon et al.(2014)<sup>29</sup> examined the association of Socio-economic status and neighbourhood on social emotional problems. Children who were found to have a greater number of family socioeconomic risks and a higher level of disadvantage in the neighborhood had significantly lower scores on cognitive skills. Parents who had more family socioeconomic risks and lived in a disadvantaged neighborhood



reported more depressive symptoms, which, in turn, showed that there was a greater probability of children having social-emotional problems.

Denham(2013)<sup>60</sup> studied the emotions felt and expressed by 298, 4 year olds on different situations that were presented on videos. He reported that feeling sad led to socially competent response while feeling angry led to aggressive behaviour. He concluded that identifying emotions would help children respond in socially competent manner.

Herndon et al.(2013)<sup>61</sup> investigated whether expression and /or the ability to regulate emotions were associated with school readiness. Behaviours of children in Head Start Programs and child-care centres were observed and compared to teachers' ratings. Emotional expression and regulation were associated with school adjustment and social and emotional readiness in the positive direction.

In the social domain, social information processing and social competence have an impact on school readiness. While emotional knowledge facilitated pro-social behaviour, aggressive behaviour affected school outcomes. Studies on emotional readiness pointed to self-regulation as an important factor in predicting school readiness. Blair<sup>52</sup> proposed a neurobiological definition of school readiness and suggested that self-regulatory skills form the foundation for behaviours and skills necessary for successful functioning in the kindergarten. Ability to attend selectively, express appropriate social responses and being able to stay engaged in academic tasks have all been implicated as factors that significantly contribute to and define "school readiness." Child's age is also reported to be an indicator of school readiness as it shows the maturity of the child in the cognitive, social and self-regulatory domains.

### 3.2.4 Behaviour

Son, Seung-Hee et al (2013)<sup>62</sup> examined behavior regulation, gender, and school readiness outcomes in pre-academic and classroom functioning in the preschool ages. The study was conducted in a sample of children attending preschool between the ages of 3-5years (n = 229). Girls scored higher on work and social skills in the classroom. No difference was observed in behaviour. However, the contribution of behavioral regulation to early reading was positive and stronger for boys.

Duncan et al. (2007)<sup>4</sup> in their study examined the associations between early cognitive skills and behavior patterns with later achievement. They suggested that early behavior competencies or problems had little prediction to later achievement. Attention abilities had small positive relations with achievement in higher grades. In contrast, cognitive abilities were the strongest predictors of achievement.

Grimm et al. (2010)<sup>63</sup> conducted a reanalysis of 3 studies from the Duncan et.al. study. The reanalysis supported the idea that attention measures are more predictive of readiness in academics than behavioural measures; however, behaviour measures showed to changes in academic achievement through elementary school

Sims, et al, (2013)<sup>64</sup> examined the overlapping of relations between measures that assess inattention and hyperactivity/impulsivity and emergent literacy skills in preschool children (n= 204 ;"M" age = 56 months). The class teachers completed the behavioural rating scales, and the pre-schoolers were assessed on the Continuous Performance Test (CPT) and the Test of Preschool Early Literacy. Across measures, inattention had an effect on academics but not hyperactivity.

There is evidence to suggest that attention processes influence the literacy component of school readiness more than the behavioural regulation. A positive behaviour contributed to better reading especially for boys.

### **3.2.5 Motor skills**

Roebers et.al (2014)<sup>12</sup> conducted a longitudinal study to measure the relation between cognitive, motor performance and child's academic achievement and school transition. The children were assessed on fine motor skills, executive functioning and non-verbal intelligence. The performance on these domains was used to predict achievement in mathematics, reading, and spelling in preschool. Analyses revealed that fine motor skills, executive functioning and non-verbal intelligence were significantly interrelated. It was also noted that executive functioning facilitates the motor-cognitive connection which is positively related to later school performance.

Grissmer et.al (2014)<sup>65</sup> included a general knowledge test to study the relationship of the various domains of school readiness and achievement in higher grades. The study concluded that attention and, fine motor skills, were stronger predictive factors than scores on math and reading. Results showed that the test of general knowledge was a strong predictor of competence in reading and science. This had a significant effect on the prediction of later mathematical skills.

Duncan et al. (2007)<sup>65</sup> studied variables that contribute to readiness in early education and quantified their contribution. They examined what factors measured at the start of the kindergarten year would predict reading and mathematical abilities in higher grades. Results found that fine motor skills were an additional predictor of math and reading in higher grades.

Cameron et.al (2012)<sup>66</sup> examined executive function (EF) and components of fine motor abilities and their effect on six different standard assessments in middle-socio-economic status children in kindergarten. When background variables were controlled, increased scores of Executive Function and fine motor skills, predicted higher achievement on other school readiness domains at the kindergarten entry.

Carlson et.al (2008)<sup>67</sup> examined the relationship between the time students were in physical education and their scores on academic subjects. The sample included students from kindergarten to 5th grade (n = 5316). Results showed a small but significant gain in mathematics and reading for girls who were enrolled in higher amount of physical education

There is a significant association of fine motor skills to school readiness along with other factors of cognition and achievement. Gross motor skills had less association with school readiness.

The studies discussed in the sections above show that school readiness that is not determined by child's skills in any one domain. Interventions and mediation analysis showed that targeting one domain increases readiness in other domains as well.

### **3.2.6 Measuring school readiness**

Snow (2006)<sup>68</sup> wrote that school readiness needs a clear definition. He argued that traditionally school readiness was viewed as a maturational process which led to readiness testing. He concluded that multiple factors that contribute to school readiness have to be assessed. Over the years school readiness has been looked at as an outcome measure, and it includes child's readiness for school, school's readiness for the child and the ability of the family to support optimal development.<sup>69</sup>

Literature search showed that the Work Sampling System which is an observational

tool incorporated all domains of school readiness. The tool was examined and proved to be reliable and valid.

Miesels et.al (2008)<sup>70</sup> examined the reliability and validity of language, literacy, and mathematics domains of Work Sampling for Head Start (WSS). 112 children who were admitted in Head Start for 2 years and a number of other programs were assessed using WSS.

The teachers underwent training before the start of the year to use WSS checklist and the method to collect observation based data about the children in their classroom during the three terms of the academic year of enrolment. The outcome data was measured using standardised tests of early reading and math. Results showed very high reliability of WSS subscales. There was moderate correlations between WSS and the outcome measures. The authors reported that WSS correlated with the tests of reading and math even when controlled for demographic variables. The ROC curves confirmed that teachers could use WSS to predict a child's performance in reading and mathematics in lower grades.

### **3.3 Predictors of school readiness**

Having assessed different domains of school readiness there is a need to find the influence of each of these domains on school performance and adjustment.

Paro and Pianta (2000)<sup>6</sup> presented the results of a meta-analysis of relationship between academic or cognitive and social or behavioral assessments from preschool to grade two. The authors reviewed seventy longitudinal studies which report the relationship between academic and social factors when measured in pre-school and then in grades up to the second. Effect sizes for academic and social predictors were small for both time spans.

Duncan et.al (2007)<sup>4</sup> used six datasets, and estimated links between 3 important components of school readiness (academic at the time of joining school, attention, and socio-emotional skills) with reading and achievement in mathematics in the later school. An analysis of the results showed that mathematical skills in early schooling was the highest predictor, and this was followed by reading and attention.

Linder Sandra M.(2013)<sup>71</sup> presented findings from a review of the literature on studies that assessed the predictive factors of school readiness in mathematics and literacy. ‘Child care experience; family structure and parenting; home environment; learning-related abilities; social behaviour; number and and literacy-based activities; and health and socioeconomic status’ were associated with school readiness. Risk factors that were reported from this meta-analysis were low birth weight, prematurity, or general health problems, and socio-demographics variables such as gender where boys struggle more than girls, single mother families where children score lower, low education level of mothers (not completed high school) or the occupation of the head of the family.

Sabol and Pianta (2012)<sup>72</sup> examined the socio-emotional and executive function categories at fifty-four months and predicted fifth-grade socio-emotional and achievement outcomes for 944 children. A group of children at 54 months who were assessed to have low working memory were found to have high levels of socio-emotional problems and were low achievers when assessed in the fifth grade. Children in whom high social competence or working memory was observed also scored high on 5th-grade achievement. Children with higher readiness profiles scored more in tests of mathematic achievement in the fifth grade after the early demographics were controlled.

Hooper et.al (2010)<sup>73</sup> examined the contribution of social-behavioural predictors in African American versus Caucasian students to their reading and mathematical skills. The predictor measures at the kindergarten were correlated with reading and mathematical scores in grades 1, 3, 5 and 8 or 9. The results showed the relative contributions of reading and mathematical skills in the early grades to later academic functioning. Early expressive skills had a positive correlation with reading and mathematics scores. The authors reported a weak association of social- emotional predictors to later learning. Early ratings of aggressive behaviour and internalizing behaviour had moderating effects on later mathematical skills and reading for African- American students.

Prior et al. (2011) conducted a longitudinal study from eight months to seven years of age and reported on school readiness (SR) and its predictive factors. The children were studied by surveys and assessments at yearly intervals. The study focused on language, pre-literacy and behavior development. The authors reported that significant predictors of SR could be observed from when the child was two years old. The predictive factors were associated with language and pre-literacy from 2-6 years. Children who showed language impairment (12%) were significantly lower on school readiness. Child's language abilities and pre literacy capabilities influenced school readiness the most.<sup>74</sup>

Pagani (2010)<sup>75</sup> examined a population data of children who spoke french. The authors examined the associations of cognitive, attention, and socio-emotional characteristics that determine kindergarten school readiness as well as second grade mathematics, reading, and general achievement. The results showed that, kindergarten cognition and attention characteristics were the factors that were predictive of achievement in the second grade. Behavioural problems also emerged

as predictors of later achievement. Predictors in the order of effect size were as follows: kindergarten mathematics skills, attention skills, receptive language skills, attention problems, and behaviour.

Romano et al. (2011)<sup>76</sup> replicated and extended findings from Duncan et al. (2007). The authors examined the effect of kindergarten literacy and math skills, attention, and socio-emotional behaviours (reports from mothers) on 3rd-grade mathematics and reading outcomes in 1,521 children. Results showed (a) mathematics, literacy and attention predicted academic scores in higher grades with math being the strongest.. The authors also found that the significant predictors of mathematics and reading in 3<sup>rd</sup> grade were socio-emotional behaviours in kindergarten (specifically hyperactivity/impulsivity, pro-social behaviour, and anxiety/depression). There were several significant associations between early and later socio-emotional behaviours. These findings supported the importance of socio-emotional behaviours as indicators of current success in school and predictors of later school success.

Performance in school is dependent upon multiple factors. Having a child 'ready for school' helps in school performance. A child if found 'not ready for school can be helped by a multidisciplinary team to overcome some of the challenges which affect school readiness.

Education is one of the most important components of human life. Poor school performance often results in children finding it difficult to cope socially and causes stress to the family. The common reasons reported for poor school performance were health problems, below average intelligence, attention deficit with or without hyperactivity disorder, specific learning disability and poor socio cultural environment and home. An early identification, diagnosis and assessment by a multi-



disciplinary team would help to find the reason for the poor school performance. This would help to plan treatment early so that the child is enabled to achieve his or her full potential.<sup>41</sup>

### **3.4 Influence of socioeconomic factors on school readiness**

The one variable that has been repeatedly reported in literature to be associated with school readiness is socio-economic status. Multiple studies have looked at school readiness in children who have grown up in poverty, and in disadvantaged areas of cities.

Secondary analyses was done of data from 3 studies of children by Burchinal et.al (2000).<sup>77</sup> They assessed if poverty, ethnic background, gender, or parental authoritarian beliefs moderate the association between quality of the care the child receives and cognitive and social outcomes in the child. The results showed that quality of child care was related to the child's development. Poverty, minority background and poor parental beliefs were associated with child care quality and school readiness. The authors also reported that quality of care was more important for language development in children from immigrant families than non-immigrant's children.

Carpiano et.al, (2008)<sup>78</sup> et.al., studied the relationship between the affluence of the surrounding areas of stay and child development outcomes in a study size of 37,798 kindergarten children.. The authors showed that when neighbourhood affluence increased, children's scores on the instrument measuring school readiness also increased significantly. There was a significant curvilinear relationship between four of the five EDI scales and the total score. This finding suggested, that concentrated affluence may have an effect on school readiness only to a certain degree, and,

children who were living in mixed-income neighbourhoods will benefit from the presence of affluent residents and the availability of services that assisted people who were from the 'lower-income' group.

Puchala et.al,(2010)<sup>79</sup> assessed independent effects of individual and community factors on school readiness among children whose second language is English. The study included all children attending kindergarten over 3 years. School readiness and child related variables were measured by the Early Development Instrument (EDI). Multilevel modelling examined how individual and neighbourhood factors moderated relation between children for whom 'English was a second Language' (ESL) and EDI domains scores. The results showed that children who lived in neighbourhoods with lower rates of employment had lower readiness scores on the EDI domains of communication and general knowledge. Children from neighbourhoods with a high ethnic variance had higher EDI scores, reiterating that a mixed neighbourhood with mixed ethnic diversity and varying degrees of affluence would enhance school readiness.

Dotterer et.al.(2012)<sup>16</sup> examined the link between socioeconomic status (SES) and school readiness. They tested whether parenting (mainly maternal sensitivity and the inappropriate negative approach/intrusiveness) and financial stress influenced the association. Participants were 164 mother-child groups from African-American and European- American families. Findings showed that maternal sensitivity mediated the link between Socio-economic Status and school readiness only for European Americans. Negative or intrusive behaviours from the mothers was a mediator between SSES and school readiness for both groups. These results indicated that the effects of parenting behaviours can vary by racial groups and thereby enhance or affect school readiness significantly.

Sirin (2005)<sup>80</sup> conducted a meta-analysis to study the relationship between socioeconomic status and gains in academics. The author found that the parental education, occupation and income significantly moderated the relationship between socio economic position and achievement in academics.

Jeon Hyun-Joo et al (2011)<sup>81</sup> examined school readiness upon kindergarten entry for children with disability who were from low-income indicators and were identified before the age of three. Children with developmental delays who were not receiving intervention had low scores on pre-academic skill at the kindergarten entry when compared to those who were not diagnosed with disability. In contrast, at age 5, the pre-academic skills of children who were receiving intervention was not different from children who had no disability signs. The results showed that early intervention services for children who were suspected to have developmental delay (from families with lower incomes) would improve their school readiness skills.

Caughy and Owen (2015)<sup>82</sup>, examined relationship between cultural socialization practices and school readiness among preschool children. The families were from low income groups. Children who experienced cultural socialization often demonstrated better pre-academic skills, comprehension, and had fewer behaviour difficulties. This association was not dependent on the gender of the child.

Bumgarner (2013)<sup>83</sup> examined the association between care received the year before they joined kindergarten and outcomes at the kindergarten entry in literacy, mathematics, and approaches to learning for Latino American children. The results revealed that the significant difference in child care in the year before the kindergarten was related positively with English literacy outcome. Latino children who were enrolled in Head Start obtained higher scores than those children in

parental care. Regardless of the care facility that they were admitted to at two years, children obtained similar scores when assessed in kindergarten on tests of mathematics, approaches to learning and literacy. The results also showed that the language of instruction is important role in prediction of kindergarten readiness. The authors concluded that centre based care in the year before kindergarten had a significant positive correlation with school readiness.

Hammer et al.,(2010)<sup>84</sup> investigated the effect of the child, his/her family characteristics, expressive and receptive language needs, and learning environment at home, on language and early learning outcomes in children from families with a low income. The results revealed that mothers education encouraged vocabulary development in the child. The regularity of learning activities at home, and children's abilities to identify letters and words were influenced by mother's educational status and the child's gender and age.

The socio-economic status variables such as ethnicity, poverty, minority status were reported to have a significant association with school readiness.

### **3.4.1 Income**

The household income is one of the factors helpful in determining the socio-economic status of a family.

Duncan et.al.(2011)<sup>85</sup> estimated the effect of income on children's achievement in school. Authors reported that thousand dollar increase in the yearly income of the family increases the achievement of young children by 5% - 6%. These results suggested a positive effect on the school achievement of pre-school children in later years.

Johnson et.al,(2013)<sup>86</sup> reported that families receiving subsidies from the government was a predictor for lower grades in mathematics. There were no significant associations between subsidy receipt and reading or socio-emotional skills. Families that received subsidy reported greater use of child care centres. This could explain the observation that the association between family income and school readiness was not significant whereas other studies reported significant small to moderate association<sup>86</sup>.

St Clair-Christman (2011)<sup>87</sup> found a positive relationship between child care quality program and program subsidy status. Programs that did not accept funds as subsidy funds were more likely to offer language and reasoning activities of a higher quality. These programs impacted children's development and school readiness positively. The authors reported that centres where teachers received more salary offered better services. Children whose families can access these services benefit more.

Pittard et.al (2013)<sup>88</sup> examined the effect of visits for Screening, diagnosis and Treatment when children were young on school readiness. The results showed that children who went regularly for these visits were 23 times more ready for school during the kindergarten age. They also reported that children who could not afford consultations did not visit often. They suggested that health care coverage policies could increase consultations and thereby increase school readiness.

In Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), 11,000 children were enrolled from birth. The Bayley Cognitive Assessment, was administered to children at nine months and then at twenty-four months. The comparison of mean scores of children from low-income and high income families showed that only about 30% of the children from families that earned low-income scored average or

above-average when compared to children from more affluent families. The authors concluded that by the time children from low income families reach their second birthday they were already at a considerable developmental disadvantage. (Halle et al., 2009)<sup>89</sup>

The economic disadvantage affected school readiness of children as it caused poverty which was detrimental to a child's health and learning.

### **3.4.2 Employment & Education**

Leary and Vermeulen(1986)<sup>90</sup> in their study on maternal employment and child's maturity at school entry found no significant association between the two variables.

Greenberger and O'Neil (1992)<sup>91</sup> reported a study of 238 mothers and 116 fathers. The parents described the behaviours of their children in the ages of 3-4-years; a small group of parents and teachers assessed the behavioural expressions of the child 2 years later. The association of maternal employment and fathers' and teachers' reports on child's behaviour was strong. Fathers perceived more problems in their 5-6-year-old when mothers were currently employed full time. Fathers and teachers observed the behavioural expression of children as more problematic when mothers educated less than high school were employed for most part of the child's life.

Brooks et al. (2010)<sup>92</sup> found that association between employment of mothers and outcomes in cognition and the development in socio-emotional coping in higher grades were neutral because negative effects are overcome by the positive effects of good quality child care.

Lombardi et.al (2014)<sup>93</sup> assessed current impact of maternal employment on school readiness. The results showed a neutral association between maternal employment

and total school readiness score. However maternal employment that started prior to nine months was linked with higher cognitive skills but poorer behavioural outcomes. Maternal employment was linked with decreased conduct problems when mothers worked between 9months to 24months of ages of their children.

There is presumably no significant association between maternal employment and overall school readiness. However reports from fathers and teachers and observational studies do suggest an increase in problem behaviours among children whose mothers were employed.

Holliday, et.al (2014)<sup>94</sup> in their study identified protective factors associated with school readiness. The study was conducted among a sample of children whose conditions for living were below the federal poverty line (n = 230). They reported that when the number of hours of child care increased and their health was regularly monitored they obtained with higher grades in mathematics, literacy, and approaches to learning, especially in children from families below the poverty line.

The literature review highlights that while poor socio-economic status as determined by the family income, parental education and occupation have a negative association with school readiness, subsidies, preschool programs, good quality child care centres and access to health care facilities and regular check-ups would improve school readiness.

### **3.5 Factors of child development that influence school readiness**

A child's physical and mental well-being has been shown as crucial to development in early childhood and making them ready for school. The child's health is affected

by complications during birth or thereafter or by growth being affected in early childhood.

Advances in care for high-risk neonates and their mothers resulted in survival of infants born preterm with low birth weight increasing. Some studies on long term follow up of these children report the prevalence of a wide array of neurodevelopmental challenges in children born preterm as they grow up. The spectrum of neurodevelopmental disabilities includes subtle disorders in functioning of brain such as 'disorders of and learning, attention deficit-hyperactivity disorder, developmental coordination disorders, problems with behaviour and difficulty in social and emotional coping.' The likelihood of lower IQ and achievement scores were more among the preterm infants.<sup>95</sup>

Sally Grantham-McGregor et.al writes that several children below 5 years from developing countries face multiple risks, such as, malnutrition, poor health, and poorly stimulated homes. These risk factors significantly affect social , motor, and cognition prospects. Stunting in young children and the prevalence of poverty have been identified as two factors that predict poor development. Both these factors were found to have associations with poor psychological and academic performance in children. More than 200 million children below the age of 5 years are not reaching their developmental potential.<sup>96</sup>

Jauhari et al.(2011)<sup>97</sup> studied the aetiology in children with suspected developmental delay. 122 children who were suspected were enrolled.in the study. Of these a definite diagnoses could be assigned to 66 children (54.1%). The definite aetiology were in the prenatal (n=17), perinatal/neonatal (n=38) and postnatal (n=11) periods.



Perricone et.al, (2013)<sup>98</sup> investigated the preschool readiness and presence of learning disabilities in moderately preterm children at preschool age. The theoretical model checked linguistic comprehension and expression; memory based cognitive skills; and motor coordination skills; pre- literacy and mathematics. The study included an experimental group of fifty-five children who were born moderately preterm children (mean gestational age=34.6 weeks), without any obvious clinical neonatal complications, and low birth weight (M=2,100 g). The control group consisted of 55 full-term children who had no pre- and perinatal complications. This study showed that children who were born preterm and had low birth weight scored statistically lower on metacognition measures, memory, orientation, and visual--motor coordination and pre-mathematics.

Reichman (2005)<sup>32</sup> summarized that children with low birth weight are at an elevated risk for cognitive and behavioural problems. Several early intervention programs have been shown to improve the cognitive skills of children born with a low birth weight. These interventions work better for children of a higher birth weight. The author emphasised the need to reduce rate of low birth weight and provide interventions that improve cognitive outcomes in low birth weight children to all children who need them.

Chen et.al(2014)<sup>99</sup> correlated 8,060 children's birth information to behavioural and cognitive aspects of school readiness. The scores of children who were born premature, small for gestational age and low birth weight were significantly lower on cognitive school readiness even after social and prenatal risks were controlled. None of the premature variables was associated with behavioural school readiness. Going to pre-school was beneficial to all children. Pre-school enrolment was associated with increased cognitive school readiness.

Msall et.al(2014)<sup>100</sup>, in their report on performance of extremely low birth weight children in kindergarten stated that these children had difficulties in coordination, perception, language, attention and social skills. Attention and executive function skills were the most important predictors of classroom functioning.

The impact of preterm birth and low birth weight on cognitive and academic achievement is proven. Children born preterm were at risk of educational delay. Pritchard et.al(2014)<sup>101</sup> examined relations between preschool neurodevelopmental functioning and educational achievement till age 9 years in 110 extremely preterm children. At corrected age of 4 years the children were assessed on all domains of school readiness. *The authors concluded that the school readiness framework is a promising framework for early identification of educational needs especially in children with neonatal difficulties.*

Janus (2011)<sup>102</sup> examined school readiness outcomes in relation to particular impairments from population data of seven countries. Learning and behaviour problems had an overall impact on children's school readiness. Specific impairments of hearing, physical and/or vision impairments seemed to affect only the area that was directly related to the impairment.

Pentimonti, et.al(2014)<sup>103</sup> studied school readiness in children with language impairment and its association with home and classroom characteristics. 136 children with language impairment were enrolled in the study. Analysis suggested that the school readiness in children with language impairment was associated with the quality of their classroom experiences. Children who received better instruction and emotional support in their classroom were more likely to have higher school readiness skills.

Prasad et.al(2014)<sup>104</sup> studied school readiness in children with epilepsy. Children with epilepsy scored 9.90 points lower than healthy children. Additional comorbidities in children resulted in their scores being 17 points lower than healthy children on Peabody Picture vocabulary Test. This study states that injuries to the brain do affect academic achievement and school performance, both of which are components of school readiness.

### **3.5.1 Antenatal complications**

Mothers of many children who gave birth to preterm or low birth weight babies are reported to have antenatal complications. This led to a search of literature for complications during pregnancy or delivery that increases the chances of infants being born with high risk.

An observational study was carried out to identify the various types of high risk pregnancy and to determine the maternal and foetal outcome in Dhaka. The study was carried out on 206 women who had high risk pregnancies. Among the 206 high risk pregnant women a majority of women (47.57%) had some medical condition during pregnancy, 31.55% had a medical condition before pregnancy. Among them a majority of 30.58% women suffered from pregnancy induced hypertension, 15.04% suffered from gestational Diabetes Mellitus and 12.13% had premature rupture of membranes. In the study population, 60.19% high risk pregnant women had a term delivery and 39.8% women delivered their babies preterm. Among them 91.31% of the neonates had Apgar score >7 and 8.61% neonates had Apgar score <7, 33.49% neonates had low birth weight and 39.80% were premature. During the study period no maternal and neonatal death were observed. This study showed that the incidence of high risk pregnancies and birth of high risk infants was high in the Asian

subcontinent. A significant number of children born to mothers with high risk pregnancies had neonatal difficulties.<sup>105</sup>

A prospective follow up of 535 pregnant women diagnosed with gestational diabetes by Wielandt (2015) showed that a majority of the children were born with normal weight. Six (4.6%) were large for gestational age. A total of 20 neonates (15.3%) developed neonatal hypoglycaemia and four (3.1%) had an Apgar score < 7 after 5 minutes. A total of 25 (19.1%) newborns were admitted to the neonatal intensive care unit. Despite the prophylactic procedures, one in six had neonatal hypoglycaemia. The study showed that Gestational Diabetes Mellitus (GDM) is a significant predictor of high risk pregnancy but proper health care facilities can reduce the incidence of neonatal health hazard.<sup>106</sup>

Bauer, et.al (2010)<sup>107</sup> suggested that with the increase in survival rates of pre-terms and children born with a low birth weight there is a need for comprehensive and coordinated intervention programs. These programs need to be more intensive for children who return to poverty stricken households. The authors proposed that there should be regular developmental screening by a paediatrician and periodic evaluation by early interventionist for children who were born premature.

### **3.5.2 Effect of age**

The age of school entry and classrooms with mixed age have been studied for its influence on school readiness.

Bell, Elizabeth R. et.al (2013)<sup>108</sup> examined associations between the classroom age composition (children of different ages in a classroom) and rate of change in school readiness in low-income preschool children. The study was conducted with 4417 preschool children who were enrolled in 207 classrooms in an urban Head Start

Program. Multilevel modelling showed that, classroom age composition was not associated with outcomes of school readiness.

Furlong and Quick (2011)<sup>109</sup> studied relationship of age, preschool experiences, and gender of the child with school readiness when the children started kindergarten. The sample included 5,512 children from families living in low socioeconomic circumstances. The results indicated that age ( $\eta^2$ .019 to .043), preschool experience ( $\eta^2$ .104 to .204), and gender ( $\eta^2$  .015 to .022) were related to children's school readiness significantly. The strongest achievement predictor was school readiness. However, children's readiness at kindergarten entry was more important than age at entry, because readiness was more a predictor of later academic achievement.

### **3.5.3 Gender**

In the study by Child's and McKay (2001)<sup>110</sup> the behaviour and achievement of boys who started school disadvantaged was assessed from teachers' rating. It was shown that boys from low income group displayed significantly poor learning behaviours. They especially showed increased distractible behaviour at age five compared to boys and girls from higher income groups This pattern was observed over the next two years of schooling. Boys even though they start disadvantaged with regard to academic achievement, socio-economic status (SES) has a stronger effect on academic achievement than gender.

Pagani et.al ((2010)<sup>75</sup> confirmed association between kindergarten cognition, attention, fine motor; physical aggression, and achievement in higher grades and involvement in classroom. These were measured at the end of second grade. Though girls showed better long-term benefits compared to boys, girls with less cognitive

skills were more vulnerable than boys and showed similar deficits even in second grade mathematics.

The presence of disadvantage in cognitive abilities or socio-economic class showed an effect on boys more than girls in the overall school readiness score. The problems related to socio economic status have to be addressed and intensive pre-school programs and head start programs for boys from disadvantaged background would help improve school readiness.

#### **3.5.4 Intelligence Quotient**

One of the components of school readiness is cognition. The intellectual functioning has always been measured using the intelligence tests. The Intelligence quotient (IQ) is the standard score to measure intelligence. IQ has been proven as the best predictor for academic achievement.

Mayes et.al.(2009)<sup>111</sup> predicted word reading and math computation scores from Wechsler Abbreviated Scale of Intelligence Full Scale IQ, neuropsychological tests, and attention deficit hyperactivity disorder (ADHD) ratings by parents in 214 elementary school children. IQ was the best single predictor of achievement.

Camargo-Figuera et.al (2014)<sup>112</sup>, aimed to identify early life predictors of low cognition in a cohort of 3721 children who have been followed up from birth to 6 years. 16.9% of children were found to have a low IQ which was a predictor of the state of cognitive skills and later academic achievement.

McIntyre (2006)<sup>113</sup> assessed the factors associated with moving to school in children who have been diagnosed with and without intellectual disability(ID). Teachers reported that children with ID had significantly more behaviour concerns, poorer

student–teacher relationship. Parents and teachers reported them to have poor social skills and self regulation than children without ID. Social skills significantly predicted adaptation to school. The poor intelligence therefore affected social functioning and school readiness. Fostering an environment which helps the child with ID in their learning and social skills will help them in their school readiness.

### **3.6 Impact of Home environment and parental involvement on school readiness**

Literature search of home environment consisted of searches on the role of home environment, literacy practices and parental involvement in the development of the different domains of school readiness.

#### **3.6.1 Home environment**

The home environment consists of the people in the home and the physical setting of the home and the neighbourhood.

Romano et.al(2010)<sup>39</sup> highlighted the effect of different aspects of the home environment on behaviour and cognition in children. From the reports of a sample of 4,521 children in the ages of 4-5 years, associations among child care practices, family factors, and behaviours were examined. Analyses indicated that when home-based care was regulated there was less physical aggression and prosocial behaviour but when children were in high quality home-based care there was greater pro-social behaviour. Among children in the home-based settings, there was greater more physical aggression if they were attending an additional child care centre. Low child care stability was associated with increased hyperactivity-inattention, internalizing behaviour, and poor pro-social behaviours. Among the family factors, parent behaviours and depression in mothers were associated with increased behavioural

problems while low income was associated with greater hyperactivity-inattention among children living in home-based care. Results suggested that child care influences preschool behavioural outcomes.

Ziol-Guest et.al (2014)<sup>114</sup> examined the relation between multiple geographical moves and the behaviour, language repertoire and early literacy skills at age 5 in 2,810 children. The findings showed that 'moving residence' three or more times in a child's age of 0-5 years life, is significantly associated with increase in inattention and internalizing and externalizing behaviour, mainly among children from disadvantaged situation.

Using data from the Early Childhood Longitudinal Study-Birth Cohort (n = ~6,550), Pilkauskas (2014)<sup>115</sup> studied the associations between co-residence (living in extended families) in early childhood and school readiness. For the entire sample, no association was found between 3-generation co-residence and school readiness. The study found that co-residence was associated with low expressive language in Asian children but more expressive language for Hispanic children increased. Statistical analyses reports showed that for children of immigrant mothers, co-residence with grandparents was associated with increase in expressive language abilities of the child and reduced externalizing and internalizing behaviours.

Belfield, and Garcia, (2014)<sup>116</sup> examined school readiness from the parental understanding and viewpoint. The authors focused on parents' efforts and expectations for kindergarten in comparison with their child's academic development. They reported a significant increase in parental awareness of school and child development, and an increase in expectations of what parents viewed as



essential when children join kindergarten, but results indicated that the parental effort to prepare children had made only modest changes.

Considering that parental notions of school readiness had shown an increase in parental awareness of development it was essential to further search the impact of parenting practices and attitudes on school readiness of children in the various domains.

### **3.6.2 Parenting conceptions and practices**

Approaches of parents and their involvement and its effect on school readiness have been explored by multiple studies. Taylor et.al(2004) suggested the model of ‘academic socialization.’ They stated that parental cognitions about schooling influence their practices and readiness outcomes in their children during the entry to school

O’Donnell (2008)<sup>117</sup> studied data from the School Readiness Survey (SR) of the 2007 National Household Education Surveys Program. 2,633 SR interviews were completed. The parents were asked information related to school readiness, book reading and T.V. viewing.

Parents were asked ‘how important they thought it was to teach their children certain behaviours/tasks to prepare them for kindergarten.’ Parent reported various academic and social requisites that children have to be taught before they joined school. These include sharing (62%), alphabets (56%), numbers (54%), how to read (45%), and how to hold a pencil (41%).

Parents were enquired about ‘how often they read to their child during the past week.’ 55% of children were read to everyday, 28 % were read to three or more times, 13 % were read to once or twice, and 3 % were not read to at all in the past week. Only 40% of children from poor households were read to everyday when compared to 60% from higher income households.

Puccioni (2015)<sup>118</sup> examined associations between parents' ideas of school readiness, transition practices they employ with their child, and children's achievement in literacy and numeracy from kindergarten till Grade one, The data was from Early Childhood Longitudinal Study-Kindergarten Cohort (n = 12,622). The results showed that parents' school readiness beliefs and transition enhancement practices were positively associated with children's early achievement and growth. Parents' beliefs was a predictor of whether they used transition practices with their children.

Merz et.al (2015)<sup>36</sup> examined the associations of ‘parental responsiveness’ and ‘inferential language’ input with ‘cognitive skills’ and ‘emotion knowledge’ among children in the preschool age who were socioeconomically disadvantaged. Parents and their two-four year-old children (mean age = 3.21 years, n = 284) participated in a free play session. Children were assessed on cognitive (language, early reading and numeracy) and awareness of emotions. Children completed the same group assessments, almost after a year. The responsiveness of parents and inferential language input from parents during the interaction were coded. All analyses were controlled for age and gender of the child and parental education. Parental responsiveness significantly predicted the cognitive skills and literacy, mathematics, and emotion awareness after one year later. The inferential language given by parents was significantly associated with existing emotion knowledge in the child in

a positive direction. It was found that, increased inferential language given by parents enhanced vocabulary growth in their child.

Okado et.al.(2014)<sup>119</sup> tested the assumption that parent demoralization was separate from support for learning and these constructs independently influence child's readiness for school. 117 kindergarten children who had low literacy and language skills and whose parents primarily hailed from low income families were recruited. Parents reported on their depressive symptoms, difficulties in parenting, behaviours that were related to learning activities, and the frequency of parent-child conversation at home. Teachers rated child's school readiness, based on the child's classroom behaviours, approaches to learning and emergent language abilities and literacy skills. The results of the study showed that parent demoralization had a negative association with child school readiness, whereas parent support for learning had a positive association with child school readiness.

Brooks-Gunn and Markman (2005)<sup>120</sup> highlighted the difference in parenting between racial and ethnic groups. African and Hispanic mothers talked lesser to their children when compared to mothers from other ethnic backgrounds. When these gaps in parenting scores were controlled the differences in school readiness scores also decreased by 20-50 percent. The authors also examined programs that serve families from lower socio-economic status and found that home- and centre-based programs that had a factor of parenting involved improved parental nurturance and discipline. The parents' skills in handling children with behaviour problems improved when they were part of programs that focussed on children's behaviour.

Walker et.al (2011)<sup>121</sup> examined the relationship between at risk families' control style and their children's readiness for school. The samples included two samples

who were from different low-income, ethnic communities (one preschool (n= 199) and one group of children joining elementary school (n = 344) were studied. In the preschool group the control styles of parents had significant relation to academic readiness. Children's social skills and persistence and effort to achieve the goal were related to the academic readiness and parental control behaviour significantly.

Manocha (2008)<sup>38</sup> assessed the stimulation given by mothers to their child in an experimental and control group in r North Indian villages. Mohite's Home Environment Inventory was scored in 120 homes where mothers were observed interacting with their child. The mean scores of experimental and control groups were almost same for 'maternal stimulation' at the initial stage. After the intervention programme the results showed that the mean scores were increased significantly for the experimental group when compared to the mean scores of the control group. This study recommended increasing awareness of the mother on early stimulation which is shown to have an influence on later achievement.

Parental responsiveness and parental beliefs about school readiness are predictors of school readiness, Parental demoralisation, and parental coercive behavioural control has been found to be detrimental to school readiness in children.

### **3.6.1 Literacy practices**

Bennett (2002)<sup>34</sup> examined the relationship between the family environment and language and literacy competencies of their pre-school child. The study sample included 143 parents and children. 'Family as Educator model' was the only model that had a significant relationship to children's language and literacy competencies (knowledge related to books, receptive and expressive language abilities).

Raikes et.al, (2006)<sup>122</sup> studied mother-child reading practice in low-income families. They found that about 50% of 2,581 mothers reported that they read to their children daily. The odds of being read to everyday at fourteen months increased if the child was the firstborn or a girl child. At 24 and 36 months, the odds of being read to was more depending on verbal ability/education of the mothers and birth order of the child (firstborns were read to more) and if the child was enrolled in Early Head Start Programs. The reading practices in families that spoke English had associations with gains in vocabulary, comprehension and cognition when they were 14 and 24 months.

Bracken and Fischel (2008)<sup>123</sup> investigated the reading behaviour in the families of 233 preschool children who were enrolled in the study and from low-income families. These children were attending the Head Start Programs. Parents filled in a questionnaire of their family reading behaviour and receptive vocabulary, story and print concepts and letter knowledge in their children. The analyses examined the differences in family reading behaviour, and its relationship to early learning abilities. The results showed that interest of the child in reading and the interaction between the parent and the child had significant relationship to the child's early learning skills of print awareness and vocabulary..

Roberts et.al (2005)<sup>124</sup> concluded from their study of 72 children and mothers of African American origin, that specific home literacy practices had significant associations with language and reading outcomes. The overall responsiveness and support that these children received from the home environment was predictive of their language and early learning even though they were from families with low incomes.

Weigel et.al (2006).<sup>125</sup> reports a study that examined associations between various constituents of the home and development of language and learning. At two different time points of the academic year data was collected from eighty-five parents and children. Results indicated that the literacy habits of parents positively correlated with their reading habits, language and literacy activities at home.

Sénéchal and LeFevre (2002)<sup>126</sup> presented the observations from the last phase of five-year longitudinal study in 168 middle class children for development of reading. The authors examined the effect of literacy practices in early childhood on subsequent comprehension, achievement of reading and emerging literacy skills. They concluded that children who were exposed to books early had better vocabulary and listening comprehension. These language skills were correlated to the reading abilities of children in grade 3. The involvement of parents in the learning and teaching process of how to read and write words was related improvements in learning. The authors concluded that success in learning had its roots in the literacy practices at home during early childhood.

Cristofaro, et.al (2012)<sup>127</sup> examined how the oral language of mothers and children impacted children's school readiness. 75 low-income mothers and children were recruited for the study. When children were 36 months of age, play interactions were used to assess mothers' and children's lexical diversity, mothers' wh-questions, and children's vocabulary was scored on Peabody Picture Vocabulary Test (PPVT-III) scores. Mothers' wh-questions and lexical diversity predicted children's PPVT-III scores at 36 months, which in turn predicted children's school readiness. Mother-child conversations were therefore shown to foster the school readiness of children from low-income backgrounds.

Robins et.al (2014)<sup>8</sup> examined the influence of informal conversations about letters in families from different socio-economic status. Focusing on parents and children aged three to five, the authors conducted five separate analyses of these conversations. The proportion of questions related to letters was lower in the lower SES families. The higher SES families spoke about letters in a sequence and emphasised on their functional purposes while this was not observed in families from lower socio-economic status. Understanding the patterns in parent-child conversations about letters was therefore concluded to be an important first step in learning their influence on children's early literacy skills and school readiness.

Skwarchuk et.al (2014)<sup>128</sup> aimed develop and examine a model of numeracy learning opportunities at home. 183 children were recruited for the study. Their parents completed a questionnaire on early-numeracy experience at home. The children from these families were called 1 year later for numeracy and literacy testing. Practice of formal numeracy activities such as simple counting was predictive of symbolic number awareness in the child. Informal numeracy practices such as number games was predictive of non-symbolic mathematical skills. Formal practice of enhancing literacy was predictive of children's reading of words.

Tomopoulos et.al,(2006)<sup>129</sup> described the link between books and toys being available in the living environment, parent-child interaction, and child development at twenty-one months among Latino children from household where the income was low. The number of books/toys in the house and how often the child was read to was measured. At 21 months, the child's cognitive development was assessed by the Bayley Mental Development Index. The language development was assessed using the Preschool Language Scale-3 and the parent-child interaction was assessed on the Caregiver-Child Interaction Rating Scale. Reading to the child and availability of

toys were related to improved child cognition ( $p=0.02$ ) and language development ( $p=0.01$ ) and decreased necessity of Early Intervention (OR=0.16) when assessed at 21 months.

The studies showed that the parent engagement and early literacy practices at home improve the school readiness of children and help children transcend the effects of poor socio economic status.

### **3.7 The teacher's and school's role in 'school readiness' of the children**

The school's readiness for the children is the third part of the definition of school readiness. The literature search focussed on finding relevant studies that highlighted the influence of various school related factors to school readiness.

Mosteller (1995)<sup>130</sup> designed a three-phase study to examine how smaller class size in the first few grades of school influenced short-term and long-term student's academic achievement. The results obtained in the kindergarten, and the next three grades of classrooms with 13 to 17 pupils and the results obtained in classrooms of 22 to 25 students were analysed. 6,500 pupils in about 330 classrooms were assessed on basic study skills, reading, and mathematics. The results showed that smaller classes produced significant improvement in early learning and cognition and this improvement was almost double for children from minority groups. The benefits observed in children from smaller classes persisted even when they were returned to classes of the usual size in the higher grades.

While in the above study the effects of a small class size continued till Grade 3, a follow up study of the same sample was done by Wilde et.al (2011)<sup>131</sup> to study the



effect of small class on earnings, employment and disability status. Results showed improvement in cognition and graduation rates in students from minority and low-income household. The small class size also caused increase in employment and earnings for black males ( $p < 0.05$ ).

It has been shown that while small class size has long term effects on academic achievement and employment, the curriculum that is used in the class also has an effect on school readiness and early literacy. Ansari and Winsler (2014)<sup>132</sup> using data from the Miami School Readiness Project examined the improvement in school readiness of low-income Latino ( $n=7,045$ ) and Black ( $n=6,700$ ) children attending two pre-kindergarten curriculum based schools: Montessori curriculum and conventional programs. (High/Scope curriculum) The parents and teachers gave reports on children's socio-emotional and behavioural skills and pre-academic skills at the start and end of the pre-K year. All children, regardless of curriculum they studied in their classes, demonstrated gains across pre-academic, socio-emotional, and behavioural skills all through the pre-Kindergarten year. Such gains were not observed in the Montessori programs. The Latino children had greatest gains in the domains of pre-academic and behaviour even though these were the domains where they had maximum needs at the start. The black children had improvements in Montessori, but they had slightly greater gains when they attended High Scope curriculum. These findings have implied that early childhood education curriculum should be modified for children from low income background and should be tailor made according to their needs.

### 3.7.1 Teachers

The person in the school who spends maximum time with children in the pre-school is a teacher. A teachers' judgements about school readiness and observations of the skills of children are helpful in further learning and social development of the children.

Sahin et.al, (2013)<sup>133</sup> conducted a qualitative research to study teachers' opinions on school readiness. The teachers who were included in the study were 35 preschool teachers and 35 first grade teachers. The researchers developed a semi-structured interview protocol which was used to collect teachers reports. The qualitative analyses which was done after teachers reports were collected showed five consistent themes:

- Definition of school readiness should include social and emotional development, abilities in language and literacy, readiness in cognitive tasks and self help skills.
- The family was the most effective people as well as institution in the school readiness process.
- Preschool education was important for school readiness and for transition to primary education.
- The difficulties children have in getting ready for school was child's unpreparedness and behavioural difficulties
- The teachers suggested that pre-school curriculum should aim to enhance development and plan curriculums which have appropriate for age activities. These activities should be pleasurable to the child. The findings showed that

the views regarding school readiness is similar among the pre-school teachers and the teachers of the first grade.

Hatcher et.al (2012)<sup>134</sup>, conducted a qualitative study where beliefs about readiness and the role of preschools in readiness among parents and preschool teachers. The beliefs indicated shared perceptions of readiness and the parents and teachers reported readiness to be shown by social and emotional development, achievement of academic skills, and familiarity with routines in school curriculum. The teachers' perception of school readiness and the curriculum they follow has been shown to have a positive effect on school readiness and kindergarten learning.

Educational achievement and major subject of the teachers of four-year olds were compared with learning environment and learning from seven major studies of early care by Early et.al (2007)<sup>135</sup>. The findings indicated that policies whose focus was entirely on increasing the teachers' educational level will not be sufficient for improving classroom quality or the achievement of the child. Instead, professional development activities and supports to improve teacher child interaction should be given importance and emphasised upon if the effectiveness of early childhood education is to be increased.

Children's self-direction, participation and academic performance are components of school readiness and these components are enhanced by a positive child-teacher relationship. The teacher-child relationship serves as a necessary support function for young children to help them in their adjustment to the school environment. Birch and Ladd (1997)<sup>136</sup>, examined how three elements of teacher-child relationship (namely closeness, dependency, and conflict) were associated with children's school adjustment. Dependency on the teacher was strongly correlated with school

adjustment difficulties, poor academic performance and less positive engagement with the school environment. The closeness between the teacher and child was linked with academic performance, teachers' scoring of whether the child liked the school, and self-directedness. This suggests that young children's relationship with their teacher should be assessed while studying their adjustment to school.

Commodari (2013)<sup>137</sup> evaluated the attachment of pre-schoolers to the preschool teachers, and its association to school readiness, and the risk for developing learning difficulties. 152 pre-schoolers were assessed in this study. The results demonstrated that attachment to preschool teachers has a positive correlation to linguistic development, and psychomotor skills required for functioning in school.

A teachers' role in the classroom is crucial not only for academic and cognitive gains but also for socio-emotional gains. This was reported in the results of the Chicago School Readiness Program (CSR) by Li-Grining (2014)<sup>138</sup>. This program aimed to promote school readiness by creating classrooms which were emotionally supportive and fostered children's self-regulation especially for young children of low-income families. The results stated that teachers when trained and supported were able to improve the socio-emotional development and self-regulation in children.

### **3.7.2 Full day care**

The teacher child interaction alone seems insufficient to promote school readiness. The hours of school, method of education have been found to have an effect on school readiness in children

The Preschool Curriculum Evaluation Research Initiative (PCER; n = 2,700), evaluated the effect of 18 different school readiness programs. The quality of preschool care children receive was significantly associated with their academic

readiness ( $r=0.03$  to  $.14$ .) One standard deviation (SD) rise in quality was related to 1 SD increase in academic achievement.<sup>139</sup>

The hours the child spends in school has also been found to have an effect on school readiness.

In a longitudinal, population-based study, outcomes of full-day kindergarten were examined beyond primary school. 15 kindergarten cohorts ( $n$  112-736) were followed up to grade nine. The assessments were done in grades 3, 7, and 8 and marks scored in grade nine were compared between the Full Day (FDK) and half-day kindergarten (HDK) students. The Full Day Kindergarten programmes which were targeted at low-income areas showed that girls in these cohorts made long term improvements in numeracy.<sup>140</sup>

Even though (FDK) is shown to have no long term effect on academic achievement in the study above, the full day kindergarten facilitates success in primary and secondary school in children from the low-income and minority families. A systematic review by Hahn et.al.(2014)<sup>141</sup> assessed the extent to which FDK, prepared children, when compared with half-day kindergarten (HDK). There was significant increase in primary and secondary school achievement and improved lifelong health. FDK improved academic achievement by an average of 0.35 SDs. The effect on verbal achievement and mathematical achievement was 0.46 and 0.24 respectively.

Fram et.al(2012)<sup>142</sup>, using Early Childhood Longitudinal Study-Kindergarten Cohort data, examined the unique and additional contributions on school readiness of initial child care experiences and prekindergarten experiences. The authors found that early use of non-parental care in non-governmental centres was associated with negative

socio behavioural outcomes whereas early participation in centre-based care with trained professionals was associated with enhanced reading and math scores.

The studies reveal significant association between teacher-student relationship, full day kindergarten, school environment and school readiness. This literature review shows that all the three components in the definition of school readiness- child, family and school have significant impact on the school readiness of a child. This influence has to be studied in detail as we lack adequate information on school readiness of children in India.

## 4 METHODOLOGY

This chapter expounds the methodology that was used for data collection and analysis.

### 4.1 Research Design

**Phase I** of this study was a **cross sectional, observational study** conducted in the schools of Vellore town. **Phase II** was a **case control study** to assess the predictive factors associated with school readiness among 3-4year old children who join school.

### 4.2 Participants:

Children for the study were chosen based on the following criteria

#### 4.2.1 Participants for Phase I

Inclusion criteria for Phase I was the following

- Children who are enrolled in the study should be in the age range of 3-4yrs (36-48 months).
- Children who have been admitted to the lower kindergarten classes.
- One/both parent/s should have been with the child at least for the past 6 months.

Exclusion criteria included the following:

- Children with a known developmental need or delay or have previously been diagnosed with a developmental disorder.
- Children who are 3-4 years of age but are in play school.
- Children from schools that do not have English as the medium of instruction.
- Children whose parents do not give a written informed consent.

#### 4.2.2 Participants for Phase II

Based on the scores of Work Sampling System the children were divided as cases and controls. Children with average scores of  $<2$  were classified as 'not ready' and chosen as cases and children with scores  $>2$  were classified as 'ready' and chosen as controls.

Other criteria for inclusion in Phase II and exclusion from Phase II were the following:

- Children whose parents were willing to attend the assessment session
- Children who were attending the kindergarten classes in the school for the first six weeks

Exclusion criteria:

- Children who were receiving any additional therapy or medical treatment



**Table 1: Inclusion and Exclusion Criteria**

<b>Phase of the Study</b>	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
Phase I	Children in the age range of 3-4yrs (36-48 months).	Child with diagnosed developmental needs
	Children admitted to the lower kindergarten classes	3-4year old in play school
	Child living with one/both parents for the last six months	Non- English medium schools
Phase II- Cases	Score of <2 on WSS	Child receiving developmental therapy
	Attending school for the last 6 weeks	
	Parent willing to accompany for assessment	
Phase II- Controls	Score >2 on WSS. Other criteria as above	Child receiving therapy / treatment

### **4.3 Sample size and sampling methods**

#### **4.3.1 Sample Size for Phase I**

The prevalence of school readiness (not ready), based on the pilot study done at 3 schools in Vellore town was found to be around 15%. In order to estimate this with the precision of 4 to 5%, with 95% CI and with the Design Effect of 2, the sample size estimated was 400 children. There were 549 children who were initially enrolled of which 29 children dropped out due to change in school or class or refusal of parents to permit their children to participate after the initial consent. The study finally had 520 participants for both Phase I and II.

#### **4.3.2 Sample Size for Phase II:**

In the community, nearly 83% of the children whose parents studied only up to high school were not ready for school<sup>143</sup>. It was expected that the Odds Ratio for ‘Not Ready’ would be 2 times higher in the exposed group. That is, the children whose

parents studied up to high school will have 2 times higher risk for their children being 'Not Ready for school'. In order to estimate the sample size for the above parameters with alpha and beta errors at 5% and 20% with 1(case):2 (control) ratio, it was estimated that we need to study 136 children who are Not Ready and 272 children who are ready for school. In Phase II of the study there were 157 cases and 363 controls

#### **4.3.3 Sampling method:**

The school was chosen as a sampling unit. Within each Postal Index Number area in the town 2-3 schools were chosen randomly. One section from each school was selected randomly and all children (whose parents consented for participation) in that section were assessed.

Phase II: Children who were assessed in Phase I were chosen and classified as cases or controls based on the scores on Work Sampling System, by a professional unrelated to the study to maintain blinding. The cognitive measure was administered by a psychologist trained in assessments for children. Parent interviews were conducted by the psychologist or a teacher. The protocols for administration was discussed and demonstrated to the teachers. The standardised interviews was carried out by the psychologist

#### **4.4 Conduct of the Study:**

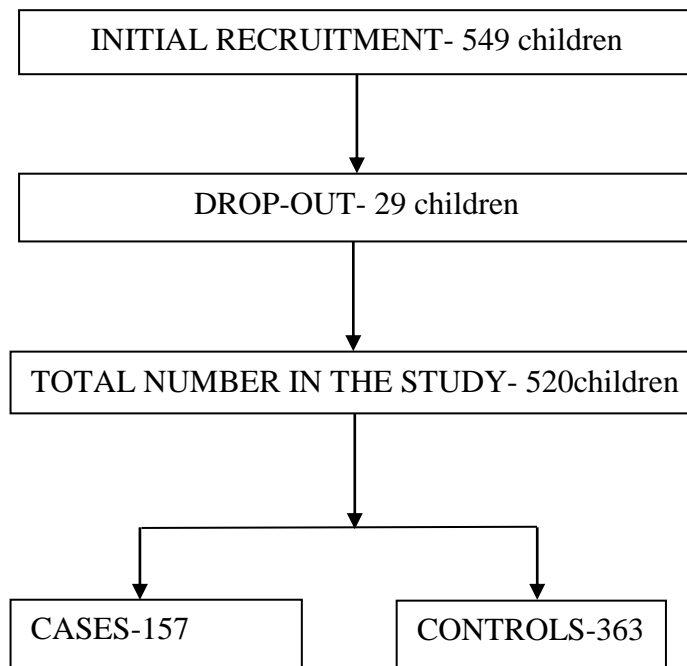
The District Elementary Education Officer (DEEO) of Vellore was approached for permission to conduct the study in schools. The list of schools in Vellore was obtained from the District Educational Office. The schools chosen for the study included government aided and private schools located in Vellore. The assessments were conducted during the first term of the school year from 2011-2014. Three schools were chosen from the postal areas. Once permission from the DEEO was obtained, a total of 22 schools were approached for permissions and 17 schools consented to have the study done in their schools.

The Phase I of the study was carried out over 6 weeks at the school entry of children. The parents were approached for consent after obtaining contact details from the school records. Once the consent was obtained for participation in the study, the child was observed in the classroom and assessed individually by the investigator for early literacy skills. The children were assessed in their classrooms for social behaviour and in a quiet distraction free environment for academic skills. They were scored on the Work Sampling System following the assessment.

During Phase II (Case control Study) the children were assessed in the presence of the parents. The cognitive measures (assessments of intelligence, perceptual ability) were administered in a quiet and distraction free area of the school. The parent questionnaires on Social Maturity, Socio-Economic Status, Parent Involvement and Home Screening Questionnaire were scored by interviewing the parents either when they visited the school for the assessment of their child or over phone during the academic year. The child's school grades and records of attendance were collected after the final assessment.

The data collection for the study was started after obtaining ethical clearance from the Institutional Review Board (IRB)

**FLOW CHART OF THE STUDY PROCESS**



## **4.5 Tools Used:**

### **4.5.1 Work Sampling System:**

The dependent variable namely school readiness was assessed using the Work Sampling System which was developed by Dr. Samuel J. Meisels and published in the year 1995.<sup>144</sup>

Since this tool was based on curriculum embedded observation it was found to be suitable for the study as the samples were chosen from a variety of schools with different syllabi.

Description of the tool:

The Work Sampling System is a curriculum embedded performance assessment. The Work Sampling System is designed to assess and document children's knowledge, skills, behaviour and accomplishments on multiple terms across various classroom domains in the school environment. The tool assesses children's skills in seven domains personal and social development, language and literacy, mathematical thinking, arts, scientific thinking, social studies and personal and physical development. Based on the performance indicators children are classified as 'proficient', 'in process' or 'not ready.'<sup>144</sup>

The Work Sampling System also has curriculum based developmental checklist from preschool to Grade III. The assessment occurs in the context of classroom activities. The students are asked to perform tasks which may or may not be familiar to a child.

#### 4.5.1.1 Statistical components of the tool:

##### Reliability of the Checklist

The Work Sampling system was designed to be scored by the teacher at school entry, fall, winter and spring of the academic year by the class teachers.

The authors examined the reliability of the Work Sampling System checklist using Cronbach's alphas and correlations. The fall, winter, and spring checklists were examined and correlated. The correlation was 0.69 between the fall and spring checklists; and 0.89 between the winter and spring checklists. There was a moderate to high level of reliability in this tool through the academic year<sup>70</sup>.

##### Validity of the Scale:

In addition to the Work Sampling System, children were scored in the fall and spring on two individually-administered norm-referenced assessments- Kindergarten Achievement Battery of the Woodcock-Johnson Psycho-educational Battery-Revised. And Motor Scale of the McCarthy Scales of Children's Abilities (MSCA).<sup>144</sup>.

The teachers scored the children for their social behaviour on Child Behaviour Rating Scale which is focuses on prosocial behaviour and cognitively oriented on-task behaviour.

Concurrent Validity was investigated by comparison of the fall and spring checklists to the fall and spring WJ-R and MSCA scores ( $r_s=0.75$  for the fall and  $0.66$  for the spring). The predictive validity was estimated by relating the fall and winter checklists to the spring assessments. The analysis showed that these checklists had high sensitivity and specificity in predicting the spring checklist.

#### 4.5.1.2 Organisation and structure of The Work Sampling System:

The Work Sampling System has developmental checklists and guidelines which describe developmentally appropriate behaviour, skills and knowledge for each age/grade level across the seven domains.

A *domain* is defined as a broad area of child's growth and learning such as *Language and Literacy*. Each domain is divided into subsets or *functional components*. For example Language and Literacy is composed of Listening, Speaking, Reading and Writing. Each functional component is composed of a set of *performance indicators*. Performance Indicators state the skills/ behaviours that would be assessed in the classroom. The functional Component of Listening is composed of the following Performance Indicators:

1. "Gains meaning by listening,"
2. "Follows two step directions,"
3. "Shows beginning Phonological awareness."

#### 4.5.1.3 Scoring:

Each performance indicator is scored as 'Not yet', 'In process' or 'Proficient'. The readiness levels used for scoring each performance indicator are:

**"3- Proficient-** indicating that the child can consistently demonstrate the skill, knowledge, behaviour or accomplishment represented by the performance indicator."

**"2- In Process-**indicating that the skill, knowledge, behaviour or accomplishment represented by the indicator are intermittent or emergent, and are not demonstrated reliably or consistently."

“1- Not Yet-indicating that the child cannot perform the indicator (i.e., the performance indicator represents a skill, knowledge, behaviour or accomplishment not yet acquired).”

The distinction between “in process” and “proficient” may be less clear depending on the specific indicators. Thus the results of Work Sampling System are frequently presented in terms of “in process or proficient” and “not yet”.

In this study, further analysis was carried out in the following manner.

1. The schools did not have a curriculum for science, social studies. Therefore these domains were given a mean score as not all the performance indicators could be scored.
2. Overall means were calculated for individual domains, and for total score<sup>145</sup>.

#### **4.5.2 Intelligence: Binet Kamat Test of Intelligence:**

Binet-Kamat Test of Intelligence (BKT): This Test of Intelligence is an Indian adaptation of the Stanford-Binet scale of Intelligence. The Indian adaptation was standardised by V.V. Kamat in South India (Bombay-Karnataka region) in 1964, on normal individuals between the age ranges three to ten years and re-evaluated in 1967.

This intelligence scale is graded according to age and it covers ages from three to twenty two years. Each age range has six test items and alternative test items. The alternative test items range from one to three at each age level. The test items are specific to each age level. The whole test comprises of seventy eight main test items and twenty one alternative items. This test has to be administered individually on each subject. The administration of the test starts at the age level of three years and



terminates at the level where the subject fails in all the test items of that particular age level. The function-wise classification of items adapted to the Binet-Kamat Test of Intelligence (Lezak, 1983) can be grouped into six major categories: “Language (L) , Memory(M) (which includes meaningful memory (Mm) and non-meaningful memory (NMm)), Conceptual thinking(CT), Reasoning (R)(which includes-non-verbal reasoning (NVR), Verbal reasoning (VR) and Numerical Reasoning (NR)) ,Visual-motor(VM) , and Social Intelligence (SI ).”The reliability of the Binet-Kamat test of intelligence is above 0.7 and the validity of this test for normal children against estimation by teachers of the Intelligence quotient is 0.5<sup>146</sup>

In the present study the test was administered from the initial age scale and was discontinued when the child failed all subtests of a particular year. The subtests passed between the basal and ceiling age was marked in months. The mental age was calculated and converted to IQ

#### **4.5.3 Non Verbal Intelligence: Seguin form board:**

Non verbal Mental Age was assessed using the Seguin Form Board(SFB). Seguin form board test consists of placing 10 shapes in the correct slot on a board. The child is given three trials and each trial is timed. The shortest time taken is recorded and converted into a mental age. The Seguin form board can be administered for children till they are 11 years old<sup>147</sup>. This test is a measure of perceptual ability. Seguin form board was administered to the child. It was observed that many of the children were either not able to place the shapes in the correct slot or took longer than 56 seconds to complete the test. Out of the 520 children who were tested only 102 were able to complete the test.

#### 4.5.4 Vineland Social Maturity Scale (VSMS):

The Vineland Social Maturity Scale was originally developed by Edgar Doll in 1935. This scale was adapted to the Indian context by Rev.Fr. Dr. A.J. Malin. VSMS provides a measure of the social age and social quotient of the child. The Indian adaptation of VSMS covers social and adaptive behaviour from birth to 15 years. Multiple studies have proved the validity of the tool in measuring social and adaptive functioning<sup>148</sup> and impact of associated comorbidities in children with intellectual impairment<sup>149</sup> and autism.<sup>150</sup>

The VSMS also assesses skills in the following domains- Self Help General, Self help Eating, Self help Dressing, Communication, Locomotion, Socialisation. The items for each year has multiple items that are related to the different domains. The conversion of raw scores into social ages for the various domains has not been standardised in India. Therefore the total raw score was calculated and converted to social age and social quotient.

#### 4.5.5 Socio-economic Status Scale - urban' by Kuppuswamy

Kuppuswamy's Socio-Economic Status Scale is an tool which has been extensively used in hospital and community based research in India. It was initially developed in 1976 and has had many modifications over the years<sup>151</sup>. It has been widely used to measure the socio-economic status in urban studies. This scale takes account of education, occupation and income of the family and classifies study groups into high, middle and low socioeconomic status. While the education and occupation categories have undergone minimal changes over the years, the 'income of the family' category has been revised regularly according to the Consumer Price Index for Industrial workers. The manual provides guidelines on scoring for occupation

and education.<sup>152</sup> The guidelines for grading Family Income given in 2011 have been used for the current study<sup>153</sup>.

#### **4.5.6 Home environment: Home Screening Questionnaire**

The Home Screening Questionnaire (HSQ) is a simple, parent answered questionnaire for assessing the quality of a home environment where the child lives and develops. The Home Screening Questionnaire has two questionnaires, one for 0-3 years and the other for 3-6 years. The 3-6 year questionnaire has been used for the current study. The 3-6 year questionnaire has a 34 item parent questionnaire and a 50 item toy checklist..<sup>46</sup> The parent questionnaire includes questions related to the home environment and parent child interaction. The Home Screening questionnaire was validated against the Home Observation for the Measurement of the Environment (HOME) Observation Inventory in India and cut off values have been prescribed for the total score<sup>154</sup>. The total scores on the Home Screening Questionnaire were used in the present study.

#### **4.5.7 Parental Involvement: Parental Involvement Scale**

The Parent Involvement Scale was developed by Rita Chopra and Surabala Sahoo to study parent involvement practices among school going children. This scale consists of 34 items covering three dimensions namely, school involvement, home involvement and parent teacher association involvement(PTA).<sup>155</sup> This Scale helps to collect information regarding the whole parental involvement in the learning and education of their child and also measures the level of involvement of the parents in the individual dimensions. The test retest reliability of this scale is 0.87 for school involvement, 0.83 for home involvement, 0.90 for involvement through PTA and 0.93 for the total involvement.<sup>156</sup> Each item is scored by the parent on a scale of 1-3.

The total scores have been classified as low, average or high. This scale has been used to measure the parent involvement in adolescents in India. The Scale has also been used in studies that compared parent involvement to parenting styles and practices.

#### **4.5.8 Proformas Used in the Study**

1. Proforma I related to parental education, language at home, antenatal & postnatal complications (Appendix I)

The parental education, occupation and household income were classified based on the Kuppaswamy Socio-economic status scale. The parents were interviewed about the antenatal period of the mother and child's neonatal period. Some parents produced written reports or information about the antenatal and neonatal period. Other information for the proforma was filled in by the parents or filled in after telephone interviews with the parent.

2. Proforma II for teacher details and school details (Appendix II): Details regarding the school and teachers were entered in this proforma. The teachers filled in their qualification, number of years of teaching experience and the number of students they are currently teaching in their kindergarten classes.
3. The details of working hours of the school, available facilities in school such as technology aided 'smart classes', play-grounds, books/ library, teacher assistants and their qualification was also filled in this proforma
4. The grades obtained in examinations were collected based on the exam conducted 6 months after admission into school. The attendance was collected at the end of the academic year.

**Table 2: Summary of Assessments**

Category	Variables	Assessment Measure
<b>PHASE I</b>		
School readiness		Work Sampling System
<b>PHASE II</b>		
Socio-economic and demographic variables	Socio Economic Status	Socio-economic Status Scale- Urban
	Socio-demographic information	Proforma I
Child related Variables	Intelligence	Binet Kamat Test of Intelligence & Seguin Form Board
	Social abilities	Vineland Social Maturity Scale
	Antenatal and Neonatal Information	Proforma I
	Academic Performance	School report cards of grades
	Attendance	School attendance register- summary
Home environment	Parent Involvement	Parent Involvement scale
	Home environment	Home screening questionnaire- 3-6 years
Teacher and School Variables	Teacher qualification, experience	Proforma II
	School infrastructure information	Proforma II

## 4.6 Statistical Analysis:

### 4.6.1 Statistical methods used

- Data was collected on a proforma and the information entered into the SPSS v16 database. Each of the variables was classified and entered as prescribed by the administration and scoring manual of all the psychometric assessments. The information from the proformas was classified based on the operational definitions.
- The items of Work Sampling System were entered as raw scores and as domain means and then classified as ready or not ready based on the scoring criteria.
- The internal consistency (reliability) of Work Sampling System was measured for item and domain scores with the total score. The concurrent validity of WSS with the IQ and SQ was also calculated
- The prevalence of children who are not ready for school at three years is presented by gender and age with 95% confidence interval. The percentage of children in the individual performance indicators and domains were calculated and their significance examined. Performance indicators with  $p < 0.05$  were retained.
- Variables were summarised for descriptive statistics (percentages, means and as median when the distribution was not normal.)
- Continuous variables were checked for normality by visually inspecting the Histograms, q-q plots and using the tests for normality (Shapiro-Wilk p-values).

- The difference in means were tested using the Independent t-test when distributions were normal and Mann Whitney U- test was used when normality was violated.
- Bivariate analyses were done for categorical variables as the primary outcome had two categories. The chi-square or Fisher's exact test was calculated to study the associations.
- P-values of  $<0.05$  was considered significant.
- Variables that had a significant association in the bivariate analyses were taken for further association tests using logistic regression. The variables that had a p-value  $<0.05$  were the predictors that were included in the model of individual factors.
- The significant variables from each of the factors were analysed using Logistic regression. The variables with a p-value of  $<0.05$  were retained in the model and the odds for the variables was noted and they were included as the predictors for children being 'not ready' for school.

## 5 RESULTS

The following chapter presents the results of the psychometric validation of the Work Sampling System and the two phases of the study.

### 5.1 - Psychometric validation of the Work Sampling System

The internal consistency of the tool and the concurrent validity of WSS was measured to establish the reliability and validity of the tool. The psychometric validation was done during the pilot study with 75 children. Cronbachs alpha was calculated for the WSS total score and domain scores and for the significant items and the total score. The item-total correlation was between 0.50-0.85 and the Cronach's alpha was 0.93 suggesting that the WSS had good internal consistency in this sample. The Pearsons correlation coefficient between domain scores and the total school readiness score ranged between 0.54 and 0.92. There was moderate correlation between the total score and the physical health and development domain. All the other domains had a strong positive correlation with the School readiness score. These correlation coefficients were significant at the 0.01 level.

**Table 3: Internal consistency**

Item	Corrected Item-total Correlation
Self concept	0.75
Self control	0.78
Approach to learning	0.85
Interaction with children	0.76
Interaction with others	0.70
Listening	0.80
Speaking	0.79
Reading	0.76
Writing	0.64
Math Process	0.71
Gross motor	0.54
Fine motor	0.50
Personal Health and safety	0.69

Cronbach's alpha=0.93



**Table 4: Domain and total score correlation**

Domain	Correlation coefficient
Personal Social	0.85
Language and Literacy	0.78
Mathematical thinking	0.76
Physical development and health	0.54
Scientific thinking	0.89
Social Studies	0.90
Arts	0.82

To measure concurrent validity of WSS, the total score was correlated with the IQ on BKT and SQ on VSMS and the school grades using Pearsons correlation analysis. The correlation coefficients were strongly positive on all the measures.

**Table 5: Concurrent Validity**

Measure	Correlation coefficient
Intelligence Quotient (IQ on BKT)	0.76
Social Quotient (SQ on VSMS)	0.79
Academic Performance (grades on school examination)	0.85

## 5.2 Results of Phase I:

The Phase I which was a cross sectional observational study was undertaken to find the prevalence of children who were not ready for school between 36-48 months. The results are presented by

- The prevalence of children who are not yet ready on each of the performance indicators and the domains.

- The prevalence of readiness on performance indicators and domains among boys and girls and the chronological age categories was estimated and the association was measured using chi-square.
- The means on domains between children who were ‘ready’ and those who were ‘not ready’ were also compared.

### 5.2.1 Prevalence of Readiness on Performance Indicators

The Work Sampling System had performance indicators which were scored. The percentage of children in each category on the performance indicators was calculated. The significance of percentage was calculated and those with  $p < 0.05$  was retained

**Table 6: Personal and Social Development**

Functional component	Indicator	Not yet (%)	In process (%)	Proficient (%)
SELF CONCEPT	Demonstrates Self-confidence	70 (13.46)	163(31.35)	287(55.19)
	Shows some self direction	68(13.08)	203(39.04)	249(47.88)
SELF CONTROL	Follows classroom routines	24(4.62)	167(32.12)	329(63.27)
	Begins to use classroom materials carefully	30(5.77)	198(38.08)	292(56.15)
	Manages transitions	43(8.27)	194(37.31)	283(54.42)
APPROACHES TO LEARNING	Shows eagerness and curiosity as a learner	66(12.69)	172 (33.08)	282(54.23)
	Attends, seeks help when encountering a problem	29(5.58)	197(37.88)	294(56.54)
	Approaches play with purpose and inventiveness	36(6.92)	183(35.19)	301(57.88)
INTERACTION WITH OTHERS	Interacts with one or more children	10(1.92)	153(29.42))	357(68.65)
	Interacts with familiar adults	18(3.46)	231(44.42)	271(52.12)
	Participates in the group life of the class	70(13.46)	172(33.08)	278(53.46)
	Shows empathy and caring for others	44(8.46)	202(38.85)	274(52.69)
SOCIAL PROBLEM SOLVING	Seeks adult help when needed to resolve conflicts	15(2.88)	212(40.77)	292(56.15)

**Table 7: Language and Literacy**

Functional component	Item	Not yet (%)	In process (%)	Proficient (%)
LISTENING	Gains meaning by listening	24(4.62)	172(33.08)	324(62.31)
	Follows two step direction	123(23.65)	142(27.31)	255(49.04)
	Shows beginning phonological awareness	279(53.65)	205((39.42)	36((6.92)
SPEAKING	Speaks clearly to be understood by most listeners	53(10.19)	148(28.46)	319(61.35)
	Uses expanded vocabulary and language for a variety of purposes	158(30.38)	203(39.04)	159(30.58)
READING	Shows appreciation for books	31(5.96)	200(38.46)	289(55.58)
	Shows interest in letters and words	101(19.42)	232(44.62)	187(35.96)
	Comprehends and responds to stories read aloud	203(39.04)	234(45.00)	83(15.96)
WRITING	Represents ideas and stories through pictures, diction and play	213(40.96)	251(48.27)	54(10.38)
	Uses scribbles and unconventional shapes to write.	34(6.54)	241(46.35)	243(46.73)

**Table 8: Mathematical Thinking**

Functional component	Not yet (%)	In process (%)	Proficient (%)
<b>MATHEMATICAL PROCESSES</b>			
Shows interest in solving mathematical problems	92 (17.69)	199(38.27)	227(43.65)
<b>NUMBERS AND OPERATIONS</b>			
Shows curiosity and interest in counting numbers	135(25.96)	157(30.19)	225(43.27)
<b>PATTERNS, RELATIONSHIPS AND FUNCTIONS</b>			
Sorts objects into groups that vary by one attribute	106(20.38)	178(34.23)	233(44.81)
<b>GEOMETRY AND SPATIAL RELATIONS</b>			
Identifies several shapes	178(34.23)	173(33.27)	167(32.12)
Shows understanding of several positional words	114(21.92)	186(35.77)	218(41.92)
<b>MEASUREMENT</b>			
Shows understanding of some comparative words	134(25.77)	172(33.08)	211(40.58)
Participates in measuring activities	143(27.50)	173(33.27)	201(38.65)

**Table 9 : Physical Development and Health**

Functional component	Not yet (%)	In process (%)	Proficient (%)
<b>GROSS MOTOR DEVELOPMENT</b>			
Moves with some balance and control	2(0.38)	14(2.69)	504(96.92)
Coordinates movement to perform simple tasks	1(0.19)	104(20.00)	415(79.81)
<b>FINE MOTOR DEVELOPMENT</b>			
Uses strength and control to perform simple tasks	4(0.77)	105(20.19)	411(79.04)
Uses eye- hand coordination to perform simple tasks	17(3.27)	271(52.12)	232(44.62)
Explores the use of various drawing and art tools	10(1.92)	281(54.04)	229(44.04)
<b>PERSONAL HEALTH AND SAFETY</b>			
Begins to perform self help tasks independently	98(18.85)	216(41.54)	206(39.62)
Follows basic health and safety rules with reminders	40(7.69)	283(54.42)	197(37.88)

#### DOMAIN 1: PERSONAL AND SOCIAL DEVELOPMENT

This domain measures a child's social and emotional competency. The awareness of self, sense of responsibility, ability to interact with children and teachers, ability to welcome transitions and follow routines were scored in this domain. The functional components of this domain include Self Concept, Self Control, Approaches to learning, Interaction with others and Social Problem solving (Table 6)

**Self concept:** This indicator measures a child's awareness of self and ability to direct oneself while engaged in activities. In this component most children were proficient (55.19%) or 'in process' (31.35%) in demonstrating self- confidence. In the other indicator of self -concept namely 'self- direction', the number of children who were 'not ready' is similar to the number not ready on the indicator of self- confidence (13.08%)

**Self-Control:** This component measures the child's ability to follow rules and routines. It also measures the extent to which a child understands the classroom expectations and modifies ones behaviour to the classroom expectations. In this component a large percentage of the sample could follow classroom routines

(63.27%) and use classroom materials carefully (56.15% ). Among the children who were not ready in this component the highest percentage of children (8.27% compared to 5.77 and 4.62% in the other indicators) could not manage transitions.

**Approaches to learning:** This component measures a child’s curiosity to learn as well as their ability to attend and stay on task and ask for help if they find the activity difficult. This component also measures the ability of a child to use materials creatively and also for the intended purpose during play. In this component more than 50% were proficient in the three performance indicators- showing curiosity as a learner, seeking help when encountering a problem and approaching play with purpose. Among the children who were not ready the highest prevalence (12.69 % as compared to 5.58% and 6.92%) of children being not ready was in ‘showing curiosity as a learner.’

**Interaction with others:** This component measures the ability of the children to interact with peers and teachers. In this component the highest percentage (68.65% as compared to 52.12%, 53.46% and 52.69%) of children with proficient skills was in the indicator “Interacts with one or more children.” In the second indicator ‘Interacts with familiar adults, 44.42% of children are ‘in the process’ category.

In this component, the highest percentage of children ‘not yet ready’ (13.46%) was in the indicator ‘participates in the group life of the class’, and 8.46% of children were not ready in the indicator ‘shows empathy and caring for others.’

**Social problem solving:** In this component majority of the children were ‘in process’ or ‘proficient.’ (40.77% and 56.15% respectively)

Overall more than half of the sample of children were either proficient or in process categories on all the indicators of the personal social domain. The highest percentage of children who were in the not yet category were on the indicators of self-confidence and participates in the group life of the class. (13.08 and 13.46%)

#### DOMAIN 2: LANGUAGE AND LITERACY:

This domain measures the language and literacy skills that are required to understand and convey meaningfully. This domain consists of 4 components namely, listening, speaking, reading and writing. (Table 7)

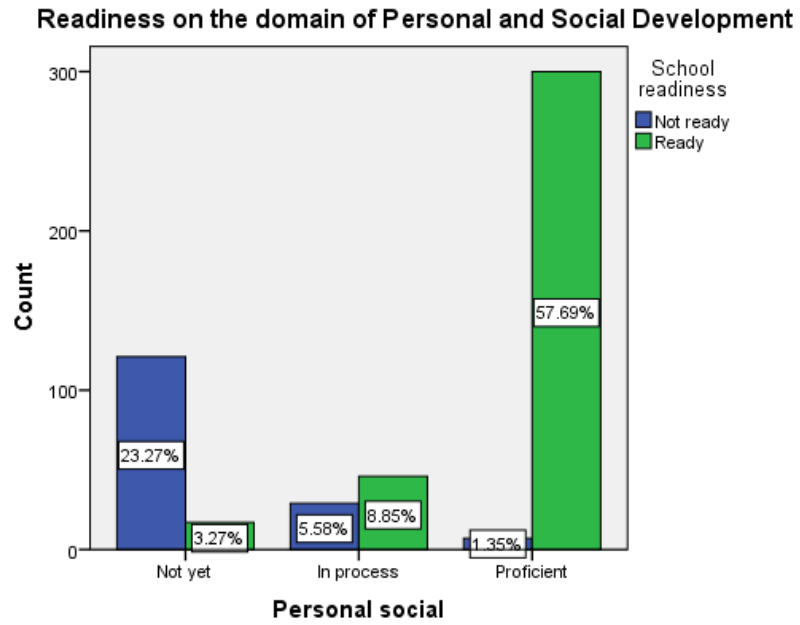
**Listening:** This component measures a child's ability to listen, comprehend and comply with the instruction. Most children were proficient in 'gaining meaning by listening' (62.31% ) and in 'following two step direction'(49.04% ). On the indicator 'shows beginning phonological awareness' a high percentage of children (53.63 %) were 'not ready' and only 6.92% of children were 'proficient.'

**Speaking:** This component measures the ability of the child to use words effectively to communicate and the ability to learn new words. A large number of children were proficient (n=319, 61.35%) or were 'in process' (28.46%) on the indicator 'speaks clearly to be understood by most listeners.' A lower percentage of children were proficient (30.58%) and 'in process' (39.04%) on the second indicator 'uses expanded vocabulary and language for a variety of purposes.'

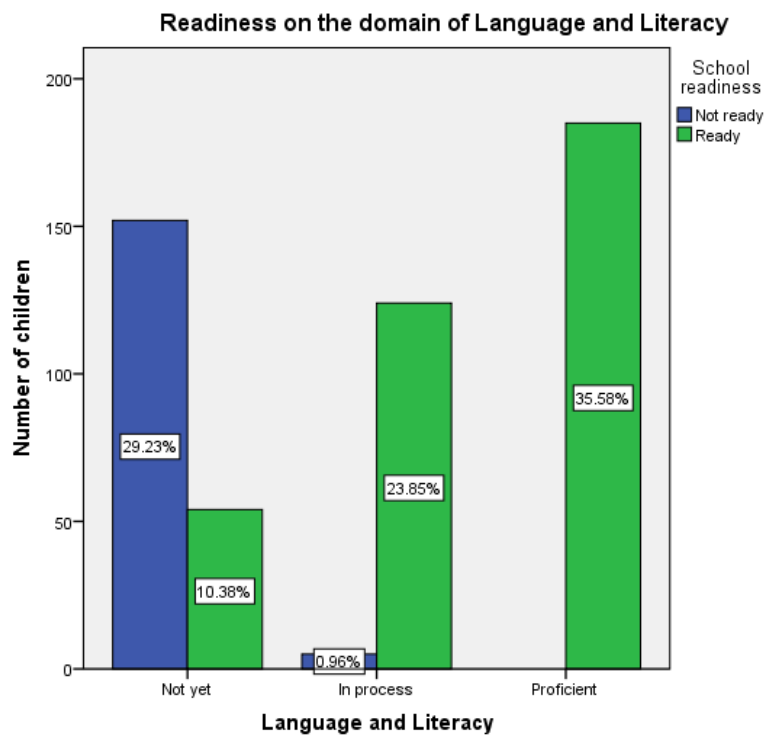
While only 10.19% were in the 'not yet' category for 'speaks clearly to be understood by most listeners' 30.38% of children were in the 'not yet' category for 'uses expanded vocabulary and language for a variety of purposes.'

**Reading:** Measurement of literacy has always looked at a child's interest in books, reading with parent. In this functional domain a child's interest in books and their interest in script was measured. The child's comprehension of content that was read to them was also measured provided the content is developmentally age appropriate. More than half of the children were 'proficient' (55.58%, 44.62%) or 'in process' (38.46%, 35.96 %) on the indicators 'shows appreciation for books', and 'shows interest in letters and words.' On the third indicator 'comprehends and responds to stories read aloud.' 39.04% of children were 'not yet ready'. This indicator has the highest percentage of children in the 'not yet' category on this domain.

**Writing:** This functional component measured the child's ability to use a writing instrument and their ability to use writing as a means of creative expression. 46.73% and 46.35% of children were 'in process' and 'proficient' categories on the indicator 'uses scribbles and unconventional shapes to write.' In comparison 10.38% were 'proficient' and 40.96% were 'not yet ready' on the second indicator of this domain 'represents ideas and stories through pictures and diction.'



**Figure 1 Readiness of Personal Social Development**



**Figure 2: Readiness of Language and Literacy**



## DOMAIN 3: MATHEMATICAL THINKING

This domain measured a child's approach to mathematical thinking and problem solving, understanding of patterns and relationships. (Table 8)

More than 70% of the children were either proficient or 'in process' on the functional components of mathematical thinking, numbers and operations and 'patterns, relationships and functions.' The percentage of children on the component 'numbers and operations' was much higher than the other two components. (25.96%)

**Geometry and Spatial Relations:** A higher percentage of children were 'proficient' on the indicator 'shows understanding of positional words' (41.92%) when compared to the percentage of children who were proficient on the indicator 'identifies several shapes.' (32.12%). Among those who were not yet ready, a higher percentage were 'not yet ready' on the indicator 'identifies several shapes'(34.23% ) and when compared to children who were 'not yet ready' on the indicator 'shows understanding of positional words.' (21.92%)

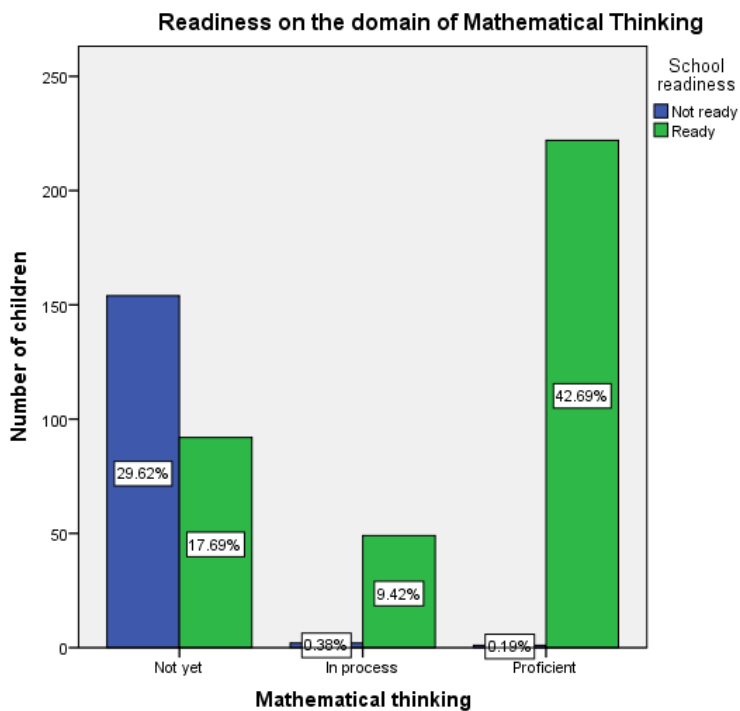
**Measurement:** A high percentage of children were 'not yet ready' on the indicator 'shows understanding of some comparative words' (25.77%) and 'participates in measuring activities' respectively when compared to other performance indicators and functional components. (27.50%)

## DOMAIN 4: PHYSICAL DEVELOPMENT AND HEALTH (Table 9)

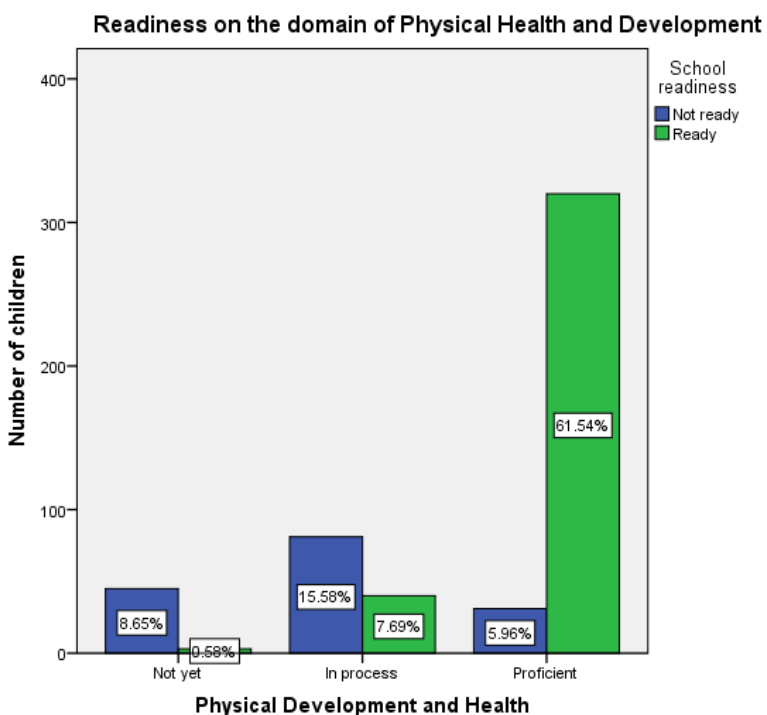
**Gross motor:** This component measured a child's ability to move in ways that demonstrate control, balance and coordination. Most children (96.92%) were 'proficient' on the indicator 'moves with some balance and control.' A high percentage of children are 'proficient' (79.81%) or 'in process on the indicator 'coordinates movement to perform simple tasks.' (20%). Almost all children are ready on this functional component.

**Fine motor:** This component measured the child's finger movements, hand and eye coordination to help in academic and self- help tasks in the class room. Most of the children are proficient on the indicator "using strength and control to perform simple tasks." (79.04%) On the other indicators "uses eye and hand coordination to perform simple tasks" and "explores the use of various drawing and art tools", a higher percentage of children were 'in process' category.' (52.12% and 54.04% respectively)

**Personal Health and Safety:** This component measured the child's growing ability to manage self-care, personal health and safety. 18.85% the of children were 'not yet ready' on the indicator ' perform self-help tasks independently while only 7.69% were 'not ready' on the indicator "follows basic health and safety rules with reminders." A higher percentage of children were 'in process.' on both indicators (41.54% and 54.42% )



**Figure 3 Readiness on Mathematical Thinking domain**



**Figure 4 Readiness on Physical Health and Development**

### 5.2.2 Prevalence of Readiness on Domains

**Table 10: Prevalence of readiness on domains in the study sample**

Sno	Domain	Not yet (%)	In process (%)	Proficient (%)
I.	Personal Social Domain	138(26.5)	75(14.4)	307(59)
II.	Language and Literacy	206(39.6)	129(24.8)	85(35.6)
III.	Mathematical Thinking	246(47.3)	51(9.8)	223(42.9)
IV.	Social Studies Domain	169(32.5)	77(14.8)	274(52.7)
V.	Scientific Thinking	174(33.5)	87(16.7)	259(49.8)
VI.	Arts	193(37.1)	62(11.9)	264(50.8)
VII.	Physical Development and Health	48(9.2)	121(23.3)	351(67.5)

#### Readiness Levels by domains:

The averages of domains show that, the highest number of children were ‘proficient’ in the domain of Physical Development and Health (351(67.5%)). The two domains with the lowest number of children in the proficient category were Mathematical Thinking (42.9%) and Language and Literacy(35.6 %).

In the ‘In process’ category the highest percentage of children were in the domains Language and Literacy (24.8%) and Physical Development and Health(23.3%). The domains of mathematical thinking and Arts had the least percentage of children in the ‘In process category.’

Not Yet Category: The domains of Mathematical Thinking (n=246(47.3%)) and Language and Literacy (n=206 (39.6%)) had the highest number of children who were ‘Not yet ready.’ The domain of Physical Development and Health had the least number of children in the ‘not yet’ category (n=48(9.2%))

## 5.2.3 Prevalence of school readiness indicators based on gender

Table 11: Personal and Social Development

Functional component	Indicator	Gender	Not yet (%)	In process (%)	Proficient (%)	p Value
<b>SELF CONCEPT</b>	Demonstrates Self-confidence	Girl	30(42.86)	79(48.47)	155(54.01)	0.1918*
		Boy	40(57.14)	84(51.53)	132(45.99)	
	Shows some self direction	Girl	23(33.82)	101(49.75)	140(56.22)	0.0044 <sup>†</sup>
		Boy	45(66.18)	102(50.25)	132(45.99)	
<b>SELF CONTROL</b>	Follows classroom routines	Girl	5(20.83)	73(43.71)	186(56.53)	0.0003*
		Boy	19(79.17)	94(56.29)	143(43.47)	
	Begins to use classroom materials carefully	Girl	12(40.00)	80(40.40)	172(58.90)	0.0001*
		Boy	18(60.00)	118(59.60)	120(41.10)	
	Manages transitions	Girl	15(34.80)	85(43.81)	164(57.95)	0.0009*
		Boy	28(65.12)	109(56.19)	119(42.05)	
<b>APPROACHES TO LEARNING</b>	Shows eagerness and curiosity as a learner	Girl	21(31.82)	79(45.93)	164(58.16)	0.0002*
		Boy	45(68.18)	93(54.07)	118(41.84)	
	Attends, seeks help when encountering a problem	Girl	9(31.03)	82(41.62)	173(58.84)	0.001*
		Boy	20(68.97)	115(58.38)	121(41.16)	
	Approaches play with purpose and inventiveness	Girl	13(36.11)	78(42.62)	173(57.48)	0.0013*
		Boy	23(63.89)	105(57.38)	128(42.52)	
<b>INTERACTION WITH OTHERS</b>	Interacts with one or more children	Girl	4(40.00)	56(36.60)	204(57.14)	<0.0001 <sup>†</sup>
		Boy	6(60.00)	97(63.40)	153(42.86)	
	Interacts with familiar adults	Girl	9(50.00)	99(42.86)	156(57.56)	0.0045*
		Boy	9(50.00)	132(57.14)	115(42.44)	
	Participates in the group life of the class	Girl	23(32.86)	80(46.51)	161(57.91)	0.0004*
		Boy	47(67.14)	92(53.49)	117(42.09)	
	Shows empathy and caring for others	Girl	12(27.27)	98(48.51)	154(56.20)	0.0013*
		Boy	32(72.73)	104(51.49)	120(43.80)	
<b>SOCIAL PROBLEM-SOLVING</b>	Seeks adult help when needed to resolve conflicts	Girl	8(53.33)	86(40.57)	169(57.88)	0.0005 <sup>†</sup>
		Boy	7(46.67)	126(59.43)	123(42.12)	

<sup>†</sup> – p-value calculated using Fisher's exact Test, \* p-value calculated using Chi-square

**Table 12: Language and Literacy**

Component	Indicator	Gender	Not yet (%)	In process (%)	Proficient (%)	p Value
<b>LISTENING</b>	Gains meaning by listening	Girl	7(29.17)	76(44.19)	181(55.86)	0.0045
		Boy	17(70.83)	96(55.81)	143(44.14)	
	Follows two step direction	Girl	44(35.77)	74(52.11)	146(57.25)	0.000
		Boy	79(64.23)	68(47.89)	109(42.75)	
	Shows beginning phonological awareness	Girl	128(45.88)	113(55.12)	23(63.89)	0.035
		Boy	151(54.12)	92(44.88)	13(36.11)	
<b>SPEAKING</b>	Speaks clearly to be understood by most listeners	Girl	23(43.40)	65(43.92)	176(55.17)	0.040
		Boy	30(56.60)	83(56.08)	143(44.83)	
	Uses expanded vocabulary and language for a variety of purposes	Girl	60(37.97)	110(54.19)	94(59.12)	0.000
		Boy	98(62.03)	93(45.81)	65(40.88)	
<b>READING</b>	Shows appreciation for books	Girl	15(48.39)	89(44.50)	160(55.36)	0.059
		Boy	16(51.61)	111(55.50)	129(44.64)	
	Shows interest in letters and words	Girl	30(29.70)	124(53.45)	110(58.82)	<0.001
		Boy	71(70.30)	108(46.55)	77((41.18)	
	Comprehends and responds to stories read aloud	Girl	83(40.89)	129(55.13)	52(62.65)	0.000
		Boy	120(59.11)	105(44.87)	31(37.35)	
<b>WRITING</b>	Represents ideas and stories through pictures, diction and play	Girl	90(42.25)	142(56.57)	30(55.56)	0.007
		Boy	123(57.75)	109(43.43)	24(44.44)	
	Uses scribbles and unconventional shapes to write	Girl	12(35.29)	110(45.64)	140(57.61)	0.006
		Boy	22(64.71)	131(54.36)	103(42.39)	

p-value- Chi-square test

**Table 13: Mathematical Thinking**

Functional component	Indicator	Gender	Not yet (%)	In process (%)	Proficient (%)	p value
<b>MATHEMATICAL PROCESSES</b>	Shows interest in solving mathematical problems	Girl	41(44.57)	92(46.23)	129(56.83)	0.0397
		Boy	51(55.43)	107(53.77)	98(43.17)	
<b>NUMBERS AND OPERATIONS</b>	Shows curiosity and interest in counting numbers	Girl	62(45.93)	68(43.31)	131(58.22)	0.0054
		Boy	73(54.07)	89(56.69)	94(41.78)	
<b>PATTERNS, RELATIONSHIPS AND FUNCTIONS</b>	Sorts objects into subgroups that vary by one attribute	Girl	45(42.45)	83(46.63)	133(57.08)	0.0130
		Boy	61(57.55)	95(53.37)	100(42.92)	
<b>GEOMETRY AND SPATIAL RELATIONS</b>	Identifies several shapes	Girl	73(41.01)	102(58.96)	87(16.73)	0.0037
		Boy	105(58.99)	71(41.04)	80(15.38)	
	Shows understanding of several positional words	Girl	45(39.47)	93(50.00)	124(56.88)	0.0114
		Boy	69(60.53)	93(50.00)	94(43.12)	
<b>MEASUREMENT</b>	Shows understanding of some comparative words	Girl	47(35.07)	91(52.91)	124(58.77)	0.0002
		Boy	87(64.93)	81(47.09)	87(41.23)	
	Participates in measuring activities	Girl	56(39.16)	94(54.34)	112(55.72)	0.0125
		Boy	87(60.84)	79(45.66)	89(44.28)	

p-value: Chi-square test

**Table 14: Physical development and Health**

Functional Component	Indicator	Gender	Not yet (%)	In process (%)	Proficient (%)	p value
<b>GROSS MOTOR DEVELOPMENT</b>	Moves with some balance and control	Girl	0(0.00)	5(35.71)	259(51.39)	0.1687 <sup>†</sup>
		Boy	2(100.00)	9(64.29)	245(48.61)	
	Coordinates movements to perform simple tasks	Girl	0(0.00)	40(38.46)	224(53.98)	0.0051 <sup>†</sup>
		Boy	1(100.00)	64(61.54)	191(46.02)	
<b>FINE MOTOR DEVELOPMENT</b>	Uses strength and control to perform simple tasks	Girl	2(50.00)	41(39.05)	221(53.77)	<0.0001 <sup>†</sup>
		Boy	2(50.00)	64(60.95)	190(46.23)	
	Uses eye-hand coordination to perform simple tasks	Girl	3(17.65)	121(44.65)	140(60.34)	<0.0001
		Boy	14(82.35)	150(55.35)	92(39.66)	
	Explores the use of various drawing and art tools	Girl	2(20.00)	121(43.06)	141(61.57)	<0.0001 <sup>†</sup>
		Boy	8(80.00)	160(56.94)	88(38.43)	
<b>PERSONAL HEALTH AND SAFETY</b>	Begins to perform self help tasks independently	Girl	31(31.63)	99(45.83)	134(65.05)	<0.0001
		Boy	67(68.37)	117(54.17)	72(34.95)	
	Follows basic health and safety rules with reminders	Girl	12(30.00)	127((44.88)	125(63.45)	<0.0001
		Boy	28(70.00)	156(55.12)	72(36.55)	

<sup>†</sup> p-value calculated using Fisher's exact test

#### DOMAIN 1: PERSONAL AND SOCIAL DEVELOPMENT

Prevalence of 'proficient', 'in process', 'not ready for school' was calculated for boys and girls for each of the performance indicators in percentage. A bivariate analysis was done to examine the association of the variables to school readiness.



The prevalence of boys who were ‘not yet ready’ was higher than the girls in all indicators of the Personal and Social Development domain except the indicator ‘interacts with familiar adults’ and ‘seeks adult help when needed to resolve conflicts’. The percentage of girls and boys in the ‘not yet category’ was statistically significant on all indicators except ‘demonstrates self confidence.’ (Table 11)

Among girls the highest percentage of ‘not yet ready’ was on the indicator ‘demonstrates self confidence’(11.36%). Among the boys the highest percentage of ‘not yet ready’ was on the indicator ‘demonstrates self confidence(15.63%), shows some self direction (17.58%), shows eagerness and curiosity as a learner(17.58%) and “participates in the group life of the class”(18.36%).

#### DOMAIN 2: LANGUAGE AND LITERACY

In this domain the percentage of boys who were ‘not yet ready’ was significantly higher than girls who were ‘not yet ready’ on all indicators. On the indicator ‘shows appreciation for books’ the percentage of girls and boys who were not ready were similar (48.39 % of girls and 51.61% of boys.). (Table 12)

Among the girls the percentage of girls who were in the not yet ready category was highest on the indicators ‘shows beginning phonological awareness’(48.48%). On the indicators ‘uses expanded vocabulary and language’ and ‘comprehends to stories read aloud’ the percentage of girls who were in the not yet ready category was high (22.73% and 331.44%)

Among the boys the percentage of boys in the ‘not yet category’ was high on the indicators ‘follows 2 step directions(30.86%), ‘shows beginning phonological

awareness’(58.98%), ‘uses expanded vocabulary and language’(38.28%) and ‘comprehends to stories read aloud’(46.88%).

### DOMAIN 3: MATHEMATICAL THINKING

The percentage of boys who were ‘not yet ready’ was significantly higher than the girls who were ‘not yet ready’ on all performance indicators. (Table 13)

Among the girls the highest percentage of girls in the not yet ready category was in the indicator ‘identifies several shapes (27.65%)’ and ‘shows curiosity and interest in counting (23.48%).’ Among the boys the high percentages of boys in the ‘not yet ready’ category was on the indicators, ‘identifies several shapes(41.02%) and ‘shows understanding of some comparative words’ (33.98%).

### DOMAIN 4: PHYSICAL DEVELOPMENT AND HEALTH

In the gross motor component the number of children who were not ready was minimal. In the fine motor component the percentage of boys who were not ready was higher on the indicators “uses eye and hand coordination to perform simple tasks.” The percentage of boys who were not ready on the indicator “begins to perform self help tasks independently” and “follows basic health and safety rules with reminders” was much higher than the percentage of girls who were not yet ready.’ (Table14)

#### 5.2.4 Prevalence of Readiness on Domains between boys and girls:

**Table 15: Prevalence on domains of School readiness by gender**

Domain	Gender	Not Yet (%)	In Process (%)	Proficient (%)	p value
<b>Personal Social</b>	Girl	44(16.79)	30(17.0)	175(66.3)	0.000
	Boy	94(36.7)	30(11.7)	132(51.6)	
<b>Language and Literacy</b>	Girl	84(31.8)	73(27.7)	107(40.5)	0.001
	Boy	122(47.7)	56(21.9)	78(30.5)	
<b>Mathematical Thinking</b>	Girl	104(39.4)	33(12.5)	127(48.1)	0.001
	Boy	142(55.5)	18(7.0)	96(37.5)	
<b>Physical Development and Health</b>	Girl	11(4.2)	51(19.3)	202(76.5)	0.001
	Boy	37(14.5)	70(27.3)	149(58.2)	
<b>Social Studies</b>	Girl	64(24.2)	34(12.9)	166(62.9)	0.000
	Boy	105(41.0)	43(16.8)	108(42.2)	
<b>Scientific Thinking</b>	Girl	69(26.1)	40(15.2)	155(58.7)	0.000
	Boy	105(41.0)	47(18.4)	104(40.6)	
<b>Arts</b>	Girl	77(29.2)	26(9.8)	161(61.0)	0.000
	Boy	116(45.5)	36(14.1)	103(40.4)	

p-value- Chi square

Prevalence of Readiness on Domains between boys and girls:

Girls were more proficient than boys (66.3% and 51.6%) in the domain of Personal Social Development. A higher percentage of boys were 'not yet' ready in the Personal Social Domain(36.7% boys and 16.7% girls).

Language and Literacy: A higher percentage of boys were 'not yet ready' in this domain (47.7% boys and 31.8% girls). A higher percentage of girls were proficient (40.5%) and 'in process' (27.7%) in this domain when compared to boys (proficient-n=78 and in process-n=56)

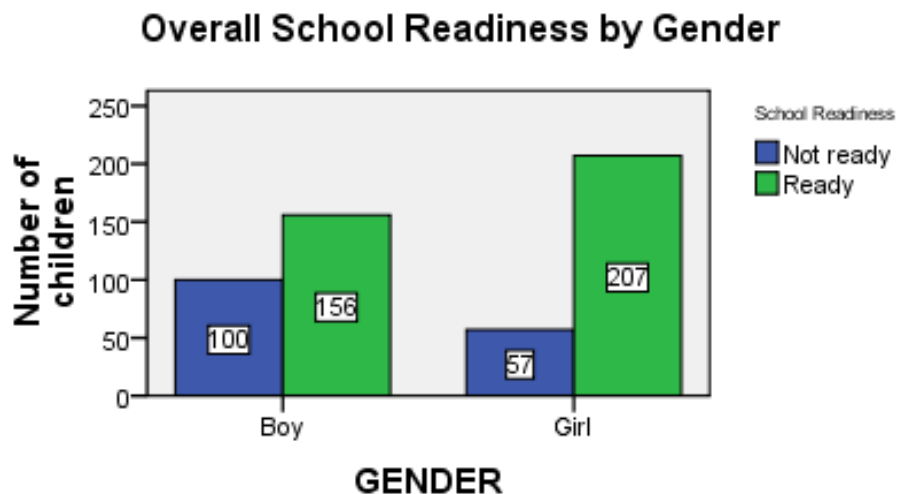
Mathematical Thinking: In this domain also more boys (55.5%) were in the 'not yet ready' category when compared to girls. A higher percentage of girls were proficient on this domain (48.1 % and 37.5%)

Physical development and Health: In this domain too there was a higher percentage of girls who were in the ‘proficient’ or ‘in process’ category when compared to boys. The number of boys who were ‘not yet’ ready (n=37) was higher than the girls (n=11).

Social Studies, Scientific Thinking and Arts: In the three domains there is a higher percentage of girls who were in the ‘proficient’ category- 62.9% in Social Studies, 61 % in Arts and 58.7% in Scientific Thinking.

### **Overall Prevalence of School Readiness based on Gender:**

78.41% of girls were ‘ready’ for school and 60.94% of boys were ready for school. The Boys were more likely to be ‘not ready’ for school as compared to girls. (21.59% of Girls and 39.06% of boys are ‘not ready’ for school.) This prevalence is significant at the <0.01 level. (Table 18)



**Figure 5: School Readiness by gender**

## 5.2.5 Prevalence of readiness on school readiness by age

Table 16: Prevalence by age

Domain	Age categories	Not Yet (%)	In Process (%)	Proficient (%)	p value
<b>Personal Social</b>	36-41 months	44(16.79)	30(17.0)	175(66.3)	0.000
	42-48 months	94(36.7)	30(11.7)	132(51.6)	
<b>Language and Literacy</b>	36-41 months	84(31.8)	73(27.7)	107(40.5)	0.001
	42-48 months	122(47.7)	56(21.9)	78(30.5)	
<b>Mathematical Thinking</b>	36-41 months	104(39.4)	33(12.5)	127(48.1)	0.001
	42-48 months	142(55.5)	18(7.0)	96(37.5)	
<b>Physical Development and Health</b>	36-41 months	11(4.2)	51(19.3)	202(76.5)	0.001
	42-48 months	37(14.5)	70(27.3)	149(58.2)	
<b>Social Studies</b>	36-41 months	64(24.2)	34(12.9)	166(62.9)	0.000
	42-48 months	105(41.0)	43(16.8)	108(42.2)	
<b>Scientific Thinking</b>	36-41 months	69(26.1)	40(15.2)	155(58.7)	0.000
	42-48 months	105(41.0)	47(18.4)	104(40.6)	
<b>Arts</b>	36-41 months	77(29.2)	26(9.8)	161(61.0)	0.000
	42-48 months	116(45.5)	36(14.1)	103(40.4)	

p-value- Chi square

The bivariate analyses of the association between age and school readiness revealed that the older children (42-48 months) were more proficient on all domains of school readiness when compared to the younger children (36-41months). The association between school readiness domains and age groups was significant ( $p=0.00$ )

### 5.2.6 Comparison of means of domains on readiness

**Table 17: Comparison of children who were ‘ready’ and ‘not ready’ on each domain**

<b>Domain</b>	<b>Classification</b>	<b>Median</b>	<b>Inter quartile range</b>	<b>p-value*</b>
<b>Personal and Social Development</b>	Not ready(n=157)	1.846	0.385	<0.001
	Ready (n=363)	2.923	0.385	
<b>Language and Literacy</b>	Not ready	1.500	0.400	<0.001
	Ready	2.500	0.500	
<b>Mathematical Thinking</b>	Not ready	1.143	0.571	<0.001
	Ready	2.714	1.000	
<b>Physical development and health</b>	Not ready	2.143	0.286	<0.001
	Ready	2.714	1.143	
<b>Scientific thinking</b>	Not ready	1.680	0.330	<0.001
	Ready	2.620	0.460	
<b>Social Studies</b>	Not ready	1.670	0.310	<0.001
	Ready	2.640	0.410	
<b>Arts</b>	Not ready	1.720	0.380	<0.001
	Ready	2.675	0.490	

\*Mann Whitney Test

The difference in means between children who were ready for school and children who were not ready for school was highly significant on all domains (p-value 0.001.)

## 5.2.7 Prevalence Statistics based on Gender and age

Table 18: Prevalence Statistics

	Not Ready for school		Ready for school		p-value- Chi-square test
	N(%)	95%CI	N(%)	95%CI	
<b>Total Sample</b>	157(30.2)	26.25- 34.15	363(69.8)	65.85- 73.75	<0.001
<b>Boys(n=256)</b>	100(39.1)	33.12- 45.08	156(60.9)	54.92- 66.88	
<b>Girls</b>	57(21.6)	16.64- 26.56	207(78.4)	73.44- 83.36	
<b>Younger (36-41 months) (n=181)</b>	112(71.34)	64.75- 77.93	69(19.01)	13.29- 24.73	<0.001
<b>Older (42-48 months)</b>	45(13.27)	9.66- 16.88	294(80.99)	76.81- 85.17	

The prevalence of children being not ready for school was 30.2% (95% CI 26.25-34.15). The prevalence was higher among boys than girls. (39.1% boys (95%CI 33.12-45.08 and 21.6% girls (95%CI 16.64-26.56). The prevalence of being not ready for school was higher among the younger age group of children (i.e less than 41 months). 71.34% (95%CI 64.75-77.93) of younger children were not ready when compared to 13.27% (76.81-85.17) of older children who were not ready for school.

### 5.3 Phase II Results: Case-Control Study

Phase II results are presented in the following order

5.3.1 Descriptive statistics of the study population on socio demographic and socio economic variables

5.3.2 Analysis of socio economic and socio-demographic variables and its association with school readiness

5.3.3 Analysis of child related variables and the association with school readiness

5.3.4 Analysis of association between parent and home variables and school readiness

5.3.5 Analysis of association between teacher and school variables and school readiness

#### 5.3.1 Descriptive statistics of the study population on socio demographic and socio economic variables

Parental Education:

The educational qualification of parents was enquired and classified and entered on Socio-economic status checklist by Kuppusamy.

**Table 19: Parental Education**

<b>Qualification</b>	<b>Father n(%)</b>	<b>Mother n(%)</b>
Primary/Middle school	82 (15.77)	104 (20.00)
High school	74 (14.04)	79 (15.19)
Post high school/diploma	119 (23.08)	97 (18.65)
Under graduate/post graduate	225 (43.27)	224 (43.08)
Professional	20 (3.85)	16 (3.08)



Majority of the parents (both fathers and mothers) had completed either under-graduation or post-graduation (43.27% of fathers and 43.08% of mothers.) Most parents had completed some level of schooling (52.89% of fathers and 53.84% of mothers).

### Parental Occupation

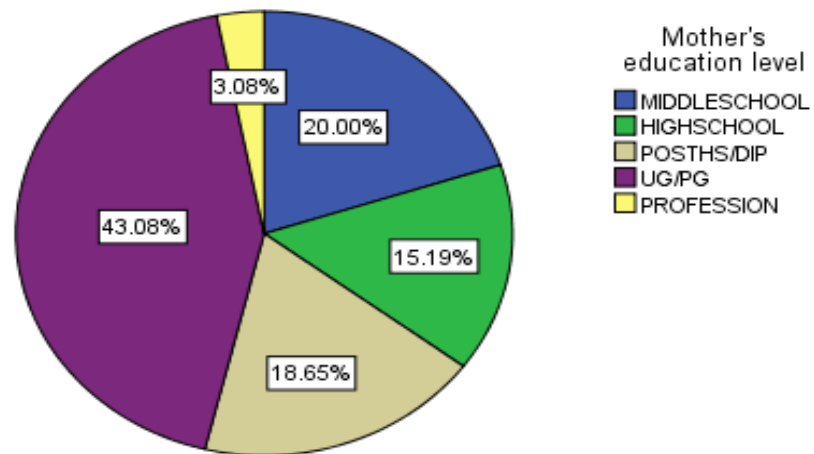
The parental occupation was classified on the Socio economic status scale.

**Table 20: Parental Occupation**

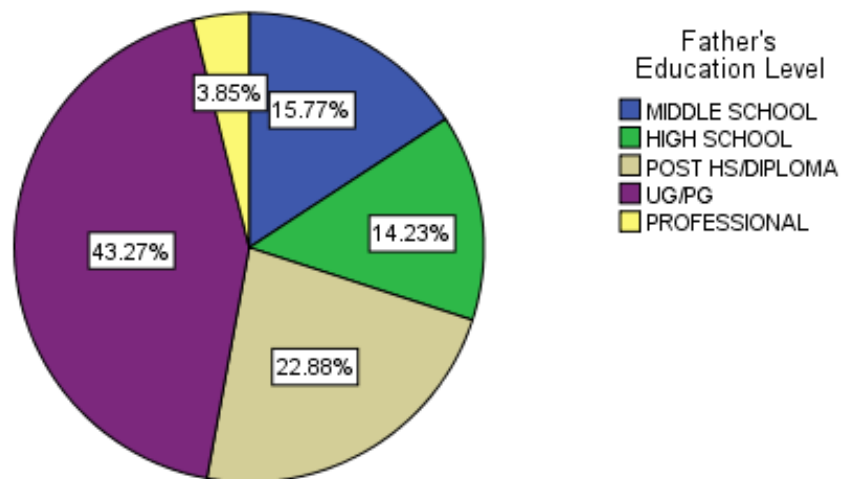
<b>Profession</b>	<b>Father n (%)</b>	<b>Mother n (%)</b>
Unemployed	-	301 (57.88)
Unskilled worker	48 (9.23)	50 (9.62)
Semiskilled worker	30 (5.77)	23 (4.42)
Skilled worker	119 (22.88)	11 (2.12)
Clerical	66 (12.69)	12 (2.31)
Semi- profession	166 (31.92)	102 (19.62)
Professional	90 (17.31)	21 (4.04)

The fathers were mostly semi- professionals or skilled workers. The majority of the mothers were homemakers and therefore classified as unemployed. The next highest professional group was the semi-professionals. Among the unemployed mothers 23.6% had completed high-school/ diploma and 39.2% had completed either under-graduation or post-graduation.

**Frequency of the Educational Qualification of Mothers**



**Frequency of the Educational Qualification of the fathers**



**Figure 6: Educational level of mothers and fathers**

**Other variables:**

The details of the location of the residence, family type, number of children in the family, language spoken at home were recorded on Proforma I

**Table 21: Other socio demographic variables**

<b>Variable</b>	<b>Number (%)</b>
<b>Family Type</b>	
Nuclear	316(60.77)
Joint	204(39.23)
<b>Number of children in the family</b>	
1	198(38.08)
2	308(59.23)
3	14(2.69)
<b>Location of residence</b>	
Rural	124(23.85)
Urban	396(76.15)
<b>Socio economic Class</b>	
I	95(18.27)
II	228(43.85)
III	97(18.65)
IV	100(19.23)
<b>Language spoken at home</b>	
Tamil	439(84.42)
Telegu	40(7.69)
Urdu	19(3.65)
Hindi	16(3.08)
Malayalam	4(0.77)
English	2(0.38)

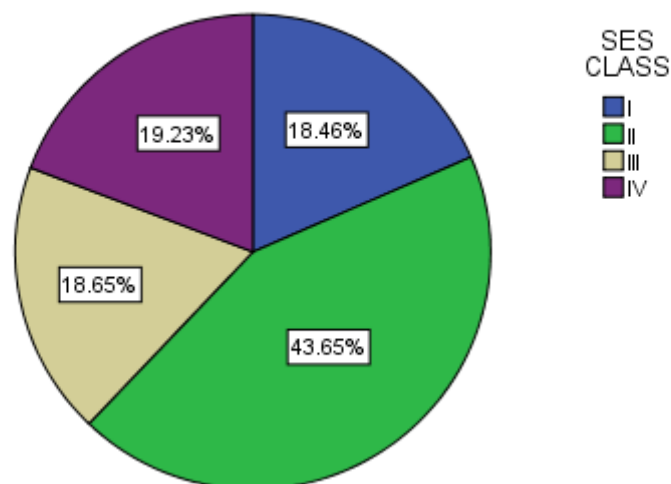
A higher percentage (60.77%) of children lived in nuclear families. 76.15 % of children lived with their families in urban areas. 43.85% of children came from families classified as Class II in the socio economic status. Almost equal percentages of children came from classes I, III and IV. A majority of children spoke Tamil at home (84.42%).

### 5.3.2 Analysis of socio economic and socio-demographic variables and its association with school readiness

The factors associated with school readiness were classified into four groups based on the definition of school readiness. These include socio demographic factors, child factors, home factors and school factors. The socio demographic factors included the following variables: parental education, parental occupation, household income, location of residence, type of family, number of children in the family.

The bivariate analysis was done to measure the association of the variables under each factor and the significance of the association was tested. (Table 22 and 23)

**Distribution of families by Socio-economic Class**



**Figure 7: Distribution of Socio-economic class**

### 5.3.2.1 Socio-economic status variables

Parental education, parental occupation and household income were categorised on the Kuppuswamy socio economic status and bivariate analyses of these variables was done.

There was a significant association between education levels of fathers and mothers and their children's school readiness. While there was a significant association between the occupation of the mother and school readiness, there was no significant association between the occupation of the father and school readiness. The association between maternal education and occupation was significant ((P-value=0.00) (Table 22)

The household's income had a significant association (P-value=0.009) with school readiness of the child. The percentage of children who were not ready for school decreased with increase in the household income.

The Socio-Economic Class was also significantly associated with school readiness (P-value= 0.002). 45% of children from Class IV were not ready for school while only 21.9% of children from Class I were not ready for school.

**Table 22: Bivariate analyses of socio economic status variables**

Variable	Categories	FATHER		MOTHER	
		Not ready (%)	Ready for school (%)	Not ready (%)	Ready for school (%)
Education	Middle School	39(47.6)	43(52.4)	50(48.1)	54(51.9)
	High School	25(33.8)	49(66.2)	18(22.8)	61(77.2)
	Post High School/ Diploma	32(26.9)	87(73.1)	33(34.0)	64(66.0)
	UG/PG	54(24.0)	171(76.0)	54(24.1)	170(75.9)
	Professional	7(35.0)	13(65.0)	2(12.5)	14(87.5)
<b>p-value</b>		<b>0.02</b>		<b>0.00</b>	
Occupation	Unemployed			103(34.2)	198(65.8)
	Unskilled	18(37.5)	30(62.5)	19(38)	31(62.5)
	Semi-skilled	10(33.3)	20(66.7)	6(21.1)	17(73.9)
	Skilled	43(36.1)	76(63.9)	3(27.3)	8(72.7)
	Clerical	23(34.8)	43(65.2)	4(33.3)	8(66.7)
	Semi-profession	46(27.7)	120(72.3)	19(18.9)	83(81.4)
	Profession	17(18.9)	73(81.1)	3(14.3)	18(85.7)
<b>p-value</b>		<b>0.076</b>		<b>0.042</b>	

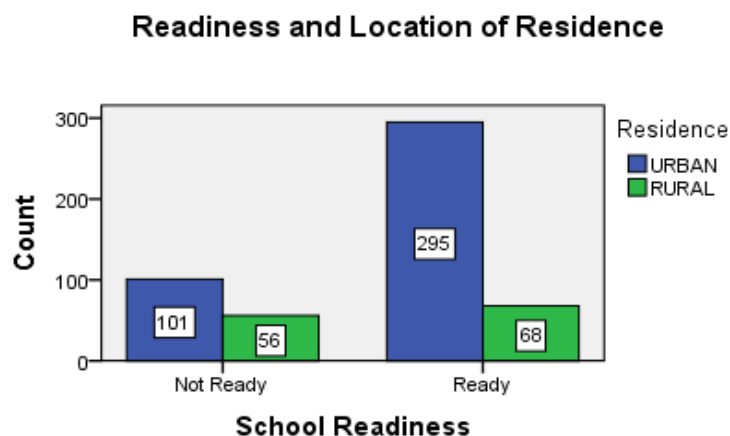
Variable	Categories	Not ready (%)	Ready for school (%)	p-value
SES Income	>29,776	15(23.4%)	49(76.6%)	<b>0.009</b>
	14,883-29765	37(22.6%)	127(77.4%)	
	11162-14882	42(33.6%)	83(66.4%)	
	7442-11161	19(29.7%)	45(70.3%)	
	4465-7441	35(40.7)	51(59.3)	
	1503-4464	9(52.9)	8(47.1)	
SESS Class	I	21(21.9)	75(78.1)	<b>0.002</b>
	II	62(27.3)	165(72.7)	
	III	29(29.9)	68(70.1)	
	IV	45(45.0)	55(55.0)	

### 5.3.2.2 Socio Demographic Variables

The bivariate analyses of other sociodemographic variables were done (Table 23). The family type, number of children in the family, language spoken at home were not significantly associated with school readiness of children. The location of the residence (i.e. urban or rural) was significantly associated with the school readiness of children. (p-value= 0.00) The location of the residence was also significantly associated with all the socio economic variables- parental education, parent occupation, household income and SES Class (p-value=0.00)

**Table 23: Bivariate analyses of socio demographic variables**

Variable	Categories	Not ready (%)	Ready for school (%)	p-value
<b>Family Type</b>	Nuclear	92(29.1)	224(70.9)	0.55
	Joint	65(31.9)	139(68.1)	
<b>Location of Residence</b>	Urban	101(25.5)	295(74.5)	<b>0.00</b>
	Rural	56(45.2)	68(54.8)	
<b>Number of children in the family</b>	1	52(26.3)	146(73.7)	0.09
	2	103(33.4)	205(66.6)	
	3	2(14.3)	12(85.7)	
<b>Language used at home</b>	Tamil	131(29.8)	308(70.2)	0.548
	Telegu	13(32.5)	27(67.5)	
	Urdu	8(42.1)	11(57.9)	
	Hindi	3(18.8)	13(81.2)	
	Malayalam	2(50)	2(50)	
	English	0(0)	2(100)	



**Figure 8: Readiness by location of residence**

The odds of children being ‘not ready’ for school were 3.56 times higher in children whose mothers have had only primary school education. Children residing in a rural set-up had higher odds of being not ready for school(OR=1.84(1.07-3.16)). (Table 24)

**Table 24: Logistic regression for socio demographic variables that predict school readiness**

Predictor	B-coefficient	Odds ratio (95%CI)	p-value
Maternal Education	1.270	3.56(2.43-5.65)	0.02
Location of residence	0.612	1.84(1.07-3.16)	0.03



### **5.3.3 Analysis of child related variables and the association with school readiness**

The child related factors included the variables- age, gender, intelligence, social maturity, pregnancy and neonatal complications, performance in the school assessments and attendance in school. The means of the different categories of age and gender were compared using Mann Whitney U- test as both had non-normal distributions. A bivariate analysis was done to test the association between the child variables and school readiness. The variables that were significantly associated with school readiness were further tested using logistic regression and model of fit.

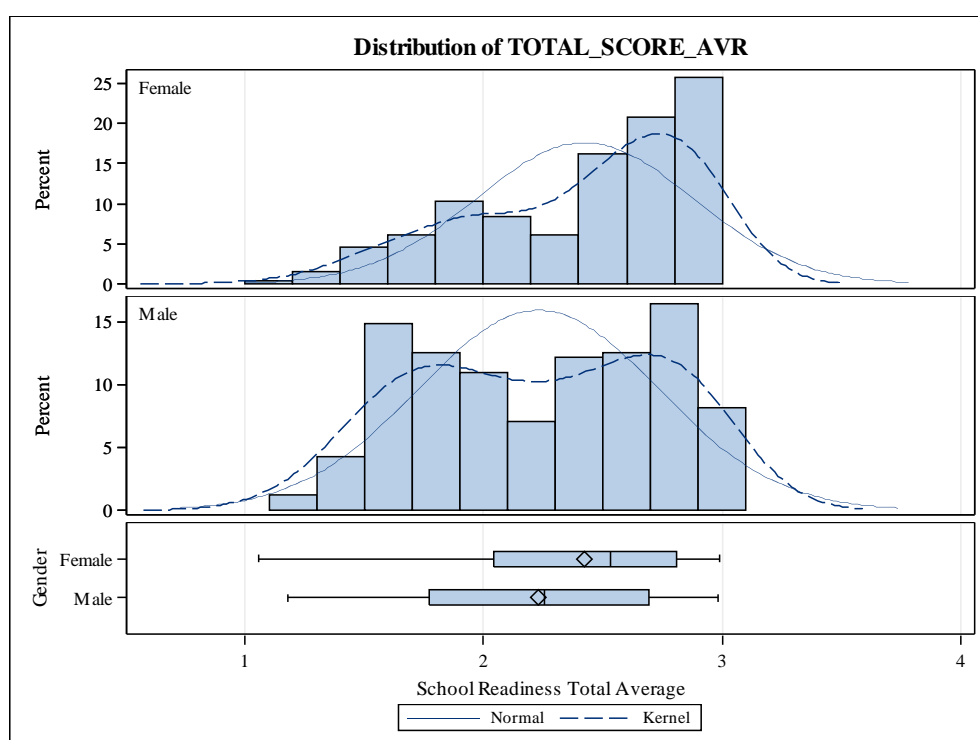
#### **5.3.3.1 Comparison of means between boys and girls on each domain**

The mean scores on each domain was analysed for normality. While the histograms looked normal, analysis of skewness and kurtosis and Shapiro Wilk statistic being less than 0.05 led to the use of non-parametric tests (Mann Whitney statistic). The mean scores of girls in every domain were higher than that of boys. The highest median scores were in the domains of Personal and Social Development and Physical development and health for the girls and boys. The lowest median scores were in the domain of mathematical thinking (Table25)

**Table 25: Comparison of means of boys and girls on each domain**

Domain	Gender	Median	Inter quartile Range	p-value*
Personal and Social Development	Girl(n=264)	2.769	0.769	<0.0001
	Boy(n=256)	2.461	1.038	
Language and Literacy	Girl	2.400	0.900	<0.0001
	Boy	2.100	1.000	
Mathematical Thinking	Girl	2.286	1.143	0.003
	Boy	2.000	1.500	
Physical development and health	Girl	2.714	0.571	<0.0001
	Boy	2.429	0.571	
Scientific thinking	Girl	2.505	0.805	0.0001
	Boy	2.235	0.930	
Social Studies	Girl	2.540	0.750	<0.0001
	Boy	2.285	0.950	
Arts	Girl	2.595	0.825	<0.0001
	Boy	2.200	0.870	
School Readiness total Score	Girl	2.530	0.768	<0.0001
	Boy	2.258	0.919	

\*Using Mann Whitney Test



**Figure 9: Distribution of the total score of School Readiness**

### 5.3.3.2 Comparison of means between younger and older children on each domain

**Table 26: Comparison of means of two age groups on domains**

<b>Domain</b>	<b>Gender</b>	<b>Median</b>	<b>Inter quartile Range</b>	<b>p-value*</b>
Personal and Social Development	36-41 months	2.00	0.85	<0.001
	42-48 months	2.846	0.54	
Language and Literacy	36-41 months	1.700	0.70	0.00
	42-48 months	2.400	0.60	
Mathematical Thinking	36-41 months	1.428	1.00	<0.001
	42-48 months	2.571	1.00	
Physical development and health	36-41 months	2.28	0.28	0.002
	42-48 months	2.71	0.57	
Scientific thinking	36-41 months	1.89	0.59	<0.001
	42-48 months	2.61	0.54	
Social Studies	36-41 months	1.900	0.59	<0.001
	42-48 months	2.62	0.50	
Arts	36-41 months	1.96	0.61	<0.001
	42-48 months	2.65	1.68	
School Readiness total Score	36-41 months	1.61	0.56	<0.001
	42-48 months	2.64	0.52	

\* Mann Whitney U-test

The above table (Table 26) shows that the means of domains for the younger age group is significantly lower than the means of domains for the older age group.

### 5.3.3.3 Association between child variables and school readiness

**Table 27: Bivariate analyses of categorical child related variables**

Variable	Categories	Not ready (%)	Ready for school (%)	p-value-(chi-square)
Age	36-41	122(77.7)	109(30)	0.00 OR=4.36(95% CI-3.12-5.08)
	42-48	35(22.3)	254(70)	
Gender	Girls	57(36.3)	207(57.0)	0.00 OR=2.33(95% CI-1.58-3.42)
	Boys	100(63.7)	156(43.0)	
Type of antenatal complication	No complication	99(23)	331(77)	0.00
	Infection	19(67.9)	9(32.1)	
	GDM	19(63.3)	11(36.7)	
	PIH	17(65.4)	9(34.6)	
	Not aware	3(50)	3(50)	
Type of neonatal complication	No complication	106(23.9)	338(76.1)	0.00
	Ashyxia	12(70.6)	5(29.4)	
	LBW	13(72.2)	5(27.8)	
	Seizure	12(70.6)	5(29.4)	
	Infections	11(73.3)	4(26.7)	
	Not aware	3(33.3)	6(66.7)	
School Performance Grade	<45	12(92.3)	1(7.7)	0.00
	45-59	24(77.4)	7(22.6)	
	60-74	49(58.3)	35(41.7)	
	75-89	66(24.4)	205(75.6)	
	>90	6(5.0)	115(95)	

#### Child Variables:

The children were divided into two age groups of 6 months each (36-41 months and 42-48 months) as the school enrolled children at 3 years or 3 1/2 years. There was a significant association (p-value 0.00) between age and school readiness as seen in Table 27. A higher percentage of children who were not ready for school were from the younger age group of (77% vs 22.3%).

A higher percentage of children who are not ready for school were boys (63.7% boys and 36.3% girls). There was a significant association between gender and school readiness.

There was a significant association between antenatal and neonatal complications and school readiness (p-value 0.00). Among those with pregnancy complications, children in the 'not ready category' had a higher percentage of pregnancy related complications. Even among children with neonatal complications, the percentage of children who had neonatal complication is higher among those who were not ready for school when compared to those who were ready for school.

There was significant association between school performance and school readiness. There was a higher percentage of children with lower grades in the 'not ready group'. (Table 27)

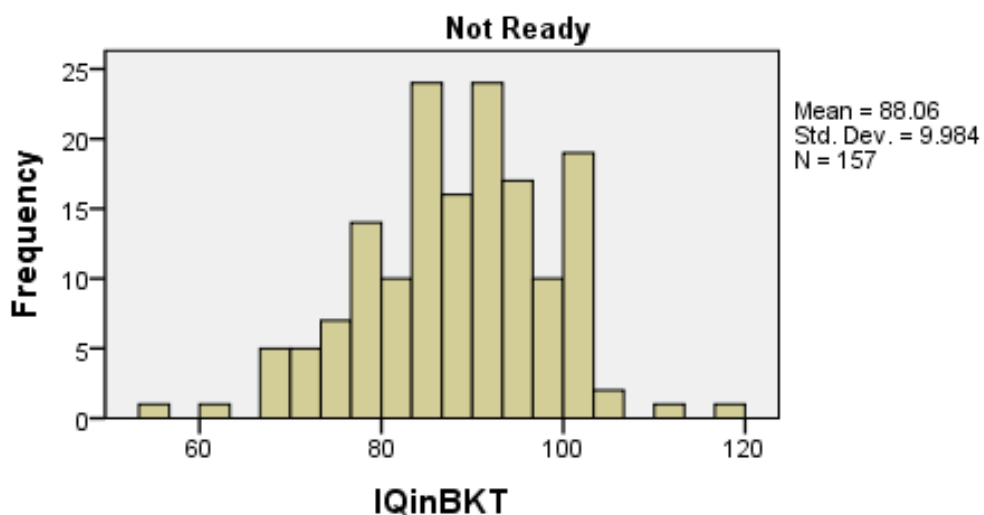
**Table 28: Analyses of association of continuous variables**

<b>Variable</b>	<b>Not ready Median(IQR)</b>	<b>Ready for school Median(IQR)</b>	<b>p-value (mann whitney)</b>
Intelligence Quotient (BKT)	89(12)	100(9)	<b>0.00</b>
Social QuotientSQ	87(19)	102(13)	<b>0.00</b>
Non Verbal IQ	102(14)	106(21)	0.66
Attendance	94(5.5)	94(4)	<b>0.02</b>

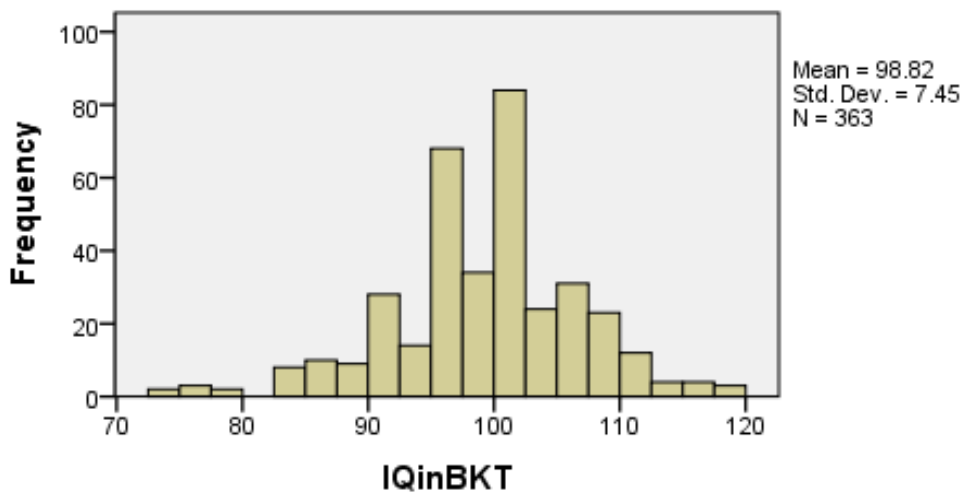
The continuous independent variables included IQ measures on BKT and SFB, social quotient(SQ) as measured by VSMS and attendance in school. The histograms were skewed and Shapiro wilk statistic was  $<0.05$  for all the variables. Therefore the Mann Whitney statistics test was used. The children who were not ready for school had lower medians on IQ and SQ and this was significant(p value=0.00). The non verbal IQ as measured by Seguin Form Board did not show a significant difference

between the two groups of children. Children’s school performance (as measured by school grades) was also significantly associated with school readiness. (Table 28)

**Histogram of IQ of children who are 'not ready for school'**



**Histogram of IQ of children who are 'ready for school'**



**Figure 10: Distribution of IQ scores in children who are ‘ready’ and ‘not ready’ for school**

**Table 29: Logistic regression for child related variables that predict school readiness**

Predictor	B-coefficient	Odds ratio (95%CI)	p-value
Age	2.361	10.60(6.809-16.513)	<b>0.00</b>
Gender	0.845	2.32(1.490-3.635)	<b>0.00</b>
IQ(BKT)	0.144	1.92 (1.81-1.97)	<b>0.01</b>
SQ(VSMS)	0.51	1.95 (1.90-1.97)	<b>0.001</b>
Attendance	0.74	0.92(0.873-0.98)	<b>0.02</b>
Performance (45-59%)	0.88	6.60(4.61-17.03)	<b>0.009</b>
Neonatal complication: Asphyxia	1.687	5.25(2.16-13.60)	<b>0.032</b>
Low birth weight	1.514	4.54(2.86-14.01)	<b>0.031</b>
Pregnancy related complication-PIH	1.309	3.70(1.97-4.76)	<b>0.05</b>

In the bivariate analysis the significant variables associated with school readiness in were included in the model for logistic regression. A binary logistic regression was done (Table 29). The goodness of fit statistic (Hosmer Lemeshow Test) was 0.583. The model predicts that the odds of children being not ready for school were 10.604(6.809-16.513) if they were younger (36-41 months). The odds of boys being not ready for school were twice as compared to girls. The antenatal complication of Pregnancy induced hypertension (OR=3.70(1.97-4.76)), and neonatal risk factors such as asphyxia during birth (OR=5.25(2.16-13.60)) and low birth weight(OR=4.54(2.86-14.01)) increased the odds of children being not ready for school. The odds of being not ready was higher for children with a lower IQ and SQ. (OR= 1.92 and 1.95)

### 5.3.4 Analysis of association between parent and home variables and school readiness

The Parent Involvement and Home Environment variables were evaluated in the Home factors. Parent involvement consisted of School involvement, Home work involvement and Parent teacher association involvement. The total home environment score was tested for association with school readiness.

**Table 30: Bivariate analyses of home variables and school readiness**

Variable	Categories	Not ready (%)	Ready for school (%)	p-value chi square
Parent Involvement-School Involvement	Low	17(56.7)	13 (43.3)	<b>0.00</b>
	Average	134 (33.8)	198 (66.2)	
	High	18 (15.9)	152 (79.6)	
Parent Involvement-Homework Involvement	Low	25 (40.3)	37 (59.7)	<b>0.01</b>
	Average	103 (32)	219 (68.0)	
	High	29 (21.3)	107 (78.7)	
Parent Involvement-Parent teacher association	Low	24 (41.4)	34 (58.6)	0.09
	Average	131 (29.1)	319 (70.9)	
	High	2 (16.7)	10 (83.3)	
Parent Involvement-Total score	Low	25 (40.3)	37 (59.7)	<b>0.014</b>
	Average	103 (32)	219 (68.0)	
	High	29 (21.3)	107 (78.7)	
Home Screening Questionnaire-Total	Poor	84 (41.4)	119 (58.6)	<b>0.00</b>
	Good	72 (23.2)	238 (76.8)	

There was significant association between parental involvement-school involvement, parental home-work involvement and school readiness (p-value= 0.001 and 0.014 respectively). (Table 30)

The total Parent Involvement Scale score and school readiness were significantly associated (p-value 0.014). The total scores on Home Screening questionnaire was



also significantly associated with school readiness (p-value 0.00). The percentage of children from a poor home environment who were not ready for school was higher than the percentage of children from good home environments who were not ready for school.

**Table 31: Logistic regression for home related variables that predict school readiness**

Predictor	B-coefficient	Odds ratio (95%CI)	p-value
PIS-SI low	1.476	4.37(1.47-10.00)	0.008
PIS-Total score	0.698	2.01(0.94-4.27)	0.007
HSQ-poor environment	0.563	1.76(1.10-2.8)	0.018

The odds of children being not ready for school was 4.37 times more in children whose parents scored low on school involvement and 2.01 times more in children whose parents scored low on the total score of the Parent Involvement Scale. The odds of a child from a poor home environment being not ready for school was 1.76 times more than a child from a good home environment.( Table 30)

### **5.3.5 Analysis of association between teacher and school variables and school readiness**

The school factors included the variables- number of children in the class, number of hours spent in school, the aid received by the school, infrastructure available ( library and books, technology based classrooms, and playground), qualification of the teacher, years of teaching experience of the teacher, availability of teaching aids, teaching assistant.

**Table 32: Bivariate analyses of school readiness and school related variables**

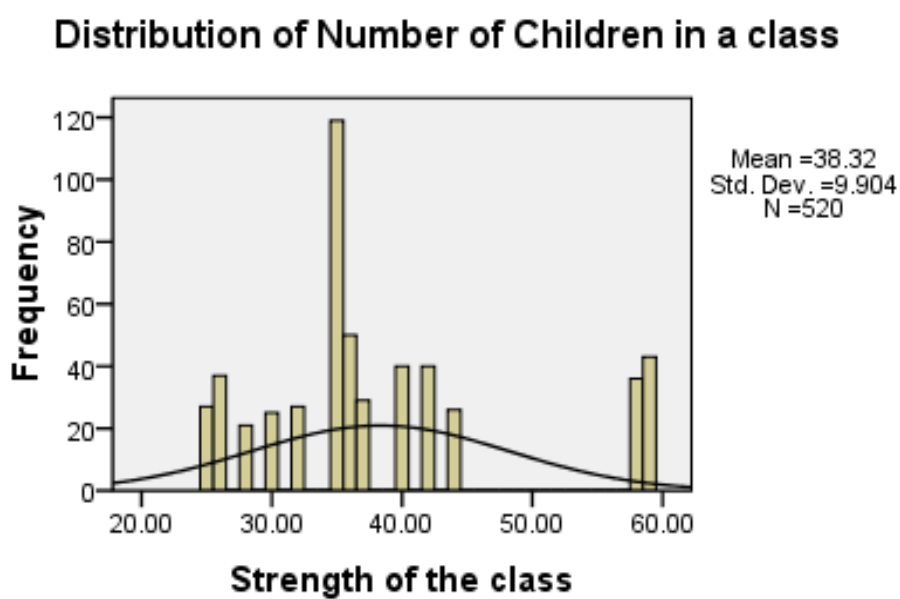
Variable	Categories	Not ready (%)	Ready for school (%)	p-value*
Assistance in the classroom	Maid	89(28.4)	224(71.6)	0.48
	Asst teacher	26(32.9)	53(67.1)	
Teacher's Qualification	DTEd	42(35.9)	75(64.1)	0.39
	BEd	91(28.7)	226(71.3)	
	Montessori	18(30.5)	41(69.5)	
Infrastructure	Techn-Available	107(30.7)	242(69.3)	0.76
	Tech-NA	50(29.2)	121(70.8)	0.30
	PlaygroundAV	101(35.7)	182(64.3)	
	NAV	56(23.6)	181(76.4)	0.39
	Aids AV	71(28.3)	180(71.7)	
	NAV	86(32)	183(68)	
<b>Continuous variables</b>				
Variable		Median (IQR)	Median (IQR)	p-value <sup>m</sup>
Experience of teachers in years		8(9)	6(7)	0.61
Hours of schooling		6(3)	6(3)	<b>0.04</b>
Strength of the class		37(7)	35(12)	<b>0.001</b>

p-value-<sup>\*</sup> Chi-square test, <sup>m</sup> Mann-whitney Test

The school factor included the categorical variables such as teacher's qualification, assistance in the classroom, and infrastructure of the school (which included library, playground, technology and teaching aids.) There was no significant association between these variables and school readiness. The continuous variables that were evaluated for association included experience of the teacher in years, hours of schooling and strength of the classroom (i.e. the number of students in a class). The hours of schooling and strength of the class were significantly associated with school readiness. (Table 32). The two independent variables among the school factors that were predictive in the model on logistic regression included hours of school and strength of the class.( OR=0.47 and 1.03 respectively) (Table 31)

**Table 33: Logistic regression for school related variables that predict school readiness**

Predictor	Odds ratio(95%CI)	p-value
Hours of school	0.47(0.30-0.76)	0.002
Strength of the class	1.03(1.01-1.05)	0.007

**Figure 11: Distribution of children according to number of students in the class**

**Table 34: Logistic regression of variables of the different domains**

Variable	Groups	Odds Ratio	95%CI	p-value
Maternal Education	<b>Primary/ Middle school</b>	<b>3.35</b>	<b>0.44-5.63</b>	<b>0.01</b>
	High School	1.45	0.20-10.03	0.23
	Intermediate/ Post High-school diploma	3.50	0.58-12.99	0.71
	BA/BSc Degree	2.33	0.44-10.28	0.17
	Professional degree (ref)			
Residence	<b>Rural</b>	<b>1.07</b>	<b>0.24-4.79</b>	<b>0.05</b>
	Urban (ref)			
Neonatal complication	<b>Asphyxia</b>	<b>4.08</b>	<b>1.96-10.44</b>	<b>0.05</b>
	<b>Low birth weight</b>	<b>5.41</b>	<b>1.16-15.71</b>	<b>0.03</b>
	Seizures	1.12	0.14-8.72	0.10
	Infections	4.55	0.86-14.01	0.06
	No complication (ref)			
Antenatal complication	Infections	1.53	0.49- 4.74	0.23
	Gestational diabetes	1.39	0.46-4.18	0.35
	<b>Pregnancy induced hypertension</b>	<b>3.70</b>	<b>0.97-10.12</b>	<b>0.02</b>
	No complication (ref)			
Performance	<b>&lt;45%</b>	<b>2.07</b>	<b>0.26-11.74</b>	<b>0.00</b>
	<b>45-59%</b>	<b>1.26</b>	<b>0.17-8.60</b>	<b>0.02</b>
	60-74%	0.62	0.13-2.85	0.07
	75-89%	0.94	0.11-3.98	0.09
	>90% (ref)			
Gender	<b>Boy</b>	<b>1.99</b>	<b>1.12-3.58</b>	<b>0.02</b>
	Girl (ref)			
Age	<b>36-41 months</b>	<b>4.64</b>	<b>2.57-11.73</b>	<b>0.00</b>
	42-48 months(ref)			
IQ	<b>&lt;75</b>	<b>1.85</b>	<b>0.87-4.97</b>	<b>0.001</b>
	>75 (ref)			
SQ	<70	1.75	1.05 - 10.98	0.06
	>70 (ref)			
Attendance	<80%	0.93	0.87- 0.98	0.22
	>80%			
Parent Involvement	<b>Low</b>	<b>2.2</b>	<b>1- 4.9</b>	<b>0.05</b>
	Medium	0.4	0.04 – 3.6	0.435
	High (ref)			
Home environment	<b>Suspect</b>	<b>3.1</b>	<b>1.13-8.5</b>	<b>0.03</b>
	Non-suspect (ref)			
Strength of the class	<30 (ref)			
	<b>&gt;30</b>	<b>3.6</b>	<b>1.2- 11</b>	<b>0.02</b>
Number of hours of school	<4 hrs (ref)			
	>4 hrs	0.67	0.2 - 2.1	0.06
<b>R<sup>2</sup> = 0.59</b>				

The variables significant in the logistic regression of individual domains were analysed together using Binary Logistic Regression (Table 34). *The variables that contributed to children being 'not ready for school' ( $R^2=0.59$ ) included, children whose mothers had studied only till middle school ( $OR=3.35;p=0.01$ ), children from rural areas( $OR=1.57;p=0.05$ ), Pregnancy Induced Hypertension in the mother( $OR=3.70;p=0.02$ ) and low birth weight/ asphyxia in the neonatal period( $OR=5.41$  and  $p=0.03$ ;  $OR=4.08$ ,  $p=0.05$ ), age, gender and intelligence of the child ( $OR=4.64p=0.00$ ;  $OR=1.99$   $p=0.02$ ;  $OR=1.92$   $p=0.00$  respectively), poor school performance( $OR=2.07$   $p=0.00$ ), low parent involvement( $p=$ ) and a suspect home environment ( $p=0.03$ ) and more than 30 students in a class( $p=0.02$ ).*

#### Summary

The results of this study show that the prevalence of children ready for school was 69.8% (65.85-73.75%-95%CI) between 3-4 years. The prevalence of children who were ready for school was higher among older children, i.e 42-48 months (80.9%) in comparison to younger children (20%). Girls were more ready for school when compared to boys (78.5% and 60.9% respectively). (Table 18)

In this study, children were most ready on the domain of Physical Health and Development (67.5%) and least ready on Mathematical thinking domain(42.9%) and Language and Literacy domain.(35.6%). (Table 10)

In the case control study, the logistic regression reveals that the odds of children being 'not ready' are more for children whose mothers have had only primary education ( $OR=3.56;p=0.01$ ) and children who reside in a rural environment. ( $OR=1.07$ ;  $p= 0.05$ )

Pregnancy Induced Hypertension in the mother in the antenatal period (OR=3.70; p=0.02) and birth asphyxia or low birth weight (OR=5.41 and p=0.03; OR=4.08, p=0.05) in the new-born period were significant predictors for children being 'not ready' for school. The odds for children being 'not ready for school' were higher if they have lower Intelligence Quotient (<75) and score lesser than 59% in the school tests. (Table 34)

The odds of children who were younger than 42 months, being 'not ready for school' was higher than older children. (Table 29 and 34) The odds of boys being 'not ready for school' was higher than girls even when controlled for age. (OR= 1.99; p=0.02). (Table 34)

Schools which have higher number of students in the class were more likely to have children who are not ready for school. (Table 33 and 34)

## **6 DISCUSSION**

School readiness in preschool is a strong predictor of later school achievement.<sup>157</sup>

Early identification of children who are ‘not ready for school’ helps to provide early intervention. Studying the prevalence of children who are ‘not ready for school’ and the predictive factors for it helps to increase awareness and develop interventions to address it.

The Discussion is presented in the following sections

### **6.1 Prevalence of readiness on performance indicators and domains**

### **6.2 Association of socioeconomic status and socio demographic variables and school readiness**

### **6.3 Association of child related variables and school readiness**

### **6.4 Association of home, parent and school readiness**

### **6.5 School and teacher variables and their association with school readiness**

#### **6.1 Prevalence of readiness on performance indicators and domains**

There are multiple tools to measure school readiness. The tool that has been used in the study to measure school readiness in children between the ages of 3-4 years was examined for reliability and validity and found to be suitable for use in the Indian subcontinent.

The Work Sampling System has been found to be a reliable and valid tool to measure school readiness from pre-school to Grade III.<sup>144</sup> In the present study the tool was examined for internal consistency. The item-total correlation was strongly

positive ( $\alpha = 0.92$ ). The concurrent validity with the intelligence measure and social quotient was also strongly positive ( $r = 0.76, 0.79$ ). The authors of the work Sampling system reported a correlation coefficient of 0.69 with Woodcock Johnson Assessment Battery and 0.76 with CBRS in the initial reliability and validity estimates of the WSS carried out by the authors of the checklist.<sup>144</sup> The reliability and validity coefficients in the present study are comparable with the original values (Cronbach's  $\alpha = 0.92$ ,  $r = 0.76$  and  $0.85$  respectively.). The tool was therefore used in the present study to measure school readiness.

### **Overall prevalence of readiness in preschool children**

In Phase I of the study the overall prevalence of children who were ready for school was 69.8% (95% CI = 65.85-73.75) of all children studied. The prevalence of children who were ready was comparable to the study on school readiness in the Minnesota State (Varley, 2012) on domains of Arts, language and literacy.<sup>48</sup> The prevalence of children who were ready on the domains of 'personal and social development' and 'physical development and health' was higher in the present study when compared to the other studies. The prevalence of children who were ready for school was lowest in the domains of mathematical thinking, language and literacy (Table 35). These were the two domains that were related to the academic achievement and require cognitive readiness and metacognitive processes. Priori (2011) reported that in children language capacities and literacy skills were predictors of school readiness.<sup>74</sup>

The present study is one of the few studies in India that looks at school readiness in the preschool age. Results from the study of school readiness in preschool showed similar results on personal-social development, physical development and health



(Missal, 2012).<sup>50</sup> The prevalence of children ‘ready’ on Language and Literacy was lower in the present study. The age range of the children chosen is younger than the other study from India which is quoted above. This could explain the lower prevalence of readiness in the present study. Despite this difference in age both the studies showed that the prevalence of children ‘ready’ on Language and Literacy is lower than in other domains. Children in India do not usually attend any child care facility before the age of 3 years and join pre-school at the age of 3 years.<sup>1</sup> Their move from the home to school consists of a transition from a monolingual environment to a bilingual environment when the medium of class-room learning is English. Most families prefer to start their children in an English medium learning environment in the hope of facilitating their learning prospects. When the language of communication everywhere else is mother tongue and if parents are not proficient in English, there is a natural adjustment stress on children at school entry. These factors do have a significant influence on school readiness especially language and mathematical thinking.<sup>158</sup>

**Table 35: Comparison of the present study with studies on school readiness from developed countries**

<b>Domain</b>	<b>Present study</b>	<b>Minnesota study (2012)</b>	<b>ECLS Study (2001)</b>	<b>Indian study(2012)</b>
Personal and Social development	73%	60.3%	70%	78%
Language and Literacy	60.4%	60.2%	75%	76%
Mathematical thinking	52.7%	57.6%	94%	-
Arts	62.7%	61.7%	-	-
Physical development and Health	90.8%	73.3%	88%	80%

In the present study the prevalence of girls who were 'ready' for school (78.4, 95%CI 73.44-83.36) was higher than the prevalence of boys (60.9, 95%CI 54.92-66.88). This is comparable to the conclusions of West et al, in the study on school readiness in the cohort from the Early Childhood Longitudinal Study. Zill and West (2001) reported that parents and teachers found girls more ready for school than boys.<sup>159</sup> Wertheimer (2015) also reported that while 60% of the boys were lagging behind on socio-emotional, cognition and language on school entry, only 36 % of the girls were lagging behind.<sup>160</sup> The present study also found that there was a difference in the prevalence of readiness among boys and girls but the gap was not as wide as concluded by Wertheimer. (Table 17 and 18)

In the present study the prevalence of readiness among the older age group was higher than the younger age group. This difference was observed in other studies, even when the age of the children was higher than the present study. (Table 18) As 0-5 years is the period of brain development, the neuro-maturational processes improve with age.<sup>52</sup> This could explain the readiness among older children when compared to the younger children.

Multiple states in the United States of America have used the WSS to estimate the prevalence of school readiness or the lack of it.<sup>49</sup> A comparison of the results of the present study with two other studies conducted in the states of Minnesota and New York, America is presented in the tables below:

**Table 36: Comparison of Prevalence of ‘Not-Ready’ for school on Personal Social Development**

<b>PERSONAL AND SOCIAL DEVELOPMENT</b>				
<b>Functional component</b>	<b>Indicator</b>	<b>Present study (%)</b>	<b>Public school NY (%)</b>	<b>Minnesota SR study (%)</b>
<b>SELF CONCEPT</b>	Demonstrates Self-confidence	13.46	12	11
	Shows some self direction	13.08	8	10
<b>SELF CONTROL</b>	Follows classroom routines	4.62	9	11
	Begins to use classroom materials carefully	5.77	5	12
	Manages transitions	8.27	11	10
<b>APPROACHES TO LEARNING</b>	Shows eagerness and curiosity as a learner	12.69	10	10
	Attends, seeks help when encountering a problem	5.58	16	15
	Approaches play with purpose and inventiveness	6.92	18	18
<b>INTERACTION WITH OTHERS</b>	Interacts with one or more children	1.92	15	11
	Interacts with familiar adults	3.46	10	12
	Participates in the group life of the class	13.46	12	10
	Shows empathy and caring for others	8.46	22	14
<b>SOCIAL PROBLEM SOLVING</b>	Seeks adult help when needed to resolve conflicts	2.88	20	15

**Table 37: Comparison of Prevalence of ‘Not-Ready’ for school on Language and Literacy**

<b>LANGUAGE AND LITERACY</b>				
<b>Functional component</b>	<b>Indicator</b>	<b>Present study (%)</b>	<b>Public Schools NY (%)</b>	<b>Minnesota study (%)</b>
<b>LISTENING</b>	Gains meaning by listening	4.62	6	11
	Follows two step direction	23.65	10	14
	Shows beginning phonological awareness	53.65	40	31
<b>SPEAKING</b>	Speaks clearly to be understood by most listeners	10.19	12	13
	Uses expanded vocabulary and language for a variety of purposes	30.38	29	21
<b>READING</b>	Shows appreciation for books	5.96	5	7
	Shows interest in letters and words	19.42	21	17
	Comprehends and responds to stories read aloud	39.04	29	13
<b>WRITING</b>	Represents ideas and stories through pictures, diction and play	40.96	38	28
	Uses scribbles and unconventional shapes to write.	6.54	18	17

In the present study most (99.62%) of the children spoke their mother tongue, which was not English. This could explain the low prevalence of children who were ready on ‘comprehension of stories read’ in English and phonological awareness. While bilingual instruction builds vocabulary could help in comprehension for ‘follows 2 step direction.’

**Table 38: Comparison of Prevalence of ‘Not-Ready’ for school on**

<b>MATHEMATICAL THINKING</b>			
<b>Components and Indicators</b>	<b>Present study</b>	<b>Public schools NY</b>	<b>Minnesota Study</b>
<b>MATHEMATICAL PROCESSES</b>			
Shows interest in solving mathematical problems	17.69	26	17
<b>NUMBERS AND OPERATIONS</b>			
Shows curiosity and interest in counting numbers	25.96	20	13
<b>PATTERNS, RELATIONSHIPS AND FUNCTIONS</b>			
Sorts objects into groups that vary by one attribute	20.38	13	15
<b>GEOMETRY AND SPATIAL RELATIONS</b>			
Identifies several shapes	34.23	40	11
Shows understanding of several positional words	21.92	35	12
<b>MEASUREMENT</b>			
Shows understanding of some comparative words	25.77	33	NA
Participates in measuring activities	27.50	40	NA

NA- Not administered

**Table 39: Comparison of Prevalence of ‘Not-Ready’ for school on Physical Development and Health**

<b>PHYSICAL DEVELOPMENT AND HEALTH</b>			
<b>Component and Indicators</b>	<b>Present study</b>	<b>Public schools NY</b>	<b>Minnesota study</b>
<b>GROSS MOTOR DEVELOPMENT</b>			
Moves with some balance and control	0.38	2	4
Coordinates movement to perform simple tasks	0.19	7	3
<b>FINE MOTOR DEVELOPMENT</b>			
Uses strength and control to perform simple tasks	0.77	3	2
Uses eye- hand coordination to perform simple tasks	3.27	3	6
Explores the use of various drawing and art tools	1.92	7	3
<b>PERSONAL HEALTH AND SAFETY</b>			
Begins to perform self help tasks independently	18.85	3	2
Follows basic health and safety rules with reminders	7.69	5	4

In the domain of **Personal Social Development** the present study showed comparable results to other studies on the performance indicators of this domain,

except on the indicator of ‘self –concept.’ In the present study children’s readiness on self-concept was the least when compared to self-control and approaches to learning. (Table 36) The authoritarian parenting style which has been reported to be the common parenting practice in India reinforces control and positive learning approach but is not permissive so the child’s self-concept could be poor when compared to self- control which is evident in the present study.<sup>161</sup> The children in the present study were able to follow instructions, manage transitions and follow routines (which are the components of self-control) but have decreased self-confidence and initiative for activities (these are components of self-concept) The entry into pre-school is the first transition from home and being in the new environment could also decrease self-confidence.

The prevalence of children ‘not ready’ on the performance indicators of self- control was lesser in the present study when compared to the other studies (4.62% vs 9 and 11%) (Table 36) The Parental engagement and responsiveness are reported to be positively related to a child’s social-emotional development (Landry et al 2001,2014).<sup>162</sup> The availability of mothers at home during the child’s early childhood and their parenting style, could have brought about higher proficiency in the functional component of self-control.

On the functional component of ‘approaches to learning’ the prevalence of children ‘not ready’ was lower than the two studies that are being compared. (Table 36) On another functional component of personal social development namely ‘interaction with others’, the percentage of proficient children was higher than reported in the Public schools and Minnesota studies. These findings suggest that children in the present study were more proficient on the functional components of ‘self-control’, ‘approaches to learning’ and ‘interaction with others’. The availability of mothers at

home(Lombardi et.al,2014), social neighbourhoods(Caughy et.al,2015) ,parental responsiveness and inferential language(Merz,2015) ,have been shown to have a positive effect on social skills in school readiness.<sup>93,82,36</sup> In the present study most mothers were homemakers and the presence of the mother at home could have helped children to develop a secure attachment and thereby developing better approaches to learning, self-control and interpersonal interaction (Huang et.al, 2012.)<sup>163</sup>

On most functional components of **Language and Literacy** (Table 37) the results are comparable with the other studies. While the percentage of ‘proficient’ children were high on the indicators ‘gains meaning by listening’(95.39%) and “speaks clearly to be understood by most listeners”(89.81%), the prevalence of children who were ‘ready’ was low on the other performance indicators. There is a higher prevalence of children who were ‘not ready’ on the more challenging items such as using expanded vocabulary,(30.38%), phonological awareness (53.65%) and comprehending and responding to stories read aloud (39.04%). This is suggestive of neuro-maturational processes that are yet to occur at this age (Shonkoff et.al 2000) or is attributable to the influence of monolingual home environment (Hoff E et.al, 2014).<sup>20,27</sup> The lack of exposure to English could make it difficult for children to comprehend stories and to have an adequate phonological awareness. The prevalence of children who were ‘not ready’ on the indicators of ‘shows beginning phonological awareness’ (53.65% in the present study and 40 and 31% in other studies), ‘responds to stories read aloud’ (39% in the present study and 29 and 21% in other studies) was higher than the Minnesota and Public schools studies. Manocha (2008)<sup>38</sup> reported that the level of language stimulation and the variety of stimulation provided by mothers in India was poor in both the control and experimental group before mothers

were introduced to child care practices. This could explain the increased prevalence of children in this study who were ‘not ready’ on the performance indicators of language and literacy.

In the domain of **Mathematical thinking** the prevalence of children who were ‘ready’ was lower than the other studies, even though the prevalence of children who were ‘ready’ on the functional components of ‘mathematical processes’ was higher than in the other studies (Table 35 and 38). The children in this study performed better than in the other studies on mathematical processes (17.69% were not ready in the present study compared to 26% in the Minnesota study). On the performance indicators of ‘geometry and spatial relations’ the prevalence of children who were ‘not ready’ was higher in this study (34.23% and 21.9% in the present study when compared to 11 and 12%). The results showed an increased proficiency in mathematical processes but decreased prevalence of proficiency in the indicators of ‘numbers and operations’, and ‘geometry and spatial relations. This could be attributed to a lack of number based activities or conversations at home, which was the case with many parents in this study. Since most of the children have been at home and were not attending a pre-school and this was their first exposure to a learning/ school environment, they might not have been exposed to geometrical concepts. The introduction of literacy and number related informal learning opportunities at home would facilitate school readiness (Skwarchuk et.al,2014).<sup>128</sup> Such interactions were rare as reported on the Home Inventory in the present study.

**Physical development and health:** There were more children ready for school on gross and fine motor indicators (99.62%, 96.73 % respectively) than quoted by Kuklinski et.al and Varley et.al, in the study of school readiness among pre-schoolers (Table 35). There was a higher prevalence of children (18.85%) ‘not



ready' on 'personal health and safety' when compared to the study by Kuklinski et.al (2%).<sup>49</sup> Personal Health and safety component involves independence in activities of self-care and awareness of safety measures. Joshi et al (2015) reported that in India the parenting practice was more authoritarian and permissive parenting was limited.<sup>161</sup> The lack of permissive parenting would therefore provide limited opportunities for the child to explore or to become independent in activities of self-care. The parents are protective and spend more time on protecting them from danger rather than educate children on health and safety measures.

The comparison of the prevalence of proficiency on different domains showed higher prevalence on the domains of 'personal and social development' and physical development and health,' when compared to the other studies (Kuklinski et.al, Varley et.al, West et.al and Brown et al)<sup>164,47</sup>. In comparison to population based studies (ELC Study, 2001) the performance in domains of language and literacy (60.4% in the present study and 75% in ECLS study), and mathematical thinking (52.7% in the present study and 94% in the ECLS study) (West et al,2001)<sup>164</sup> was lower in the present study. This is significant and calls for activities of early intervention and parent education as these are corrective measures to prevent or reduce poor school readiness.<sup>126,34</sup>

The prevalence of school readiness in the present study was lower than in the other studies. This warranted the need to identify the factors that were significantly associated with school readiness.

## 6.2 Association of socioeconomic status and socio demographic variables and school readiness

The present study showed that parental education ( $p=0.00$ ), mother's occupation ( $p=0.042$ ), household income ( $p=0.009$ ) and socio economic class ( $p=0.00$ ) had **significant association** with school readiness in the bivariate analysis, but the logistic regression analysis showed that lower maternal education and location of residence in the rural areas were predictors for children being 'not ready for school.'

The present study corroborates the findings of the previous studies (Hammer et.al 2010, Roberts et al, 2005) by showing a significant association between education levels of parents and their children's school readiness.<sup>84,124</sup> This finding in a sample of children who have had no previous exposure to a learning environment suggests that maternal education has a positive effect on the child's readiness for school. Maternal education has been shown to have a positive effect on children's literacy and cognitive readiness in the study done by Halle et.al (2009), Camargo-Figuera(2014)<sup>89,112</sup>. The parental education level was shown to be a determining factor in the home literacy practices by Roberts et.al<sup>124</sup> and pre-academic knowledge of children (Merz et.al 2014)<sup>165</sup>. Mother's role in influencing early child development is therefore significant and is found to be poor in mothers who are uneducated and living in poor home environments as suggested by Nair et.al, Manocha, Magnuson.<sup>166,38,167</sup> Maternal education would therefore help provide better home based care and learning opportunities for children in India as most children are at home during the early childhood before they join pre-school. The present study showed that the mothers who were more educated were from a higher socio-economic class- 64% of the mothers from SES Class I had completed

undergraduation or postgraduation whereas a majority of mothers (76%) from SES Class IV had only studied till middle school. The prevalence of children who were ready for school was higher (76%) when mothers were more educated (51% when mothers were less educated) in the present study.

Maternal occupation is found to be significantly associated with school readiness ( $p = 0.042$ ). In the present study majority of mothers (57.9%) were actually homemakers and therefore categorised as unemployed. Maternal employment at year 1 of child's life was shown to be negatively associated with problem behaviours and difficulties in school readiness in the study conducted by Greenberger.<sup>91</sup> The other studies by Lombardi et.al, and Leary et.al who studied maternal employment and school readiness in preschools reported that there was neutral association or no significant association between school readiness and maternal employment<sup>90,93</sup>. The cognitive scores at ages 3, and 5 were higher on some measures of behaviour regulation and language for children whose mothers worked part-time in their first year of life when compared to children whose mothers worked full time in the study conducted by Brooks Gunn et.al<sup>92</sup>. Greenberger et al (1992) reported that father's perceived an increase in aggressive behaviour of their children if mothers were away at work.<sup>91</sup> Considering that most of the mothers in the present study were homemakers and that their children received no other learning intervention prior to joining school, the effect of mother's availability could be an important contributory factor for a higher school readiness in children observed in this study. The availability of mothers at home could have influenced the higher percentage of children who were noticed to be proficient in the social and emotional performance indicators (74%).

**Family Income:** In the present study it was noted that the percentage of children 'not ready' for school was higher when household income was lower (52.9%) when

compared to children coming from families whose income was higher (23%). There was also a significant association between household income and school readiness in other studies. Duncan et.al estimated that a increase in yearly income by a thousand dollars increased the achievement of children in early grades by 5%–6% on a school examination.<sup>85</sup> A higher income implies that parents would be able to provide more toys, books that stimulate cognitive development and create an interactive environment with the use of these facilities. This could help improve school readiness (especially cognitive and language development) in children as suggested by Tomopoulos (2006)<sup>129</sup>. The transition from home to school would be easier when the home environment was engaging and encouraging for exploratory experiences for a child. All parents irrespective of their socio-economic state would be able to provide a stimulating home environment if parents are made aware of the value of regularly creating opportunities for learning and interaction with their pre-school child.

**Socio economic class:** The socio economic class of the family was determined, based on the household income, parental education and occupation. In the present study better socio-economic status of the family, related positively to increased school readiness ( $p=0.002$ ). The socioeconomic disadvantage was shown to have an adverse effect on school readiness in social, emotional and cognitive domains as suggested by the studies by Carpiano, West J, and Han.<sup>62, 139,145</sup> This is a disturbing observation as the majority of children who join school would be hailing from a spectrum of socio-economic classes and not exclusively from the higher socio-economic classes alone. The observation of this study points to a disadvantage to children from low socio-economic status when they start their schooling. There is a need to promote opportunities for all children to begin their schooling with no or

minimum disadvantage. The impact of the limitations due to the stressful socio-economic milieu in which they were born, need to be compensated by pro-active child development support.

The **socio-demographic variable** that was significantly associated with school readiness was location of the residence of the family. The language spoken at home was not associated with school readiness but was significantly associated with language and literacy skills.

The location of residence (urban or rural) was significantly associated with school readiness on the bivariate and logistic regression analyses in this study. Children whose families lived in the urban areas were more 'ready' (74.5%) than children whose families lived in the rural areas (54.8%.) (Table 23). The other demographic variables such as type of family and number of children in the family were not significantly associated with school readiness. The bivariate analysis also showed that there is an association between children from the rural areas and lower socio-economic classes with regard to school readiness ( $p=0.00$ ). This suggests that children growing up in the rural areas are already at a disadvantage which would affect their school readiness adversely.

Kiernan suggested that parental living situation and the neighbourhood environment had an adverse impact on school readiness of children.<sup>168</sup> The risk factors ( such as low birth weight/ birth asphyxia, poor home environment and alternate child care services) which have a bearing on children being 'not ready' for school was reported to be more in the deprived settlements (Nair et.al, 2004)<sup>166</sup> The impact of poverty is also reported to be more in the rural areas, as shown by the assessment of living conditions in 45 developing countries in the study by Grantham-McGregor<sup>96</sup>.

The association of 'rural living' and children being 'not ready' for school observed in this study concurs with the studies quoted above. This reiterates the need for the developing countries to evolve strategies to facilitate early childhood development monitoring and supportive measures especially in the rural areas. The interplay of the compounding factors needs some attention when we plan to promote readiness of children for school because some of those factors are preventable and modifiable. A more concerted effort to provide parental education for readying children for school by encouraging parents to enrol their children in the Anganwadis would be desirable.

**Language spoken at home:** Studies by Hoff E et.al<sup>27</sup>, of children from the bi-lingual families where Spanish was spoken normally showed that their ability to use English improved as they were exposed to both languages. English being used at home predicted better vocabulary scores according to the study quoted above. A study by Lee et.al (2012) on the school readiness of children from immigrant families showed that the language background promoted children's expressive language skills and early reading skills at kindergarten<sup>169</sup> A longitudinal study of the academic growth curves of children from non English dominant families showed that there was a gap in the academic achievement between children from the non-English-dominant bi-lingual or monolingual families and their English peers.<sup>55</sup> In the present study even though there was not a significant association between school readiness and the language spoken at home ( $p=0.54$ ), a significant association was noted between the language spoken at home and the language and literacy skills in the functional domain. ( $p=0.02$ ). Since most of the children spoke the native language only, there could be difficulty in later academic achievement especially in English as poor phonological awareness and comprehension are predictors of later achievement difficulties.<sup>55,71</sup> While the prevalence of children in the present study

who could follow instructions in English in the classroom was high (75%) there was low proficiency in the use of expanded vocabulary and comprehension of stories read to them (6.92% and 15.96%). Even though early vocabulary and reading abilities are predictive of later achievement,<sup>89</sup> early intervention helps dual language learners (children who spoke their mother tongue and learn English at school) in overall proficiency in academics and social interaction.<sup>170</sup> The early identification of language and literacy difficulties in children whose native language is not English, can help in planning to help such children.

*The two most important variables that predicted the school readiness was maternal education and location of residence.* These two variables have been reported to be significant in the other studies mentioned. While other variables had a significant association with school readiness, low maternal education and residing in rural areas were the main predictors of children ‘not ready’ for school when significant variables from all the factors associated with school readiness were analysed.

### **6.3 Association of child related variables and school readiness**

In the present study age, gender, Intelligence Quotient, Social Quotient, and school performance were significantly associated with school readiness in the bivariate analysis. Some of the neonatal risk factors were also significantly associated with school readiness.

**Age of the child:** The present study showed a significant association between the age of the child and school readiness. The younger children were, the more was their risk for being ‘not ready for school’ (OR=10.36 in the logistic regression analysis of the child variables and 5.64 in the logistic regression including all the significant

variables from all factors). (Tables 29 and 34) The results of the present study also showed that the difference in the means between the older and younger children on all the domains of school readiness were significant (Table 26). The highest differences between the two groups were in the domains of mathematical processing and language and literacy.

The earlier study on age at school entry reported by Mosteller (1995) stated that, children who entered kindergarten younger than 4 years of age showed signs of maladjustment and nervousness while being in transition to school. Children who were older scored significantly higher academic grades when compared to younger children (Beattie)<sup>171</sup>. The Early Longitudinal Childhood Study reported by West et.al (2000) found that in reading, mathematics and general knowledge older kindergarteners outperformed younger kindergarteners.<sup>164</sup> The ‘maturist perspective’ of school readiness emphasised that age was a significant variable and older children were always more ready for school. Teachers’ report on school readiness predictors stated that older children performed better (High, 2008).<sup>69</sup> Teachers reported that one of the factors to be considered in children who were struggling to adjust in the kindergarten is their age (Bell et.al).<sup>109</sup> The children in the older age group in the present study were significantly more ‘ready’ on all domains of school readiness. Younger children therefore need more assistance during transition and can be prepared better for school by providing a developmentally appropriate curriculum.<sup>172</sup>

**Gender:** The prevalence of children ‘not ready for school’ was higher among boys (63.7%) than in girls (36.3%) in the present study. There was a significant association between school readiness and gender (OR= 1.99 p=0.02) as shown in Table 34. This association was noted in other studies of school readiness as well. In the study of school readiness in Hispanic children conducted by Furlong et.al (2011),



gender had a significant association ( $\eta^2=0.015-0.02$ ) with school readiness in kindergarten, but this association was not present while predicting grade level achievement.<sup>109</sup> A study by Child's (2001) on boys who were disadvantaged at school entry, found greater hyperactivity and , distractibility and difficulty to regulate themselves in the class routines if they came from the lower socio-economic households.<sup>110</sup> The means of boys and girls on domains of school readiness was significant on all the seven domains of Work Sampling System in the present study. The mean scores of boys were significantly lower than those of the girls. The present study concurs with other studies about girls being more ready for school than boys. Boys have been reported to be more vulnerable for other developmental disorders such as Attention Deficit Hyperactivity Disorder and autism and specific learning disability. Therefore boys are more vulnerable than girls and need to be closely monitored even before they join pre-school especially if they have had multiple risk factors that could be adversarial.

**Antenatal risk factors:** Risk factors of hypertension and diabetes were reported by mothers in the present study and the analysis showed that antenatal complications were significantly associated with school readiness outcome (Table 27). The Logistic regression analysis showed that the odds of children being 'not ready for school' was 4 times more in children who were born to mothers who had Pregnancy Induced Hypertension (Table 29). When all the variables associated with school readiness were analysed the odds of children being not ready for school was 3.70,  $p=0.02$  if their mothers had PIH (Table 34).

The different risk factors during pregnancy have a detrimental effect on the cognitive development of a child according to Grantham-McGregor.<sup>96</sup> The socio-economic factors have also been shown to affect the health of the mother adversely during

pregnancy (Fiscella et.al).<sup>33</sup> The Pregnancy Induced Hypertension (PIH) which is one of the risk factors during pregnancy could affect the gestational growth of a foetus. The presence of Hypertension or Gestational Diabetes Mellitus (GDM) was reported to be associated with complications in the neonatal period (Raio et.al(2015) Bhat (2012).<sup>173,174</sup> Shapla et.al (2015) reported that among the newborns who had an APGAR score of <7 a significant proportion was born premature and with low birth weight.<sup>105</sup> These neonatal difficulties were found to affect school readiness (Reichman 2005)<sup>32</sup> and their emotional regulation (Msall, 2014).<sup>100</sup> Bhat (2012) also found that the maternal morbidities and neonatal complications such as neonatal hypoglycemia, macrosomia, and prematurity were significantly higher in mothers with GDM<sup>174</sup>. The occurrence of premature birth seems to be correlated to gestational hypertension and associated problems in about 25% of the VLBW infants according to Spiegler et.al ( 2013).<sup>175</sup>

In the present study PIH was the only antenatal risk factor that was significantly associated with poor school readiness. This is a preventable and treatable condition during pregnancy and creating awareness during pregnancy about this would help mothers to seek early medical assistance.

**Neonatal complication:** In the present study neonatal complications had a significant association with school readiness. The Logistic regression analysis showed that children with neonatal risk factors of birth asphyxia and low birth weight had a higher risk of being ‘not ready’ for school. (Tables 28, 34)

The developmental delay which is an adverse outcome of high risk pregnancy was seen more in children less than 2 years of age coming from deprived background especially in the developing countries (Grantham et.al,2007).<sup>96</sup> The incidence of

neurodevelopmental delay among high risk newborns was significantly high when Low Birth Weight, prematurity and neonatal illnesses were the major complications (Berham 2007 and Chattopadhyay 2015).<sup>176,95</sup> Studies by Reichman (2005) and Ackerman (2006) proposed that a Low birth weight in an infant would adversely affect school readiness.<sup>177,32</sup> However according to Mallik (2007) children with low birth weight who were at risk for being 'not ready' for school were more responsive to early intervention<sup>178</sup>. Children with neurodevelopmental delay are more likely to be 'not ready' for school unless early intervention is provided as reported by Chen and Mallik in their studies.<sup>99, 178</sup>. This reinforces the need to be aware of the risk factors in the neonatal period. A regular monitoring of the child's physical and mental development would help in early identification and early referral to specialists. An early intervention approach would help to overcome some of the challenges children face considering that the denial of this would lead them to being 'not ready for school'. The mandatory guidelines of the Indian Academy of Pediatrics, that all professionals plot the developmental trajectory of infants during their follow-up visits to the 'under five' clinics using the Trivandrum Developmental milestone chart could help in identifying children who would be at risk in school readiness.

**IQ, School Grades, SQ:** The Intelligent Quotient (IQ) has been proven to be the best predictor of academic achievement according to Mayes et.al<sup>111</sup>. The IQ is known to be a predictor of reading even in the adulthood especially the verbal IQ and the working memory (Alloway et.al, Tiu et.al).<sup>179,180</sup> The IQ is influenced by home environment and socio-economic status especially in the developing years. (Espy et.al 2001.)<sup>181</sup> In the present study the Intelligence Quotient was significantly associated with school readiness, the odds of children with lower IQ (OR=1.92(1.81-

1.97) and social quotient (OR=1.95 (1.90-1.97) being 'not ready' for school was higher. In the logistic regression of all the statistically significant variables associated with school readiness, IQ was a significant predictor, and children with IQ < 75 were more at risk for being 'not ready' for school. (Table 34).

Social competencies in children was a mediator between social information processing and school readiness<sup>59</sup>. Children's intelligence levels predict social competence, academic achievement and poor social behaviors.<sup>182,52</sup>. The intelligence level of children with learning disability was a predictor of their social competence and academic gains. Conversely, the intelligence potential of children developing normally predicted their academic achievement and anti-social behaviors according to Yukey (2013).<sup>183</sup>

IQ and SQ were significantly associated with school readiness in the present study. The Logistic Regression analysis revealed that children who were not ready for school were 2 times more at risk to have a lower IQ and SQ (<80). Even though Intelligence is not measured regularly in preschools, children who struggle with school readiness can be assessed for intelligence and cognitive functions, as this would help in designing assistance that would help them in their learning process.

#### **6.4 Association of home, parent and school readiness**

**Parent Factors:** The parent involvement in the school transition and education of their children has positive associations with school readiness.<sup>184</sup> Parents' beliefs about school readiness were linked to children's achievement and growth, while the efforts of parents to facilitate transition improved children's achievement when they started kindergarten. Parental beliefs were predictors of what they practiced to facilitate the transition to school in the child.<sup>118</sup> (Konerza, Puccioni).

A study by Hammer et.al also showed that parent involvement in the Head Start Program has a positive effect on development and literacy.<sup>84</sup> The parental literacy habits were associated with beliefs about reading, parent-child activities on literacy and language at home. It also influenced children's print knowledge and reading interest.<sup>125</sup> (Weigel) Parenting responsiveness also significantly predicted academic and emotional achievement (Merz et.al.)<sup>36</sup>. These findings show the significant role of the parents in getting the child 'ready for school.'

The present study found significant association between parent-home involvement scores, parent-school involvement scores, parent involvement total scores and school readiness which is similar to the other studies referred to above. The Logistic regression analysis among child related variables showed that the odds of children who were 'not ready' from families where parent-school involvement scores were low was 1.5 times higher (Table 30). The logistic regression of all the statistically significant variables from the different factors showed that the odds of children being 'not ready' was 2 times higher if the total parent involvement score was low.

**The Home environment** assessment involved the study of the neighbourhood where the house was located and the parental engagement and provision of activities for stimulation of the psycho-social development of children. Mother and child reading and conversation was reported as an activity that significantly increased expressive vocabulary and social-emotional development.<sup>127,122</sup> Books and toys and other play equipment were shown to facilitate school readiness.<sup>129</sup> Jeon et.al concluded in their study that a poor home environment had detrimental effects on cognition and socio-emotional regulation.<sup>29</sup> A poor home environment was significantly associated with poor school readiness in the present study too. The odds of children from poor home

environments being not ready for school was almost 3 times higher when compared to their counterparts from healthy non-suspect home environment.

The parenting skills, child rearing practices and home environment are critical factors in influencing the school readiness of children. The transition from home to school can be stressful. Preparing a child for school is further enhanced by having an optimal home environment and engaging parents.<sup>118,134,185</sup>

### 6.5 School related variables that impact school readiness

The ready school refers to a school that devotes sufficient time to classroom learning by providing learning materials such as books and aids for teaching and having teachers who are competent and effective.<sup>158</sup>

In the present study, the above stated variables were assessed. The number of working hours and strength of the class (i.e number of children in a class) had significant association with school readiness among the school variables. The logistic regression analyses of all the statistically significant variables from all the factors showed that the strength of the class was significantly associated with school readiness.

**Working hours of the school:** Full Day kindergarten (FDK) has gains in academic achievement of children at the end of kindergarten years and Brownell et.al stated that it had academic benefits in the long-term<sup>140</sup>. Votruba-Drazal looked at benefits of full day versus half day kindergartens and reported that the initial benefits in academics would fade out during a repeat assessment in the higher grades. The fade out was associated with the type of students and the school characteristics.<sup>186</sup> The present study also found that increased school hours did have significant association with school readiness ( $p=0.04$ ), among school variables but not when all significant

variables were analysed suggesting that a full day kindergarten alone does not contribute to school readiness.

**Number of children in the class:** In the present study, class size of more than 30 was a significant predictor of poor school readiness. One of the earliest studies on the class size found that smaller classes produced improvement in early learning and cognition. The effect of small class size on the achievement of children coming from disadvantaged or immigrant settlements was initially about double of what was observed for children from the advantaged households. But in later years, it was about the same. Observations made by Mosteller when the study participants were in Grade V proved that the children who were initially in smaller classes continued to achieve better grades than their class-mates when they were returned to classes with the regular-size.<sup>130</sup> Project STAR which was a school readiness program targeting children from lower socio-economic backgrounds found improved cognition and high school graduation rates and increased employment for African students who were enrolled in classes of smaller size.(Wilde et.al.)<sup>131</sup> In the present study the school with the least number of children was 25 and the highest number was 43. The logistic regression analysis showed that classes with more than 30 students were 3.6 times more likely to have children ‘not ready’ for school (95%CI 1.2-11, p=0.02). It is advisable therefore to have smaller class sizes atleast in the pre-school. This would help children in their transition and augment school readiness. A smaller class size would help teachers give more attention to children and provide the necessary intervention for children who are not ready for school.

**Teachers’ qualification and years of experience** were not significantly associated with school readiness in children in the present study (Table 32). While a study by Landry et.al found that teacher competencies, teacher responsiveness and regular

teacher training programs have a positive correlation with school readiness<sup>162</sup>, seven major studies of early care and education which observed quality of the classroom and the academic outcomes of children showed no significant association between teachers' education and children's academic outcome<sup>135</sup>. Thus policies that focused only on increasing the educational qualification of teachers would not be sufficient for enhancing classroom quality or academic achievement of children. Instead, training teachers to have positive interactions with children would help make the early childhood education effective. Such training programs have been found to be effective in enhancing school readiness in pre-schoolers according to Swaminathan.<sup>187</sup> The present study found resources such as teacher aid, use of technology, availability of books, playground etc. in the school, contributing towards student friendly ambience in the school (Table 32). The availability of these resources did not however seem to determine school readiness in this study. Programs to improve the teachers' skills could help in supporting children while they are in transition to the school.

The present study showed that while the prevalence of school readiness matches other studies, the girls were significantly more ready than the boys and the odds of younger children being 'not ready' was more than in the older children. The different factors studied did have significant association with school readiness (Table 34). Each of the factors such as socio-economic status, variables associated with child development and functioning, home environment, parent involvement and teacher and school factors all contributed towards making a child ready for school.



## 7 SUMMARY OF FINDINGS

This study aimed at finding the prevalence of children who are ready for school, both by gender and age. The study also aimed to study if the predictive factors for children who were not ready for school was different when compared to children who were ready. This chapter summarises the findings of the study in keeping with the objectives of the study

- The overall prevalence of children who were ‘ready’ for school was similar to other studies from developed countries on the domains of Arts and scientific thinking and was comparable to the data from similar socio demographic sample. The prevalence of children being ‘ready for school’ was higher in the domains of Personal Social development and Physical development and Health. The prevalence of children ‘ready for school’ was lower on mathematical thinking and language and literacy.
- The prevalence of girls who were ‘ready’ for school was higher than boys who were ‘ready.’ This was seen on all the domains of school readiness. The means performance of boys and girls on all domains were also statistically significant. This difference was evident in other large scale cohort studies (ECLS, 2001)
- The older age group of children (42-48 months) were more ‘ready’ for school than the younger age group. The percentage of children in the older age group who were ready was more than triple than in the younger age group. Younger children were 5 times more at risk for being ‘not ready’ for school.

- Among the socio economic and socio demographic predictive variables in the present study, maternal education and the location of the residence were predictive of school readiness. Maternal education was reported as an important predictor in other studies.
- Among the child related variables IQ and academic performance in class were predictive of poor school readiness. Antenatal complication of PIH and neonatal complication of low birth weight and birth asphyxia were significant predictors of poor school readiness. Higher parent involvement and the non-suspect home environment were predictors of school readiness.
- The availability of resources and the teacher's qualifications did not have a significant association with school readiness. The number of hours a child spends in school (<4 hours) and the number of children in the class were important predictors of school readiness in children.
- Logistic regression of the significant variables from the socio-economic and demographic factors, child related factors, parent and home factors and school showed age, gender, IQ, academic performance, maternal education, location of residence, pregnancy induced hypertension, birth asphyxia, low birth weight, home environment and parent involvement were significant predictors of school readiness. The association of these variables with school readiness was reported in other studies but the present study is one of the few from India on school readiness and probably the only one to have analysed all these factors comprehensively.

## 8 CONCLUSION AND RECOMMENDATIONS

- The overall prevalence of children who are ready for school is lower than other population based studies of the western countries but comparable to prevalence from other Indian studies. The prevalence being lower necessitates the working together of policy makers, school authorities and families to increase the prevalence of children who are 'ready' for school. The Early Childhood Development program and other child development programs could create more school readiness programs which target not only government schools but also the urban, private and government aided schools.
- The prevalence of children ready for school is higher among girls when compared to boys. The relative risk of being 'not ready for school' is more for boys than girls. This was found on all domains of school readiness. This calls for regular developmental monitoring of boys and creating awareness in the community about the increased risk of boys being 'not ready for school' at three years. Children who are identified early should receive early intervention.
- Children who were older (42-48 months) were more 'ready for school' when compared to younger children (36-41 months). The younger age group of children were 5 times more at risk for being 'not ready' for school. The high risk indicates that 3 year old children require more time for transition to school and for the development of the neuro-maturational processes that help school readiness. The increased risk demands that parents be made aware of

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the ways they can prepare their young children for school. The younger children were 'not yet ready' on the higher and more challenging cognitive skills. It is therefore essential for families to introduce some of the activities for concept formation, sound awareness and vocabulary development at home. While raising the age of school entry would help prepare the children for school, that alone would not suffice, as other studies which assessed school readiness when children were older than 3 years also showed the same difference between older and younger children. A developmentally appropriate curriculum for kindergartens is a necessary to facilitate development on all domains of school readiness.

- The prevalence of children 'not ready for school' was in the domains of mathematical thinking and language and literacy. It is essential therefore that the families are informed and trained to provide a learning environment where these domains are stimulated. Formal and informal literacy practices in the home do have long term academic benefits. These activities can be printed in a manual for families to have as a guide and practice them with their children.
- The socioeconomic burdens in a developing country are evident from the results of this study. Parental education has a significant relation to school readiness and maternal education is more significantly associated. While parental education is significant the socio economic status and the family income also influence school readiness in children. Despite the economic disadvantage the education of parents especially of the mothers would enhance school readiness in children. Intervention programs that have targeted the education of the primary care giver have shown beneficial

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results. Such educational programs could be started for mothers to learn optimal child care and stimulation activities. Children in rural areas were found to be more at risk of being ‘not ready for school.’ Programs equivalent to Head Start program could help to prepare children for school. Enhancing the teaching and learning programs in Balwadis/ Anganwadis will be beneficial as these early centres of learning are available through-out the country even in villages.

- Antenatal and Neonatal risk factors are significantly associated with children being not ready for school. In our country cognitive and psycho-social developments in children are not regularly monitored or stimulated. Families visit government and private health care facilities only for immunisations or/and when the child is unwell. High risk infants should be monitored for their cognitive and social development and seen more often by health professionals. Since lower IQ was associated with ‘not ready’ for school, early identification and intervention are essential. Head start programs and Early education services facilitate school readiness and decrease the gap between these children and their well peers. Children who are at risk should be enrolled in early childhood education services or be referred to centres that provide developmental stimulation. Parents should be made aware of the type of engagement that facilitates school readiness. In the present study 15% of the children had one of the risk factors but 30% of children were not ready for school. It is therefore essential for children who had neonatal risk factors to have cognitive and socio-emotional stimulation before they join school. Mothers who had pregnancy induced hypertension or babies with low birth

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weight or birth asphyxia should be referred to developmental paediatricians for regular monitoring of the baby and early intervention.

- The percentage of children who were ready at three and a half years of age and higher was almost three times more. If kindergartens could begin at 3 1/2 years children have more time to cognitive and maturational processes to take place. Even if children are enrolled in school at three they could be given an early childhood curriculum that increases school readiness in all domains and introduce cognitively challenging performance items after they turn 3 1/2 years.
- The strength of the class should be small or the student-teacher ratio should be minimal. This could help children become 'ready for school' as evidenced in other studies. This study showed a negative association of school readiness and strength of the class. The class rooms should have challenging activities and the child will need the assistance of the teacher for these activities. Children in the younger age group could be in classrooms with fewer children so that they receive appropriate attention and stimulation.

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### IMPACT OF THE STUDY:

School readiness has been stated to be an important pre-requisite for academic and socio-emotional achievement in school. The present study highlighted the importance of school readiness in the Indian school setting. The prevalence of school readiness being lower than in the other countries creates the need for regular assessment of school readiness of children when they are young and before they join pre-school.

The findings of the present study validate the influence of teacher and school factors and home and parent factors on school readiness. The study therefore reiterates assessment of these factors and planning for effective intervention.

Despite its limitations the study brings to light the different predictors for children being 'not ready for school.' This study has far reaching effects for children in India in that it has identified variables that individually or together influence school readiness in young children. Further research and development of programs that target the variables and promote school readiness in young children will bring about a generation that is academically enabled and socially competent.

**“The principle goal of education in the schools should be creating men and women who are capable of doing new things, not simply repeating what other generations have done; men and women who are creative, inventive and discoverers, who can be critical and verify, and not accept, everything they are offered.”**

— Jean Piaget

## CONCLUSION AND RECOMMENDATIONS

This research work hopes to awaken in educators, teachers and parents the interest to fill the world of a child with numerous learning opportunities that will turn them into citizens who will rise above the ordinary to achieve their full potential. It is in the achievement of this potential that a nation can develop.



## 9 LIMITATIONS OF THE STUDY

This is the first study from South India that looked at the prevalence and predictive factors associated with school readiness in the pre-school age. Every year about 6000 children join school in this city. Schools whose medium of instruction was English were only chosen. The lack of assessment tools in the local language was the reason for this choice. The government schools offer admission to the first grade only and were therefore not included in this study. The lack of information from these two types of schools could be considered a limitation and future studies could be undertaken to include these families and children.

The assessment tools used were standardised in India, but some of the tools like Binet Kamat Test, Vineland Social Maturity Scale were standardised in 1960s and need to be updated. The correlation between these tests and the primary assessment tool, the Work Sampling System was strongly positive and therefore justifies the use of these assessments.

A direct observation of the home, parent child interaction and assessment of parent's cognitive and social-emotional competencies were not possible given the nature of the schools and the willingness of parents.

Further analysis of school infrastructure was limited by the lack of standardised assessment tools and uniform guidelines for pre-schools in India. This lacuna was felt during the assessment of the infrastructure in school. The scoring of the proforma was done after interviews

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**11 APPENDIX****PROFORMA I**

Name of the child:

Date of birth:

Gender:

Name of the School:

1. Fathers Occupation:

Mothers Occupation:

2. Your highest level of education completed

- Less than High school (Primary/ Middle)
- High School
- Diploma
- Bachelors degree
- Professional degree

3. Your households total monthly income

- Less than Rs10,000
- Rs. 10- 25,000
- 25,000-50,000
- >Rs. 50,000 (Amount Rs \_\_\_\_\_)

4. What language does your family speak most at Home?

- Tamil
- Telegu
- English
- Others \_\_\_\_\_

5. Did the mother have any difficulties during Pregnancy? Yes/No

(Excessive vomiting, diabetes, hypertension etc)

List

6. Did the child have any difficulties after birth in the first few months? Yes/No

(did not cry at birth, seizures, infection, etc required admission in a hospital)

List

**PROFORMA II**

Name of the School:

Teacher Qualification:

Number of years of teaching experience:

Number of Students in the class:

The working hours of the school (for pre-school):

Type: Govt aided/ Private

Do you have help in the classroom: Yes/ No

Type of help: Teacher assistant/ Maid

Does the school have a play ground: Yes/ No

Does the school have a library/ access to books: Yes/ No

Does the school have smart classes: Yes/ No

Do you have educational aids in school: Yes/No

List:

# WORK SAMPLING SYSTEM Pre - School 3

## I Personal and Social Development

### A Self concept F W S

- 1 Demonstrates self-confidence. (p. 1) Not Yet    
 In Process    
 Proficient
- 2 Shows some self-direction. (p. 1) Not Yet    
 In Process    
 Proficient

### B Self control F W S

- 1 Follows simple classroom rules and routines with guidance. (p. 1) Not Yet    
 In Process    
 Proficient
- 2 Begins to use classroom materials carefully. (p. 2) Not Yet    
 In Process    
 Proficient
- 3 Manages transitions. (p. 2) Not Yet    
 In Process    
 Proficient

### C Approaches to learning F W S

- 1 Shows eagerness and curiosity as a learner. (p. 2) Not Yet    
 In Process    
 Proficient
- 2 Attends briefly, and seeks help when encountering a problem. (p. 2) Not Yet    
 In Process    
 Proficient
- 3 Approaches play with purpose and inventiveness. (p. 2) Not Yet    
 In Process    
 Proficient

### D Interaction with others F W S

- 1 Interacts with one or more children. (p. 3) Not Yet    
 In Process    
 Proficient
- 2 Interacts with familiar adults. (p. 3) Not Yet    
 In Process    
 Proficient
- 3 Participates in the group life of the class. (p. 3) Not Yet    
 In Process    
 Proficient
- 4 Shows empathy and caring for others. (p. 3) Not Yet    
 In Process    
 Proficient

### E Social problem-solving F W S

- 1 Seeks adult help when needed to resolve conflicts. (p. 4) Not Yet    
 In Process    
 Proficient

## II Language and Literacy

### A Listening F W S

- 1 Gains meaning by listening. (p. 5) Not Yet    
 In Process    
 Proficient
- 2 Follows two-step directions. (p. 5) Not Yet    
 In Process    
 Proficient
- 3 Shows beginning phonological awareness. (p. 5) Not Yet    
 In Process    
 Proficient

### B Speaking F W S

- 1 Speaks clearly enough to be understood by most listeners. (p. 5) Not Yet    
 In Process    
 Proficient
- 2 Uses expanded vocabulary and language for a variety of purposes. (p. 6) Not Yet    
 In Process    
 Proficient

### C Reading F W S

- 1 Shows appreciation for books. (p. 6) Not Yet    
 In Process    
 Proficient
- 2 Shows interest in letters and words. (p. 6) Not Yet    
 In Process    
 Proficient
- 3 Comprehends and responds to stories read aloud. (p. 7) Not Yet    
 In Process    
 Proficient

### D Writing F W S

- 1 Represents ideas and stories through pictures, dictation, and play. (p. 7) Not Yet    
 In Process    
 Proficient
- 2 Uses scribbles and unconventional shapes to write. (p. 7) Not Yet    
 In Process    
 Proficient

## III Mathematical Thinking

### A Mathematical processes F W S

- 1 Shows interest in solving mathematical problems. (p. 9) Not Yet    
 In Process    
 Proficient

### B Number and operations F W S

- 1 Shows curiosity and interest in counting and numbers. (p. 9) Not Yet    
 In Process    
 Proficient

### C Patterns, relationships, and functions F W S

- 1 Sorts objects into subgroups that vary by one attribute. (p. 9) Not Yet    
 In Process    
 Proficient

## D Geometry and spatial relations F W S

- 1 Identifies several shapes. (p. 10) Not Yet    
 In Process    
 Proficient
- 2 Shows understanding of several positional words. (p. 10) Not Yet    
 In Process    
 Proficient

## E Measurement F W S

- 1 Shows understanding of some comparative words. (p. 10) Not Yet    
 In Process    
 Proficient
- 2 Participates in measuring activities. (p. 10) Not Yet    
 In Process    
 Proficient

## IV Scientific Thinking

### A Inquiry F W S

- 1 Uses senses to observe and explore classroom materials and natural phenomena. (p. 13) Not Yet    
 In Process    
 Proficient
- 2 Begins to use simple tools and equipment for investigation. (p. 13) Not Yet    
 In Process    
 Proficient
- 3 Makes comparisons among objects. (p. 13) Not Yet    
 In Process    
 Proficient

## V Social Studies

### A People, past and present F W S

- 1 Begins to recognize own physical characteristics and those of others. (p. 15) Not Yet    
 In Process    
 Proficient

### B Human interdependence F W S

- 1 Begins to understand family structures and roles. (p. 15) Not Yet    
 In Process    
 Proficient
- 2 Describes some jobs that people do. (p. 15) Not Yet    
 In Process    
 Proficient

### C Citizenship and government F W S

- 1 Shows awareness of group rules. (p. 16) Not Yet    
 In Process    
 Proficient

### D People and where they live F W S

- 1 Shows beginning awareness of their environment. (p. 16) Not Yet    
 In Process    
 Proficient

## VI The Arts

### A Expression and representation F W S

- 1 Participates in group music experiences. (p. 17) Not Yet    
 In Process    
 Proficient
- 2 Participates in creative movement, dance, and drama. (p. 17) Not Yet    
 In Process    
 Proficient
- 3 Uses a variety of art materials for tactile experience and exploration. (p. 17) Not Yet    
 In Process    
 Proficient

### B Understanding and appreciation F W S

- 1 Responds to artistic creations or events. (p. 18) Not Yet    
 In Process    
 Proficient

## VII Physical Development and Health

### A Gross motor development F W S

- 1 Moves with some balance and control. (p. 19) Not Yet    
 In Process    
 Proficient
- 2 Coordinates movements to perform simple tasks. (p. 19) Not Yet    
 In Process    
 Proficient

### B Fine motor development F W S

- 1 Uses strength and control to perform simple tasks. (p. 19) Not Yet    
 In Process    
 Proficient
- 2 Uses eye-hand coordination to perform simple tasks. (p. 20) Not Yet    
 In Process    
 Proficient
- 3 Explores the use of various drawing and art tools. (p. 20) Not Yet    
 In Process    
 Proficient

### C Personal health and safety F W S

- 1 Begins to perform self-care tasks independently. (p. 20) Not Yet    
 In Process    
 Proficient
- 2 Follows basic health and safety rules with reminders. (p. 20) Not Yet    
 In Process    
 Proficient

**Not Yet**—child cannot demonstrate indicator  
**In Process**—child demonstrates indicator intermittently  
**Proficient**—child can reliably demonstrate indicator

**F** = FALL  
**W** = WINTER  
**S** = SPRING

The Work Sampling System preschool-3 Developmental Guidelines contains full descriptions of each performance indicator. (Number in parentheses indicates the page in the Guidelines where the indicator is described.)

4th Edition  
**P3**

CHILD  
 DATE OF BIRTH \_\_\_\_\_

TEACHER \_\_\_\_\_

SCHOOL \_\_\_\_\_

FEMALE  MALE

Observation Periods \_\_\_\_\_

FALL \_\_\_\_\_

WINTER \_\_\_\_\_

SPRING \_\_\_\_\_

The Work Sampling System,  
 preschool-3  
 Developmental Guidelines

## VINELAND SOCIAL MATURITY SCALE

DEVELOPMENTAL PAEDIATRICS UNIT  
CMC, VELLORE.

### VINELAND SOCIAL MATURITY SCALE

#### RECORD SHEET

Name: \_\_\_\_\_ D.O.B.: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CMCH No.: \_\_\_\_\_ DEVP No.: \_\_\_\_\_

Score	S.No.	Test Items	Score	S.No.	Test Items
<b>0 – 1 YEAR</b>					
<input type="checkbox"/>	1.	"Crows", Laughs.	<input type="checkbox"/>	29.	Goes about house or yard.
<input type="checkbox"/>	2.	Balances head.	<input type="checkbox"/>	30.	Discriminates edible substances from non-edibles.
<input type="checkbox"/>	3.	Grasps object within reach.	<input type="checkbox"/>	31.	Uses names of familiar objects.
<input type="checkbox"/>	4.	Reaches for familiar persons.	<input type="checkbox"/>	32.	Walks upstairs unassisted.
<input type="checkbox"/>	5.	Rolls over, (unassisted).	<input type="checkbox"/>	33.	Unwraps sweets, chocolates.
<input type="checkbox"/>	6.	Reaches for nearby objects.	<input type="checkbox"/>	34.	Talks in short sentences.
<input type="checkbox"/>	7.	Occupies self unattended.	<b>2 – 3 YEARS</b>		
<input type="checkbox"/>	8.	Sits unsupported.	<input type="checkbox"/>	35.	Signals to go to toilet.
<input type="checkbox"/>	9.	Pulls self upright.	<input type="checkbox"/>	36.	Initiates own play activities.
<input type="checkbox"/>	10.	"Talks", imitates sounds.	<input type="checkbox"/>	37.	Removes shirt or frock if unbuttoned.
<input type="checkbox"/>	11.	Drinks from cup or glass assisted.	<input type="checkbox"/>	38.	Eats with spoon/hands (food).
<input type="checkbox"/>	12.	Moves about on floor (creeping, crawling).	<input type="checkbox"/>	39.	Gets drink (water) unassisted
<input type="checkbox"/>	13.	Grasps with thumb and finger.	<input type="checkbox"/>	40.	Dries own hands.
<input type="checkbox"/>	14.	Demands personal attention.	<input type="checkbox"/>	41.	Avoids simple hazards.
<input type="checkbox"/>	15.	Stands alone.	<input type="checkbox"/>	42.	Puts on shirt or frock unassisted (need not button).
<input type="checkbox"/>	16.	Does not drool.	<input type="checkbox"/>	43.	Can do paper folding.
<input type="checkbox"/>	17.	Follows simple instructions.	<input type="checkbox"/>	44.	Relates experiences.
<b>1 – 2 YEARS</b>					
<input type="checkbox"/>	18.	Walks about room unattended.	<b>3 – 4 YEARS</b>		
<input type="checkbox"/>	19.	Marks with pencil or crayon or chalk.	<input type="checkbox"/>	45.	Walks downstairs, one step at a time
<input type="checkbox"/>	20.	Masticates (chews) solid or Semi-solid food.	<input type="checkbox"/>	46.	Plays co-operatively at kindergarten level.
<input type="checkbox"/>	21.	Pulls off clothes.	<input type="checkbox"/>	47.	Buttons shirt or frock.
<input type="checkbox"/>	22.	Transfers objects.	<input type="checkbox"/>	48.	Helps at little household tasks.
<input type="checkbox"/>	23.	Overcomes simple obstacles.	<input type="checkbox"/>	49.	"Performs" for others.
<input type="checkbox"/>	24.	Fetches or carries familiar objects.	<input type="checkbox"/>	50.	Washes hands unaided.
<input type="checkbox"/>	25.	Drinks from cup or glass unassisted.			
<input type="checkbox"/>	26.	Walks without support.			
<input type="checkbox"/>	27.	Plays with other children.			
<input type="checkbox"/>	28.	Eats with own hands (biscuits, bread, etc.).			

Score	S.No.	Test Items	Score	S.No.	Test Items
<b>4 – 5 YEARS</b>					
<input type="checkbox"/>	51.	Cares for self at toilet.	<input type="checkbox"/>	71.	Uses tools or utensils.
<input type="checkbox"/>	52.	Washes face unassisted.	<input type="checkbox"/>	72.	Does routine household tasks.
<input type="checkbox"/>	53.	Goes about neighbourhood unattended.	<input type="checkbox"/>	73.	Reads on own initiative.
<input type="checkbox"/>	54.	Dresses self except for tying.	<input type="checkbox"/>	74.	Bathes self unaided.
<input type="checkbox"/>	55.	Uses pencil or crayon or chalk for drawing.	<b>9 – 10 YEARS</b>		
<input type="checkbox"/>	56.	Plays competitive exercise games.	<input type="checkbox"/>	75.	Cares for self at meals.
<b>5 – 6 YEARS</b>					
<input type="checkbox"/>	57.	Uses hoops, flies kites, or uses knife	<input type="checkbox"/>	76.	Makes minor purchases.
<input type="checkbox"/>	58.	Prints (writes) simple words.	<input type="checkbox"/>	77.	Goes about home town freely.
<input type="checkbox"/>	59.	Plays simple games which require taking turns.	<b>10 – 11 YEARS</b>		
<input type="checkbox"/>	60.	Is trusted with money.	<input type="checkbox"/>	78.	Distinguishes between friends and Play mates.
<input type="checkbox"/>	61.	Goes to school unattended.	<input type="checkbox"/>	79.	Makes independent choice of shops.
<b>6 – 7 YEARS</b>					
<input type="checkbox"/>	62.	Mixes rice "properly" unassisted.	<input type="checkbox"/>	80.	Does small remunerative work; makes articles.
<input type="checkbox"/>	63.	Uses pencil or chalk for writing.	<input type="checkbox"/>	81.	Follows local current events.
<input type="checkbox"/>	64.	Bathes self assisted.	<b>11 – 12 YEARS</b>		
<input type="checkbox"/>	65.	Goes to bed unassisted.	<input type="checkbox"/>	82.	Does simple creative work.
<b>7 – 8 YEARS</b>					
<input type="checkbox"/>	66.	Can differentiate between AM & PM.	<input type="checkbox"/>	83.	Is left to care for self or others.
<input type="checkbox"/>	67.	Helps himself during meals.	<input type="checkbox"/>	84.	Enjoys reading books, newspapers, magazines.
<input type="checkbox"/>	68.	Understands and keeps family secrets.	<b>12 – 15 YEARS</b>		
<input type="checkbox"/>	69.	Participates in pre-adolescent play.	<input type="checkbox"/>	85.	Plays difficult games.
<input type="checkbox"/>	70.	Combs or brushes hair.	<input type="checkbox"/>	86.	Exercises complete care of dress.
			<input type="checkbox"/>	87.	Buys own clothing accessories.
			<input type="checkbox"/>	88.	Engages in adolescent group activities.
			<input type="checkbox"/>	89.	Performs responsible routine chores.

Score:  
 Chronological Age \_\_\_\_\_  
 Social Age \_\_\_\_\_  
 Social Quotient \_\_\_\_\_

## SOCIO – ECONOMIC STATUS SCALE (URBAN)

INFORMATION BLANK  
**Socio-Economic Status Scale (Urban)**  
B. KUPPUSWAMY

**SESS**  
**Class**

**FORM B**

*Please answer the following questions as carefully regarding your father. If your father is not alive then give the particulars regarding you guardian.*  
नीचे के प्रश्न आपके पिता के बारे में हैं, यदि पिता न हो तो अपने संरक्षक के बारे में सूचना दीजिये।

1. Name ..... 2. Age .....

नाम आयु

3. Address (Institutional) .....

पता (संस्था का)

4. Address (Home) .....

पता (घर का)

**A. Education of Father/Guardian**  
आपके पिता / संरक्षक की शिक्षा

1. School or College Examinations passed उत्तीर्ण परीक्षाएँ, स्कूल अथवा कॉलेज	Year if known किस वर्ष	2. Technical or Professional Examination passed उत्तीर्ण टेक्नीकल या व्यावसायिक परीक्षाएँ	Year if known किस वर्ष
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

2

**B. Occupation of Father / Guardian**  
आपके पिता / संरक्षक का व्यवसाय

1. (a) In which organisation he does his work ? .....

वे किस संस्था में काम करते हैं ?

(b) Who controls the organisation ? .....

संस्था का उच्चतम अधिकारी ?

2. (a) What is exact designation ? .....

संस्था में उनका पद ?

(b) What is the nature of work ? .....

काम का रूप ?

**C. Income of your Father / Guardian**  
आपके पिता / संरक्षक की आय

1. What is the monthly salary or wages of your father or guardian ?.....

उनका मासिक या साप्ताहिक वेतन ?

2. What are the allowances or bonus he gets ?.....

नियमित आय के अलावा लाभाना, बोनस आदि जो उन्हें मिलते हैं

3. Any other source of your income ..... Monthly Income

आय के अन्य स्रोत मासिक आय

(a) .....

(b) .....

(c) .....

(d) .....

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## BINET – KAMAT TEST OF INTELLIGENCE

### BINET KAMAT TEST OF INTELLIGENCE

- |                           |                                |
|---------------------------|--------------------------------|
| 1. Name of the child:     | 10. Date of testing:           |
| 2. Father's name:         | 11. Serial No. of study child: |
| 3. Mother's name:         | 12. Sex of the child:          |
| 4. Name of the centre:    | 1. Male      2. Female         |
| 5. Area Classification:   | 13. Date of birth:             |
| 1. Rural      2. Urban    | Year ___ Month ___ Day ___     |
| 6. Centre code:           | 14. Age of the child:          |
| 7. Village/Locality code: | Years ___ Months ___ Days ___  |
| 8. Type of Investigation: | 15. Height/Length (cms):       |
| 9. House No:              | 16. Weight (Kgs):              |

Test done/ Not done:  
If not done, state reasons:

### RECORD FORM

TEST ITEM NO.	AGE LEVELS (YEARS)												
	III	IV	V	VI	VII	VIII	IX	X	XII	XIV	XVI	XIX	XXII
1.													
2.													
3.													
4.													
5.													
6.													
Alt. 1													
Alt. 2													
Alt. 3													

BASAL AGE:  
CEILING AGE:  
MENTAL AGE (MA):  
INTELLIGENCE QUOTIENT (IQ) = MA / CA x 100:

### PATTERN ANALYSIS

S.No.	FACTORS	MA	IQ
1.	SPEED OF RESPONSE		
2.	MEMORY		
3.	PERCEPTION OF FORM		
4.	COMPREHENSION		
5.	SENSATION		
6.	SIMILARITIES		
7.	REASONING		
8.	PRACTICAL JUDGEMENT		
9.	VOCABULARY		
10.	IMAGERY		
11.	IDEATIONAL JUDGEMENT		

Remarks:

Signature of the Psychologist

## SEGUIN FORM BOARD

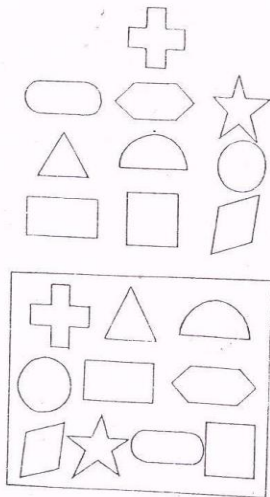
1. Name of the child:
2. Father's name:
3. Mother's name:
4. Name of the centre:
5. Area Classification:  
1 Rural      2 Urban
6. Centre code:
7. Village/Locality code:
8. Type of Investigation:
9. House No:

### SEGUIN FORM BOARD

10. Date of testing:
11. Serial No. of study child:
12. Sex of the child:  
1 Male      2 Female
13. Date of birth:  
Year \_\_\_ Month \_\_\_ Day \_\_\_
14. Age of the child:  
Years \_\_\_ Months \_\_\_ Days \_\_\_
15. Height/Length (cms):
16. Weight (Kgs):

Test done/ Not done:  
if not done, state reasons:

Fig - PRESENTATION ARRANGEMENT



SUBJECT

### RECORD SHEET

Trials	Time Taken
1.	_____seconds. 3 8
2.	_____seconds.
3.	_____seconds.

### RESULTS

SHORTEST TIME OF THREE TRIALS:  
 MENTAL AGE (MA) :  
 INTELLIGENCE QUOTIENT (IQ) = MA/CA × 100:

Remarks :

Signature of the Psychologist

## PERMISSION LETTER

From

To

Mr. B.Sukumar devadoss, M.A., M.Ed.,  
District Elementary Educational Officer,  
Vellore:4

Mrs. Reeba Roshan,  
Lecturer & Psychologist.  
Developmental Paediatrics Unit  
Christian Medical College &  
Hospital,  
Vellore.

Rc.No. 433/B4./2010, dt. 10.2.2010

Sir,

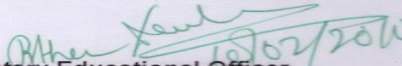
**Sub:** Your Request for permission for assessing Primary and Nursery school and Government Middle Schools and other schools in Vellore.

**Ref:** Development Paediatrics Unit Christian Medical College and Hospital , Vellore dt. 10/2/2010.

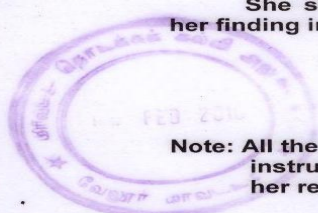
Mrs Reeba Roshan, Lecturer & Psychologist , Developmental Paediatrics Unit of Christian Medical College and Hospital , Vellore is granted permission to visit the Nursery, Primary schools in and around Vellore ( Rural & Urban ) to assess the learning needs of children as part of her research work on the following conditions.

- 1) Her study should not in any way be a hurdle in the academic activity of the children concerned.
- 2) It should not involve the overstay of children outside class hours. ( School working hour ) in the school.
- 3) This permission is granted only to complete her research work.
- 4) She should not publish anything in the press . She is strictly prohibited to release her findings in the press .

She should apply to the government for implementations of her finding in the proper channel.

  
District Elementary Educational Officer,  
Vellore:4

**Note:** All the heads of pre, Nursery Primary and Middle schools are instructed to Co-operate with the bearer of this letter in doing her research work.





SOCIO - ECONOMIC STATUS SCALE (URBAN)

SCORE CARD

B. KUPPUSWAMY  
SOCIO-ECONOMIC STATUS SCALE (URBAN)  
SCORE CARD

SESS Class

Code No ..... Name.....

Age ..... Address.....

Check below by putting a cross in the appropriate item box on the basis of information Blank. Put the weights (Scores) in last column.

ITEMS	Weight	Score	ITEMS	Weight	Score
<b>A. Education</b>			<b>C. Income (Revised 1981)*</b>		
1. Professional degree or Hons. M.A. & above	7	<input type="checkbox"/>	1. Above Rs. 2,000.00 per month	12	<input type="checkbox"/>
2. B.A. or B. Sc. Degree	6	<input type="checkbox"/>	2. Between Rs. 1,000.00 and Rs. 1,999.00	10	<input type="checkbox"/>
3. Intermediate or Post-High School Diplomas	5	<input type="checkbox"/>	3. Between Rs. 750.00 and Rs. 999.00	6	<input type="checkbox"/>
4. High School Certificate	4	<input type="checkbox"/>	4. Between Rs. 500.00 and Rs. 749.00	4	<input type="checkbox"/>
5. Middle school completion	3	<input type="checkbox"/>	5. Between Rs. 300.00 and Rs. 499.00	3	<input type="checkbox"/>
6. Primary School or literate	2	<input type="checkbox"/>	6. Between Rs. 101.00 and Rs. 299.00	2	<input type="checkbox"/>
7. Illiterate	1	<input type="checkbox"/>	7. Below Rs. 100.00	1	<input type="checkbox"/>
A.....			C.....		
<b>B. Occupation</b>			<b>Total Score</b>		
1. Profession	10	<input type="checkbox"/>	(Add. A. B. C.)		
2. Semi-Profession	6	<input type="checkbox"/>	<div style="border: 1px solid black; width: 60px; height: 60px; margin: 0 auto;"></div>		
3. Clerical, Shop owners, Farm-owners etc.	5	<input type="checkbox"/>	<b>Total Score</b>		
4. Skilled worker	4	<input type="checkbox"/>	<b>SESS Class</b>		
5. Semi-Skilled worker	3	<input type="checkbox"/>	S	26-29	...
6. Unskilled worker	2	<input type="checkbox"/>	C	16-25	...
7. Unemployed	1	<input type="checkbox"/>	A	11-15	...
B.....			L	5-10	...
			E	Below 5	...

# HOME SCREENING QUESTIONNAIRE

## Ages 3-6 Years

Child's Name \_\_\_\_\_ Birthdate \_\_\_\_\_ Age \_\_\_\_\_  
 Parent's Name \_\_\_\_\_ Phone No. \_\_\_\_\_  
 Address \_\_\_\_\_ Date \_\_\_\_\_

### Home Screening Questionnaire Ages 3-6 Years

Please answer **all** of the following questions about how your child's time is spent and some of the activities of your family. On some questions, you may want to check more than one blank.

<p><b>For office use only</b></p> <p>1. a) Do you get any magazines in the mail? YES NO          b) If yes, what kind?  <input type="checkbox"/> home and family magazines  <input type="checkbox"/> news magazines  <input type="checkbox"/> children's magazines  <input type="checkbox"/> other</p> <p>2. Does your child have a toy box or other special place where he/she keeps his/her toys? YES NO</p> <p>3. How many children's books does your family own?  <input type="checkbox"/> 0 to 2  <input type="checkbox"/> 3 to 9  <input type="checkbox"/> 10 or more</p> <p>4. How many books do you have besides children's books?  <input type="checkbox"/> 0 to 9  <input type="checkbox"/> 10 to 20  <input type="checkbox"/> more than 20</p> <p>Where do you keep them?  <input type="checkbox"/> in boxes (packed)  <input type="checkbox"/> on a bookcase  <input type="checkbox"/> other (explain _____)</p> <p>5. How often does someone take your child into a grocery store?  <input type="checkbox"/> hardly ever; I prefer to go alone  <input type="checkbox"/> at least once a month  <input type="checkbox"/> at least twice a month  <input type="checkbox"/> at least once a week</p> <p>6. About how many times in the past week did you have to spank your child?</p> <p>7. Do you have a T.V.? YES NO          About how many hours is the T.V. on each day? _____</p>	<p><b>For office use only</b></p> <p>8. How often does someone get a chance to read stories to your child?  <input type="checkbox"/> hardly ever  <input type="checkbox"/> at least once a week  <input type="checkbox"/> at least 3 times a week  <input type="checkbox"/> at least 5 times a week</p> <p>9. Do you ever sing to your child when he/she is nearby? YES NO</p> <p>10. Does your child put away his /her toys by himself/herself <b>most of the time</b>? YES NO</p> <p>11. Is your child allowed to walk or ride his tricycle by himself/herself to the house of a friend or relative? YES NO</p> <p>12. What do you do with your child's art work?  <input type="checkbox"/> let him/her keep it  <input type="checkbox"/> put it away  <input type="checkbox"/> hang it somewhere in the house  <input type="checkbox"/> throw it away shortly after looking at it</p> <p>13. In the space below write what you might say if your child said, "Look at that big truck."          _____</p> <p>14. What do you usually do when a friend is visiting you in your home and your child has nothing to do?  <input type="checkbox"/> suggest something for him/her to do  <input type="checkbox"/> offer him/her a toy  <input type="checkbox"/> give him/her a cookie or something to eat  <input type="checkbox"/> put him/her to bed for a nap  <input type="checkbox"/> play with him/her</p>
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<p><b>For office use only</b></p> <p>15. How often does your child eat a meal at the table with <b>both</b> mother and father (or other adult male)?  <input type="checkbox"/> never  <input type="checkbox"/> at least once a month  <input type="checkbox"/> at least once a week  <input type="checkbox"/> at least twice a week  <input type="checkbox"/> at least 3 or 4 times a week  <input type="checkbox"/> at least once a day</p> <p>16. How often does your child spend time playing or "working" with his/her father (or other adult male)?  <input type="checkbox"/> at least 4 times a week  <input type="checkbox"/> at least twice a week  <input type="checkbox"/> at least once a week  <input type="checkbox"/> at least once a month  <input type="checkbox"/> never</p> <p>17. How often does someone get a chance to take your child out of the house for an outing (shopping, park, zoo, restaurant, museum, car trip, library, etc.)?  <input type="checkbox"/> at least 6 times a year  <input type="checkbox"/> at least once a month  <input type="checkbox"/> at least twice a month  <input type="checkbox"/> at least once a week</p> <p>18. Check the things which you (or other adult or older child) are helping or have helped your child to learn:          a. <input type="checkbox"/> colors (like naming colors of things)          b. <input type="checkbox"/> alphabet          c. <input type="checkbox"/> numbers          d. <input type="checkbox"/> understanding of time (like morning-afternoon and now-later)          e. <input type="checkbox"/> shapes (like drawing circles or squares)          f. <input type="checkbox"/> reading new words or writing his/her name</p> <p>19. Has your child learned any songs, prayers, or nursery rhymes?          YES NO          If yes, where did he learn them?  <input type="checkbox"/> at day care or preschool  <input type="checkbox"/> from a sister or brother  <input type="checkbox"/> at church or Sunday School  <input type="checkbox"/> from mother or father  <input type="checkbox"/> from television</p> <p>20. It is 30 minutes before dinner and your child is hungry. Most of the time you would:  <input type="checkbox"/> give him/her a snack  <input type="checkbox"/> have him/her wait for dinner</p>	<p><b>For office use only</b></p> <p>21. Which items do you sometimes let your child choose for himself / herself?  <input type="checkbox"/> part of what to have for breakfast or lunch  <input type="checkbox"/> favorite foods in the grocery store (fruit, cereal, cookies, etc.)  <input type="checkbox"/> the clothes he wants to put on  <input type="checkbox"/> none of the above</p> <p>22. What would you do if your child got angry and hit you?  <input type="checkbox"/> hit him/her to show him/her it hurts  <input type="checkbox"/> send him/her to his/her room  <input type="checkbox"/> spank him/her  <input type="checkbox"/> talk to him/her  <input type="checkbox"/> ignore it</p> <p>23. Do you have any pets? YES NO</p> <p>24. Do you have any plants in your house? YES NO</p> <p>25. Which of the following best describes your neighborhood:  <input type="checkbox"/> it is not as clean as I would like it  <input type="checkbox"/> the houses are not well cared for  <input type="checkbox"/> it is well cared for  <input type="checkbox"/> it is well cared for and attractive</p> <p>26. How many bedrooms does your house have?          _____          How many people are living in your house?          _____</p> <p>27. Do you occasionally try new recipes that you find in the newspaper or in magazines? YES NO</p> <p>28. Is anyone in the family presently taking a class in school at the college level? YES NO</p> <p>29. Who buys the groceries for the family?          Sometimes Often  <input type="checkbox"/> Mother  <input type="checkbox"/> Father  <input type="checkbox"/> Grandparent  <input type="checkbox"/> Older child  <input type="checkbox"/> Other</p>
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# HOME SCREENING QUESTIONNAIRE

## Ages 3-6 Years

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30. Most of the decisions about how the family income is to be spent are made by:
- Mother
  - Father
  - Grandparent
  - Friend

\_\_\_\_\_

\_\_\_\_\_

31. How often do you and your child get a chance to play together (like pretend games, dolls, house, cars and trucks, or table games)?
- hardly ever; too young
  - at least once a week
  - at least 3-4 times a week
  - everyday

\_\_\_\_\_

32. Do you have any friends or relatives with children about the same age as your child? YES NO

\_\_\_\_\_

33. When your child asks if he/she can do something you think he/she is too young to do, would you be more likely to say:
- no, I don't want you to
  - no
  - not now
  - No. You're too young now but when you're older you'll be able to do it.

### FOR OFFICE USE ONLY

See the HSQ Reference Manual for scoring instructions.

Questions Subtotal \_\_\_\_\_

Toy Checklist Subtotal \_\_\_\_\_

TOTAL HSQ SCORE \_\_\_\_\_

HSQ Results \_\_\_\_\_

Scorer's Name \_\_\_\_\_

-3-

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34. What would happen if your child spilled his/her milk?
- he/she would be spanked
  - he/she would have to clean it up
  - someone else would clean it up
  - he/she would be sent to his/her room

\_\_\_\_\_

Please complete the checklist on the next page.

-4-

We are interested in finding out what kinds of toys children have in their homes. The items listed below are for children of different ages.

PLEASE CHECK ANY OF THE FOLLOWING THAT YOU HAVE IN YOUR HOME AND THAT YOUR CHILD IS ALLOWED TO PLAY WITH. DO NOT CHECK THE ONES THAT YOU DO NOT HAVE NOW OR ONES THAT ARE BROKEN.


WE DO NOT EXPECT A CHILD TO HAVE ALL OF THESE ITEMS.

- |   |  |
|---|--|
| 1. <input type="checkbox"/> dolls with clothes or paper dolls             | 26. <input type="checkbox"/> crib gym                          |
| 2. <input type="checkbox"/> stuffed animals, animal toys or animal books  | 27. <input type="checkbox"/> jumpseat or door swing            |
| 3. <input type="checkbox"/> dress-up clothes or costumes                  | 28. <input type="checkbox"/> squeeze toys                      |
| 4. <input type="checkbox"/> tricycle, bicycle or scooter                  | 29. <input type="checkbox"/> rattles                           |
| 5. <input type="checkbox"/> stroller or walker                            | 30. <input type="checkbox"/> T.V.                              |
| 6. <input type="checkbox"/> wagon   | 31. <input type="checkbox"/> Busy Box                          |
| 7. <input type="checkbox"/> Big Wheel or child-size car                   | 32. <input type="checkbox"/> gun                               |
| 8. <input type="checkbox"/> pull or push toy                              | 33. <input type="checkbox"/> clay or play dough                |
| 9. <input type="checkbox"/> mobile  | 34. <input type="checkbox"/> real or toy musical instruments   |
| 10. <input type="checkbox"/> child-size furniture                         | 35. <input type="checkbox"/> sand box                          |
| 11. <input type="checkbox"/> high chair                                   | 36. <input type="checkbox"/> homemade building toys            |
| 12. <input type="checkbox"/> playpen                                      | 37. <input type="checkbox"/> blocks                            |
| 13. <input type="checkbox"/> puzzles - at least three                     | 38. <input type="checkbox"/> Tinker Toys, Lego or Lincoln Logs |
| 14. <input type="checkbox"/> alphabet toy, alphabet game or alphabet book | 39. <input type="checkbox"/> record player                     |
| 15. <input type="checkbox"/> number toy, number game or number book       | 40. <input type="checkbox"/> children's records                |
| 16. <input type="checkbox"/> coloring book                                | 41. <input type="checkbox"/> chalkboard                        |
| 17. <input type="checkbox"/> dot-to-dot or color-by-number book           | 42. <input type="checkbox"/> swings                            |
| 18. <input type="checkbox"/> scissors                                     | 43. <input type="checkbox"/> jungle gym                        |
| 19. <input type="checkbox"/> pegboard                                     | 44. <input type="checkbox"/> car, truck or train               |
| 20. <input type="checkbox"/> toy telephone                                | 45. <input type="checkbox"/> measuring cups                    |
| 21. <input type="checkbox"/> plastic snap-together beads                  | 46. <input type="checkbox"/> pots and pans                     |
| 22. <input type="checkbox"/> musical toy or music box                     | 47. <input type="checkbox"/> toy dishes                        |
| 23. <input type="checkbox"/> children's books                             | 48. <input type="checkbox"/> doll carriage                     |
| 24. <input type="checkbox"/> ball   | 49. <input type="checkbox"/> plastic tools and workbench       |
| 25. <input type="checkbox"/> shape ball or box                            | 50. <input type="checkbox"/> crayons, paints or pencils        |

To reorder call: (800) 419-4729

Catalog #8102

**CONSUMABLE BOOKLET OF P I S**


**Consumable Booklet**  
 of  
**P I S**  
 (English Version)

T.M. Regd. No. 564848  
 Copyright Regd. No. C A-73256/2005 Dt. 13. 5. 05

**Dr. Rita Chopra (Kurukshetra)**  
**Dr. Surabala Sahoo (Kurukshetra)**

Please fill up the following informations (By the Parent) :-

Name.....(Father / Mother)

Address..... Date.....

Qualification : Father..... Mother.....

Occupation : Father..... Mother.....

Monthly Income : Father..... Mother.....

**INSTRUCTIONS**

This scale contains some statements relating to parent involvement. Parent Involvement encompasses three broad dimensions i.e. parent involvement at school, parent involvement in home and involvement of parents through parent- teacher associations. Please go through each statements under each dimension and indicate how each item is related to you about your involvement with your child. Some of the statements may apply to you; others may not. If you are frequently involved with your child on the given statement please put a tick mark (✓) on the place given under frequently, if occasionally you agree with the statement (✓) put a tick mark on the place given under occasionally and if you never involve with your child please put a tick mark (✓) on the place given under never.

Please give free and frank responses to each statement. Your responses will be kept strictly confidential and will be used for research purpose only.

**SCORING TABLE**

Involvement Area	School Involvement	Home Involvement	Involvement through PTA	Total Involvement
Scores				

Estd. 1971 ☎ : (0562) 2364926  
**NATIONAL PSYCHOLOGICAL CORPORATION**  
 4/230, KACHERI GHAT, AGRA-282 004 (INDIA)

Sr. No.	STATEMENTS	Frequently	Occasionally	Never
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**PART - I**

- I talk to my child about what he/she is learning in school.
- I check my child's behaviour with his/her classmates.
- I encourage my child to participate in co-curricular activities.
- I let my child to go on school trips with his/her classmates.
- I take keen interest in sorting out the problems faced by my child in the school.
- I encourage my child to make friendship with his/her classmates.
- I help my child in fundraising activities of the school.
- I pay close attention to my child's improvement in his/her learning.
- I show interest in knowing my child's achievement level in each subject.
- I try to find out from my child what specific subjects he/she wants to learn.

**PART - II**

- I see the content of the home work assignment of my child.

**CONSUMABLE BOOKLET OF P I S**

Sr. No.	STATEMENTS	Frequently	Occasionally	Never
12.	I ask my child about his/her grades when he/she brings home a test report.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	I help my child in making time table for his/her day-to-day activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	I help my child in solving the problems of day-to-day life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	I try to create congenial environment for my child to study in.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	I encourage my child to work hard to get good grades.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	I spend time working with my child on reading writing skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	I praise my child for his/her attainment in front of others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	I encourage my child to see educational programmes on T.V.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	I take my child to places in the community to learn new things (i.e. zoo and museums etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	I help my child in completing his/her home work daily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	I help my child in preparing notes after discussing it with the teacher.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	I talk with my child's teacher on telephone when required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	I encourage my child while he/she is working on creative activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sr. No.	STATEMENTS	Frequently	Occasionally	Never
---------	------------	------------	--------------	-------

**PART - III**

25.	I visit the teachers to seek help for my child in his/her school work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	I ask the teacher to send me a regular report of my child's performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	I share my views with other parents about the school activities during parent-teacher meet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	I attend the parent-teacher meetings to discuss my child's progress.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	I place my opinion before the PTA regarding the organization of co-curricular activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30.	I participate in planning class room activities with the teacher.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	I keep regular contact with my child's class teacher.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	I talk to the teacher about my child's accomplishment in school subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	I suggest the teachers for regular checking of my child's home work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	I praise my child for school work in front of teachers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## **Participant Information and Consent form**

**Study Title:** A Study to identify school readiness in children between 3-4 years upon school entry.

### **Persons responsible for the study:**

Reeba George  
Lecturer  
Developmental Paediatrics Unit  
Christian Medical College and Hospital  
Vellore  
Phone No:0416-2283260

### **About the Study:**

School readiness is an essential pre requisite for academic achievement and school adjustment. Readiness does not reside solely in the child but reflects the environments in which children find themselves- their families, early childhood settings, schools and neighbourhood.

In India the educational system now includes all groups of children into regular school under the Sarva Shiksha Abhiyan. There is therefore a need to assess the readiness of children in all domains in order to identify skills of children and refer children for special services if not ready. The present study aims to assess children's readiness for school in the domains of physical development, language and literacy, number skills, arts and, personal and social development.

Factors that have been associated most consistently with children's mental and social-emotional preparedness for school are: socioeconomic status, child's health, family background characteristics, home environment, participation in some sort of preschool program. Such influences have to be studied in India to offer better educational services for children. This study proposes to methodically understand the readiness for school in children and study the influence of family, school and home environment factors.

**Study Conduct:**

Children who are admitted into nursery and primary schools between the ages of 3 and 4 years will be addressed in this study. Play and activity based items will be done with the child. The child's physical development, language and learning skills, creative and constructive abilities and number skills will be studied. The parents will be interviewed for their involvement in the child's learning and the home environment. The child's abilities and needs will be discussed with the parent and suggestions will be offered. The family will be referred for further intervention if there be a need. These assessments will be done during the first term of school

**Possible Benefits from the study:**

Screening of the child in the classroom and on other activities will help to identify strengths and areas of need which will help the teacher in the classroom and the parent in the learning process of the child. If a child has a need in learning or social interaction the factors contributing to this can be identified and communicated to the parent and teacher. The child can receive early intervention which can help to cope with or overcome the difficulty.

**Possible Risks in The study:**

There are no new tests or assessments that are being used in this study. All the tests are regularly used with children in this age range. Therefore there is no risk for those involved in this study.

**Confidentiality of information about children who participate in this study:**

All information regarding children involved in this study will be strictly confidential. All information regarding the assessment and its results will be discussed only with the parent.

**Consent:**

Your consent is requested for the above mentioned study. If you have any doubts or questions regarding the study, the person conducting the study will be happy to clarify and provide additional information.

**Withdrawal from the study:**

You are free at any time to withdraw from the study without having to give any reason.

**CONSENT FORM**

I \_\_\_\_\_ parent of  
\_\_\_\_\_ have read (or been read to) the information regarding the study,  
and I have understood the written informed consent form for the parent for this study.

By signing this form I voluntarily agree to allow my child to be assessed by the study persons.

I understand that I can withdraw my consent at anytime without having to offer any reason.

Child's Name:

Parent's Signature

Date:

Person obtaining consent: Reeba George

Signature:

Date:



## பங்கு பெறுபவரின் தகவல் மற்றும் ஒப்புதல் படிவம்

**ஆராய்ச்சியின் தலைப்பு:** இந்த ஆய்வானது 3 - 4 வயது குழந்தைகள் பள்ளியில் சேர்ந்தவுடன் எவ்வாறு இருக்கிறார்கள் என்று கண்டறிய

### **இந்த ஆய்வின் பொறுப்பாளர்:**

ரீபா ஜார்ஜ்

விரிவுரையாளர்

குழந்தைகள் மனவளர்ச்சி பிரிவு

சி.எம்.சி. மருத்துவமனை

வேலூர் - 632 004

தொலைப்பேசி எண்: 0416 - 2283260

### **இந்த ஆய்வைப்பற்றி:**

குழந்தைகள் படிப்பில் சிறந்து விளங்குவதற்கும், பள்ளியில் மற்றவர்களுடன் பழகுவதற்கும் பள்ளியில் சேர்ந்தவுடன் எவ்வாறு இருக்கிறார்கள் என்று கண்டறிவது மிகவும் அவசியமானது. பள்ளியில் குழந்தைகள் எவ்வாறு இருக்கிறார்கள் என்று கண்டறியும் பொழுது, இது குழந்தைகளை மட்டும் சார்ந்ததல்ல, அவர்களை சுற்றி நடக்கும் சூழ்நிலையும் ஒரு காரணம் - அதாவது குடும்பம், சிறு வயது சூழ்நிலை, பள்ளி மற்றும் பக்கத்தில் வசிப்பவர்கள்.

நம் இந்திய கல்வி முறையின் அடிப்படையில் இந்த சர்வ சிக்கஷா அபியன் கீழ் எல்லா தரப்பு குழந்தைகளும் வழக்கமான பள்ளியில் சேரலாம். அதினால் படிப்பில் பிரச்சினை இருக்கும் குழந்தைகளை முதலிலேயே கண்டுப்பிடிக்க இந்த ஆய்வு பயன்படும்.

### **ஆய்வு முறை**

3 லிருந்து - 4 வயது நிரம்பிய நர்சரி மற்றும் தொடக்க பள்ளிக்கு செல்லும் குழந்தைகள் இந்த ஆராய்ச்சியில் சேர்த்து கொள்ளப்படுவார்கள். விளையாட்டு செயல் மூலம் குழந்தைகள் மதிப்பிடப்படுவார்கள். இதன் மூலம் குழந்தையின் வளர்ச்சி, மொழி, படிப்பு, படைப்புத்திறன், மற்றும் கணக்குத் திறமைகள் மதிப்பிடப்படும். குழந்தையின் படிப்பில் பெற்றோரின் பங்கு மற்றும் வீட்டு சூழ்நிலை எவ்வாறு இருக்கிறது என்று பெற்றொரிடம் கேட்கப்படும். குழந்தையின் திறமை மற்றும் தேவைகள் பெற்றொருக்கு விளக்கப்படும். அவசியப்பட்டால் பயிர்ச்சிற்காக பரிந்துரை

செய்யப்படுவார்கள். இந்த மதிப்பிட்டு முறை பள்ளியின் முதல் கட்ட காலத்தில் செய்யப்படும்.

### **இந்த ஆய்வால் வரும் பயன்கள்:**

வகுப்பறை மற்றும் மற்ற செயலில் ஈடுபடும் குழந்தைகள் மதிப்பிடப்படும் பொழுது திறமை மற்றும் தேவைகள் கண்டுபிடிக்கப்படும். இதன் மூலம் ஆசிரியர் மற்றும் பெற்றோர் குழந்தையின் படிப்பில் உதவ முடியும். குழந்தையின் படிப்பில் அல்லது மற்றவர்களுடன் பழகுவதில் தேவை இருந்தால் அதின் காரணங்களை கண்டுபிடித்து ஆசிரியர் மற்றும் பெற்றோரிடம் அறிவிக்கப்படும்.

### **ஆய்வால் வரும் பிரச்சினை**

இந்த ஆய்வில் புதிய சோதனையோ அல்லது மதிப்பிட்டு முறையோ பயன்படுத்தவில்லை. எல்லா மதிப்பிட்டு முறையும் இதே வயது உள்ள குழந்தைகளுக்கு தவறாமல் செய்து வருகிறோம். அதினால் இந்த ஆய்வில் பங்கு பெரும் குழந்தைகளுக்கு எந்த பிரச்சினையும் இல்லை.

### **இந்த ஆய்வில் பங்கு பெரும் குழந்தைகளின் விவரம் இரகசியமாக வைக்கப்படும்:**

குழந்தைகளின் மதிப்பிட்டு விவரங்கள் பெற்றோரிடம் மட்டும் சொல்லப்படும்.

### **சம்மதம் கொடுத்தல்**

இந்த ஆய்வில் பங்கு பெற உங்களின் சம்மதத்தை கேட்கிறோம். இந்த ஆய்வில் ஏதேனும் சந்தேகம் இருந்தால் திருமதி ரீபா ஜார்ஜை அனுகி இதை குறித்த தகவல்களை தெரிந்து கொள்ளலாம்.

### **இந்த ஆய்விலிருந்து விலகதல்:**

இந்த ஆய்விலிருந்து நீங்கள் எப்போது வேண்டுமானாலும் எவ்வித காரணமுமின்றி விலகலாம்.

## ஓப்புதல் படிவம்

நான் \_\_\_\_\_ பெற்றோராகிய \_\_\_\_\_

இந்த ஆய்வின் தகவலை படித்து (எனக்கு படித்து காண்பிக்கப்பட்டது) தெரிந்து கொண்டேன். இந்த ஆய்வைப்பற்றி நன்றாக புரிந்து கொண்டேன்.

இதில் கையொப்போம் செய்வதின் மூலம் என் குழந்தையை இந்த ஆய்வில் பங்கு பெற அனுமதி அளிக்கிறேன்.

இந்த ஆய்விலிருந்து நான் எப்போது வேண்டுமானாலும் எவ்வித காரணமுமின்றி விலகலாம் என அறிந்திருக்கிறேன்.

குழந்தையின் பெயர்:

பெற்றோரின் கையொப்போம்:

தேதி:

ஓப்புதல் வாங்கும் ஆய்வாளர்: ரீபா ஜார்ஜ்:

கையொப்போம்:

தேதி: