



ST. MARY UNIVERSITY SCHOOL OF GRADUATE STUDIES

**EFFECT OF EARLY CHILDHOOD EDUCATION ON LATER
EDUCATIONAL ACHIEVEMENT IN CASE OF MAJOR FOUR
REGIONS AND ADDIS ABABA CITY ADMINISTRATION**

BY

TESFAYE HAILU

DECEMBER 2018

ADDIS ABABA

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**A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY SCHOOL OF
GRADUATE STUDIES IN THE PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTERS OF
DEVELOPMENTAL ECONOMICS.**

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ABSTRACT

This paper using data from the Young Lives longitudinal survey in Ethiopia, examines the effect of preschool attendance on Later Educational Achievement of Urban children on young cohort, were children between the age of 6 and 18 months during the first round of the survey which was conducted in the year 2002. Then these households and later on their children are surveyed in three different rounds. These survey rounds happened in the years 2002, 2006, 2009 and 2013. For the current analysis we use information from the surveys conducted in the years 2006 and 2013. From all regions Addis Ababa, Amhara, Oromia, SNNP and Tigray number of resident randomly selected from each region are 267, 76, 81,165 and 83 selected respectively. Total of 672 residents randomly selected from all regions. The young cohort of children is randomly selected from some 20 communities in the four main regions of Ethiopia and the Addis Ababa city administration. The regions are Amhara, Oromia, SNNP and Tigray.

Measured by Early Grade Reading Assessment (EGRA) test, Peabody Picture Vocabulary test (PPVT) and Regression for Math test. We used Ordinary Least Square regression model to estimate the impact of Preschool. The result shows preschool attendance has a statistically significant on children's later educational achievement age between 5 and 12. Overall, the findings suggest that a significant part of children's educational inequalities at later ages are explained by the level of early childhood investment.

Key term: *Early preschool attendance, Early Grade Reading Assessment (EGRA) test, Peabody Picture Vocabulary test (PPVT) and Regression for Math test*

DECLARATION

I Declare that this thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been acknowledged.

Name

Date and Signature

ENDORSEMENT

This thesis has been submitted to St. Mary's University, school graduate studies with my approval as university advisor.

Advisor

Mesfin Seyoum(Phd)

Date and Signature

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Education which is given to the age of 3 up to 5 years old children is called pre-school education. Preschool education is designed to help children mental, Physical, Emotional, Linguistic and social development. Different psychologist, educationists and policy makers have given different names to this type of education namely nursery school education, kindergarten education, pre -primary education and even sometimes zero class education.

Academic achievement is a cumulative process involving both mastering new skills and improving already existing skills Pallas et al., (1990); Pungello, Kuperschmidt, Burchinal, and Patterson,1996). Information about how children acquire reading and math skills point to the importance of specific academic skills but also indicates that more general cognitive skills, particularly oral language and conceptual ability, may be increasingly important for later mastery of more complex reading and mathematical tasks. Basic oral language skills become critical for understanding texts as the level of difficulty of reading passages increases (NICHD Early child care research Network,2005b, Scarborough 2001, Snow et al,1998; Storch and Whitehust,2002; Whitehust and Lonigan,1998).

Although children's academic achievement is largely stable throughout childhood, children do demonstrate both transitory fluctuations and fundamental shifts in their achievement trajectories Duncan et al., (2007).

Investment in Early childhood education are believed to be critical informing the foundation for life -long learning and providing children with the opportunity to reach their full potential. This is because early childhood is a crucial phase of growth and development, where early circumstances can influence outcomes across the entire course of an individual's life (WHO 2012). In many high-income countries, there are a number of studies that support such relationships and strongly suggest that the

best hope for changing the educational disparity of children is to invest resources during their earliest years Heckman et al., (2006); Cunha et al., (2006). Others also argue that investing in early childhood development benefits children, individuals and societies by providing the base for healthy development Berlinski et al., (2008). Authors such as Heckman and Kautz, (2012) contend that investing in early childhood education might be one of the most effective interventions for helping poor children, families, communities and nations, and may help break the intergenerational cycle of poverty.

No experimental data show that children's achievement test scores are related to prior cognitive functioning and the attainment of basic skills in math and literacy such as number and letter recognition Stevenson and Newman, (1986). In their meta-analysis, La Paro and Pianta, (2000) found middle-range correlations in cognitive/academic skills both from preschool to kindergarten (.43) and from kindergarten to first or second grade (.48).

Attention-related skills such as task persistence and self-regulation are expected to increase the time during which children are engaged and participating in academic endeavors. Research has shown that signs of attention and impulsivity can be detected as early as age 2.5 but continue to develop until reaching relative stability between ages 6 and 8 Olson et al., (2005); Posner and Rothbart, (2000). Studies linking attention with later achievement are less common, but consistent evidence suggests that the ability to control and sustain attention as well as participate in classroom activities predicts achievement test scores and

grades during preschool and the early elementary grades Alexander et al., (1993); Raver, Smith-Donald, Hayes, & Jones, 2005). These attention skills, which are conceptually distinct from other types of interpersonal behaviors, are associated with later academic achievement, independent of initial cognitive ability McClelland et al., (2000); Yen, Konold, & McDermott, 2004) and of prior reading ability and current vocabulary (Hawse, Lange, Farran, & Boyles, 2003).

Children's socioemotional skills and behaviors are also expected to affect both individual learning and classroom dynamics. Inadequate interpersonal skills promote child-teacher conflict and social exclusion (Newcomb, Bukowski, & Pattee, 1993; Parker & Asher, 1987), and these stressors may reduce children's participation in collaborative learning activities and adversely affect achievement (Ladd et al., 1999; Pianta & Stuhlman, 2004). Correlational evidence linking problem behaviors to academic achievement is found in the Beginning School Study. First-grade ratings on items describing a cheerful, outgoing temperament (roughly the opposite of internalizing problems) predicted adult educational attainment better than preschool or first-grade achievement scores (Entwisle et al., 2005). Other studies yield similar results. For example, children with consistently high levels of aggression from ages 2-9 were more likely than other children to have achievement problems in third grade (NICHD Early Child Care Research Network, 2004).

During the period from 2010-15, the Government of Ethiopia, through the Ministry of Education and Regional Education Bureaus, has supported large-scale implementation of pre-primary education, in all areas of the country, via a combination of government, community, nongovernmental (NGO), church and private sector initiatives. From a level of just over 340,000 in the 2009/10 academic year, enrolment reached over 3,000,000 in 2014/15. Students are enrolled across Child-to-Child schemes, multi-year kindergarten programs, Accelerated School Readiness courses and a one-year O-Class 'reception' year. Various studies are ongoing, to understand the effectiveness of these different approaches (see for example, Mundy et al. 2014).

In 2015, the Ministry of Education set ambitious targets for the next five years (2015/16-2019/20), which are elaborated in its fifth Education Sector Development Program (ESDP V, Ministry of Education 2015). ESDP V now leads national planning and implementation in the education sector and highlights pre-primary education as a priority, with the goal: "to provide all children with access to pre-primary education for school preparedness".

1.2 Statement of the problem

Early childhood programs and policies that promote academic skills have been gaining popularity among politicians and researchers. For example, President Bush, (2002) endorsed Head Start reforms in 2002 that focus on building early academic skills, observing that “on the first day of school, children need to know letters and numbers. They need a strong vocabulary. These are the building blocks of learning, and this nation must provide them.

The National Research Council’s Committee on the Prevention of Reading Difficulties in Young Children recommends providing environments that promote pre literacy skills for all preschool children Gredler, (2002). Similarly, the National Association for the Education of Young Children and the National Council of Teachers of Mathematics (2002) issued a joint statement that advocated for high-quality mathematics education for children ages 3–6.

Children aged 3 to 7 years constitute a large section of the Ethiopian population according to the national census conducted in 2007 by Central Statistics Agency (CSA,2009). Over 16 percent of the then 74 million populations, that is, more than 12 million were under this age category and above 10% were in the ages 4 to 6 years. However, Early Childhood Care and Education (ECCE) is one of the most neglected areas in Ethiopia. As to the Annual Educational Statistical Abstract of Ministry of Education (MoE, 2013), the gross enrollment rate of Kindergarten (KG, ages 4 to 6) was only 6.2% and mainly concentrated in urban areas.

Pre-school education. There is a limited number of NGO-sponsored pre-schools throughout rural Ethiopia, but these institutions are insufficient to address the needs of a rural community that makes up the majority of Ethiopia’s population. By contrast, urban areas have a relatively high concentration of privately owned and government-subsidized pre-schools. However, even here, the majority of urban families are unable to meet the expense of private pre-school education. The only option available for low-income families and the urban poor is enrolling their children in government-subsidized, community-based pre-schools. Enrollment in these

facilities is often high, resulting in overcrowded classrooms with a teacher–student ratio of 1:30 or greater. A typical classroom is often a single room where children sit in rows on wooden benches facing the teacher. The lessons are usually teacher-directed, and great emphasis is placed on discipline Fisher and Swindells, (1998).

In one empirical example, Calman and Tarr-Whelan, (2005) found that preschool attendance is associated with lower dropout rates and higher grades. Dallos and Comley-Ross, (2005) also found that preschool attendance has a positive effect on children’s completion years of primary and secondary education, accompanied by low dropout and repetition rates in each grade for preschoolers compared to non-preschoolers. Fantuzzo et al., (2005) and Wylie and Thompson, (2003) likewise discovered a positive contribution on learning dispositions and social-emotional outcomes. {Citation}investigated early education and children’s outcomes and indicated that investments in human capital before the age of 5 appeared to have long-lasting positive effects on children’s educational pathways. Ruhm and Waldfogel (2011) evaluated the long-term effects of early childhood education programs and contended that expansions of early education generally yield benefits at school entry, adolescence, and for adults, with the benefits largely pronounced for disadvantaged children.

In terms of expected economic returns, the Government of the United States (2014) estimated that ‘expanding early learning initiatives would provide benefits to society of roughly [US]\$8.60 for every \$1 spent, about half of which comes from increased earnings for children when they grow up.’ In spite of growing evidence in high-income countries, there is limited empirical evidence on the long-term contributions of preschool education in Africa, particularly in Ethiopia. As far as it is known, there are no studies in Ethiopia on this issue other than the ones by Woldehanna and Gebremedhin, (2016), Azubuike (2014), Orkin, Yadete and Woodhead (2012) and Hoot, Szente and Mebratu (2004). Except the latter, all made use of Young Lives data in their analyses. For instance, (Woldehanna, 2011) studied the cognitive effects of preschool attendance of urban children aged 5 and 8 years. Recognizing the

importance of preschool education on children's cognitive development, he recommended the expansion of public preschool centers in the country.

Azubuike (2014) also investigated factors influencing school achievements at primary school level and concluded that early investment in the form of preschool education improves the performance and educational achievement of students at primary level. More broadly, Orkin et al., (2012) looked at the landscape of early childhood development in Ethiopia, showing that investment in early childhood development is minimal and basic primary school systems are still being consolidated; children often enrol late and tend to have difficult trajectories through school as a result of dropping out or progressing slowly through grades. In 2013/14, World Bank data showed that the gross completion rate for lower secondary education was as low as 29.4 per cent (World Bank 2016). Such a low rate raises the question as to whether the limited access to preschool centers experienced in early years of life might be associated with the low completion rate of secondary education.

I focused on the young cohort were Children between the age of 6 and 18 months during the first round of the survey. This study aimed to fill this research gap by looking at the long-term estimates of early childhood education on successful completion of secondary education.

1.3 Objective of the study

The main objective of this Study is to analyze the effect of Early Childhood Education on Later Educational Achievement.

Specific objectives are:

- a). To determine the influence of Childs preschool upon later academic achievement.
- b) To explore how parent's educational status affect Childs education
- c) To analyses how household characteristics like household size and household consumption affect Childs education.

1.4 Research Hypothesis

Pre-school education is the first step in child's educational journey. Early childhood experts have the opinion that attending high quality preschool program helps to promote children's social and emotional development and prepare them for kindergarten and beyond.

Null Hypothesis (H0): Early childhood education has no contribution for later educational achievement.

Alternative Hypothesis (H1): Early childhood education contribute for later educational achievement.

In this study, the main interest is to investigate the role, if any, that attending early childhood education have on later educational achievement. We measure later educational achievement using children test scores on standardized exams administered to children. These test are called the Peabody Picture Vocabulary Test (PPVT) and Cognitive Development Assessment-Quantitative test (CDA-Q).

1.4 Significance of the study

It helps the government to design appropriate educational policy to increase educational outcome or to get quality and creative labor force which contribute for economic growth of a nation. It shows Government and private sector contribution for provision of early education. This study also shows the current performance of the government in early education. This study helps private investors to invest in these area and it also benefit families by creating awareness of Early childhood education.

1.6 Scope and limitation of the study

This research considers the effect of early childhood educational on later educational achievement. The young Lives data covers from round 1,2002 up to round 5,2016. The survey covers all 9 regions (Amhara, Oromia, Southern Nation, Nationalities and peoples, Tigray, and Addis Ababa city administration).

1.7 Organization of the study

This paper is organized in five chapters. Following this introductory chapter, the second chapter comes, which provides a theoretical and empirical review on early childhood education. Chapter three deals with methodology of the study and the fourth chapter describes the findings of both descriptive and econometric analyses. Finally, chapter five contains conclusions and Recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Literature Review and Preprimary class in Ethiopian Context

Historically, early childhood learning programs have been rarely seen as economic development initiatives. However, the work of neuroscientists with respect to brain development in the early years suggest economic savings by investing in early learning programs, particularly in the area of social-emotional development. Furthermore, research by leading economists around the world has linked investment in early childhood development with economic prosperity, productivity and competitiveness for both the individual and society. Charles Coffey, former executive vice-president of the Royal Bank of Canada Financial Group and former director of the Council for Early Child Development, David Dodge, former governor of the Bank of Canada, and two other prominent Canadian economists, Gordon Cleveland and Michael Krashinsky, all argue that investing in the early years is justified by the returns provided to society in the long term.

Investment in early childhood learning builds human development because younger children have a longer span of time to yield returns to society. James Heckman, a Nobel Laureate in Economic Sciences, builds the premise that “skills beget skills”, more people acquire more skills which lead to more skilled people. “The returns to human capital investments are greatest for the young for two reasons: (a) younger persons have a longer horizon over which to recoup the fruits of their investment and (b) skill begets skill” Deephouse, (2000). Sticht, (2010), the 2003 recipient of UNESCO’s Mahatma Gandhi Medal for his work in adult literacy, further develops that premise by arguing that investment in early childhood learning that includes a component for parents is a long-term investment in what he terms “multiple life cycles” (p.52) as it relates to parenting practices and activities. The Canadian Council on Learning Reports, 2007, 2008, 2009, 2010; (Coffey, 2007)all stress the importance

of investing in early childhood learning programs as it relates to social and economic returns.

Longitudinal studies like the Perry Preschool Project and the Abecedarian project have yielded sound empirical evidence that high quality early childhood programs yield significant positive benefits for both the children and society in general. Both projects are models of comprehensive integrated programming that combined early learning, health, home-visiting, non-parental care, and parenting supports. The findings based on rigorous evaluation of these high quality preschool programs include substantial positive effects of early environmental experiences on cognitive and non-cognitive skills, achievement, job performance, and social behaviors long after the programs ended Nores et al., (2005); Masse and Barnett, (2002). The Perry Preschool Project and the Abecedarian project which evaluated the effects of child parent centers located in or near public schools in the city of Chicago produced key findings that included significant higher educational attainment and lower rates of juvenile arrests (Reynolds et al, 2004).

Other research has studied the impacts of community-based early learning programs and services that offer a combination of early learning programs and supports for families. These include supports such as home visits and opportunities for parents and children to interact and are accessible to all children and parents in a neighborhood or community, not exclusive to those living in vulnerable circumstances. Penn et al (2004) in an international review of early years studies concluded that programs that integrate opportunities for both children and parents are beneficial for children aged birth to 6. In a study of British children by Sylva et al (2004), the researchers reported that children who attended early learning programs that incorporated parenting supports made better progress intellectually. Findings from the Kindergarten Data Collections of the Early Childhood Longitudinal Study, Birth Cohort Denton Flanagan and McPhee, (2009)) showed that children enrolled in child care and preschool environments scored higher on reading, mathematics, and fine motor assessments than children with no regular attendance

in preschool or participation in early childhood programs in the year prior to Kindergarten.

Oral language development begins before birth. It continues to increase and strengthen in the pre-school and early school years. Infants pay attention to the sounds of speech and significant adults in their lives encourage this natural ability when they speak often to them. Toddlers begin to understand and produce speech to communicate their wants and needs and to interact with others. At age three, early literacy skills begin to develop and continue parallel to language skills development. Older children (ages four to six) have a growing understanding of the purpose of written language and the conventions of print. Hoff (2009) concluded that language development is very similar across children and even across languages; however, the rate of development varies widely, depending on the amount and nature of children's language experience.

Dickinson and Tabors, (2002) identify strengths in homes and in preschool early learning programs that build strong language and literacy foundations. The study is based on the assumption that rich language experiences during the preschool years play an important role in children being able to read with comprehension when they reach middle school. The researchers followed 74 children from preschool through seventh grade. Conversations in preschool early learning settings and the homes were conducted; mothers and preschool teachers were interviewed to identify the kinds of interactions and experiences that made a difference in children's later literacy skills. A battery of language and literacy assessments were administered to the children beginning in Kindergarten, including the ability to understand words, letter knowledge, early reading and writing, and phonemic awareness. Each year assessments in language and literacy were administered to the children. Analysis of data revealed that exposure to varied vocabulary, opportunities to be part of conversations, and early home and learning environments that are cognitively and linguistically stimulating are three dimensions of children's experiences during the preschool and Kindergarten period that are related to later literacy success. Based

on their results, they concluded that the early childhood period is key to getting children off to a strong start in language and literacy and that building early foundations in rich oral language contributes to latter literacy development.

Early childhood is a period of great opportunity for shaping children's way of interacting with their environment and shaping their adulthood and more generally their future (WHO 2012). Several studies have investigated the importance of early childhood investment for children's education and their life in general. Cunha and Cunha et al., (2010) studied the life cycle of human skill formation dealing with investments in children's skills. They argued that childhood is a multistage process where early investments feed into later investments as the result of 'skill begets skill' and 'learning begets learning', implying that the economic returns of early investments are higher.

Reynolds et al., (2011) also found that children's preschool participation at ages 3 to 4 have large and long-term effects on children's wellbeing. Waldfogel, (1999) reviewed the potential benefits and drawbacks of early childhood interventions, focusing on the Rand study of early interventions, the Head Start program, and the NICHD study of early child care. The review showed that early childhood interventions could make a difference in improving outcomes for children. Ramey and Ramey, (2004) also contended that quality childhood education and care could bring huge differences in the lives of poor disadvantaged children. Specifically, children who participated in preschool programs were found to have higher scores on reading and mathematics tests that persisted up to adulthood, stayed longer in education, and were less likely to become teenage parents. Barnett and Lamy, (2006) revealed that attending preschool significantly increases scores on vocabulary and math's tests, while print awareness skills though vocabulary were insignificant for those who attended for only one year. Wylie and Thompson, (2003) investigated the effect of early childhood education on children at age 14 and found that children who attended an early child education institution, where most were from middle-class families, had higher mathematics and reading scores.

Magnuson et al., (2007) also found that pre-kindergarten is associated with increases in math's and reading skills at kindergarten entry, but that the gains were found to have faded out in Grade 1. For disadvantaged children, however, the initial gains were higher and also more persistent than for the full sample.

There is a limited number of NGO-sponsored pre-schools throughout rural Ethiopia, but these institutions are insufficient to address the needs of a rural community that makes up the majority of Ethiopia's population. By contrast, urban areas have a relatively high concentration of privately owned and government-subsidized pre-schools. However, even here, the majority of urban families are unable to meet the expense of private pre-school education. The only option available for low-income families and the urban poor is enrolling their children in government-subsidized, community-based pre-schools. Enrollment in these facilities is often high, resulting in overcrowded classrooms with a teacher–student ratio of 1:30 or greater. A typical classroom is often a single room where children sit in rows on wooden benches facing the teacher. The lessons are usually teacher-directed, and great emphasis is placed on discipline Fisher and Swindells, (1998).

Although the 1994 Ethiopian Education and Training Policy (ETP) that defines the current education system states 'kindergarten will focus on all round development of the child in preparation for formal schooling', early childhood education in Ethiopia is not compulsory. Neither, until recently, has any explicit budget been allocated by the government towards this subsector. Two reasons have commonly been mentioned for the de-emphasizing of this subsector until recently Woldehanna et al., (2018). First, as resources are insufficient for providing even basic primary and secondary education, the government has been maximizing its efforts at these other levels of the education sector. Second, the government wanted to encourage the involvement of private actors to invest in early childhood education (MoE 2007/08). As result, the subsector has been dominated by kindergartens owned by private actors, communities and faith-based/NGO preschools.

The great importance of early childhood was recognized in 2000 at the World Education Forum in the elaboration on goal 1 of the Dakar Framework for Action: not only the importance of early childhood care and education (ECCE), but also its influence on each of the other goals. However, it did not set specific targets on early childhood care and education to be achieved by 2015. Here, literature on definition of ECCE, the government policies, teacher training and curriculum issues shall be briefly reviewed to be followed by the analysis of Early Childhood Care and Education mainstreaming in education in terms of pre-primary, O- class and child to child.

In terms of policies pertaining to children, Ethiopia has committed itself to several legislations. One of the most influential declarations in education adopted in 2000 by the Dakar Framework for Action was the first EFA goal. Furthermore, Ethiopia is one of the signatories to the United Nations Convention on the Rights of the Child, signed in December 1991.

2.2 Conceptual and Theoretical literature

Education which is given to the age of 3 up to 5 years old children is called pre-school education. Preschool education is designed to help children mental, Physical, Emotional, Linguistic and social development.

Role of Parents in Early Childhood Learning

In a report for the World Health Organization's Commission on the Social Determinants of Health, Siddiqi, Irwin, & Hertzman (2007) name the family environment as the primary source for children's experiences and contact with the larger community. A home environment that facilitates sensory stimulation, social interaction, language development and physical activity enhances healthy development and learning for young children (CECD, 2007; (Di Francesco, 2011).

Interactions between parents and their children play a crucial role in their children's social, emotional and cognitive development. Parent-child relationships and parenting practices (ways in which parents relate to their children) are strong influences on short-term and long-term development and learning Justice et al.,

(2008) contends that children's development of cognitive and social skills needed for later success in school may be best supported by responsive parenting, a style characterized by affection, warmth and being responsive to a young child's signals, needs, and interests. Phillips and Shonkoff, (2000) reported that parental sensitivity, responsiveness, and consistency are associated with positive child outcomes.

Landry et al., (2006) conducted an experimental study to examine whether mothers' responsive behaviors could be facilitated and whether such behaviors would boost young children's learning. A total of 264 mother-infant pairs participated in the ten-week experiment. Mothers, randomly assigned to an experimental group, were trained by facilitators during home visits to implement playing and learning strategies shown to help improve infant development. Mothers in the comparison group received the same number of home visits, but were not trained in the playing and learning strategies. Four aspects of responsive parental behavior were evaluated: active response to infant's attempt to communicate, emotional-affective support, support for infant attention, and language input supporting developmental need. The results of the study revealed that all the mothers who had received the training were more attentive and warm to their infants. Infants whose mothers had received the training demonstrated significantly higher increases in their communication and social behaviors. The researchers concluded that the mothers who had received the training showed improvements in their own behavior and caused change to their infants' behavior.

Campbell et al., (2008) examined the effectiveness of three longitudinal studies, the Perry Preschool Project, the Abecedarian Project, and the Chicago Child- Parent Centers Study. The Perry Preschool Project operated from 1962 to 1965 in Ypsilanti, Michigan, and consisted of 2.5 hours of center-based preschool each morning for five days a week for children three and four years old living in low income families. It also included weekly 1.5 hour in-home visits by program teachers and monthly parent meetings. Children (N=123) were randomly assigned to program or no-program control groups. The Abecedarian project provided free, full-day educational childcare

to 111 children from infancy to age five in Chapel Hill, North Carolina from 1972-1985. Infants were randomly assigned to either the early educational intervention group or the control group. The Chicago Child-Parent Centers Study, a quasi-experimental design based on identification of existing groups of children, was a center based early intervention that provided comprehensive educational and family support services to children aged three to nine in low income families. Schweinhart, (2013), in examining the effectiveness of the three studies, points out that work done with parents to teach them about child development and the types of early learning activities they could do at home with their children was one of the five ingredients that stands out as definitive in enhancing child development outcomes.

Chao and Willms,(2002) found that parenting practices have important effects on a child's social and cognitive outcomes. In their study, the authors asked parents of 19,000 children between the ages of two and eleven years 25 questions pertaining to parental practices. Strong positive effects on outcomes were associated with positive parenting practices, in particular the effect of responsive parenting. Holding, rocking, talking, singing, and playing with a child are all positive parental practices that facilitate early childhood learning and development. Based on the large representative sample of Canadian families used, the researchers found that both positive and negative parenting practices occur in families of all socio-economic levels. These results highlight the need for early learning opportunities to be universal as positive parenting practices is important for all families.

Barnett and Frede, (2010), Co-director of The National Institute for Early Education Research (NIEER) points out that designing and providing additional programs and resources to children in families below an arbitrary income cutoff as a means to reducing the achievement gap ignore the fact that children and families move in and out of different income levels. Barnett insists that programs and services that are universal in nature minimize the risk of moving children in and out of programs and services that serve children whose families who may have a short-term reduction in economic resources.

The longitudinal study Effective Provision of Pre-school Education (EPPE) funded by the British government and conducted by Hall et al., (2009) followed the progress of 3000 children ages three to seven years. The study was designed to examine the effects of pre-school education and care on a large representative sample over time. Linguistic and cognitive assessments were administered to the children at ages three, five, and seven, the first assessment at age three serving as a baseline measurement against which to measure attainment at ages five and seven. The baseline consisted of four subtests of the British Ability Scales II (Block Building, Verbal Comprehension, Pictures Similarities, and Naming Vocabulary) and the overall General Cognitive Ability (GCA). Five subscales from the British Ability Scales II were administered to the children at age 5: Verbal Comprehension, Picture Similarities, Naming Vocabulary, Pattern Construction and Early Number Concepts as well as the Letter Recognition test Clay, (1993) and the subscales Rhyme and Alliteration from the Phonological Awareness assessment (Sticht, 2010) (Bryant & Bradley, 1985). Children at age seven were assessed using the National Assessment Tests (SATS) in reading, writing and mathematics. In addition, information was collected on parental, family, child, and home characteristics, child care history, and ethnic status for use as predictors and/or control variables in subsequent analysis. They reported that maternal educational levels and the home learning environment during the preschool years were the strongest predictors of academic and behavioral outcomes for children at age 10 years.

Sénéchal (2006) examined the longitudinal relations among early literacy experiences at home and children's literacy skills in Kindergarten, word reading and spelling skills in grade one, and reading comprehension, fluency, spelling, and reading for pleasure in grade four. Ninety French-speaking children were tested at the end of Kindergarten and grade one and 65 were followed until the end of grade four. Parents of children in Kindergarten reported that storybook reading occurred frequently and that they sometimes taught their child to read words. Results revealed that parent teaching about literacy in Kindergarten directly predicted Kindergarten alphabet knowledge as well as reading fluency in grade four. Storybook exposure directly

predicted vocabulary in Kindergarten and the frequency with which children reported reading for pleasure in grade four. Storybook exposure indirectly predicted reading comprehension in grade four.

Tamis-LeMonda et al., (2012) list three aspects of children's experiences in the home environment that are critical to early language growth and learning. These aspects include: the provision of certain learning activities like reading to children on a daily basis, a parenting style characterized by responsiveness, and the provision of materials such as age-appropriate toys and books. In addition, they point out that parents with higher education levels and higher economic resources are better able to provide positive learning experiences for their young children.

Investing in Early Childhood Learning: Building Human Development

Historically, early childhood learning programs have been rarely seen as economic development initiatives. However, the work of neuroscientists with respect to brain development in the early years suggest economic savings by investing in early learning programs, particularly in the area of social-emotional development. Furthermore, research by leading economists around the world has linked investment in early childhood development with economic prosperity, productivity and competitiveness for both the individual and society. Charles Coffey, former executive vice-president of the Royal Bank of Canada Financial Group and former director of the Council for Early Child Development, David Dodge, former governor of the Bank of Canada, and two other prominent Canadian economists, Cleveland and Krashinsky, (1998), all argue that investing in the early years is justified by the returns provided to society in the long term.

Investment in early childhood learning builds human development because younger children have a longer span of time to yield returns to society. James

Heckman, a Nobel Laureate in Economic Sciences, builds the premise that "skills beget skills", more people acquire more skills which lead to more skilled people. "The returns to human capital investments are greatest for the young for two reasons: (a)

younger persons have a longer horizon over which to recoup the fruits of their investment and (b) skill begets skill” Heckman, (2000). Sticht, (2010), the 2003 recipient of UNESCO’s Mahatma Gandhi Medal for his work in adult literacy, further develops that premise by arguing that investment in early childhood learning that includes a component for parents is a long-term investment in what he terms “multiple life cycles” (p.52) as it relates to parenting practices and activities. The Canadian Council on Learning Reports, 2007, 2008, 2009, 2010; Dodge, 2003; and Shonkoff, 2007 all stress the importance of investing in early childhood learning programs as it relates to social and economic returns.

Longitudinal studies like the Perry Preschool Project and the Abecedarian project have yielded sound empirical evidence that high quality early childhood programs yield significant positive benefits for both the children and society in general. Both projects are models of comprehensive integrated programming that combined early learning, health, home-visiting, non-parental care, and parenting supports. The findings based on rigorous evaluation of these high quality preschool programs include substantial positive effects of early environmental experiences on cognitive and non-cognitive skills, achievement, job performance, and social behaviors long after the programs ended {Citation}. The Perry Preschool Project and the Abecedarian project which evaluated the effects of child parent centers located in or near public schools in the city of Chicago produced key findings that included significant higher educational attainment and lower rates of juvenile arrests (Reynolds et al, 2004).

Other research has studied the impacts of community-based early learning programs and services that offer a combination of early learning programs and supports for families. These include supports such as home visits and opportunities for parents and children to interact and are accessible to all children and parents in a neighborhood or community, not exclusive to those living in vulnerable circumstances. Penn et al (2004) in an international review of early years’ studies concluded that programs that integrate opportunities for both children and parents are beneficial for children aged birth to 6. In a study of British children by Sylva et

al (2004), the researchers reported that children who attended early learning programs that incorporated parenting supports made better progress intellectually. Findings from the Kindergarten Data Collections of the Early Childhood Longitudinal Study, Birth Cohort (Denton & McPhee, 2009) showed that children enrolled in child care and preschool environments scored higher on reading, mathematics, and fine motor assessments than children with no regular attendance in preschool or participation in early childhood programs in the year prior to Kindergarten.

Economists have begun to quantify the economic impact of investing in early childhood learning in both the short-term and long-term benefits to the individual and society. As Figure 1 illustrates, Cameiro and Heckman (2003) calculate that the return on the investment in primary and secondary education is 3:1 whereas for early childhood learning programs it is 8:1. Cunha et al (2005) calculated that a \$1 invested in early childhood returns three times as much as a \$1 invested for school aged children and eight times as much a \$1 invested for adult education. Jacques van der Gaag, professor of Development Economics, Universities van Amsterdam, calculated that for every \$1 invested in early childhood programs the return to society is \$3. He linked the benefits of early childhood programs to health, education, and social capital. Lynch (2004) supports growing global evidence that investment in early childhood programs easily pay for themselves over time by generating very high returns for participants, the government, and the public, “While participants and their families get part of the total benefits, the benefits to the rest of the public and government are larger and, on their own, tend to far outweigh the costs of these programs” (p.4). Fairholm (2009) estimated a benefit-cost ratio of 2.54 to 1 for the Canadian early childhood sector.

Oral Language and Early Literacy Development

Oral language development begins before birth. It continues to increase and strengthen in the pre-school and early school years. Infants pay attention to the sounds of speech and significant adults in their lives encourage this natural ability

when they speak often to them. Toddlers begin to understand and produce speech to communicate their wants and needs and to interact with others. At age three, early literacy skills begin to develop and continue parallel to language skills development. Older children (ages four to six) have a growing understanding of the purpose of written language and the conventions of print. Hoff (2009) concluded that language development is very similar across children and even across languages; however, the rate of development varies widely, depending on the amount and nature of children's language experience.

Dickinson and Tabors, (2002b) identify strengths in homes and in preschool early learning programs that build strong language and literacy foundations. The study is based on the assumption that rich language experiences during the preschool years play an important role in children being able to read with comprehension when they reach middle school. The researchers followed 74 children from preschool through seventh grade. Conversations in preschool early learning settings and the homes were conducted; mothers and preschool teachers were interviewed to identify the kinds of interactions and experiences that made a difference in children's later literacy skills. A battery of language and literacy assessments were administered to the children beginning in Kindergarten, including the ability to understand words, letter knowledge, early reading and writing, and phonemic awareness. Each year assessments in language and literacy were administered to the children. Analysis of data revealed that exposure to varied vocabulary, opportunities to be part of conversations, and early home and learning environments that are cognitively and linguistically stimulating are three dimensions of children's experiences during the preschool and Kindergarten period that are related to later literacy success. Based on their results, they concluded that the early childhood period is key to getting children off to a strong start in language and literacy and that building early foundations in rich oral language contributes to latter literacy development.

The vocabulary children bring to written text affects their reading and comprehension. It has been established that children's vocabulary, in particular, in

Kindergarten is one of the best predictors of reading comprehension in grades three and four (Sénéchal, Ouellette, & Rodney, 2006; {Citation}). A study by Hart and Risley (1995) showed that children born into families with low incomes were exposed to less cumulative vocabulary than children born into families with higher incomes. They established that the difference in verbal skills at age three still held at age nine. These findings are consistent with the evidence that the most sensitive period for language development is in the early years (Nelson, 2000) and that poor verbal skills during the early years result in poor language and literacy skills later in life.

Bertrand (2006) estimated the difference in the cumulative number of words addressed to a child in the first four years of life based on family income, from approximately 10 million for children in families with low incomes to approximately 50 million for children in families with high incomes. These differences have been shown to be related to the resources available in the home and maternal patterns of verbal interactions as early language development is rooted in the early social exchanges children have with their parents and other significant adults in their lives Lucchese et al., (2007).

In a longitudinal New Zealand Study (2008), when the association of maternal education levels and family income was accounted for, it was found that family income alone had a relatively small association with competency levels. However, researchers did find that the level of family income when a child is age five continued to have statistical significance when associated with literacy and numeracy levels at age 16. Davis-Kean (2005) points out those parents with higher educational levels are more apt to engage their children in more learning-related opportunities in the home and in environments outside the home.

A five-year longitudinal study was conducted by Sénéchal & LeFevre (2002) in Ottawa, Ontario with 168 children from families with middle and upper middle incomes. Three cohorts of children from three schools participated in the study: two cohorts of Kindergarten children (N=110) and one cohort of children in grade one (N=58) followed to the end of grade three. One of the objectives of the study was to

assess the long term influence early literacy experiences at home have on reading achievement, measured at the end of grade three. Parents completed an extensive questionnaire at the beginning of the study using a five-point scale (1=never, and 5 = very often) about home literacy experiences measuring the frequency of storybook reading and the frequency of teaching their children to read and print words. At the beginning of grade one, children were assessed for receptive language, phonological awareness, emergent literacy, analytic abilities, using the Peabody Picture Vocabulary Test-Revised, the Stanford Early School Achievement Test, Concepts About Print Test, and the Weshler Preschool and Primary Scale of Intelligence-Revised. Reading at the end of grade one was assessed using the vocabulary and comprehension subtests of the Gates-MacGinitie Reading Tests.

The Kindergarten cohort was assessed using the Woodcock-Johnson Psycho-Educational Battery-Revised. Results showed that children's exposure to storybook reading at home was related to vocabulary development and listening comprehension skills, and that these skills were directly related to children's reading in grade three. Researchers found that early literacy skills directly predicted reading at the end of grade one and indirectly predicted reading in grade three.

According to Raviv, Kessenich, & Morrison (2004) of particular importance for young children in their language and cognitive development is the quality of the mother-child interactions and the verbal responsiveness of the mothers.

Mothers with high levels of education tend to be more verbally engaging and responsive to their young children, such as asking questions and playing games that use language that build vocabulary and encourage them to reply (Richman, Miller & LeVine, 1992; Tracey & Young, 2002). This research substantiates Hoff-Ginsberg's (1998) research with mothers of two-year-old children that compared high school educated mothers and college educated mothers and the difference between the language interactions with their children. She found that college educated mothers talked more, asked more questions, and used fewer directives with their children than high school educated mothers all of which impacts on oral language and early literacy

development. Rosenzweig and Wolpin (1994), using data from a National Longitudinal Survey of Youth (NLSY), found that maternal education completed during the period from a child's birth to three years old improved the child's later vocabulary and academic skills.

Conversation with parents and other significant adults in their lives is one of the most valuable resources for emergent literacy. Informal back and forth talk between a child and parents provide building blocks for oral language development. Activities such as storytelling, singing, role-playing, and conversations all help to develop and sustain oral language development with young children. Later reading and writing extend and represent oral language. Tamis-LeMonda & Rodriguez (2009) reported that central to children's early language development is consistent participation in shared book reading and storytelling as a means to expanding their vocabulary. They also point out that in their review of the research that the amount and style of language that parents/caregivers use with young children is a strong predictor of children's early language. According to Christie and Roskos (2009) the development of early language skills are linked to later reading comprehension and fluency.

The results and conclusions from these studies have implications for programs that support young children and their families. Parent-focused supports targeting parenting practices that encourage activities at home can foster oral language and early literacy development for the children in those families. Providing environments in the home and in other settings that are rich in oral language, print, shared storytelling and reading promotes the development of vocabulary, early reading, and early writing for young children.

Early Mathematical Development

Children's intuitive attention and interest in number emerge long before they begin formal schooling. Lock and Gurganus (2004) propose that an early sense of number may well be the building block of mathematics. It develops through a variety of experiences as young children develop basic counting skills, literally see small quantities, and add small amounts. Having young children share their thinking by

having them touch objects as they count, draw pictures, and explain “how they know” helps them to develop their understanding and use of numbers. Tudge and Doucet (2004) noted that “numbers are just as much a part of everyday activities as letters” (p.35). Number sense in mathematics development is sometimes likened to phonemic awareness in reading development. It is much more than counting; it involves the ability to work with numbers easily and to understand their different uses and relationships.

Knowledge of counting and quantity has the potential to develop quickly as babies grow into toddlers. Preschoolers have the capability of thinking about and solving mathematical problems in different ways. Ginsburg et al., (2008) cite evidence by researchers Baroody et al., (2006); Ginsburg, (2009); and Ginsburg et al., (2006) that show that young children from birth to five years of age develop informal ideas of size, space, pattern, shape, more and less, taking away, location, and position that are actually quite sophisticated, complex, and broad. This informal knowledge sets the stage for learning more complex mathematical skills and concepts (Osana et al, 2010).

The mathematics knowledge children acquire prior to entering school has implications for school performance. Shaklee et al (2008) in their review of the research report that “research suggests that children’s early mathematical experiences play an enormous role in the development of their understanding of mathematics, serve as a foundation for their cognitive development, and can predict later school success at the high school level” (p.1). According to the National Council of Teachers of Mathematics (NCTM) (2007), “Research on children’s learning in the first six years of life validates the importance of early experiences in mathematics for lasting positive outcomes”. Duncan et al (2007) used data from six large-scale longitudinal studies and found that across all six studies the strongest predictors of later achievement were school-entry math, reading, and attention skills. However, further analysis of the results found that early mathematics skills had the greatest predictive power, followed by reading and attention skills.

A socio-cultural view of mathematical development acknowledges that young children's engagement and learning are affected by mathematically-related influences from a variety of 'others' in the child's life (Bronfenbrenner, 1979, Rogoff, 2003). Through tracking a cohort of students in England through primary school, Aubrey et al., (2006) found that children who exhibit mathematical knowledge when they enter school appear to be advantaged in terms of their mathematical progress through primary grades. They concluded that children who enter school with limited mathematical knowledge continue to under achieve throughout their primary years unless there is active intervention on their behalf. Jordan et al (2009) examined children's number competencies over six time periods from the beginning of Kindergarten to the middle of grade one in relation to their mathematics achievement over five later time periods, from the end of grade 1 to the end of grade three. They found that the relationship was strong and significant and that the number competence in Kindergarten predicted the rate of growth in mathematics between grade one and grade three as well as achievement levels through to the end of grade 3.

The frequency of activities related to early mathematical development in the home has been linked to family income and maternal levels of education. There is growing evidence that differences in young children's mathematical knowledge in early childhood are related to socioeconomic status (SES). A study by Starkey et al., (2004) found a significant SES-related gap in mathematical knowledge at the beginning of the pre-Kindergarten year. They contend that young children from families with low incomes receive less support for mathematical development than their peers from families with higher incomes. When the researchers implemented an intervention program they found that while it significantly enhanced the mathematical knowledge of both groups of children, the children from families of lower incomes acquired more knowledge, relative to their starting point, than the children from families with higher incomes. The level of maternal education and their level of understanding of mathematics both impact on the frequency of mathematical activities that occur in the home with young children. Paris et al., (2006) showed that Kindergarten

children's mathematical performance was higher when the level of mother's education was at the post-secondary level.

In an attempt to understand how different cultures and, how families within cultures from different socioeconomic levels support children's early mathematical development, Starkey and Klein, (2006) undertook a study of 600 three to six-year-old American, Chinese, and Japanese children. The study included equal numbers of children from lower and higher socioeconomic backgrounds. Intra-cultural variation favoring children from families with higher incomes was found in each country and group differences appeared by age three years. In all three countries mathematics activities were undertaken more frequently by young children in homes with higher family incomes than in homes with lower family incomes and parenting practices varied with family SES. The findings revealed the age by which group differences appear in early mathematical development, and the impact of parenting practices on development of early mathematical knowledge.

Ginsburg-Block et al., (2006) point out that young children are highly motivated to work with numbers and enjoy numeracy activities on their own. They are eager to imitate rote counting, make attempts at counting objects, make comparisons of more and less, and pay attention to patterns and shapes. However, the authors state that children will learn more about mathematics when they have opportunities to engage in numeracy activities on a daily basis in a playful, natural way at home and in other settings. As a result, these children are more prepared when they encounter numeracy activities in formal schooling.

Children who are encouraged to play with, talk about, and think about numbers at home and in other early learning environments experience mathematical concepts as a natural part of their world. The informal mathematical language and understanding that they use in their play becomes the basis for formal mathematical language and understanding as they move through school. For example, children who are provided with opportunities to play with blocks discover in a natural way the size relationships among them and the more frequently they make the comparisons the

more complex their thinking develops. Providing young children at home with materials such as blocks, shapes, and puzzles that inspire mathematical thinking can foster the development of skills such as early numeracy, patterning, and measurement Sherman-LeVos, (2010). Universal programs that provide support to parents/families with respect to the types of mathematical activities they can do at home with their children builds on the intrinsic motivation of young children to engage in mathematical activities.

Duncan et al (2007) used data sets from six large-scale longitudinal studies: The Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K), a nationally representative sample of 21,260 children who were in Kindergarten in 1998–1999; the National Longitudinal Survey of Youth (NLSY), a multistage random sample of 12,686 individuals age 14 to 21 in 1979 (Center for Human Resource Research, 2004); the NICHD Study of Early Child Care and Youth Development (SECCYD) drawn from a multisite study of births in 1991 (NICHD Early Child Care Research Network, 2005; the Infant Health and Development Program (IHDP, an eight-site randomized clinical trial with a total of 985 low birth weight (2500 g/5.51 lb or less) premature infants in 1985; the Montreal Longitudinal-Experimental Preschool Study (MLEPS) comprised of several consecutive cohorts of four and five year old children launched from 1997 to 2000 for a total of 767 children; and the 1970 British Birth Cohort Study (BCS) a nationally representative longitudinal study that followed into adulthood a cohort of 17,196 infants children born in Great Britain during the first week in 1970 with a reduced the sample size for most analyses to between 9,000 and 10,000 cases. The researchers found that across all six studies the strongest predictors of later achievement were school-entry math, reading, and attention skills. However, a meta-analysis of the results showed that early math skills had the greatest predictive power, followed by reading and then attention skills. Furthermore, the researchers found that patterns of association were similar for both boys and girls and for children from families of all socioeconomic circumstances.

Klibanoff et al (2006) using a sample of 146 four-year olds drawn from 13 preschool settings and day-care centers in the Chicago area examined whether the amount of mathematical speech, “math talk”, used by the adults in these settings was related to gains in children’s mathematical knowledge. The researchers documented the talk of the adults through audiotaping adult speech and the observers completed a ten item questionnaire based on the National Association for the Education of Young Children’s (NAEYC) preschool checklist (Hyson et al., 1990). The audiotaping allowed the researchers to assess adult mathematical speech as it occurred rather than relying on adults’ memory of what had occurred. The children’s math knowledge was assessed for the following: ordinarily, cardinality, calculation, shape names, understanding “half,” and recognizing conventional number symbols. Children were assessed individually using an assessment consisting of 15 questions administered in the fall (October) and again in the spring (April), with each session lasting about 10 minutes. To minimize practice effects, alternative forms of the assessment were used and the order of forms counterbalanced across children. The researchers found that the amount of “math talk” had a positive impact on children’s mathematical understanding over the school year. Developing a healthy disposition toward mathematics has been a topic of research in the past decade. Children are not born with a negative disposition or a natural aversion towards using mathematics. Young children play mathematics as they explore, problem-pose and problem-solve across a variety of situations as a regular component of their everyday play. Children with a healthy disposition toward mathematics have a positive attitude toward their ability and the value of mathematics in their lives. They enjoy doing mathematical activities and games and believe that they are capable of reasoning or solving a problem themselves. They show persistence and curiosity when they meet a challenging problem. In the early years’ young children are developing their beliefs about what mathematics is and about themselves as mathematics learners. The NCTM (2000) Position Paper on mathematics in the early years emphasizes the importance of young children’s first experiences with mathematics being encouraging, engaging and positive as their early experiences influence their performance in later years.

Kilpatrick et al (2001) say that in addition to the concepts and skills that underlie mathematical proficiency, children who are successful in mathematics have a positive disposition towards mathematics. Providing opportunities for young children that are developmentally appropriate and joyful helps them to experience success and meet challenges that build their confidence.

Perso (2006) describes a numerate individual as one who has both the knowledge of mathematics and the confidence and ability to apply that knowledge to everyday living. In an increasingly complex world, practical applications of mathematics to a wide range of everyday situations are very important. An implication for early learning opportunities in mathematics is that young children build a strong foundation in mathematics in learning environments that encourage active and engaged participation.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, I discuss about the type of research, the data used in the study and the sampling procedures. Moreover, I also discuss in detail the instruments used in the data collection, the nature of the secondary data and the accompanying methods of analysis implemented to answer the research question of the current study.

3.2 Types of Research

Different types of research could potentially be implemented to answer the research question raised in the current paper: analyzing the effect of early education on children's later Educational Achievement. For example, a randomized control trials (RCTs) could be introduced to a randomly selected child where these children could be given a chance to attend early education. A randomly assigned others could be kept without access to such schooling opportunities. Then after some years down the line following the introduction of the early schooling opportunities, we may evaluate the difference in the cognitive development of these two groups of children: treated ones (those who have been given the early schooling) and the control ones (those who did not attend the early schooling). Then, the difference in the cognitive outcomes between these two groups, if any, can be considered as the effect of the intervention. However, implementing such interventions is beyond the reach of the current study.

An alternative research approach to answer the research question of this study is to use observational data. Depending on the capacity of parents and for some other reasons, there are some children who manage to attend early schooling whereas significant others fail to do so. This is indeed the case across many urban areas in Ethiopia where access to early schooling exists but only a portion of children attend this education. Thus, to evaluate the impact of attending early schoolings on children on later educational achievement we may compare the cognitive test scores of those children who attended such education and those that did not attend. Using a secondary longitudinal data collected across many urban areas in Ethiopia, this study

tries to answer this important question: Does attending early schools improve children's cognitive development in the latter lives.

3.3 Data Type

To answer the research question raised in this study, I use primary data collected by the Young Lives Ethiopia in collaboration with the Ethiopian Development Research Institute. The Young Lives survey is a primary data collected by interviewing parents of children and children themselves. The parents are interviewed in a face to face interview by trained enumerators. During the interview, either the father or the mother of the children answered the questions concerning about the socioeconomic situation of the household's members such as education, income and wealth status. On the other hand, to measure the cognitive outcomes of children standard test scores are presented to the children.

3.4 Sampling Procedure and Sampling Size

The data we use in the current study is drawn from the Young Lives Survey of Ethiopia. The Young Lives Survey tracks about 3000 children grouped into two categories: young cohort and old cohort. The young cohort were children between the age of 6 and 18 months during the first round of the survey which was conducted in the year 2002. After this first round, this group of children and their parents have been surveyed three times. For our study we focus on this young cohort of children.

The young cohort of children is randomly selected from some 20 communities in the four main regions of Ethiopia and the Addis Ababa city administration. The regions are Amhara, Oromia, SNNP and Tigray. The 20 communities come from districts (weredas) in the following zones/city administration: Addis Ababa, North Wello, South Gondar, East Shewa, Arsi zone, North Shewa, Gurage, Wolayita, Hawassa city administration zone, Sidama zone, Hadiya, Southern Tigray; and Eastern Tigray. To keep the confidentiality of households and their locations, Young Lives Ethiopia does not provide the names of the weredas randomly chosen from each of these zones.

The methodology used to select the 20 sites/communities across the country is called the sentinel site surveillance system. Then from each community/village about 100 households with a 1-year-old child were randomly selected to participate in the survey. This random selection of households enables to have enough representation of the overall population based on socioeconomic characteristics. Then these households and later on their children are surveyed in three different rounds. These survey rounds happened in the years 2002, 2006, 2009 and 2013. For the current analysis we use information from the surveys conducted in the years 2006 and 2013. The former contains information about preschool attendance of the child whereas the latter includes information about the child's cognitive outcomes, household characteristics and other child related information such as age, educational attainment, etc.

After dropping some observations with missing information on main variables used in the analysis, we are left with a final sample size of 600 observations. It should also be remembered, our analysis focuses only on sample located in urban areas. As a result, we drop all samples from rural areas as there is no preschool provision in rural villages in Ethiopia.

From all regions Addis Ababa, Amhara, Oromia, SNNP and Tigray number of resident randomly selected from each region are 267, 76, 81,165 and 83 selected respectively. Total of 672 residents randomly selected from all regions.

3.5 Method of data collection

The data used in the current study are obtained from the Young Lives survey which is a primary longitudinal data collected by the Ethiopian Development Research Institute (EDRI) in collaboration with the University of Oxford (<https://www.younglives-ethiopia.org/about-young-lives-ethiopia>). The method of data collection used in this survey is a face to face interview where a household head or a primary caregiver of the child is interviewed by trained enumerator.

3.5.1 Questionnaires

The questionnaire used in the Young Lives study involved about eleven sections. These sections included questions about household roster, educational and health status of the children, livelihoods of the household, socioeconomic status of the household, experience of shocks, perceptions of the household head, anthropometric measures of the mother and the child. Moreover, standard cognitive tests translated into the mother tongue of the children were also administered to the children in order to measure their cognitive development.

3.5.2 Method of Data Analysis

As mentioned in the introduction part, the main objective of the current study is to investigate the effect of pre-school enrollment on children's later educational outcomes. In order to do this econometrically, we run an Ordinary Least Square regression model of the form:

$$Y_{ij} = \alpha + \beta_1 \text{Preschool}_{ij} + \mathbf{X}'_{ij}\boldsymbol{\beta} + \varepsilon_{it} \quad (1)$$

where Y_{ij} is later educational outcome of child i in village j as measured by his/her achievement on three different tests: the Early Grade Reading Assessment (EGRA) test, Peabody Picture Vocabulary test (PPVT) and Regression for Math test. Our main coefficient of interest is β_1 which measures the effect of pre-school attendance on the child's cognitive development. On the other hand, we also control of other socioeconomic characteristics of the child and that of his parents such as age, and sex of the child, and age, sex, and educational attainment of the child's parents and household size, wealth/income of the household, etc. These variables are represented by \mathbf{X}'_{ij} in our equation (1) above. Last, ε_{it} represents unobserved individual characteristics of the child that might influence the child's cognitive development.

The OLS model estimated using Eq.(1) is appropriate to answer the research question as it allows for a linear relationship between preschool enrolment status and education outcome of children in their later ages. The model also allows to control for observed household and child characteristics that might affect cognitive

development of children such as wealth status of parents, their educational attainment, household size, age of the child and that of parents. Therefore, the use of the OLS model in our estimation is appropriate for the research question of the current paper.

CHAPTER FOUR: RESULT AND DISCUSSIONS

This study uses both descriptive and empirical estimation to show the contribution of attending preschool on later educational achievement.

4.1 Descriptive statistics'

Table 1: Descriptive statistics of variables used in estimation (urban sample)

VarName	Obs	Mean	SD	Min	Max
<i>Child characteristics</i>					
Test score on <i>EGRA</i>	587	4.22	2.08	0	12
Test score on Math	662	9.09	5.05	0	25
Test score on <i>PPVT</i>	667	91.34	38.98	19	167
Child attended preschool (=1 if “Yes” otherwise 0)	672	0.58	0.49	0	1
Child age in months	670	97.14	3.79	87	107
Child is male (=1 if “Yes” otherwise 0)	672	0.52	0.50	0	1
Child enrolled in school (=1 if “Yes” otherwise 0)	672	0.88	0.32	0	1
<i>Caregiver and household head characteristics</i>					
Caregiver’s age	666	36.55	9.45	15	82
Caregiver’s education	672	4.65	4.37	0	14
Household head is male (=1 if “Yes” otherwise 0)	672	0.71	0.45	0	1
Household head education completed	637	5.77	4.66	0	14
<i>Household characteristics</i>					
Household size	672	5.88	2.07	2	13
Log of monthly household consumption per adult	670	5.03	0.65	2.98	7.00
Number of children born after child to household	672	0.73	0.86	0	6

Household has land (=1 if “Yes” otherwise 0)	672	0.60	0.49	0	1
Household has debt (=1 if “Yes” otherwise 0)	672	0.47	3.41	0	88
Household own house (=1 if “Yes” otherwise 0)	672	0.46	0.50	0	1
Household has electricity (=1 if “Yes” otherwise 0)	672	0.92	0.27	0	1
Household has Tv (=1 if “Yes” otherwise 0)	672	0.54	0.50	0	1
Household has radio (=1 if “Yes” otherwise 0)	672	0.66	0.48	0	1
Household has mobile phone (=1 if “Yes” otherwise 0)	672	0.57	0.50	0	1

Pre-school education (the treatment variable for this study) is defined as education taking place in establishments regularly attended by a child outside his or her own home that provide educational activities for children before they start formal primary school. These include formal center-based care in the form of nurseries (privately operated, community owned and public).

58 percent from 672 respondents have attend preschool. From the total 587 respondents an average score 4.22 in EGRA test, out of 662 observations an average score was 9.09 in Math and from 667 observations in PPVT test an average score was 91.34.

An average age in month from the total 670 observations was 97.14 and 52% was male out of 672 observations. Out of 672 observations 88 percent was currently enrolled in school.

From the total 666 observations of care giver an average age was 36.55 years. Out of the total 672 observation of caregiver an average education level was grade 4.655.

From the total 672 observation of household head 71% was male. The average household head educational level is grade 6.

From the total 672 observations an average household size was 6. Out of the total 670 observations the average real monthly household consumption per adult was 5. Out of the total 672 observations an average those who has the land was 0.6. From the total 672 observations an average of 0.92 have an electricity, 0.54 have tv, 0.66 have radio and 0.57 have mobile phone.

4.2. Econometrics Result

Table 2: The effect of preschool attendance and other socioeconomic characteristics on child's EGRA score (Dependent variable: EGRA score)

	(1)
Child has been enrolled in preschool (dummy)	0.642 (2.49)**
Age of the child (in months)	0.038 (1.71)*
Child is male (dummy)	-0.056 (0.34)
Child is enrolled in school (dummy)	1.053 (3.03)***
Age of the primary caregiver (in years)	0.004 (0.29)
Primary caregiver's education	0.005 (0.19)
Household head is male (dummy)	0.449 (2.13)**
Household head's education	-0.020 (0.77)
Age of the household head	-0.001 (0.06)
Household size	-0.049 (1.09)
Log of income per adult of the household	0.193 (1.15)
Number of children born after the child	-0.049 (0.42)
Household owns a land (dummy)	0.348 (1.32)
Household owns a house (dummy)	-0.615 (2.30)**
Household has access to electricity (dummy)	-0.303 (0.61)
Household owns television (dummy)	0.646 (3.15)***
Constant	-1.873 (0.75)
R ²	0.194
N	552

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

In first column (see table 3) without controlling any variable, this gives an indication that those who attended preschool have a better reading result. If someone attends preschool his EGRA result will be 0.642 higher than someone who didn't go to preschool.

In column 1(see table 3) When the child is currently enrolled at school the EGRA score increases by 1.053.

In column 1(table 3) when the household head is male child's EGRA test score increases by 0.449. when a household own a house child's EGRA test score increases by 0.615.

In column 1(see table 3) when the household has accesses to electricity child's EGRA test score increases by 0.646.

Table 3: The effect of preschool attendance and other socioeconomic characteristics on child's PPVT score (Dependent variable: PPVT score)

	(1)
Child has been enrolled in preschool (dummy)	11.471 (2.61)***
Age of the child (in months)	2.075 (6.10)***
Child is male (dummy)	2.142 (0.85)
Child is enrolled in school (dummy)	9.563 (2.16)**
Age of the primary caregiver (in years)	-0.028 (0.13)
Primary caregiver's education	0.036 (0.09)
Household head is male (dummy)	-1.538 (0.45)
Household head's education	0.508 (1.24)
Age of the household head	-0.062 (0.31)

Household size	0.926 (1.33)
Log of income per adult of the household	3.769 (1.41)
Number of children born after the child	-3.406 (1.98)**
Household owns a land (dummy)	6.743 (1.69)*
Household owns a house (dummy)	-7.189 (1.98)**
Household has access to electricity (dummy)	6.223 (1.29)
Household owns television (dummy)	12.115 (3.50)***
Constant	-159.002 (4.30)***
R2	0.388
N	628

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Column 1(see table 4) gives an indication that going to preschool increase a child's Peabody Picture Vocabulary test (PPVT) score by 11.471 than child's who did not go to preschool. When Childs enrolled to preschool at his early age child's PPVT score increase by 2. And also if the child's currently at school child's PPVT score increase by 9.563. when the house hold owns television child's Peabody Picture Vocabulary test (PPVT) score increases by12.115.

As we see on table 4 all independent variables are explaining the dependent variable by 0.388 and it also which is significant number.

Table 4: The effect of preschool attendance and other socioeconomic characteristics on child's Math score (Dependent variable: Math score)

	(1)
Child has been enrolled in preschool (dummy)	1.909 (3.65)***
Age of the child (in months)	0.146 (3.23)***
Child is male (dummy)	0.186 (0.57)
Child is enrolled in school (dummy)	2.374 (5.07)***
Age of the primary caregiver (in years)	-0.015 (0.60)
Primary caregiver's education	0.014 (0.26)
Household head is male (dummy)	0.468 (1.04)
Household head's education	0.105 (2.06)**
Age of the household head	0.025 (1.11)
Household size	-0.102 (1.06)
Log of income per adult of the household	0.189 (0.51)
Number of children born after the child	0.166 (0.71)
Household owns a land (dummy)	0.866 (1.64)
Household owns a house (dummy)	-0.846 (1.73)*
Household has access to electricity (dummy)	1.007 (1.57)
Household owns television (dummy)	1.374 (2.92)***
Constant	-11.083 (2.19)**
R2	0.387
N	623

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Column (1) gives an indication that going to preschool increase a child's math's result by 1.909 than the other who did not go to preschool. When we control important child variables like child is currently in school child's math's result increases by 2.374.

When the household education level is high child's math score increases by 0.105. when the house hold owns television child's math score increases by 1.374.

As we see on table 5 all independent variables are explaining the dependent variable by 0.387 and it also which is significant number.

Correlation Matrix

	chld_pr esch	chld_age	chld_mal e	chld_enrl d	caregvr_ag e	caregvr_edu c	hhhead_ male	head_edu c	hhhead_ag e	hhsiz	lg_hhinc m_peradu lt	chldrn_br naftr	hh_ownd e	hh_ownhse ctrycyt	hh_ownt v
chld_presch	1														
chld_age	0.065	1													
chld_male	0.0285	-0.0277	1												
chld_enrld	0.2758	0.0827	-0.077	1											
caregvr_age	0.1106	0.0355	0.0153	0.0256	1										
caregvr_educ	0.3882	0.0122	0.0658	0.1363	-0.1626	1									
hhhead_male	0.0078	-0.0674	-0.0014	-0.0428	-0.21	0.1151	1								
head_educ	0.3408	0.0252	0.0367	0.1132	-0.2357	0.6596	0.3414	1							
hhhead_age	0.109	0.0112	0.0184	0.0564	0.671	-0.1395	0.101	-0.2075	1						
hhsiz	-0.1186	-0.0426	-0.0053	-0.0905	0.1688	-0.1189	0.2586	-0.0277	0.2944	1					
lg_hhincm_peradu	0.4311	-0.0448	0.0225	0.2255	-0.1155	0.4917	0.0261	0.4175	-0.054	-0.1831	1				
chldrn_brnaftr	-0.268	0.0224	-0.0354	-0.1329	-0.2645	-0.1366	0.1824	-0.0528	-0.2281	0.2307	-0.1875	1			
hh_ownd	-0.4358	-0.0394	-0.0045	-0.1656	-0.0855	-0.0896	0.0275	-0.0833	-0.0477	0.1268	-0.0537	0.2044	1		
hh_ownhse	-0.2521	-0.0433	0.0132	-0.1616	-0.0094	0.0074	0.1308	0.0328	0.0651	0.2351	0.0257	0.1228	0.6852	1	
hh_hselectrycyt	0.2662	-0.0078	0.0139	0.3709	0.0575	0.1946	-0.069	0.2036	0.0816	0.0165	0.2956	-0.3008	-0.1731	-0.1399	1
hh_owntv	0.4986	-0.0088	0.0661	0.1528	0.0047	0.4866	0.1661	0.4243	0.1344	0.1274	0.5144	-0.1774	-0.1682	-0.0035	0.282

Looking at the correlation, generated by the Correlation function within Data Analysis, we see that there is positive correlation among several variables. The correlation coefficients are between -1 and 1 so it is statistically significant.

```
. imtest, white
```

```
White's test for Ho: homoskedasticity  
against Ha: unrestricted heteroskedasticity
```

```
chi2(239)      =      229.29  
Prob > chi2    =      0.6626
```

```
Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	229.29	239	0.6626
Skewness	33.55	23	0.0719
Kurtosis	0.06	1	0.8079
Total	262.90	263	0.4901

As we see we failed to reject the null hypothesis because the p-value is 0.6626 therefor heteroscedasticity is not assumed.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Based on the findings, it was concluded that children's who had pre-school education perform better in academics than children's who did not attend preschool education. Children who attend preschool have better result in Math test, Early Grade Reading Assessment and Peabody Picture Vocabulary test. Math and reading skills at the point of school entry are consistently associated with higher levels of academic performance in later grades. Particularly impressive is the predictive power of early math skills, which supports the wisdom of experimental evaluations of promising early math interventions.

When child previously enrolled to preschool are currently stay at school he/she perform better than the other who did not go to preschool.

It is believed that the more economic opportunities families see for themselves and their children, the more likely it is that they will support early educational programs. Such an interrelation among microsystems is the stepping stone for additional improvement in early childhood and better opportunities for children's academic development.

We analyzed the correlation between pre-school attendance and test scores, and the impact of pre-school education on latter education achievement, using longitudinal data from the Young Lives survey in Ethiopia. We implemented OLS model to the effect of preschool. Across all these models, the results consistently showed that early childhood education was positively associated with children's cognitive development both at the age of 5 and at the age of 11. Furthermore, not only is it associated with cognitive development, but pre-school attendance is also positively associated with early entry into primary school and with better score.

5.2 Recommendation

Pre-school has enormous positive impact on the future educational life of a child so the federal government, regional state government, private sectors and NGOs interested in young children should support the provision of preschool at all levels. Because investing in child's education is a backbone for sustainable development of nation.

Most of preschools are concentrated in Large cities of the country and privately owned. Due to the high cost, pre-schools in the private sector are beyond the reach of most middle income families. As a result, the early years of the vast majority of children from financially poor backgrounds are lost and wasted. Therefore, the policy makers or the government have to give attention for the provision a standardize and competent preprimary schools for all. I suggest the government can provide preschool in Addis Ababa and in large cities for civil servant by opening "Day care" centers at city administration office which can also provide preschool for children.

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