PRIMARY EDUCATION AND LITERACY LEVELS AMONG WOMEN WITH LOW EDUCATIONAL ATTAINMENT IN ZAMBIA: ANALYSIS OF SECONDARY DATA

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ABSTRACT

Introduction: Primary education in Zambia remains the key determiner of literacy. However, there is little research on the relationship between primary education and literacy levels, independent from higher levels of formal education. This association is imperative, as primary education completion is the primary estimator of literacy in many developing countries.

Purpose: The paper assessed the relationship between primary education and literacy levels among women of low educational attainment in Zambia.

Methods: The study was interested in the women participants who responded to literacy questions during 2018 Zambia Demographic and Health Survey. This paper assessed the relationship between primary education and literacy, using the 2018 Zambia Demographic and Health Survey dataset. Given the study focus, the researcher restricted the analysis to a total sample of 6171 women respondents who had received at most a primary school level of education out of the total samples of 9959 women. Pearson's X^2 test and logistic regression analysis were the techniques for analysis.

Findings: There was a significant association between education level and whether or not women were literate X^2 (1) = 544.69, p < .000. Based on the odds ratio for the un-adjusted model, primary education level was indeed associated with literacy with an increase in odds of being literate (31.49 (20.37 - 48.69) times higher than for women with no formal education).

Recommendations: The study recommended further research using mixed methods to confirm various associations that have been observed in the study.

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PUBLIC INTEREST STATEMENT

Today, primary education remains the key determiner of literacy. This is because participation in higher levels of education remains at the lowest rates in many African countries, with Zambia ranking among the lowest. The study focuses specifically on women, whose literacy has garnered extensive international interest. Against this background, the researcher tried to assess the relationship between primary education and literacy levels among women of low educational attainment in Zambia using data from the 2018 Zambia Demographic and Health Survey. This study is important especially to the policy makers, teachers, nongovernmental organizations championing for women education and many others involved in the provision of adult literacy programmes for women with little or no formal schooling. The study will further help to clarify on the relationships between literacy and education and offers recommendations to examine others different ways in which women acquire literacy skills outside of the formal education system.

INTRODUCTION

Today, primary education remains the key determiner of literacy. However, there is little research on the relationship between primary education and literacy levels. This relationship is imperative, as primary education is the primary mean of literacy skills. Literacy encompasses the ability to read, write and make simple arithmetical calculations. According to UNESCO (2000), a literate person is a one who can both read and write a short, simple statement on his or her everyday life, while an illiterate person is one who cannot read and write. From a broader perspective is a functional literacy which is used in international discussions, that is, a person is considered literate when he or she can effectively engage in all activities in which literacy skills are required (UNESCO, 2015). A further review of literature on functional literacy is carried out in three different contexts: international discussions, adult literacy and general education. Though these definitions are similar, each is useful for a specific purpose in this analysis. UNESCO (2015) defines it in international discussions as the level of skill needed to function adequately in society, while Jarvis (1999) defines adult education in the form of adult life experience. Merriam, Caffarella and Baumgartner (2007) had earlier stated that "all adult learning begins with 'life experience'." It means that life experiences play a significant role in adult learning. Professor Jarvis explained further by giving an analogy that, "When my grandson comes home from school, we often ask him—what did you learn at school today? And, we expect a response! But if we ask adults—what have you learned from life recently? We might receive a different response" (Jarvis, 2012). He argued that many adults that may be asked to write down learning events find it extremely difficult because a great deal of our everyday learning is incident, pre-conscious, and unplanned.

In international discussion literacy estimation is based on adult literacy rate and youth literacy rate, where the former denotes the percentage of a population aged 15 and above who are literate and the latter as the percentage of those aged 15–24 years who are also literate. In this paper, data was collected on these two groups. However, not all of the Zambian women in this group have completed primary school (of 7 years). However, this may not mean that they are illiterate based on the definition of functional literacy above. Furthermore, there is a need to investigate the influence of primary education on literacy skill of women in the community as captured in the Zambia Demographic and Health Survey data set. World Bank (2018) estimated that the literacy rate among adult female (ages 15 and above) in Zambia is 83.08%. What is of interest in this study is that ever since the declaration of literacy as a Human Rights in 1948, estimates on adult literacy rate have been mainly based on educational attainment. For instance, many international organizations estimation of literacy is based on the educational attainment of a country of its citizens who have attained a certain level of education typically above primary school (World Bank, 2018; UNESCO, 2013; UNESCO, 2015). This practice is also common among scholars in the academia who often labels individuals and have never attended formal education as "illiterate" and those who have completed formal education, especially

primary school level as "literate" (Hughes and Schwab, 2010, p.48)

This study is further motivated by the assumption that women who went to primary school in some instances, many years ago learned how to read and have preserved the same skills through adulthood (Graff,2008). This is in contrast to today's women who manifest low academic skills despite many advantages that a modern school offers. Thus, this makes the researcher investigates the literacy levels of the women as captured by DHS. This study, therefore, assesses the relationship between primary education and literacy levels among women of low educational attainment in Zambia, using data from the 2018 Zambia Demographic and Health Survey (DHS). On the other hand, Hughes and Schwab (2010) argue that taking this assumption that all adults who have attained primary education can read is liable to overestimation of adult literacy. Additionally, Watkins (1999) advanced that this relates to the quantity-quality issue in education. For instance, in many low-income countries, including Zambia, school expansion has occurred rapidly (Ministry of Education, 2015). However, the increase in enrolments is not in tandem with school resources. Hence, the high numbers of students participating in schools have strained school systems, thereby interfering with the overall quality of education. At the same time, there are concerns of lack of school materials, lack of enough teachers and in some instances government spending on education is inefficient across the country which further compromises the quality of education (Ministry of Education, 2015). The other reason as Mohamed (2015) puts is that though many countries have compulsory primary education, school attendance is not compulsory, thus, leading to high rates of absenteeism among the students. That is, a person with primary education may have spent the entire years outside school; hence, affecting his achievement of academic proficiency. For instance, the Ministry of Education in Zambia reported a 91.8 per cent primary school completion rate at Grade 7 (2015). However, the transition rate was reported at 67.5 per cent from primary school to secondary school, mainly due to the lack of places to accommodate all primary school (Ministry of Education, 2015). This means many students with the potential to advance to secondary school, have no chance to enhance their academic proficiency further. Hence, primary education remains the only way to measure their literacy skills.

Furthermore, other barriers reported to affecting the transition rates include school fees introduced at grade 8, other costs related to education and long distances to many schools especially in rural areas (Ministry of Education, 2015). Additionally, the World Bank (2018) reported some considerable differences in the requirements to operate a school in an urban and rural setting. For instance, World Bank estimates show that 80 per cent of primary schools in rural areas are not electrified (2018). Further, they noted things like lack of physical facilities, school buildings, and the shortage of teaching and learning materials as other challenges that rural schools continue to face. Hence, merely assuming that someone is literate by having completed primary education may not be enough. On the other hand, are those against judging literacy based on Western-style of education who argues that by solely assuming that adults cannot read, based on the mere fact that they have not been to formal school could also underestimate literacy (Bakirdjian,2013; Aitchison, 2005). In many societies, today, as Bakirdjian (2013) puts it, opportunities to learn to read are not just restricted to formal education. That is, adults who have never been to formal school may have found some learning opportunities outside the formal system to learn how to read and write like from family members or through other ways. In Aitchison (2005), we find historical evidence across African societies that point to literary practices that precede far way before colonization and the introduction of Western-style schools. Hence, the point that people who have never been to formal school may not only have some reading abilities but also can engage in practical activities in their communities that require some forms of literacy.

Today, like Lankshear and Knobel (2008) puts it with the proliferation of adult education, people are acquiring literacy skills outside the formal school setting. Many studies have shown that in many countries, a large percentage of people have participated and continue to participate in an adult learning programmes

(Hughes and Schwab, 2010). Hillier (2005) further argues that participating in an adult literacy programme does not guarantee literacy just like formal school attendance. However, the point to drive home is that the presence of non-formal learning programmes in many countries, suggests that at least some people are acquiring literacy skills outside the formal education setup. Hence, the point here is that we need to acknowledge the limitations of estimating literacy solely on formal educational attainment.

STATEMENT OF THE PROBLEM

Studies examining literacy skills and health behaviour have found literacy to be an important predictor of a woman's likelihood of accessing healthcare for herself or her child. Previously, many researchers implicitly or explicitly treated literacy and education level as proxies for each other, despite their differences. However, there is little research examining the relationship between primary education and literacy levels, independent from higher levels of formal education. This dissociation is imperative, as primary education completion is the primary estimator of literacy in many developing countries. In international discussion especially by UNESCO one is categorized either as literate or illiterate, depending on whether or not he attained a certain cut-off point, usually primary education level. This dichotomous position is also an often practice in many countries who have adopted it in assessing the extent of national literacy problems in which such factors as grade-level attainment serve as the cut-off point (Kaestle, 1990). It is also relevant to take this fact, inferring literacy from data on educational attainment is a limitation in itself since schooling does not produce literacy in the same way everywhere. For example, evidence from national assessments shows that in many low-income countries, a large fraction of primary-school students cannot read a single word of a short text (Watkins, 1999). However, one would still argue that UNESCO literacy rates are mere estimation mostly based on education attainment whose validity can still be established by

assessing those who have learned under a formal curriculum. Against this background, the study assessed the relationship between primary education and literacy levels among women of low educational attainment in Zambia, using data from the 2018 Zambia Demographic and Health Survey (DHS).

PURPOSE OF THE STUDY

To assess the relationship between primary education and literacy levels among women of low educational attainment in Zambia.

RESEARCH QUESTIONS

1. What is the significant relationship between primary education and literacy levels, independent from higher levels of formal education?

METHODOLOGY

The research is quantitative in methodology with descriptive and comparative design methods. The descriptive and comparative designs are well suited for this study since the researcher thought to assess the relationship between primary education and literacy levels among women of low educational attainment in Zambia, using data from the 2018 Zambia Demographic and Health Survey (DHS).

Population and Sample

The study was interested in the women participants who responded to literacy questions during 2018 Zambia Demographic and Health Survey. The ZDHS followed a stratified two-stage sampling procedure to select men and women between 15-49 years of age who have low educational attainment (Central Statistical Office, 2018). Given the study focus, the researcher restricted the analysis to a total sample of 6171 women respondents who had received at most a primary school level of education out of the total sample of 9959 women who were surveyed during the 2018 Zambia Demographic and Health Survey. The researcher excluded women with secondary education or higher because they were assumed to be fully literate.

Table 1. Zambians Women with Primary Education Attainment

		Total (n = 6171)	Illiterate Group (n = 4129)	Literate Group (n = 2042)	Pearson X^2 test (df)	P-value
Age(Mean)			29.40	29.47		.75
Education Level	No Education	16.8%	24.7%	1.0%	(1) = 544.69	.000
	Primary	83.2%	75.3%	99.0%		
Religion	Catholic	16.8%	17.9%	14.6%	(1) = 10.35	.001
	Protestant	83.2%	82.1%	85.4%		
Marital Status	Single/Alone	19.7%	19.3%	20.6%	(1) = 1.6	0.23
	Married/Living with a Partner	80.3%	80.7%	79.4%		
Work Status	No	52.3%	53.4%	50.2%	(1) = 5.30	0.02
	Yes	47.7%	46.6%	49.8%		
Location	Urban	17.9%	15.9%	21.9%	(1) = 33.24	.000
	Rural	82.1%	84.1%	78.1%		
Age Group	Olde (35 and above)	27.8%	27.6%	28.3%	(1) = 0.31	0.58
	Young (Below 35)	72.2%	72.4%	71.7%		

The tables 1 above show that the mean age of the sample was 29.43, with a minimum age of 15 and the maximum age of 49. The analysis was conducted on a total sub sample of 6171 women with low educational attainment in Zambia. Table 1 above presents descriptive and correlations statistics for the total sample of 6171 women with primary education attainment. Of this simple, 4129 women were illiterate, and 2042 women were literate (67% and 33%, respectively). A high proportion of literacy was found among women in the literate group compared to the proportion of illiteracy among women in the illiterate group (99.0% versus 73.3%. A high proportion of women were protestant (85.4% were literate while 82.1% were illiterate, Seventy-eight percent 78.1% lived in the rural area and 84.1% were in the illiterate group). Additionally, a high proportion of women in both groups were married. They had a score of 79.4% in the literate group and 80.7% in the illiterate group, 50.2% of the women in the literate group had no job while 53.4% in the illiterate group had a job. The average age was 29.43, with a high proportion of women below 35 years old (71.7% in the literate group and 72.4% in the illiterate group). Furthermore, as presented in the table, there was a significant association between education level and whether or not women were literate $X^2(1) = 544.69$, p < .000. Among the covariates, religion, work status and location were significantly associated with literacy (X^2 (1) = 10.35, p < .001, X^2 (1) = 5.30, p = .02 and X^2 (1) = 33.24, p < .000, respectively). However, as with marital status and age group, no significant associations were found between them and literacy, (X^2 (1) = 1.6, p = .23 and X^2 (1) = .31, p = .58, respectively).

The simple logistic regression for education level as the main model was significant, and the goodness-of-fit test for this model was Chi-square (1) = 748.3, p < .00. R squared Cox. Snell = 0.014 and Nagelkerke = 0.10. The constant from the multiple adjusted logistic regression was −3.69, and the goodness-of-fit test for this model was Chi-square (6) = 791, p <00. R squared Cox.Snell = 0.012 and Nagelkerke = 0.10.

Instrument for Data Collection

The study used the 2018 Zambia Demographic and Health Survey (DHS) dataset after being granted access to the dataset by the USAID team.

Procedure for Data Collection

The 2018 Zambia Demographic and Health Survey tested the women literacy levels by asking them to read a sentence on a card, as shown by the interviewer. Based on the respondent's answer, the interviewer then recorded whether the respondent was able to read the entire sentence, parts of the sentence, or cannot read at all. The respondents were categorized as: fully literate, partially literate, or illiterate. For analysis the outcome of the variable of interest was dichotomized into two groups as: illiterate (if the respondent could not read and literate if the respondent could only read a part or the entire sentence). On the other hand, McKay (1993) advances that some people may take literacy as dichotomous based on whether or not someone has attained a certain cut-off point. Based on this, the researcher followed the cut-off point of whether the respondent could read the entire sentence or cannot read at all and categorize them as literate or illiterate. Additionally, the study presumed that it was full basic literacy (as assessed by the DHS, 2018) that would lead someone to read and answer questions. This position is similar to Yukyan, Broaddus and Surkan (2013) in their study on "literacy and healthcare-seeking among women with low educational attainment" using the same data set. The primary predictor was educational level coded as a nominal categorical variable, to include only women who indicated whether they had no formal education whatsoever or had primary school education. The covariates included socio-demographic variables. They were coded as follows: Age was dichotomous into two groups of those below 35 and those of 35 years and above. The work status included into two categories as yes "if working" or no "if not working". Religion included only two categories: Catholics and Protestants. Geographical location was coded at two categories: rural and urban while marital status was coded as widowed, divorced, or women who were married or living with a partner).

Method of Data Analysis

The study conducted all the analyses using R version 3.6.0. Firstly, the researcher conducted a descriptive analysis to analyse the literacy levels of women with a primary education background. Secondly, simple logistic regression analyses were performed on the outcome variable of literacy with primary education as a predictor in the initial analysis to assess the unadjusted impact of primary education and then also with each of the covariates. Last but not least, the study computed multiple logistic regression to examine the impact of primary education after adjusting for religion, marital status, work status, geographical location and age as potential covariates. The choice of this model is because the logistic technique of analysis allows the researcher to trust the logical result irrespective of adequacies of the data gathered, which is less supported using the linear regression method. The results of the logistic regression models were converted into odds ratios where values larger than one indicate a higher likelihood of being literate; odds ratios smaller than one indicate a smaller likelihood compared to other groups.

Data Access and Ethical Considerations

The DHS programme officially granted access to the data sets after submitting a request outlining the purpose of the analyses. The DHS contains de-identified secondary data and is considered exempt under human subjects' review.

RESULTS
Research Question 1: What is the significant relationship between primary education and literacy levels, independent from higher levels of formal education?

Table 2: Simple and Multivariate Logistic Regression

	Un-adjusted			Adjusted		
	B (SE)	OR (95%, CI)	P value	B (SE)	OR (95%, CI)	P-value
Education Level						
No Education	-3.88 (0.22)					
Primary	3.45 (0.22)	31.49 (20.37 - 48.69)	< .00	3.46 (0.22)	31.72 (20.50 - 49.06)	.00
Religion						
Catholic	-0.91(0.07)					
Protestant	0.24 (0.07)	1.27 (1.09-1.47)	< .001	0.26 (0.08)	1.29 (1.11 - 1.51)	.001
Marital Status						
Single/Alone	-0.64(0.06)					
Married/Living with a Partner	-0.09(0.07)	0.92 (0.80 - 1.05)	.21	-0.09(0.07)	0.92 (0.79 - 1.05)	0.22
Work Status						
No	-0.76(0.04)					
Yes	0.12 (0.05)	1.13 (1.02 - 1.26)	.02	0.08 (0.06)	1.08 (0.96 - 1.21)	0.17
Location						
Urban	-0.39(0.06)					
Rural	-0.39 (0.07)	0.68 (0.59-0.77)	< .000	-0.32(0.07)	0.72 (0.63-0.83)	.00
Age group						
Olde (35 and above)	-0.68(0.05)					
Young (Below 35)	-0.03(0.06)	0.97 (0.85-1.09)	= .58	-0.16(0.06)	0.85 (0.75 - 0.97)	.01

Table 2 shows the results from Simple and Multivariate Logistic Regression for Un-adjusted OR and Adjusted OR of being literate among women of low education level in Zambia. In the unadjusted model, for women with low education levels, the odds of women being literate were 31.49 (20.37 - 48.69) times higher for women with primary education level than for women with no formal education. After adjusting for religion, marital status, work status, location and age, the odds of women being literate were 31.72 (20.50 - 49.06) times for women with primary education level compared to women with no formal education. Among the covariates, the significant predictors of being literate were religion, work status and location, indicating that Protestant women, women who were working and women in rural areas, were 1.27 (1.09-1.47), 1.13 (1.02 - 1.26) and 0.68 (0.59-0.77) times likely to be literate compared to Catholic women, women with no work and women in urban areas respectively.

DISCUSSIONS

The study's main question was whether there is a relationship between primary education and literacy levels among women of low education levels. The above analysis revealed that, among these women, Pearson's X^2 the test indicated

that low education level was significantly associated with literacy. Additionally, based on the odds ratio for the un-adjusted model, primary education level was indeed correlated with literacy with an increase in odds of being literate. The relationship remained significant even after accounting for religion, marital status, work status, location and age. Following these analyses, primary education level was a statistically significant predictor of literacy in both the adjusted and unadjusted models. Thus, this

provides support for those justifying for the continuous reliance on educational attainment to generate population estimates of literacy rates as an intermediary, that is, adults who have completed typically primary education level as "literate" and those who have not as "illiterate" (World Bank, 2018; UNESCO, 2015). On the contrary, overall statistics showed that majority of women were illiterate. Study results revealed that a high proportion of women with primary education were illiterate. The study findings attribute the low level of academic proficiency among women in primary schools due to underachievement in higher levels of education (Lankshear & Knobel, 2008). Further, we may also associate poor performance to absenteeism and prolonged periods out of school. This position is in line with Mohamed (2015) who puts it that though many countries have compulsory primary education, school attendance is not compulsory, thus, leading to high rates of absenteeism among the students. That is, a person with primary education may have spent the entire years outside school; hence, affecting his achievement of academic proficiency.

Interestingly, the covariates of marital status and age were not statistically significantly associated with literacy following Pearson's X^2 test. Incidentally,

marital status was the only covariate that was not a statistically significant predictor of literacy in either the unadjusted or adjusted models, while age was significantly associated with literacy only in the adjusted model. The results seem to suggest that husbands or partners maybe less supportive of women education in Zambia. As Silberschmidt (1999) pointed out, in Africa, traditionally, the male as the head of the household was the decision-maker and controller of all wealth, such as land, money and labour, which included women. However, further research may be needed to understand men's attitude towards women empowerment in Zambia. Furthermore, a statistically significant Pearson's X^2 test of associations was found

among the covariates of religion, work status and location. Also, religion, work status and location were found to be strong predictors of literacy both in the unadjusted

or adjusted models, on the other hand, in exception of location, religion and work status had an increase in the odds of being literate among women of low education level in Zambia. Suggesting that women of low education level might be acquiring basic literacy skills through some non-formal learning activities outside the formal education setup through religious organizations and work places. Bakirdjian (2013) argued by only assuming that adults cannot read, based on the mere fact that they have never gone to school, we could be underestimating literacy. As established in this study among the covariates, religion and workplace are strongly associated with literacy among women with low education levels in Zambia. Though, a separate study is relevant, we may hypothesize, therefore, that women learn necessary literacy skills through adult learning in churches or at the work place. Similar to Hughes and Schwab's (2010) conclusion that in many countries, a large proportion of people have participated and continue to participate in an adult learning programme.

On the other hand, the finding seemed to confirm that location is a barrier. The study reports a high proportion of illiteracy among women with low levels of education from the rural area. Besides, the rural area was found to be associated with a decrease in the odds of being literate. This points to high inequalities in the delivery of education between urban and rural areas in Zambia. World Bank (2018) estimates show that 80 per cent of primary schools in rural areas are not electrified. However, the paper refrained from over-interpreting these results given the limitation of the DHS method of assessing literacy as appointed out above in the method section, and because, as established other women with no formal education also manage to become literate. Even though religion and work status were found to be strongly associated with literacy, the study cannot infer that these women acquire basic literacy skills through churches or workplace because it is unable to control for and later claim causality without a clear study design that can infer causality. However, the study results are consistent showing that primary education is associated with literacy levels, independent from higher levels of formal education. Taken together with Pearson's

X^2 test, the logistic regression analysis for literacy as the outcome variable indicated that primary education is indeed associated with being literate among women of low education level in Zambia.

CONCLUSIONS

Educational attainment data are essential for several reasons beyond the narrow focus of this study. Since educational data not only offer accurate ways of estimating global adult literacy but also contribute to social science literature concerning the consequences of education. However, it is worth noting that since this study used secondary data for its analysis, no causality is claimed. In summary, the study acknowledges the deficiencies mentioned above associated with the DHS dataset. As mentioned before the DHS uses a simple method for assessing literacy, which fails to take into account the multiple types of literacy that have been identified and the fact that literacy skills lie along a continuum (McKay, 1993). Hence, the study hopes that in the future integrated methods of assessing literacy can be adopted by the DHS. However, despite all these limitations, the DHS dataset is still valuable, given that it contains a large, nationally representative sample. Additionally, DHS surveys generally have the same questions. Thus, the analysis of this study is subject to comparisons across surveys.

The study's findings provided support for the relationship between primary education and literacy levels, independent from higher levels of formal education. Hence, providing evidence for using educational attainment to estimate literacy rates. That is, primary education is still relevant and valid as a predictor of literacy. On the other hand, the study observed that solely relying on primary education to estimate literacy; we may be underestimating it given strong associations that have been found among the covariates of religion and workplace.

RECOMMENDATIONS

The study recommends for integrated methods of estimating literacy. Additionally, the study recommends further research using mixed methods to confirm various associations that have been observed in the study. The study recommends for longitudinal research to establish aspects of literacy programmes that could be tailored to women of low educational attainment which may be especially important for women unable to return to formal schooling.

Conflicts of Interest
The author declares no conflict of interest.

Disclaimer Statement
The opinions expressed in this study are those of the author and do not represent the official position of the Department of Measurement and Evaluation in Education.

Notes on Author
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