

**The Intersection of Gender, Education, and Health: A Community-level Survey of
Education and Health Outcomes for Women in Southeastern Togo**

Trevor V. Mattos, Miranda Adams MacKinnon, Dorothy F. Boorse

Gordon College: BIO381 Public Health Research

15 May, 2012

Abstract

Gendered education and health outcomes are of great importance for developing regions of the world where low standards of human health and low levels of education persist. Low levels of female education are common in low-income countries, where priority is often given to educating boys. The literature demonstrates that, in the African context, gendered education affects family health. Our research examined gendered education and health outcomes at the community level in southeastern Togo. Very few studies document the socio-economic realities for women in southeastern Togo, and fewer still evaluate community-level data for these variables. Data from the community of Ganavé, Maritime, Togo were collected by way of a household survey—administered home-to-home by field researchers. Data were analyzed using SPSS. Chi-square tests were used to assess the relationship between levels of maternal education and several measures of family or community health. We found that levels of education were much lower among mothers than they were among fathers, but that education levels were very low for both. Maternal education, in particular, was found to be a significant determinant of family hygiene and sanitation, identification of intestinal worms as a health problem, and home birth rates. Analysis of child labor, school attendance, and child mortality variables was precluded by our small sample size. These data seem to support the idea that higher rates of female education in the West African sub-region would be expected to have a positive effect on maternal health, as well as family and community health. Our data from Ganavé, a village community in southeastern Togo, support the findings of other studies in sub-Saharan West Africa, that maternal education affects family health. Further research, with samples from a broader range of economic strata and possibly degrees of urbanization, may assess the strength of the relationship between female education and family health in West Africa.

Introduction

Women's education and health are related issues that bear on the lives of hundreds of millions of girls and women throughout the developing world. Low levels of education for girls and women lead to negative health outcomes for women and their communities.

In developing countries female education levels are much lower than male levels. The gendered education gap in schools throughout the developing world is disconcerting because low education levels influence disease prevention, fertility, and mortality rates for women in the developing world. Educated women attain higher socioeconomic status and are better able to sustain themselves and their families.

In a cross-country analysis, Smith & Haddad (1999) found that educating women led to more productive farming, which caused a decline in malnutrition. In Zambia, HIV infection rates were lower among more educated women (de Walque 2004). Educated women also choose to have fewer, safer pregnancies. The evidence shows that women's fertility declines as education levels increased (Klasen 1999; Herz & Sperling 2004; Tuman *et al.* 2007). Decreased fertility improves family health, quality of life, and life expectancy (King & Hill 1993). Lester *et al.* (2010) estimate that 530,000 women die annually from pregnancy-related causes. But evidence from Bangladesh, for example, shows that improved family planning and fertility decline, linked to female education, led to a 50% reduction in maternal mortality (Lester *et al.* 2010). By increasing knowledge about health care practices and reducing the average number of pregnancies, female education significantly reduces the risk of maternal mortality (Summers 1994).

Rustein (2000) notes that education may positively affect nutrition, use of health services,

childcare practices, food preservation, and household cleanliness. The literature widely demonstrates that educated women raise healthier communities. One key indicator of this is reduced child mortality as a result of increased maternal education (Huq *et al.* 2007). Kinney *et al.* (2010) find that child mortality rates are 50% lower for primary-level educated mothers than they are for uneducated mothers. And Mellington and Cameron (1999) find that each year of a mother's primary school reduced child mortality risk by 1.7%, and each year of secondary school by 2.0%. Pena *et al.* (2000) assert that educated mothers have a higher chance of meeting child needs, including using preventative and treatment-based health services.

UNESCO studies have shown that the gendered education and health outcomes are highly concentrated in South Asia and sub-Saharan Africa (Herz & Sperling 2004). In sub-Saharan Africa, more than half of girls – about 54 percent – do not complete primary school (Bruns *et al.* 2003). In Chad, 90 percent of all 15 –19-year-old girls had not completed primary school and in Burkina Faso, 80 percent had not done so (Filmer 1999). More recently, Ojogwu (2009) found gender disparity in school enrollment in Nigeria, despite MDG efforts to reduce gender-based education disparities. A 2006 survey of primary school attendance in Nigeria found gender discrimination to be a significant impediment to school attendance (Iyamu & Obiunu).

In Ghana, maternal reproductive health care services remain socially stigmatized for rural Ghanaian women (Yakong 2010). Despite recent reductions in maternal mortality in Ghana, rates remain unacceptably high (Gumanga *et al.* 2011). And rural African women in Ghana continue to be educationally disadvantaged (Shabaya & Konadu-Agyemang 2004). Data from Ghana show reduced maternal mortality as a result of increased education levels (Lester *et al.* 2010).

Studies in West Africa link education to health improvements. Evawoma-Enuku *et al.* (2010) evaluate literacy and health outcomes in Nigeria, claiming that literacy is critical for

improved health. Ikeako *et al.* (2006) found formal maternal education to be a significant indicator of choice of health services for delivery in Nigeria. Usman (2009) found increased personal health empowerment, minimized reproductive morbidities, better family planning, better nutrition, improved hygiene and sanitation, and improved child healthcare with educated rural Nigerian women.

In West Africa, long-term gains of girls' education include: higher family income, better-nourished and healthier families; even primary educated girls raise healthier and more educated families than uneducated girls (Tuwor & Sossou 2008). In Togo specifically, high rates of poverty persist, with 75% of the population, particularly in rural areas, having difficulty meeting basic health, education, nutritional, and housing needs. The most recent World Bank data show 61.7% of the total population beneath the poverty line, 56-year life expectancy, and a 57% literacy rate. The World dataBank records show there are 81,473 female children out of primary school, compared to only 5,830 male children (WB 2000), and primary school completion rates for males and females are 84% and 64%, respectively. The rate of secondary school participation among females in Togo is 35%, up from 25% in 1990 (WB 2010). Adult literacy is at 44% for females and 70% for males (WB 2006). Youth literacy rates are 68% female and 85% male (WB 2006). Maternal mortality was last recorded at 478 per 100,000 women (WB 1998) and fertility is 4 live births per woman (WB 2009).

Community-level survey data are helpful, if not readily available, for studying public health demographic trends in sub-Saharan West Africa. Some recent survey-based public health studies in West Africa have focused on genital cutting (Morison *et al.* 2001), child mortality and healthcare access (Rutherford *et al.* 2009), and hypertension (Cappuccio *et al.* 2004). Community-level surveys and comparative studies offer helpful qualitative and quantitative data

analysis mechanisms for evaluating public health outcomes. Public health research on smaller, less populous, sub-Saharan African nations is not well represented in the current literature. And very few, if any, studies deal with community-level gender, education, and health data in Togo. Primary source community-level data is important for understanding specific cases within the broader context, for developing a more nuanced understanding of broad patterns in public health. This study seeks to document the exact gender-related health and education outcomes for the population of Ganavé, a particular Togolese community in southeastern Togo. Researchers disclosed the results of this study to the non-profit organization Clinics of Hope, Massachusetts. Clinics of Hope will use our data to craft public health programs specific to the population of Southeastern Togo.

Methods

This survey examined the population of Ganavé, a rural community in southeastern Togo, on the Togo-Benin border. Research procedures were carried in accordance with the requirements of the Gordon College Institutional Review Board, which determines appropriate protocol for research involving human subjects.

The locale and design of this study were selected in consultation with local, indigenous health workers, and experienced medical practitioners. Field research staff included principle investigators, an independent translator, and a local Togolese community health worker. The details and the purpose of the study were fully disclosed to community leaders as well as all household respondents. Principle investigators obtained consent from village elders before

conducting the population survey between 4 June 2011 and 7 August 2011. Prior to administering each individual survey, respondents were informed that they had the right to abstain from the study, or any question they wished to pass over within the survey. Given relatively low literacy rates, researchers read aloud an informed consent document in English, French, and *Ewe*, the local dialect. All respondents chose to participate by giving verbal consent, and all were interviewed in their own language.

Researchers surveyed thirty-five households, which provided data for 268 individuals (including 64 deceased). Individual-level questions were mixed with household-level questions in the questionnaire. Of the 268 individuals, 204 were living and 64 were deceased. Data were recorded for 109 males and 105 females. Sex was undetermined for 54 individuals, all of whom were deceased. The mean age for both living and deceased was 22.97 years. For deceased individuals, the mean age was 15.12 years, while for living individuals it was 25.43 years. Mean ages for males and females were 25.31 years and 27.48 years, respectively.

Survey questions were separated into four sections: (I) Individual household member data, (II) Mortality Data, (III) Family and community health data, (IV) and work and education data. Questions addressed a broad range of public health factors including questions of gender, age, child mortality, fertility, STH infection rates, health services, infectious disease, sanitation and hygiene, and educational levels.

Relationships between variables were tested using chi-square, crosstabular analysis, and various measures of association. Seven variables were used to statistically test for relationships: (1) sex, (2) maternal education, (3) paternal education, (4) hand washing, (5) latrine use, (6) identification of intestinal worms as a health problem, (7) home births (*Note that crosstabular analysis of child labor, school attendance, and child mortality revealed low cells counts, due to

our small sample size, and no further testing was done). Data analysis was performed using SPSS version 19.0 (SPSS 2010).

(1) The variable sex was a nominal level variable, defining the gender of each individual responding to the survey. (2) The maternal education variable was an ordinal level variable that defined how educated the mother of each household was. Values for maternal education were “less than primary level education”, “primary level education”, “secondary level education”, “tertiary level education” (however, no mothers had attained a tertiary level of education and so it does not appear in any representations of the data). (3) The variable paternal education was an ordinal level variable that defined how educated the father of each household was. Values for paternal education were “less than primary level education”, “primary level education”, “secondary level education”, “tertiary level education”. (4) The hand washing variable was treated as an ordinal level variable and explained whether or not members of the household washed their hands with soap – values: yes, no. (5) The latrine use variable was treated as an ordinal level variable and determined whether household members defecated in a latrine or in different places in the bush. Values for latrine use were “latrine” or “in the bush, different places”. (6) The variable identification of intestinal worms as a health problem was treated as an ordinal level variable, and determined whether households considered intestinal worms to be a major problem for health or not – values: yes, no. (7) The home births variable was treated as an ordinal level variable and measured the rates of home births among mothers in the community. Values for home births were “yes, mother gave birth in home” or “no, mother did not give birth in home”.

We first tested the hypothesis that: (a) sex affects level of education of mothers/fathers, where sex is the independent variable, and parents’ level of education is the dependent variable.

In the case where the null hypothesis was rejected, we tested the following hypotheses: (b) levels of maternal education affect rates of household hand washing, (c) levels of maternal education affect rates of household latrine use, (d) levels of maternal education affect identification of intestinal worms as a health problem, (e) levels of maternal education affect home birth rates.

Results

Education levels in Ganavé varied significantly between sexes. Figure 1 shows that of the 35 households surveyed, 23 (65.71%) households had mothers with less than a primary level education, 9 (25.71%) households had mothers with a primary level education, 3 (8.57%) households had mothers with a secondary level education, and there were no households that had mothers with a tertiary level education. In the community surveyed, 173 (64.55%) individuals were members of a family whose mother had less than a primary level education, 84 (31.34%) individuals were members of a family whose mother had a primary level education, 11 (4.10%) individuals were members of a family whose mother had a secondary level education, and there were no individuals that were members of a family whose mother had a tertiary level education.

Household-level data for Mother's and Father's level of education

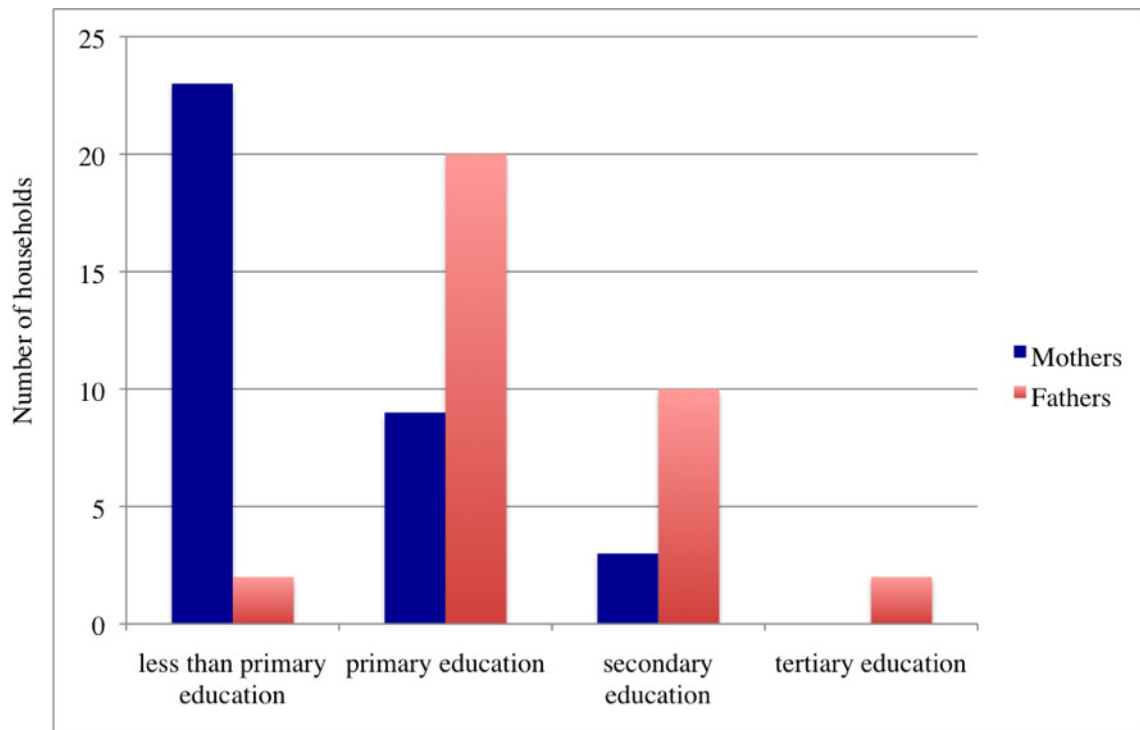


Figure 1: Levels of Education for Mothers and Fathers from a Community Survey of 35 households in Southeastern Togo (2011)

Alternatively, 2 (5.88%) households had fathers with less than a primary level education, 20 (58.82%) households had fathers with a primary level education, 10 (29.41%) households had fathers with a secondary level education, and 2 (5.88%) households had fathers with a tertiary level education (see figure 1). There were 21 (7.92%) individuals that were members of a family whose father had less than a primary level education, 154 (58.11%) individuals were members of a family whose father had a primary level education, 83 (31.32%) individuals were members of a family whose father had a secondary level education, and 7 (2.64%) individuals were members of a family whose father had a tertiary level of education. We found a significant relationship between sex and mother's/father's level of education, using chi-square as a test statistic ($\chi^2 = 27.57$; $df=3$; $p<0.005$) (Agresti & Finlay 2009). This relationship was confirmed using the

lambda (λ) proportionate reduction error (P.R.E.) measure of association, which showed a weak to moderately strong relationship exists between sex and mother's/father's level of education ($\lambda=0.35$).

Figure 2 compares maternal education with various indicators of health in the community. Rates of hand washing for households in our sample increase along with mother's level of education. For households where the mother had less than a primary level education, 58.4% of individuals did not wash their hands with soap and 41.6% of individuals did wash their hands with soap. For households where the mother had a primary level education, 15.5% of individuals did not wash their hands with soap and 84.5% of individuals did wash their hands with soap. For households where the mother had a secondary level education, 0.0% of individuals did not wash their hands with soap and 100.0% of individuals did wash their hands with soap. We found a significant relationship between maternal education and hand washing, using chi-square as a test statistic ($\chi^2 = 51.077$; $df=2$; $p<0.005$). This relationship was confirmed using the gamma (γ) P.R.E. measure of association, which showed that a strong positive linear relationship exists between maternal education and hand washing ($\gamma=0.800$).

Maternal Education and Indicators of Health for Individuals in Ganavé

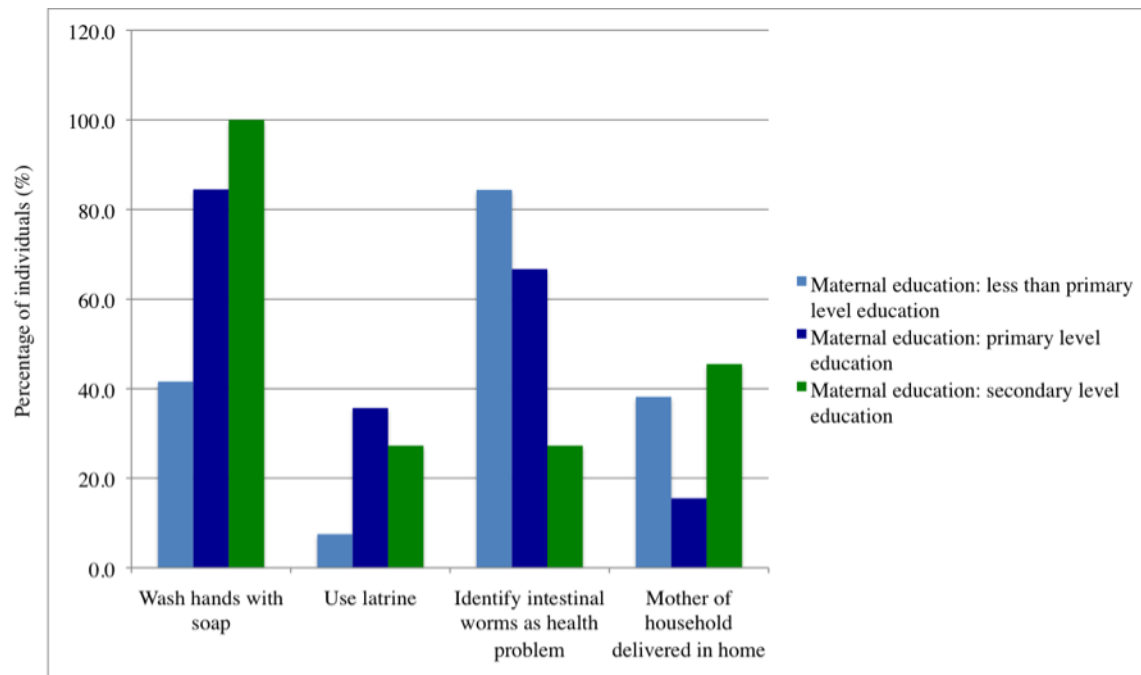


Figure 2: Relationships between Levels of Maternal Education and Various Indicators of Health from a Community Survey of 35 households in Southeastern Togo (2011)

A similar relationship exists with respect to maternal education and latrine use. For individuals from households where the mother has less than a primary level education, 92.5% use different places in the bush and 7.5% use latrines. For individuals from households where the mother has a primary level education, 64.3% use different places in the bush and 35.7% use latrines. For individuals from households where the mother has a secondary level education, 72.7% use different places in the bush and 27.3% use latrines. We found a significant relationship between maternal education and latrine use, using chi-square as a test statistic ($\chi^2 = 30.634$; $df=2$; $p < 0.005$). This relationship was confirmed using gamma, which showed that a moderate to strong positive linear relationship exists between maternal education and latrine use ($\gamma = 0.672$).

Analysis of maternal education and respondents' indication of whether intestinal worms

were a health problem revealed a significant relationship as well. For households where the mother has less than a primary level education, 84.4% of individuals cite intestinal worms as a health problem and 15.6% do not. For households where the mother has a primary level education, 66.7% of individuals cite intestinal worms as a health problem and 33.3% do not. For households where the mother has a secondary level education, 27.3% of individuals cite intestinal worms as a health problem and 72.7% do not. We found a significant relationship between maternal education and indication of intestinal worms as a health problem, using chi-square as a test statistic ($\chi^2 = 25.335$; $df=2$; $p < 0.005$). This relationship was confirmed using gamma, which showed that a moderately strong negative linear relationship exists between maternal education and indication of intestinal worms as a health problem ($\gamma = -0.546$).

Figure 2 also shows the relationship between maternal education and home births. For households where the mother has less than a primary level education, 38.2% gave birth at home and 61.8% did not. For households where the mother has a primary level education, 15.5% gave birth at home and 84.5% did not. For households where the mother has a secondary level education, 45.5% gave birth at home and 54.5% did not. We found a significant relationship between maternal education and home births, using chi-square as a test statistic ($\chi^2 = 14.570$; $df=2$; $p < 0.005$). The strength of the relationship was assessed using the gamma, which showed that a weak to moderately strong negative linear relationship exists between maternal education and home birth rates ($\gamma = -0.378$).

This study sought to address the question: Do levels of maternal education affect various indicators of health in communities of Southeastern Togo? The literature shows that maternal education does affect health in various parts of the world, but very few studies exist on Togo. The extent to which maternal education affects human health could increase support for girls and women's education and improve health in this particular region of West Africa. Several hypotheses related to maternal education and family health were tested. Community-level data from Ganavé, a village in southeastern Togo, demonstrated significant relationships between sex and mother's/father's level of education (χ^2 ; $p=0.000$; $\lambda=0.35$); maternal education and hand washing (χ^2 ; $p=0.000$; $\gamma=0.800$), latrine use (χ^2 ; $p=0.000$; $\gamma=0.672$), indication of intestinal worms as a health problem (χ^2 ; $p=0.000$; $\gamma=-0.546$), and home birth rates (χ^2 ; $p=0.001$; $\gamma=-0.387$). The small size of our sample prevented us from testing child mortality, child labor, and school attendance against maternal education.

As we expected, our community data showed that maternal education has a positive effect on various measures of family and community health. Mothers with a high level of education had a higher probability of raising families that regularly washed their hands with soap than mothers with a low level of education. Mothers with a high level of education had a higher probability of having families that used a latrine than mothers with a low level of education. Mothers with a high level of education had a higher probability of having families who did not cite intestinal worms as a health problem than mothers with a low level of education. Mothers with a high level of education had a higher probability of not giving birth at home than mothers with a low level of education. But there are some limitations to the variables measured and to the results of this study.

The survey and research protocol for this study were written in English, while the

national language in Togo is French. Still, little French is spoken in many rural communities, where local dialects are the most frequently spoken language. In Southeastern Togo most village communities use the *Ewe* dialect. All survey procedures were conducted in English, translated to French, and then translated to *Ewe*. Respondents' answers were translated from *Ewe* or French back to English and recorded. It is possible that the exact meaning of some terms in the questions was skewed in the translation process. For example, the location of child births included multiple options such as clinic, government clinic, hospital. The meanings of these words may be different in *Ewe*, and this may have affected our results (though translators explained at length, in consultation with researchers).

An inconsistency also arose with the question of home birth rates, where secondary educated mothers gave birth at home more frequently than mothers with a primary level or less than a primary level education. This is likely attributable to the low sample size of mothers with a secondary level of education. A larger sample of secondary educated mothers may have yielded different results.

The latrine use variable was also problematic in that the definition of a latrine was not very clear to respondents. It was difficult in the course of the survey to distinguish between a proper latrine and one that a respondent may have constructed improperly. Nevertheless, researchers defined a latrine as a closed (not open-air) structure. Though a significant relationship was found, the pattern is disrupted at the secondary level of education. In our sample, secondary educated mothers registered less latrine use than primary educated mothers. This too is likely due to the small sample size for secondary educated mothers.

Mortality data came with a certain level of uncertainty as well. Often times the age of the deceased was estimated. It was difficult to gauge the extent to which ages were unknown or

incorrectly estimated. Explanations of deaths were also rather ambiguous at times. Many family members guessed as to why another family member may have died. Malaria was a very common and reasonable response. However, witchcraft and unexplainable seizures were also cited several times. The survey did not ask the gender of those deceased, though at times it was provided. Knowing the gender of all the deceased would have enabled researchers to ask important questions about gender and mortality. Were education levels gathered on those deceased, the data may have enabled researchers to further explore the connection between health and education for communities in Southeastern Togo.

Data for intestinal worm infection rates was also problematic. The variable ‘indication of intestinal worms as a health problem’ did not measure intestinal worm infection rates, but whether respondents considered intestinal worms a major problem for health or not. Respondents who chose that intestinal worms were not a problem may or may not have had lower incidence of intestinal worm infections. In fact, indication of intestinal worms as a health problem may increase with maternal education in the population because more educated mothers may be more aware of intestinal worms. However, the results of the hypothesis test suggest that as maternal education increases, intestinal worm infection rates decrease (this assumes mothers can properly identify when a family member is infected with intestinal worms). Given these caveats and limitations, the results of our data analysis do seem to indicate a positive relationship between maternal education and health.

These indicators of family and community health have demonstrated positive relationships with higher levels of maternal education (which are very low compared to those of fathers). Hypothesis testing confirmed that these particular relationships, as demonstrated in the community of Ganavé, likely exist in the general population as well. The results of this study

indicate that maternal education levels are low in Southeastern Togo, and that levels of maternal education have a significant effect on various indicators of family health in Southeastern Togo. Our data from Southeastern Togo are consistent with country-level studies from various parts of Africa, including other sub-Saharan West African nations (Herz & Sperling 2004; Bruns *et al.* 2003; Pena *et al.* 2000). Our data seem to indicate that higher levels of maternal education could improve human health in Southeastern Togo. Further research and perhaps more sophisticated quantitative analysis may strengthen this assertion.

This paper documents the exact gender-related education and health outcomes for the population of a remote community in southeastern Togo. Community-level studies in this region are scarce. It is questionable whether any study has recorded gender-related health and education data from southeastern Togo. In general, West Africa is an under-researched region of the world. Current data –specific to issues of gendered health and education outcomes– are lacking in World Bank and WHO databases.

Our results seem consistent with various studies that evaluated the relationships between gender and health, and gender and education in sub-Saharan Africa. However, our small sample may be the cause of some inconsistencies in general patterns (e.g. home birth rates spike for secondary level educated mothers, deviating from downward trend). One specific place where our small sample size is particularly problematic is with secondary level-educated mothers. Due to the fact that so few mothers have a secondary level education (and no mothers have a tertiary level education), some relationships may be less representative of the population from which the survey was drawn. A larger sample size would help to minimize the effects of random deviations from the general patterns observed in our sample. A greater range of education levels may also yield more robust results. Were levels of education measured as number of years, rather than

highest level of education completed, more rigorous statistical testing may have been conducted.

It is also important to note that maternal education levels were repeatedly tested against various indicators of health. Repeated testing increased the risk of type 1 error and may have weakened the strength of our statistical analysis and the assertions based on the statistical analysis.

There remain some other important questions that this study did not cover. Further work in these areas may be helpful and make important contributions to the literature and to our understanding of the social determinants of health in Southeastern Togo. Does maternal education have a significant effect on fertility, child mortality, or maternal mortality in Southeastern Togo? Rigorous research and analysis of these questions may support the broader hypothesis presented in this study, that maternal education does effect indicators of health in Southeastern Togo.

Literature Cited

Agresti, Alan and Barbara Finlay. 2009. *Statistical Methods for the Social Sciences*, fourth edition. Upper Saddle River, NH: Prentice-Hall.

Bethony, Jeffrey, Simon Brooker, Marco Albonico, Stefan M Geiger, Alex Loukas, David Diemert, and Peter J Hotez. 2006. Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. *The Lancet*, 367: 1521-32.

Bruns, Barbara, Alain Mingat, and Ramahatra Rakotomalala. 2003. *Achieving Universal Primary Education by 2015: A Chance for Every Child*. Washington, D.C.:

World Bank.

Cappuccio, Francesco P., Frank B. Micah, Lynsey Emmett, Sally M. Kerry, Samson Antwi,

Ruby Martin-Peprah, Richard O. Phillips, Jacob Plange-Rhule and John B. Eastwood.

2004. Prevalence, Detection, Management, and Control of Hypertension in Ashanti, West Africa. *Hypertension* 43: 1017-1022.

De Walque, Damien. 2004. "How Does Educational Attainment Affect the Risk of Being

Infected by HIV/AIDS? Evidence from a General Population Cohort in Rural Uganda."

Working Paper, World Bank Development Research Group. Washington, D.C.

Evawoma-Enuku, Usiwoma, Mabel Oyitso, Christie Akpoigho Enuku. 2010. Health Literacy and

the Millennium Development Goals in Nigeria. *Education* Vol. 131 No. 1: 106-112.

Filmer, Deon. 1999. "The Structure of Social Disparities in Education: Gender and

Wealth." Policy Research Report on Gender and Development, Working Paper Series

No. 5, World Bank Development Research Group/Poverty and Human Resources.

Washington, D.C.

Garcia, Marito, Alan Pence, and Judith L. Evans. 2008. *Africa's Future, Africa's Challenge:*

Early Childhood Care and Development in sub-Saharan Africa. The World Bank:

Washington, DC. 525 pp.

Gumanga, S.K., D.Z. Kolbila, B.B.N. Gandau, A. Munkaila, H. Malechi, and K. Kyei-Aboagye.

2011. Trends in Maternal Mortality in Tamale Teaching Hospital, Ghana. *Ghana Medical*

Journal Volume 45, Number 3: 105-110.

Herz, Barbara, and Gene B. Sperling. (2004) *What Works in Girls' Education: Evidence and*

Policies from the Developing World. *Council on Foreign Relations*, pages 1-20.

Huq, Mohammed Nazmul, and Tarana Tasnim. *Maternal Education and Child Healthcare in*

- Bangladesh. 2007. *Maternal & Child Health Journal*, 12:43-51.
- Ikeako, L.C., H.E. Onah, and G.C. Iloabachie. 2006. Influence of formal maternal education on the use of maternity services in Enugu, Nigeria. *Journal of Obstetrics and Gynaecology*, 26(1): 30-34.
- Iyamu, Ede O.S. and Jude J. Obiunu. 2006. The Dilemma of Primary School Attendance in Nigeria. *Journal of Instructional Psychology*, Vol. 33, No. 2: 147-153.
- King, Elizabeth M., and M. Anne Hill. (1993). *Women's Education in Developing Countries: Barriers, Benefits, Policies. Published for the World Bank, The Johns Hopkins University Press, Baltimore & London, 337 pages.*
- Kinney, Mary V., Kate J. Kerber, Robert E. Black, Barney Cohen, Francis Nkrumah, Hoosen Coovadia, Paul Michael Nampala, Joy E. Lawn. 2010. Sub-Saharan Africa's Mothers, Newborns, and Children: Where and Why Do They Die? *Plos Medicine*, 7:6.
- Kirwan, Patrick, Samuel O Asaolu, Síle F Molloy, Titilayo C Abiona, Andrew L Jackson, and Celia V Holland. 2009. Patterns of soil-transmitted helminth infection and impact of four-monthly albendazole treatments in preschool children from semi-urban communities in Nigeria: a double-blind placebo-controlled randomized trial. *BioMed Central, Infectious Diseases*, 9:20.
- Klasen, Stephen. 1999. "Does Gender Inequality Reduce Growth and Development? Evidence from Cross-Country Regressions." Policy Research Report on Gender and Development Working Paper No. 7. Washington, D.C.
- Lester, Felicia, M.D., M.P.H., Nerys Benfield, M.D., and Mohamed M.F. Fathalla, M.D. (2010). *Global Women's Health in 2010: Facing the Challenges. Journal of Women's Health*,

vol. 19, no. 11, pages 2081-2089.

- Mellington, Nicole, and Lisa Cameron. 1999. Female Education and Child Mortality in Indonesia. *Bulletin of Indonesian Economic Studies*, 35: 115-44.
- Morison, Linda, Caroline Scherf, Gloria Ekpo, Katie Paine, Beryl West, Rosalind Coleman, Gijs Walraven. 2001. The long-term reproductive health consequences of female genital cutting in rural Gambia: a community-based survey. *Tropical Medicine & International Health*, 6:8, pages 643-653.
- Ojogwu, Emma. 2009. Structural Adjustment and Gender Access to Education in Nigeria. *Gender & Education*. 9:2, pp. 161-178.
- Omwami, Edith Mukudi, and Edmond J. Keller. 2010. Public Funding and Budgetary Challenges to Providing Universal Access to Primary Education in sub-Saharan Africa. *International Review of Education*, 56:5-31.
- Parashar, Umesh D., Joseph S. Bresee, Roger I. Glass. 2003. The global burden of diarrhoeal disease in children. *Bulletin of the World Health Organization*, 81: 4.
- Pena, Rodolfo, Stig Wall, and Lars-Ake Persson. 2000. The Effect of Poverty, Social Inequity, and Maternal Education on Infant Mortality in Nicaragua, 1988-1993. *American Journal of Public Health*, 90: 64-69.
- Rustein, Shea O. 2000. Factors associated with trends in infant and child mortality in developing countries during the 1990s. *Bulletin of the World Health Organization*, 78: 10.
- Rutherford, Merrin E., John D Dockerty, Momodou Jasseh, Stephen R.C. Howie, Peter Herbison, David J. Jeffries, Melissa Leach, Warren Stevens, Kim Mulholland, Richard A. Adegbola, and Philip C. Hill. 2008. Access to health care and mortality of children under 5 years of age in the Gambia: a case-control study. *Bulletin of the World Health*

- Organizaiton, 87:216-224.
- Shabaya, Judith, and Kwadwo Konadu-Agyemang. 2004. Unequal access, unequal participation; some spatial and socio-economic dimensions of the gender gap in education in Africa with special reference to Ghana, Zimbabwe and Kenya. *Compare*. 34:3.
- Smith, Lisa C., and Lawrence Haddad. 1999. "Explaining Child Malnutrition in Developing Countries: A Cross-Country Analysis." IFPRI Food Consumption and Nutrition Division Discussion Paper No. 60. Washington, D.C.
- Summers, Lawrence H. (1994). Investing in All the People: Educating Women in Developing Countries. *Economic Development Institute of The World Bank, seminar paper 45*: 1-24.
- Tchuente', L.-A. Tchuem, J.M. Behnke, F.S. Gilbert, V.R. Southgate, and J. Vercruyssen. 2003. Polyparasitism with *Schistosoma haematobium* and soil-transmitted helminth infections among school children in Loum, Cameroon. *Tropical Medicine and International Health*, 8:11, 975-986.
- Theunynck, Serge. 2009. School Construction Strategies for Universal Primary Education in Africa: Should Communities Be Empowered to Build Their Schools? The World Bank: Washington, DC. 257 pp.
- Tuman, John P., Ayoub S. Ayoub, and Danielly Roth-Johnson. (2007). The Effects of Education on Fertility in Columbia and Peru: Implications for Health and Family Planning Policies. *Global Health Governance, vol. 1, no. 2*, pages 1-13.
- Tuwor, Theresa, and Marie-Antoinette Sossou. 2008. Gender discrimination and education in West Africa: strategies for maintaining girls in school. *International Journal of Inclusive Education*. 12:4, pp. 363-379.
- Usman, Lantana M. 2009. Rural adult education and the health transformation of pastoral women

of Northern Nigeria. *International Journal of Lifelong Education*. 28:5, pp. 631-647.

SPSS (2010). Version 19.0 [Computer Software]. Retrieved March 2012. Available from

<<http://www-01.ibm.com/software/analytics/spss/>>.

Yakong, Vida Nyagre, Kathy L. Rush, Joan Bassett-Smith, Joan L. Bottorff, and Carole

Robinson. 2010. Women's experiences of seeking reproductive health care in rural

Ghana: challenges for maternal health service utilization. *Journal of Advances Nursing*

66(11), 2431-2441.