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The Pedagogical Implications of Maternal Educational Attainment on Children's Educational Outcomes in Cameroon

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ABSTRACT

It is unclear how mothers affect their children's learning at home and how the pedagogical approaches used by mothers can lead to positive outcomes for children. The purpose of this study was to provide pedagogical evidence on the effects of Cameroonian women's level of educational attainment on children's level of educational outcomes. The survey research design and data from the 2011 Demographic and Health Survey were used. The instrumental variable probit model was used for data analysis. The results revealed that maternal educational attainment had a significant effect on children's educational outcomes. Mothers' utilization of play based, song, storytelling and reading pedagogies or walking curriculum had positive implications on children's educational outcomes. From a policy perspective, accelerating increase in women's schooling had the potential to accelerate children's educational outcomes in Cameroon. This was an important step to enhancing children's cognitive growth.

Keywords: *Cameroon, Child, Educational Outcomes, Maternal Educational Attainment, Pedagogical Implications*

1. INTRODUCTION

Mothers primarily become involved in their child's education through teaching them at home (Nsamenang, 1992; Quaye, 2011; Bettinger, Hægeland and Rege, 2014). The mother as a teacher did not develop overnight (Tchombe, 2011; Ardita and Rabije, 2016). Before the arrival of western education in Cameroon, mothers had successfully consolidated their position as educators of their children. Even though they had been considered as teachers, it was still not enough because they needed to preserve the status quo and use key teaching practices in order to promote their children's cognitive, social and emotional learning and consolidate their role. It should be recalled that, different teaching methods, strategies and activities would appear to have been used by mothers in order to enhance their children's learning outcomes. Two of the maternal teaching approaches or strategies where children were actively engaged stand out prominently as examined below.

First, mothers taught using play based pedagogy and song pedagogy. The children learned from some interactive activities where their mothers pacified them, looked at them and smiled with them. As the children developed physically, their mothers interacted with them through playful, singing and dancing activities. Second, mothers taught using narrative pedagogy and walking curriculum. The children learned outside their homes through activities like storytelling or walking to places like the farm, market or church. In these areas, the children learned by touching new surfaces (such as stones, leaves and grass), counting, smelling and tasting new food respectively. Interestingly, mothers were able to teach their children with little or no cost. In general, demonstration, illustration, structuring, eliciting children's reactions and consequently reacting remained the underlying teaching principles used by mothers. This is in line with the Africentric education philosophy

where children learn by observation, participation and doing (Tchombe, 2019).

While upholding the assertion that mothers constitute an important variable in the process of early childhood education, Tchombe (2011; 2019) argued that effective teaching for learning outcomes required planning. She described learning outcome as statements of learners' performance after engaging in learning activity. It could result from the attainment of a set of related learning objectives. Learning objectives could be stated in the cognitive, affective or psychomotor domain. In this regard, the learning outcomes for early childhood education would appear to depend on the kind of scaffolding that mothers' offered to a child or learner. Undoubtedly, mothers have adopted active teaching approaches and techniques hence reducing the passivity of learners. Yet, one of the unanswered questions regarding learning outcomes concerns the type of learning outcomes to develop in a child at a particular age and how to effectively teach this young learner at home in order to improve their educational outcomes.

From the historical trends, it is evident that, teaching was seen as an interpersonal activity with a facilitative role for learning. Moreover, teaching was done through learning trajectories. Nevertheless, the children of today want to scrutinize almost everything and sometimes it becomes difficult for the mothers to effectively interact with them. Mothers may find it difficult to create the pedagogical, social and ethical conditions under which their children pay attention and acquire knowledge and skills. Therefore, understanding the practicality of mothers' education continues to be the focus of educational policy formation in Cameroon over the years as stated in the National Development Strategy, 2020- 2030 (MINEPAT, 2020). This is because; mothers' ability to teach and be in charge of their children's learning depends on their access to education.

It is worthy to note that, girls' and women's access to education is supported by various educational policies and strategies. Some of these include: the access to free and compulsory primary education (Law No. 004 of 14th April, 1998); the ability to make education accessible in every region of the country (Growth and Employment Strategy Paper (GESP),

2009); the ability to achieve gender equality and empower all women and girls (Millennium Development Goal (MDG), 2000; Sustainable Development Goals (SDG), 2015).

In spite of the government's adoption of policies and strategies that shift emphasis from traditional access to education in urban areas, dominated by boys to focus on rural areas, girls, women and children wellbeing as a whole; the National Development Strategy 2020-2030 (MINEPAT, 2020), report revealed that, about 14 percent of children at the primary level are out of school with girls being the most affected in the different regions of the country. The report further stated that, the rural areas in Cameroon are characterized by inadequate material and human resources. To remedy these problems, the government had increased her public finance in the educational sector from 13.2% in 2019 to 14.7% in 2022 (MINEPAT, 2020). Notwithstanding this considerable effort by the government, the relatively large primary school dropout rate of girls in the different regions of Cameroon pushes one to wonder whether a large majority of girls or women actually attain a certain level of education that would enable them contribute effectively to their children educational or learning outcomes.

On the demographic front, the issue of reducing the dependency ratio of 0.85 in Cameroon remains a constant concern. According to National Development Strategy 2020-2030 (NDS 30), the fertility rate has dropped however, the female population represents about 51 percent of the total population and children under the age of fifteen accounts for over 43 percent of the total population. This high demographic statistics of women and children questioned the traditional assumption that, low maternal educational attainment limits children educational attainment (Feinstein, Duckworth and Sabates, 2008). Still commenting on the statistics, the quantity-quality of children model which postulated that, lower fertility rates may allow parents to give more care time to each child and constrain resources to their children's human capital development (health and education) as well as other necessities of life remains uncertain.

Given the aforementioned arguments, the most logical conclusion is that, some features of maternal educational attainment affects

children's cognitive development such as: mother's teaching approaches and strategies, mother's levels of educational attainment, maternal fertility, mother child relationship, time spend with a child, time spend participating in the labour market, income earned, mother's age, marital status, among others. Given the lack of clarity on which elements of maternal educational attainment affect which children educational outcomes, the objectives of this study are:

To evaluate the effects of maternal educational attainment on children's educational outcomes in Cameroon

To examine the pedagogical implications of maternal educational attainment on children's educational outcomes in Cameroon.

2. LITERATURE REVIEW

From a strictly theoretical point of view, the ecological framework maintained that the examination of child development needs to consider both the child's individual characteristics (such as cognitive competences, age, gender) and the familial, social and cultural context in which the child develops (Bronfenbrenner, 1979; 1986). Along this line of thought, the economic model of intergenerational transmission of educational success developed by Feinstein et al. (2008) states that, parental education has a major influence both directly and via other channels on children's educational attainment or development. The model assumes that, it is not only parents' education factor that has an effect on children's educational outcomes but children are themselves important determinants of their own academic and psychological development.

Children need verbal and non-verbal scaffolding. To corroborate this statement, the social development theory of Vygotsky (1978) emphasized the role of the sociocultural environment in the development of a child's cognition. To him, learning is a social process that depends on interactions with adults and peers, cultural norms, and their environmental circumstances. The framework of the theory illustrates that, learning occurs on two levels, first through interaction with others, and then through integration into an individual's mental structure. The theory is of value to this paper because it traces a child's social

interactions as part of a larger unit, such as parent and child, teacher and child, or brother and sister.

On the one hand, Vygotsky recognized that children learn through pedagogical practices like: guided participation, apprentice in thinking, scaffolding and zone of proximal development. On the other hand, Bandura's (1986) social learning theory focuses on the fact that people learn from one another through observation and imitation, and that new behaviour will continue if it is reinforced. According to this theory, learning occurs when children modeled a new concept. This aforementioned frameworks and models form the conceptual and theoretical basis for our examination of the consequences of maternal educational attainment.

From an empirical perspective, De Serf's (2002) ordinary least square results showed that a one-year increase in mothers' level of education resulted to a significant increase in children's education. However, household characteristics like family size, income of mother and female-headed household had no significant effects on children's education (De Serf, 2002). De Serf's (2002) study was different from the present one in that, the database excluded important explanatory variables like mothers' hours at work or mothers' time spent with children, the amount of money spent on each child in the school, parents' attitudes on education and values of education.

Similarly, Chevalier (2004) used the instrumental variable approach and British family resources survey dataset and found a positive effect of both parents' education on their children's schooling achievements when focusing on natural parents only. He noticed that step-parents have no or a negative impact on children's education. Based on these results he concluded that, there is no endogeneity of parental education.

In another study, Mare and Maralani (2006) used the Indonesia Family Life Survey (IFLS) data. The results of the ordered logit models revealed that there was a positive association between the effects of women's educational attainment on the educational attainments of the next generation. The factors enhancing this were the reduction in fertility and a more favourable marriage partner of an educated mother. To

corroborate Mare and Maralani's (2006) results, Roach (2009) used demographic health survey (DHS) data as well as integrated public use micro data series in Uganda. Roach's (2009) ordinary least square (OLS) regression results showed that, there was a minimal amount of correlation between mother's fertility and her children's educational attainment, but there was little evidence for a causal relationship.

Ermisch and Pronzato (2010) estimated the causal impacts of parents' education on children's education focusing on a comparison between the USA, Norway and Sweden. They argued that the reason for the smaller maternal effect was due to the fact that better educated mothers worked more in paid employment and spend less time interacting with their children.

In South Africa Magejo, Ntuli and Gwatidzo (2014), used the OLS technique to estimate the correlation between parental and child education. Their findings reveal that, approximately one third of the variation in a child's schooling is explained by maternal/paternal education. The results further indicate that the education of the mother was generally more important in influencing that of the child although the effect was more pronounced among sons rather than daughters. However, Magejo et al. (2014) study was different because of the lack of data focusing on instrumental variables and researcher bias.

From a pedagogical perspective, several studies have investigated the influence of play based, song, storytelling and reading pedagogies or walking curriculum on children's educational outcomes. Play-based learning is a context for learning through which children organize and make sense of their social worlds, as they engage actively with people, objects and representations (DEEWR, 2009). Based on this definition, Wiysahnyuy (2013) quantitative and qualitative findings revealed that, guided play helped two to six years old children in Nso, Cameroon to develop cognitive skills. She argued that during play children were involved in a lot of activities that enhanced their imagination, divergent thinking and creativity. However, play prevented some children from paying attention to useful task (Wiysahnyuy, 2013). Similarly, Abels, Papaligoura, Lamm and Yovsi (2017), findings indicated that three-month-old children in three cultural communities (Nso, Cameroon;

Gujarati, India; Athens, Greece) educational outcomes were enhanced when their mothers interacted with them using play based pedagogy.

To reaffirm Murphey (1992) findings, Millington (2011) used a t-test and a small sample size of 28 Asian students and found that the use of song based pedagogy would increase young learners listening, pronunciation and speaking skills as well as their grammar. Similarly, Aguirre, Bustinza and Garvich (2016) used observation and questionnaire for two groups of students one with songs and the other without songs and found that songs had a positive influence on student motivation to learn in Peru.

Glesne and Pugach (2018) found that narrative practices had a positive influence on learning outcomes. Using a sample comprised of 98% Cameroonian of which 54% were mothers and 46% were fathers Tchombe and Mbangwana (2013) argued that 83.9% of parents very often and often told their zero to six years old children cultural folktale and sang cultural songs whereas, 16.1% of parents rarely and never educated their children using story based pedagogy. They concluded that early childhood years are years for laying a firm foundation for appropriate development. Previous studies also found that, story based pedagogy had a positive effect on learners' educational outcomes. This was because it captured the learners' attention; conveyed substantive information related to the curriculum and expanded their sense of connection with others (Rossiter and Clark, 2007).

Parent-child reading in the early years had a substantial impact on emerging literacy skills (Jeynes, 2012; Nye, 2006; Van Voorhis et al., 2013) and on child's ability to think and communicate mathematically (Amber, Capraro, Rupley and Capraro, 2017). In a recent study Ledger and Merga (2018) found that 62.7% of the respondents would prefer to being read to at home; 27% indicated that no one read to them in the home, 17.7% reported being read to every day, with 25.8% read to, often and 56.5% only sometimes. In a nutshell, mothers were reported as providing the most support for children (62.8%), with reference to Grandmas, Nannas and sisters far outweighing male support.

From the review of related literature, it is worthy to note that, a handful of research datasets did not use instrumental and explanatory

variables that made it difficult for these studies to measure all mother and child variables that would have explained children's educational attainment better in the models. Moreover, there was a problem of selection bias in the aforementioned studies. This study addresses these gaps.

3. METHODOLOGY AND DATA SETTING

Using the ecological framework of Bronfenbrenner (1986) and the model of intergenerational transmission of education success developed by Feinstein, Duckworth and Sabates (2016) the children's educational attainment model was specified as:

$$CEDUC = \tau_1 Z + \Phi_1 MEDUC + \varepsilon_1 \dots\dots\dots 1$$

Where CEDUC is child's educational attainment, defined as an outcome variable and surrogated by the variables: mother plays with child, mother sings song to child, mother tells stories to child, mother reads book with child, mother strolls out of the house with child and mother spends time with child). Z is a vector of household exogenous characteristics: mother's characteristics (age, age squared, marital status, participation in the labour market, place of residence); father's characteristics (presence in the house, age, age squared, education, education squared); household size and children under the age of five in the household. MEDUC stands for maternal educational attainment, defined as an endogenous explanatory variable and captured in complete years. In the model, τ_1 represents vector of the parameters of the exogenous variables, Φ_1 symbolizes vector of the parameters of the endogenous variable and ε_1 signifies the error term.

The probit estimate (equation 1) may be biased either upward or downward based on the effects that maternal education has on child's education and on the correlation between variables excluded or omitted from the model and maternal education. The apriori expectations would be that the probit estimate of Φ_1 should

be biased upward (if maternal education has a positive effect on child's education). This is adopted from Chevalier (2004).

Interestingly, the used of either ordinary least square (OLS) estimation approach or probit approach without controlling for endogeneity biased resulted to inconsistent estimate. Thus, to control for endogeneity biased, the study adopts the two stage least squares estimation approach. This permits one to specify another model (first stage equation) as follows:

$$MEDUC = \delta_1 Z + \lambda_1 LCS + \mu_1 \dots \dots \dots 2$$

Where MEDUC is maternal educational attainment defined as the outcome variable; Z is the vector of exogenous variables and LCS is large child size at birth, defined as an endogenous explanatory variable in the maternal education production function. In equation 2, δ_1 as well as λ_1 are parameters to be estimated whereas μ_1 is the error term. Notably the 2SLS model should capture the causal effect of maternal education for those mothers whose education is affected by size of children at birth. As such, the 2SLS estimates of Φ_1 can be interpreted as estimating the average marginal effect of a unit increase in mother's education for mothers whose education is affected by the large child size at birth. Before presenting the 2SLS estimates, the reduced form analysis of maternal education is presented; it would be expected that mothers with small size children should have children with lower education, because mother's education is negatively affected by size of the child at birth.

Large child size is used as an instrumental variable to overcome the endogeneity problem between mother's education and child's education which cannot be adequately controlled for by observable characteristics. Assuming that large child size is a valid instrument, the study used the ivprobit model (probit model controlling for endogeneity) which better respects the binary nature of CEDUC as represented by the following two equations:

$$CEDUC^* = \tau_2 Z + \Phi_2 MEDUC + \varepsilon_2 \dots\dots\dots 3$$

$$MEDUC = \delta_2 Z + \lambda_2 LCS + \mu_2 \dots\dots\dots 4$$

Where, CEDUC stand for actual children's educational attainment and CEDUC* denotes desired children's educational attainment, note that CEDUC=1 if and only if CEDUC* > 0 and zero otherwise, and the error terms ε_2 and μ_2 follow a bivariate normal distribution with non-zero correlation. The marginal effect of a variable Z^K is calculated as the average of the marginal effect of everyone in the sample as follows:

$$ME(Z^K) = \frac{1}{N} \sum \frac{\delta P(CEDUC = z, MEDUC, \hat{\tau}, \hat{\phi}, \hat{\delta})}{\delta Z^K} \dots\dots\dots 5$$

Where Z is a vector of characteristics with Z^K the K'th element in that vector, thus the marginal effect of maternal educational attainment on children's educational attainment is:

$$ME(Z) = \frac{1}{N} \sum [P(CEDUC = 1 MEDUC = 1) - P(CEDUC = 1 MEDUC = 0)] \dots\dots 6$$

The identification problem in this study is resolved by using the two stage least squares (2SLS) econometric technique of evaluation. The Sargan's test statistic and Durbin-Wu-Hausman test were done at the second-stage regression to tests for the over-identifying exclusion restrictions. Therefore, the study used variables (instruments) that influenced maternal educational attainment as well as children's educational attainment inputs (equations 2) and selection of women into the estimation sample (equations 3) without directly affecting the children's educational attainment, (equations 1). The strength and relevance of the instruments are examined following the first order criteria (tests). The F statistics on excluded instrument is expected to be larger than the p value. Specifically, the Anderson-Rubin Wald test of joint significance of endogenous regressors is expected to be larger than the p value of 0.0000. This justifies that the instruments might not be weak. With many strong instruments, the adjusted R^2 of the first-stage regression would be nearly 1 which signifies that the instruments

are relevant and 2SLS strategy is appropriate. The Cragg-Donald Wald F statistics on weak identification is expected to be larger than the Stock-Yogo weak ID test critical values of 16.38 (10% maximal IV size). This implies that the hypothesis of weak identification could be rejected. The Sargan statistics on over identification test of all instruments is expected to be greater than the X^2 p value. This test the null hypothesis that all instruments are valid, hence failing to reject signifies instrument validity. The endogeneity test of endogenous regressors that is the Durbin Wu-Hausman X^2 test on exactly identified instruments is expected to be greater than the X^2 p value. This implies that, the OLS estimates are not reliable for inference.

The data used for the study is the Cameroon's Demographic and Health Survey (DHS) for 2011 collected by the national institute of statistics. Based on the DHS data, the area of study is Cameroon. The design used is the survey research design. The target population of the study consisted of women, men and children from the ten regions of Cameroon. The sample population consisted of a total of 15,060 households. The sample was collected using representative clustering survey sampling techniques at the national level. The instruments used for data collection were questionnaires and interviews administered by the national institute of statistics. It is worthy to note that, all men and women age 15-49 were eligible for interview. The data collected provided detailed information on individual and household characteristics. The variable children's educational outcomes are captured by an improvement in zero to five years old children's communication and cognitive skills resulting from mother's utilization of play based, song based storytelling and reading pedagogies or walking curriculum with children.

4. FINDINGS

This section presents, interprets and discusses results of the study as shown in table 1, 2 and 3.

4.1. Descriptive statistics for a random sample of children

The respondents were asked to indicate their household characteristics. The responses are shown on table 1.

Table 1: Descriptive Statistics for Children With Education and Without Education Outcome

Variables	Full Sample		Children with Education Outcome		Children with No Education Outcome	
	Mean	SDV	Mean	SDV	Mean	SDV
Child's Education	0.073	0.260	1.000	0.000	0.000	0.000
Mother's Educational Attainment	4.593	4.046	7.892	3.788	4.332	3.949
Child Size at Birth (1=large size at birth, 0 otherwise)	0.792	0.405	0.860	0.346	0.787	0.409
Mother's Age	28.495	6.975	29.657	5.828	28.403	7.050
Mother's Age Squared	860.672	423.499	913.533	362.897	856.486	427.666
Marital Status (1=Married, 0 otherwise)	0.726	0.445	0.763	0.424	0.723	0.447
Father's Present in the House (1= present, 0 otherwise)	0.724	0.446	0.776	0.416	0.720	0.448
Mother's Participation in the Labour Market (1= Mother participated, 0 otherwise)	0.684	0.464	0.741	0.437	0.679	0.466
Household Size	10.212	5.599	8.827	4.240	10.322	5.678
Father's Education in complete years	5.056	4.871	8.641	4.664	4.772	4.773
Father's Education Squared	49.297	66.529	96.408	82.485	45.567	63.630
Father's Age	40.059	11.360	38.903	7.802	40.151	11.590
Father's Age Squared	1733.84	1142.762	1574.324	656.088	1746.471	1171.793
Number of Children Below the Age of 5	2.783	1.733	2.515	1.266	2.805	1.763
Household Socio-Economic Status (1= Rich, 0 otherwise)	0.538	0.498	0.822	0.382	0.515	0.499
Place of Residence (1= urban, 0 otherwise)	0.488	0.488	0.673	0.469	0.372	0.483
Number of observation	11732		942		10790	

Source: Computed by the Author from the 2011 Cameroon DHS, N/B: Figures are sample Means and Standard Deviation of children with or without education outcomes and values in the table are presented to three significant figures.

Table 1 describes the outcome variable as the child's education outcome. From the full sample of 11732 observations, the mean number of years of education for children between 0 to 59 months (that is, under five years) is 0.073 years. The endogenous determinant variable is maternal educational attainment. On the average, the number of years of education for mothers is 4.5 years. The endogenous instrument used is the child characteristic (large child size). Particularly, the full sample indicates that on average 79.2 percent of children were born with large size. The exogenous covariates used are: mother's age, mother's age squared, marital status, father's presence at home, mother's labour force participation, household size, father's education, father's education squared, father's age, father's age squared, children under the age of five, household socio economic status and place of residence. The mean of large child size at birth in the sub sample of children with education is higher (86.0 percent) as compared to children without education (78.7 percent). It has been equally observed that the mean of married mothers is higher (76.3 percent) in the sub sample of children with education as opposed to that of children without education (72.3 percent). On average 77.6 percent of fathers are present at home and their children are educated. This implies that fathers who have spent 8.6 years in schooling and are presence at home have much time to spend on their children education. However, 72 percent of fathers are present at home and their children are uneducated. Perhaps, fathers who have spent only 4.7 years at school and are present at home do not spend much time on their children education.

Table 1 further indicates that the mean of mother's who participated in the labour market is higher (74.1 percent) for

mothers with educated children as opposed to mothers with uneducated children (67.9 percent). 82.2 percent of rich households have children with education as compared to 51.5 percent of rich household that have children with no education. These values simply indicate that mothers who are engaged in the labour market can improve on the welfare of their children. This is because mothers with 7.8 years of schooling are financially strong to support the cost of the education of their children (hence their children are educated) as opposed to mothers with 4.3 years of schooling and with uneducated children.

The 2011 DHS further shows that on average, 67.3 percent of mothers whose children have some level of education and 48.3 percent of mothers whose children have no education lived in the urban centers. Specifically, table 1 suggests that fathers with 8.6 years of schooling are financially strong to support the cost of the education of their children (hence their children are educated) as opposed to fathers with 4.7 years of schooling and with uneducated children. Interestingly, the 2011 data set indicates that, the household size (8.8) and the number of children under the age of five years (2.5) is lower in the sub sample of children with education as compared to that of children with no education.

4.2 Findings for the effects of maternal educational attainment on children's educational outcomes

Potential effects of maternal educational attainment on child education outcomes were investigated utilizing instrumental probit (IV Probit) as shown on table 2.

Table 2: Marginal Effects of Maternal Educational Attainment on Child Education Outcome

Variable	OLS	2SLS 1 st Stage	2SLS 2nd Stage	IV Probit
	Child Educ	Maternal Educ	Child Educ	Child Educ

Mother's Educational Attainment	0.012*** (14.82)	n/a	0.035*** (2.61)	0.251*** (3.75)
Child Size at Birth (1=large size at birth, 0 otherwise)	n/a	0.429*** (6.77)	n/a	n/a
Mother's Age	0.012*** (4.95)	0.105*** (3.70)	0.010*** (3.34)	0.074** (2.33)
Mother's Age Squared	-0.000*** (-4.72)	-0.001*** (-3.82)	0.000* (-3.11)	-0.001** (-2.19)
Marital Status (1=Married, 0 otherwise)	0.045*** (6.76)	-1.846*** (-25.66)	0.088*** (3.37)	0.521*** (5.15)
Father's Present in the House (1= present, 0 otherwise)	0.020*** (3.20)	-0.695*** (-9.85)	0.036*** (3.18)	0.166** (2.33)
Mother's Participation in the Labour Market (1= Mother participated, 0 otherwise)	0.017*** (3.31)	0.242*** (4.25)	0.010* (1.71)	0.059 (1.07)
Household Size	-0.002*** (-4.63)	-0.031*** (-4.65)	-0.002*** (-2.80)	-0.006 (-0.80)
Father's Education in complete years	0.004*** (3.19)	0.211*** (13.38)	-0.000 (-0.16)	0.051 (1.53)
Father's Education Squared	-0.000 (-0.48)	0.011*** (10.18)	-0.000* (-1.68)	-0.006*** (-9.93)
Father's Age	0.003*** (3.10)	0.002 (0.25)	0.003*** (2.93)	0.047*** (2.79)
Father's Age Squared	-0.000*** (-3.02)	-0.000 (-1.49)	0.000*** (-2.49)	-0.000*** (-2.58)
Number of Children Below the Age of 5	0.007*** (4.03)	-0.144*** (-6.65)	0.011*** (3.97)	0.109*** (6.11)
Household Socio-Economic Status (1= Rich, 0 otherwise)	0.004 (0.568)	2.188*** (28.97)	-0.048 (-1.54)	-0.261 (-1.42)
Urban Areas	0.042 (0.000)	0.128** (1.73)	0.039*** (5.51)	0.178** (2.19)
Constant	-0.344*** (-8.59)	2.475*** (5.57)	-0.409*** (-7.32)	-5.379*** (-7.50)
LR chi2/F ² : Prob > chi2	77.86 [14, 11717; 0.0000]	961.35 [14, 11717; 0.0000]	58.67 [14, 11717; 0.0000]	1288.48 [14; 0.0000]
Number of observation	11732			

Source: Computed by the Author from the 2011 Cameroon DHS, N/B:The reported marginal effects are the average estimated change in probability of education. Values are in three significant figures; absolute value of robust t-statistics in parentheses beneath estimates. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level. n/a = not applicable.

The ordinary least square estimate indicates that maternal educational attainment is positively associated with child education outcomes at 1 percent level of significant. This result implies that, an increase in mother's education by one additional year increases the education of her child by 0.012. The verifications of average marginal effects of maternal educational attainment effect on child educational outcomes using two stage least square (2SLS) shows that, an increase in maternal education has a probability effect of 0.035 to increase a child's education and this result is statistically significant at 1 percent level. Our estimate of the ivprobit reveals stronger marginal effects of maternal education on child education with a probability effect of about 0.261 and significant at 1percent level. The ivprobit estimates of the effect of maternal education on child education are much larger than the OLS and 2SLS estimates reported in columns 1 and 3.

The first stage 2SLS (column 2) results reveal that, the estimated coefficient on large child size at birth positively affects child education by 0.429. This result is statistically significant at 1percent level. With respect to the robustness check, it is observed that the Sargan statistic (over-identification test of all instruments) is 0.000. The Cragg-Donald F statistic (weak identification test) of 45.87 is much greater than Stock-Yogo weak ID test critical value of 16.38 indicating that, the instrument is strong and relevant. The endogeneity test of endogenous regressors is 3.155 [$p = 0.0757$]. This diagnostic test cast no doubt on the practicability and robust nature of the results.

The ivprobit results of mother's age and marital status, indicates that maternal education increases the probability of children's education. These results are significant at 5 percent and 1 percent level for both mother's age and marital status respectively. This results suggest that concerning mother's education, an increase in the mother's age by one year has a probability effect of

0.074 increase in child's education whereas, marital status increases the probability of child's education by 0.521.

It is evident from the results that an additional year of father's education increases the probability of children's education by 0.051. The presence of husbands and children below the age of five in the house significantly increases the probability of children's education by 0.166 and 0.109 respectively. This is true at 5 percent and 1 percent level of significance. As shown in table 2 column 4, being an urban resident relative to rural residency increases the probability of children's education by 0.178. The findings reveal that an increase in household size by one additional child reduces the probability of children's education by 0.006.

4. 3. Findings for the pedagogical implications of maternal educational attainment on children's educational outcomes

In this study, pedagogical implications of maternal educational attainment were measured either to foster children's educational outcomes or not. Specifically, the salient implications of maternal pedagogical approaches and strategies were investigated using percentages as shown on table 3.

Table 3: Maternal Pedagogical Approaches and Children's Cognitive Development

Maternal Pedagogical Approaches and Strategies	Yes (%)	No (%)	Difference (%)	Children's Educational Outcomes: Foster cognitive growth
Mother play with child	22.82	77.18	-54.36	Sustain concentration Build imagination and creativity Develop self-confidence Encouraged greater independence Promote physical fitness
Mother sing songs to child	24.40	75.60	-51.2	Sustain attentiveness Develop listening skills Improve reflective and

				communication skills Promote appreciation skills Demonstrate creativity skills
Mother tell stories to child	17.05	82.95	-65.9	Sustain concentration Boost listening skills Foster imagination Enhance communication and social skills
Mother read books with child	8.12	91.88	-83.76	Stimulate curiosity Improve concentration and spark imagination Promote emotional and social skills Build communication skills
Mother stroll out of the house with child	21.58	78.42	-56.9	Building self confidence Creating strong emotional bond Improve communication skills Foster imagination and creativity
Mother spend time with child	26.95	73.05	-46.1	Promote emotional and social skills Build communication skills Creating strong emotional bond Develop self- regulating skills

Source: Author, computed from DHS 2011

Table 3 shows the responses that mothers gave on different pedagogical approaches and strategies. The findings revealed that the pedagogical approach and strategy which mothers frequently used was spending time with the child (26.95%). More than 75.60% of the mothers did not sing songs to their children while only 24.40% of these mothers used the song pedagogy. More mothers (22.82%) used the play based pedagogy as compared to the walking curriculum (21.58%). Reading of books with the child (8.12%) was the least frequently used pedagogy. A comparison of mothers who used the different pedagogical approaches and strategies with those who did not, revealed that more than 50% of the mothers were not engaged in activities like playing (54.36%), singing (51.2%), storytelling (65.9%), reading (83.76%) and strolling (56.9%) with their child. Less than 50% (46.1%) of the mothers spend time with their child.

4. 4. Discussions of findings

The study revealed that the variations in children's educational outcomes are determined by the number of years of schooling of their parents. In line with this finding, the National Development Strategy 2020-2030 (MINEPAT, 2020) reiterated that, when the government engages in equality and access to education for both boys and girls; it will lead to an enhancement of the cognitive abilities, motor skills and technical skills of these boys and girls which are necessary in school and in preparation for adulthood. This means that, young learners can acquire competences by schooling in either urban or rural areas in Cameroon. When they become parents, they can use the competences acquired from schooling to enhance their children's education. The works of Magejo, Ntuli and Gwatidzo (2014) in South Africa, support these current findings that, the variation in a child's education is explained by maternal/paternal education.

The study further revealed that mother's age, marital status, father's presence at home, household size, father's education, father's age, children under the age of five, household socio economic status and place of residence are the salient factors that determine maternal educational attainment in Cameroon. This means that, the difference in children's education outcomes can be due to parent's level of education, size of the household and the number of children under the age of five in the household among other exogenous characteristics of mothers. Therefore, household characteristics can greatly inform the kind of educational outcomes that children can have at home. These findings are contrary to the empirical works of De Serf (2002) where household characteristics like family size and income of mother had no significant effects on children's education.

The positive and significant marginal effects of maternal educational attainment on children's educational outcomes is a pointer to the fact that, mothers with high education may place a higher valuation on the quality of learning or cognitive development of their children as opposed to quantity or number of children they may prefer to have during their reproductive age. This finding is deeply rooted in the

economic model of intergenerational transmission of educational success (Feinstein et al., 2008) which exposes that, highly educated mothers would have fewer, healthy and well educated children.

This finding further revealed that, the positive and significant effect of marginal educational attainment on children's educational outcomes is as a result of the factors that determine maternal educational attainment and children's characteristics. Chevalier (2004), Mare and Maralani (2006), Roach (2009) and Feinstein et al. (2008) corroborate the above assertion. According to the finding, children between the ages of zero to 59 months who had a large size at birth would probably be able to observe and imitate most activities that their mothers carry out at home. Later these children may carry out these activities without support from their mothers. This means that, Cameroonian mothers' interaction and scaffolding of their children facilitate their cognitive, social and emotional development. This finding is in line with Vygotsky's social development theory that, learning occurs through children's interaction with others and their integration of what they have learned into their mental structure. Similarly, the finding reaffirms Bandura (1986) social learning theory that children learn through observation and imitation and the new behaviour continues if reinforced.

The pedagogical approaches and strategies used by mothers are very vital in this study. It was observed that when some mothers used the play based pedagogy there was a probability for their children between the ages of zero to 59 months to be alert, active and conscious to learn. They probably would be able to conceive ideas and construct knowledge on their own. In line with this findings, Wiysahnyuy (2013) and Abels, et al., (2017), were right to conclude that mothers' use of play in Nso-Cameroon has much to do with the development of children between the ages of three months to six years imagination, attentiveness, divergent thinking and creativity.

On the one hand, very few mothers also used song based and narrative pedagogies with their children although, there was the likelihood that, this would enhance their children between the ages of zero to 59 months listening, reflective, appreciation, creative and communication skills. This finding is consistent with that of Murphey

(1992) Millington (2011), Aguirre, Bustinza and Garvich (2016) who argued that singing of songs to young learners would increase their listening, pronunciation and speaking skills as well as their grammar. The findings further reaffirmed the empirical works of Rossiter and Clark, (2007), Tchombe and Mbangwana (2013) and Glesne and Pugach (2018) that, children's visualization of things they have not yet experienced, interpretation of meanings behind stories and development of language remain the positive consequences of mothers' effective implementation of story based pedagogy.

On the other hand, there was a possibility for children between the ages of zero to 59 months to be curious, thoughtful and to communicate effectively with others when their mothers read or strolled with them. Interestingly, majority (62.7%) of children would prefer to be read to at home especially by their mother (Ledger and Merga, 2018) and to leave home for a walk. Unfortunately, the findings revealed that just a handful of Cameroonian mothers utilized this pedagogical approaches and strategies. One possible explanation for this could be that, better educated mothers worked more in paid employment and spend less time interacting with their children at home. In line with other studies in this domain (Ermisch and Pronzato, 2010; Amber, et al., 2017) these results suggest that an increase in the presence of family members (like fathers) reading to children at home increases children's educational outcomes.

The general observation is that, enhancing endowment in maternal education would increase children's cognitive development through quality time spend playing, singing, telling stories, reading and strolling with a child. This is in consonance with Brofenbrenner's theory (1986) which noted that, when parents spend quality time within the home, school and community with a child, it affects the emotional, social, communication and self-regulating skills of the child positively. However, this observation is not true for Cameroon. The observed differences between mothers who used the different pedagogical approaches and strategies with those who did not, may account for their inability to effectively enhance their children emotional, social, communication and self-regulating skills.

Pedagogical implications for practice

Given the discussions presented in this study about the effects of maternal educational attainment on children's educational outcomes, it is appropriate to spell out the implications of this analysis to practice in childhood education:

Mothers should take a holistic approach to teaching their children. Indeed, they should integrate play based, song, storytelling and reading pedagogies with walking curriculum.

Mothers should cultivate the habit of spending quality time with their children. The strategies that mother could use at home to spend quality time on teaching their children include: playing, cracking jokes and laughing with them in order to promote physical fitness and cognitive growth; Singing traditional songs and music with them so as to improve their appreciation and communication skills; narrating educative stories to children so as to encourage play and enable them understand the values of stories; reading educative books with them in order to expose them to words not used in daily conversations and to inculcate in them the culture of reading; strolling with the child in order to create a bonding and trusting relationship with them.

The result of this study indicates that there are several pedagogical implications of the effects of maternal educational attainment on children's educational outcomes in Cameroon. This is because very few mothers use play based, song, story based and reading pedagogies or walking curriculum with their children instead of spending quality time with their children. In fact, the analysis shows that children's educational outcomes are probably affected by the time that their mothers are spending on interactive activities with them. Based on the findings, the following suggestions are presented as recommendations to mothers, caregivers and early childhood educators:

Mothers should attain higher level of education so as to effectively teach their children at home.

Mothers should create strong emotional bond with their children by spending quality time with them.

Schools should encourage and support their teachers to effectively and frequently use the different pedagogical approaches and strategies with their young learners throughout primary schools.

Schools should play a key role in effectively communicating the importance of continued use of active pedagogies (like play, song, reading and strolling) at home to mothers, caregivers and children.

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