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## ASSESSING COGNITIVE DEVELOPMENT OF PRESCHOOLERS IN THE SELECTED PRE-PRIMARY SCHOOLS IN MOROGORO MUNICIPALITY -TANZANIA

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### ABSTRACT

This study sought to assess cognitive development of preschoolers in the selected pre-primary schools in Morogoro Municipality as a requisite for successful primary education. Cognitive development focuses on information processing, such as decision-making, attention, memory, language abilities, learning, and perceptual skills. The study involved 213 preschoolers from 10 randomly selected preschools in Morogoro Municipality. The study employed International Development and Early Learning Assessment tool (IDELA) in data collection. Both Kiswahili and English versions of IDELA was used in assessing cognitive development of children. The study found that Morogoro Municipality preschoolers have excellent development in all spheres of cognitive development. For example, preschoolers had the mean of 92 in early numeracy, 80% in early literacy and a mean of 90% in executing executive functions. Furthermore, statistically significant difference in cognitive development of pre-schoolers was found based on their age (at  $p < 0.00$ ), sex ( $p < 0.00$  for early literacy). Based on the type of school, the study found  $p < 0.00$  for numeracy,  $p = 0.02$  for executive function and  $p \leq 0.00$  for early literacy. The study recommend that parents should be encouraged to enroll their children in preschool centers.

**KEYWORDS:** International Development and Early Learning Assessment tool (IDELA), Preschoolers, Early Childhood Education, Cognitive development, early literacy, early numeracy and executive function

### 1.0 Background and Context of the Study

#### 1.1 Introduction

Cognitive development entails the ability of the children think, explore and figure things out. It also includes the development executive function, problem solving and dispositions skills that are essential for learning in primary school and beyond (Pence and Nsamenang, 2008; Bietenbeck et al., 2019). Although cognitive skill development depends to a certain extent on the genetic makeup of

the child, it is largely dependent on their learning in the early years (Wang & Wang, 2015). A child's thinking and learning skills can be improved with practice and the right training. Child's cognitive development during early childhood, which includes building skills such as pre-reading, language, vocabulary, and numeracy, begins from the moment a child is born (TIE, 2016). Developmental psychologists have found that the brain acquires a tremendous amount of information about language in the first year of life even before infants can speak (Wang & Wang, 2015). In Tanzania, the preprimary curriculum focusses on development of intellectual ability in the form of pre-3Ss which includes pre-reading, pre-writing and arithmetic (TIE, 2016).

There is a strong connection between the development a child undergoes early in life and the level of success that the child will experience later in life (Napoli & Purpura, 2018; Shukia, 2019; Webb, 2021). How well a child thinks, learns, communicates, concentrates, problem-solve and relate to others when he/she enters school and later in life depends largely on the experiences one acquires during the early childhood education (Hurvitz et al, 1987). Cognitive skills allow children to understand the relationships between ideas, to grasp the process of cause and effect and to improve their analytical skills. According to Shukia (2019) children entering primary school with prerequisite skills for cognitive maturity cope with primary school routines and perform better in mathematics and reading skills than their fellows who did not attend preprimary education. Therefore, it is important to expose children to preprimary education in order to strengthen their cognitive skills and readiness to make effective transfer of primary education (Napoli & Purpura, 2018; Shukia, 2019; Webb, 2021). Enrolling in early childhood education plays a significant role in cognitive development of pupils in lower primary education.

Preprimary education is seen by many as an integral part of basic education and represents the first step in achieving the goals of Education for All. It is an important stage which lays the foundation for future learning and that the child who has access to pre-primary education has a better foundation in education (Mligo, 2018). Globally, preprimary education has been considered necessary because it helps to meet the different needs of young children during the crucial early years of life and enhance their readiness for schooling, and has a positive influence on later school achievement (Woldehanna, 2012). Early childhood education has been described as formal and informal educational programs that guide holistic development of children throughout their preschool years, approximately four to age six years (Jena & Paul, 2016; Wang & Wang, 2015).

In Tanzania, the existence of preprimary education came as a response to the adoption 1990 international policy of early childhood education and to the international and national agenda advocating early childhood education as a basic right to all children (Rao & Mutahaba, 2010). In 1995 the Education and Training Policy only formalized pre-school education for children aged 5 and 6 years old and integrated it to formal education (Ministry of Education and Culture, 1995). Although preschool education in Tanzania was formalized in 1995 it was still not a mandatory part of the education structure until 2014. According to Rao and Mutahaba (2010) this was due to insufficient

number of trained teachers. The Education and Training Policy of 2014 categorically stated that basic education including pre-primary education to be mandatory to all children (Tusome Pamoja, 2016). The policy emphasis on holistic development of a child which means development of child with cognitive, socio emotional and physical skills ready to start preprimary education. Children entering primary school are expected to come with the prerequisite skills for cognitive maturity to comply with primary school routines to build a solid and broad foundation for lifelong learning and wellbeing (Jukes, 2018 & Nirmala, 2014).

### **1.2 Problem statement**

The last two decades of child development research have seen dramatic changes in the way psychologists characterize the early stages of cognitive development. Children who were once regarded as an organism driven by simple sensorimotor schemes, are now seen as miniature adults with sophisticated processing cognitive skills (Madole and Oakes 1999). The research on the cognitive development of theories in children has important implications for how teachers work with and educate children. In 2016, the Ministry of Education Science and Technology in Tanzania reviewed the pre-primary education curriculum. The review was influenced and guided by the Education and Training Policy of 2014 and recommends on holistic development of a child (socio-emotional development, physical development and cognitive development). According to the syllabus (2016), the pre-primary education curriculum intends to develop the following cognitive competences: (i) ability to read; (ii) ability to communicate; (iii) ability to count; (iv) ability for concrete reasoning; (v) mastering artistic skills; and (vi) applying mathematical concepts. However, there is no clear evidence from literatures on whether preschoolers are developing competences in these arears. Little is known on whether pre-primary schools are imparting appropriate cognitive skills as directed in early childhood education curriculum. Hence, this study aims at assessing levels of cognitive development of preschoolers and determine the extent to which sex, type of school and age influences their cognitive development in pre-primary schools.

### **1.3 General Research Objective**

The purpose of this study is to assess the cognitive development of pre-schoolers in the selected private and government owned preschool centres in Morogoro Municipality.

#### Specific objectives

- (i) To measure the cognitive development levels of pre-schoolers in the selected private and government owned preschool centres in Morogoro Municipality.
- (ii) To determine whether statistically significant difference exists between the cognitive development of pre-schoolers based on their age, sex, and type of school enrolled.

## 2.0 METHODOLOGY

### 2.1 Area of the study

The study was carried in Morogoro Municipality. The area was conveniently selected by the researcher. Tanzania preprimary schools uses the same curriculum to teach preprimary schools. Hence, preschoolers receive uniform knowledge and skills as directed by the curriculum.

### 2.2 Research design

This study is basically descriptive. It employed cross sectional data collection mode in which a researcher took data from population at one specific point in a time and tolerates the comparison of many variables at the same time without meddling with the subjects (Setia, 2016). To ensure diversity of the sample, the study included children from public and private pre-primary school in Morogoro Municipality. The list of pre-primary schools was obtained from Morogoro Municipality Education office.

### 2.3 Sample size determination and Sampling technique

In this study, the target population included all pre-school learners who are in their final year of their pre-primary education in Morogoro municipality. The choice of the final year preschoolers assumes that they have covered the full preprimary school curriculum. These preschoolers are expected to have developed all required skills. Sample size was 213 calculated using the Cochran (1977) formula as discussed by Barlett et al. (2001) and Adam (2020).

$$n_o = \frac{t^2 * S}{d^2} \dots\dots\dots (1)$$

Where t = value for selected alpha level.

S = estimated variance of the scaled variable.

d = acceptable margin of error for mean being estimated.

The t-value for alpha of 0.05 is 1.96 for the sample size above 120. Three percent margin of error is acceptable (Krejcie & Morgan, 1970). Three percent margin of error would result in the researcher being confident that the true mean of a five-point scale is within ±.15 (.03 times five points on the scale).

$$\text{Estimated variance of the scaled variable (s)} = \frac{\text{number of points in the scale (5)}}{\text{number of standard deviations (4)}} \dots\dots\dots (2)$$

$$n_o = \frac{1.96^2 * 1.25}{0.15^2} = 213.$$

Furthermore, for identifying students to be selected from public and private pre-primary schools proportionate sampling procedures is applied. The population for students in public pre-primary schools was 5,206 and 2,503 for private schools.

Formula for calculating sample size for each stratum (public and private).

$$\text{Sample size of public schools} = \frac{\text{Public schools population}}{\text{Total population}} \times \text{Total sample size} = \frac{5,206}{5,206+2,503} \times 213 = 143$$

$$\text{Sample size of private schools} = \frac{\text{Private schools population}}{\text{Total population}} \times \text{Total sample size} = \frac{2,503}{5,206+2,503} \times 213 = 70$$

Number of pupils from public and private preprimary were 143 and 70 sampled from 6 and 4 public and private schools respectively. The number of pupils and schools were calculated using proportional to size formula. Codes were assigned to both schools and pupils, then a random number generator was used for selection.

#### 2.4 Data collection tool

The study adopted International Development and Early Learning Assessment tool (IDELA). This tool was published in 2011 and it has been used in 70 countries worldwide with different population of children (Pisan et al., 2015). Both Kiswahili and English version of (IDELA) was used in assessing cognitive development of children. Public pre-primary schools employ Kiswahili as their primary language of communication, whilst private schools primarily use English as their primary language of instruction. The IDELA tool is easily translated and administered in low-resource settings and has strong reliability and validity. The average internal consistence reliability of the IDELA is 0.9. The tool is made up of 22 items in five domains of development which are emergent literacy and language, emergent numeracy, motor development, socioemotional development, executive function, and approaches to learning (Pisan et al., 2015). In this study, questions in the subscales of emergent literacy, executive function and emergent numeracy used in assessing cognitive development of preschoolers. Emergent literacy was measured by assessing preschoolers' ability in expressing vocabulary, ability in printing objects, ability to identify letters, ability to write, ability to answer questions from short stories and ability identify sounds. In early numeracy, preschoolers were assessed in their ability to compare objects, make sorting, identification of numbers, ability in correspondence, simple arithmetic, ability to fill puzzle and on identifying of shapes. Lastly, preschoolers' ability in executive functions were assessed by measuring their short-term memory and inhibitory action. IDELA tool enables assessment overtime in a specific area, and the items allow children of different abilities to answer the questions. It is designed to take approximately 30 minutes to administer.

### 2.5 Grading system of preschoolers’ performance in the IDELA tool

The grading system for the pre-primary level pupils of Tanzania was adopted in grading preschoolers’ performance in the IDELA cognitive test. According to this scale grade A which ranges from 81% to 100% implies a very satisfactory or excellent performance, while B grade ranges from 61% to 80% and implies satisfactory or good cognitive development. The scale award to a preschoolers grade C (average), for a pupils who will score between 41% to 60%. Grade D stands for ‘Below average’ or unsatisfactory cognitive development and is awarded for a score between 21 – 40% in the test. Grade F stands for poor very poor and were awarded to those preschoolers who score between 0% - 20%. After marking, preschoolers’ score were converted into percentages and classified into these five categories using the above criteria and presented in the table format as shown in Table 1 below.

**Table 1: Test scores grading system**

Corresponding %	Grade	Description of the performance
0-20	F	Very unsatisfactory
21-40	E	Unsatisfactory
41 - 60	C	Average
61- 80	B	Satisfactory
81-100	A	Excellent

Source: URT (2022)

### 2.6 Data analysis

To determine the levels of cognitive abilities, the study employed descriptive statistics. Modes on literacy, executive function and emergent numeracy were calculated. Modes are useful in determining the most common value in the data set. Modes have been applied in studies which adopted IDELA tool such as the study done in Ethiopia by Wolf et al., (2017). A study done in India by Seidan et al., (2021) on the effects of two early interventions on the developmental outcomes of children also adopted the same techniques. Thus, the modes was useful in determining the overall performance of the pupils in three dimensions capturing cognitive skills. The difference of cognitive levels by type of school was determined by using Mann-Whitney U test. The test is recommended in two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed. Mann-Whitney U test is expressed in the equation as;

$$U_x = n_x n_y + n_x \frac{(n_x + 1)}{2} - R_x \dots \dots \dots (3)$$

$$U_y = n_x n_y + n_y \frac{(n_y + 1)}{2} - R_y \dots \dots \dots (4)$$

Where  $U_x$  and  $U_y$  are Mann-Whitney U test statistics for public and private schools respectively,  $n_x$  is the number of public schools,  $n_y$  is the number of private schools,  $R_x$  is the sum of the ranks assigned to public schools and  $R_y$  is the sum of the ranks assigned to private schools. In context of this study, type of schools is binary variable and the data are not normally distributed, thus, the test is appropriate. Furthermore, to test the difference by age, the study employed Kruskal-Wallis H Test. The test is useful in determining statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable (Green & Riddell, 2012 & Napoli & Purpura, 2018). In this study, age was divided into three groups, five, six and seven years. The categorization of these age groups was guided by the fact that most of pupils in these schools were five to seven years old. So, the use of Kruskal-Wallis H test is acceptable.

### 3.0 FINDING AND DISCUSSION

#### 3.1 Levels of cognitive abilities of preprimary pupils

The overall performance of preschoolers' cognitive abilities was assessed using IDELA tool. The specific areas assessed included early literacy, early numeracy, and executive function. The results are presented in Table 2 and table 3. Findings shows that 91% of children scored very high with the mean rank of 92. The results are comparable to those of studies measuring the development of cognitive skills in preprimary school years (Green & Riddell, 2012; Napoli & Purpura, 2018; Schweinhart, 2014; Weiland et al., 2013 ). Majority of children were able to solve problems requiring simple arithmetic skills and rational understanding. Teachers promoted one-to-one counting as a means of helping children to recognize numbers. In addition, teachers promoted one-to-one counting as a means of identifying the total number of items in a collection. For instance, when counting four tins, children pointed to a tin and said "one," pointed to a second tin and said "two," pointed to a third tin and said "three," and pointed to the final tin and said "four." This method helps children to practice recognition of the cardinality principle: that the last number word is the total (cardinal value) of the collection. These results give a more detailed picture of how preprimary education gives children enough time to practice their number skills so as to be able to learn mathematics skills in primary schools. Thus, children begin learning about numbers at an early age by reciting the count sequence. The requirement to recall words in reverse order imposes a significant working memory processing load on children, requiring them to hold information in mind while they manipulate it mentally (Weiland et al., 2013).

**Table 2: Pre-schoolers' cognitive skills overall performance**

Items	Performance	Frequency	Percentage
Early literacy	Very high	113	53%
	High	70	33%
	Medium	20	10%
	Low	10	5%
	Very low	0	0%
	Total		213
Early numeracy	Very high	294	91%
	High	19	9%
	Medium	0	0%
	Low	0	0%
	Very low	0	0%
	Total		213
Executive function	Very high	172	81
	High	33	15
	Medium	6	3
	Low	1	1
	Very low	0	0
	Total		213

Source: Research survey 2022

In assessing levels of literacy skills, the study assessed reading skills on letters, words, comprehension and writing skills. Findings represented in table 2 indicate that, in literacy skills, 53% of children scored very high and 33% scored high whereby the mean rank was 80. These results imply that majority of the children demonstrated high levels of literacy abilities when engaged in purposeful and meaningful reading and writing activities. 15% of preschoolers demonstrated poor literacy skills. The probable reasons for these findings could be associated with the use of scaffolding teaching methods in the learning process. Example, teachers use nursery songs which helps to motivate children to memorize and drill different alphabets, vocabularies. Moreover, the presence of labeled object around the classroom and storytelling technique prompt children to understand different things and encode different vocabularies in their memory. These results contradict the findings by Woldehauna and Gebremedhin (2012) who investigated the effects of pre-primary school experiences on the pupils' cognitive development and found that there is positive effects of early literacy in learning outcomes.



**Table3: Preschoolers overall mean and standard deviation**

	N	Mean	Std. Deviation
Early literacy	213	80	.166
Early numeracy	213	92	.079
Executive function	213	90	.130

Source: Research survey 2022

Executive function is also considered as part of cognitive development. It is the ability of the brain to hold on working with the information, focus thinking and filtering distractions. However, children are not born with these skills but potentials to develop them. These skills are relevant to preprimary because executive function abilities develop rapidly during childhood. To check whether children develop these capabilities in preprimary education, levels of executive function development was also assessed. Findings show that 81% of Morogoro preschoolers had a mean of 90% indicating that they have very high developed ability in this area. This implies these preschoolers can follow the rules and keep memory to complete the task. More outdoor activities like educational games and sports could be associated with improved executive function to majority of children. Access to different types of learning activities and interaction with peers allows children to learn language processing, develop better memory, flexible thinking and improved self-control. These results are consistent with the result of the recent study by Altun (2022) who found out that executive function is the long-term determinant for children cognitive development. He also found out that kids who have access different type of readings and language processing activities would have better problem-solving skills and better memory.

### 3.2 Levels of cognitive development based on type of school

The study also intended to assess levels of cognitive development among preschoolers based on the type of school enrolled. The study uses items of literacy, numeracy and executive function adapted from IDELA to determine levels of cognitive skills. Respondents were individually asked question that aimed to test reading, writing and executive function skills. Moreover, Mann Whitney U test was performed to determine whether there is significant difference in cognitive between pupils in public preprimary schools and those from private preprimary schools.

**Table 4: Difference in overall cognitive development of preschoolers based on type of school.**

Items	Participation	Mean rank	z-score	p-value
Early numeracy	Private preprimary	109.16	-6.44	0.000
	Public preprimary	60.42		
Executive function	Private preprimary	92.73	-2.27	0.023
	Public preprimary	76.46		
Early literacy	Private preprimary	112.65	-7.412	0.001
	Public preprimary	57.3		

Source: Research survey 2022

Table 3 shows that the mean value for numeracy was 109.2 and 60.42 respectively. The Z score value was at -6.44 and statistical significant difference in early literacy at  $p < 0.001$  indicating that private preprimary pupils scored high on early numeracy than public preprimary pupils. The study results are consistent with the findings by Aunio et al. (2014) who found out the difference in mathematics skills among children was already observed among children from different types of schools. The difference in performance could be caused by differences in class size and availability of resources. The pre-primary curriculum recommends teacher pupil ratio of 1:25 with one qualified teacher and one assistant. This has been realized in many private pre-primary schools but yet in public pre-primary schools whereby the teacher pupil ratio is which was 1:60 and above which is very higher than the recommended ratio. The difference in class size may be attributed to better performance in many private pre-primary schools. Moreover, in public pre-primary schools teachers teach by using activities recommended in curriculum whereby in private pre-primary schools all activities recommended in the curriculum are covered and above the recommended. However, private pre-primary schools provide preschool education to children below pre-primary school age which play a big role in prompting a child cognitively as it gives a child enough time to learn different cognitive skills as it offers one year of baby class.

During interview with teachers, one public pre-primary schoolteacher report that in teachers guide it has been recommended that for the first eight months children learn mathematics skills through activities such as play, cards, pictures and songs in order to learn different numeracy skills. The role of the teacher is to demonstrate how various activities can be performed. At these levels children learn by doing hence a teacher is supposed to provide children an opportunity to actively participate in learning process by doing. Yet in majority of public pre-primary schools the teaching method applied is mostly teacher centered due to lack of enough teaching and learning materials. Contrary to private pre-primary schools whereby by availability of enough teaching and learning materials allow teachers to be more flexible in their teaching strategies which allow interaction between teacher and pupils hence children become more motivated during learning process.

Furthermore, the mean value for literacy was 92.7 for private and 57.3 for public schools respectively. The Z score value was at -7.41 and statistical significant difference at  $p < 0.001$  indicating that private preprimary pupils scored high on early literacy than public preprimary pupils. The difference could be associated with the fact that in public pre-primary schools teachers teach by using the steps prescribed in national curriculum. In addition, these use teachers' guide which directs that during early years, children learn that written words carry meaning and they connect written words with sounds. They also teach children to associate books with reading and reading with pleasure. During first eight months of preprimary year, children are not taught the actual reading rather understanding what reading is about and how it works. They also learn to understand the existing relationship between written letters or words and sounds. After eight months of learning how reading works they start to learn how to write and read letters, how to hold a pencil and how to open the book.

In public schools, teachers depend on teaching materials recommended in the national pre-primary curriculum, which are, however, not enough in most schools. Other teaching aids such as toys, paper drawings, charts and the like are not available in public schools. To the opposite, there is a variety of teaching aids ranging from print materials to game toys and electronic media in most of privately owned settings. Availability of teaching materials in privately owned schools as compared to public counterparts can be explained by better financial situation, better institutional organization, larger school space and influence of foreign curricula (Mmassa, 2016, Woldehauna and Gebremedhin, 2012) on the effects of pre-primary school experiences on the pupils' academic achievement outcome where they found out that private pre-primary schools offers quality pre-primary education has positive effects early learning experience and cognitive development of children at the ages of both five and eight years, with the bigger impact at latter age. The results also shows that executive function was statistically significant of  $p = 0.023$  with mean rank of 92.73 in private pre-primary pupils and 76.46 in public preprimary schools which indicate that private pre-primary pupils scored high in executive function than public pre-primary pupils. Quality interaction between teacher and children observed in surveyed private pre-primary schools could be associated with better performance in executive function. The findings are in line with previous studies conducted on the importance of teacher-student interactions for children's executive function (Araujo et al., 2016; Vandenbroucke et. al, 2017, Verschueren, et al., 2016) which found positive relationship between teacher and a child. The studies further found that availability of resources significantly related to better executive functions and working memory of preschoolers.

### **3.4 Levels of cognitive development based on age**

The study sought to test whether there is significance difference in levels of cognitive development of preschoolers according to their age. Early literacy, executive function and early numeracy were used to compare the groups. The mean, chi square and p-value between participants in each age group are presented in table 4. The results indicate that the levels of cognitive development of older preschoolers is greater than the young one. The results in table show that the mean rank of seven years old is 97.47 for early literacy skills and 96.07 for early numeracy skills, 6 years old have the mean rank of 84.49

in early literacy skills and 83.42 in early numeracy skills and 5 years old have the mean rank of 53.05 in early literacy skills and 60.77 in early numeracy skills. The p-value was 0.002 for early literacy skills and 0.017 for early numeracy skills. The findings imply that as a child grows old their level of cognitive skills increase as their ability to learn literacy and numeracy skills also increase. The probable reason is that children at age of six and to twelve years old develop ability to think more logically and solve problem better than those of age five. At this age children combine, separate, sort and learn alphabet and numbers. Findings are consistent with the study by (Msokola, 2014; NAS, 2015; Yadi, 2020) which concluded that age determines cognitive development of children.

**Table 5: Difference in overall cognitive development of preschoolers based on age.**

Items	Age	Mean rank	chi-square	p-value
Early literacy	5	53.05	12.68	0.002*
	6	84.49		
	7	97.46		
Early numeracy	5	60.77	8.14	0.017*
	6	83.42		
	7	96.07		

Source: Research survey 2022

### 3.5 Levels of cognitive development based on sex

Sex differences have been regarded as a causal factor for academic achievement. The results in Table 5 disapprove the notion that sex does determine cognitive abilities. Sex is an important factor in explaining cognitive performance at age of 5 and above. However, the magnitude of these coefficients provides some suggestive evidence that on average of cognitive skills does signify that there is a significant difference in cognitive skills between girls and boys. This is because the T-test reveals a stronger correlation between cognitive skills and sex. The findings result imply that the difference in literacy scores between boys and girls was significant while the difference in numeracy was not significant. The p-value for early literacy is  $p < 0.00$  with the mean rank of 72.2 for boys and 97.4 for girls compared to early numeracy whereby the  $p = 0.069$  with a mean rank of 76.1 for boys and 96.9 for girls. In executive function, results show  $p = 0.01$  with the mean rank of 73.2 for boys and 95.6 for girl. These findings imply that girls statistically performed better in literacy and executive functions than boys.

**Table 6: Difference in overall cognitive development of preschoolers based on age.**

Items	Sex	Mean Rank	z-score	p-value
Early literacy	Boy	72.26	-3.045	0.000
	Girls	97.45		
Executive function	Boys	73.24	-2.89	0.012
	Girls	95.64		
Early numeracy	Boys	76.18	-1.48	0.069
	Girls	96.88		

Source: Research survey 2022

The reasons behind these findings could be that girls are more competent in learning language than boys. The results is consistent with the findings of the study done by Kiptum et al., 2013; Ratemo,2016 who investigated whether there is gender difference among standard one pupils' achievement in literacy and numeracy. They found significant gender difference in literacy in favour of girls but no significant different observed in numeracy skills achievement among standard one primary schools. This finding is also consistence with the findings of Palejwala and Fine (2015) who utilized the Wechsler Primary and Preschool Scale of cognitive development which measures early literacy and early numeracy with a sample of children between the ages of two and seven years and found evidence of girls outperforming boys in this early childhood stage.

#### 4.0 CONCLUSION AND RECOMMENDATIONS

The results from the study conclude that pre-primary have impacted positively and significantly to cognitive development of children in areas of early literacy, early numeracy and executive functions as majority of pupils scored high in all items that measured their levels of cognitive development. Although there is evidence that pre-primary education has impacted positively to cognitive development, findings proved that the quality and learning outcomes differ by age and setting in terms of delivery and teacher experiences in public and private pre-primary classrooms.

Poor learning condition found in majority of public pre-primary schools makes it is hard for teachers to assist children in development of cognitive skills as it stipulated in national curriculum as a result there is the difference between what is been intended by curriculum to what is given and received in these pre-primary classes. Unlike private pre-primary schools classes which are more organized and maintain the provision of quality pre-primary education in to attract business therefore they ensure that they regulate their services and activities according to the demands.

Moreover, evidence shows how different in quality and outcomes would have major implications for children development in pre-primary schools. The difference found in levels of cognitive skills of children in different setting, age and sex existing in pre-primary schools proves that there is a need for the government improve the existing standards of early education. The government should identify particular strengths and weaknesses of different types of preprimary education settings and service delivery models to equip better in pre-primary education in order to improve to provide the necessary support to the various setting.

While the study focuses on the development of 3Rs as an important aspect in cognitive development, there is a need for Ministry of Education and other stakeholders placed responsible for provision of quality services in pre-primary should not focus on directives but pay more attention in making sure the service provided in pre-primary schools is equal to that stated in pre-primary school's curriculum. Moreover, evidence of the quality of education provided to children in most of private pre-primary schools inform teachers, TIE, and other stakeholders responsible for pre-primary education to review the entire teaching process so that they can cater teaching to their specific learning needs. Moreover, the study recommends the ministry of education to facilitate the development of improved training and support to teachers which will ensure that teachers know how to conduct age-appropriate learning activities and have adequate teaching and learning materials in promoting children's early literacy and early numeracy. Lastly the study recommends for more longitudinal study that could show the impact of pre-primary on subsequent learning on cognitive skills, understanding the overall skill level of children entering Standard I and at what ages do children typically gain specific competencies in order to provide extremely valuable evidence to convince policymakers to prioritize concrete efforts in pre-primary.

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