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Gender Equality as a Means to Improve Maternal and Child Health in Africa

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Abstract

In this paper we examine whether measures of gender equality, household decision-making and attitudes toward gender-based violence are associated with maternal and child health outcomes in Africa. We pooled Demographic and Health Surveys (DHS) data from eight African countries and used multilevel logistic regression on two maternal health outcomes (low body mass index and facility delivery) and two child health outcomes (immunization status and treatment for an acute respiratory infection). We found protective associations between the gender equality measures and the outcomes studied, indicating that gender equality is a potential strategy to improve maternal and child health in Africa.

Keywords

autonomy; decision-making; gender norms; maternal and child health; Africa

In this paper we explore the question of whether gender equality is associated with key health outcomes predictive of maternal and child mortality in Africa. In much of sub-Saharan Africa, health services are not easily available to all women because of distance or cost. If women with higher decision-making and more positive gender norms have greater ability to access existing maternal and child health services than their counterparts, then the promotion of gender equality could be seen as a means to give women access to potentially life-saving care and treatment for themselves and their children.

Despite some progress, maternal and under-five mortality remain high in developing countries. Millennium Development Goal (MDG) 5 aims to reduce by three-fourths the maternal mortality ratio (MMR) from 1990 to 2015. The decrease from 400 maternal deaths per 100,000 live births in 1990 to WHO's estimate of 260 maternal deaths per 100,000 live births in 2008 represents only a 35% decline (World Health Organization, 2010). MDG 4 aims to reduce by two-thirds the under-five mortality rate from 1990 to 2015. The decline from 87 under-five deaths per 1000 live births in 1990 to UNICEF's (United Nations

Children's Fund, 2012) estimate of 51 under-five deaths per 1000 live births in 2011 represents only a 41% decline. Africa in particular carries a high burden of maternal and under-five mortality, accounting for an estimated 15% of the world's population but 50% of under-five deaths and 58% of maternal deaths. Few countries in Africa are on track to meet either MDG4 or MDG5.

While MDG 4 and 5 have a maternal and child health focus, MDG 3 pertains to gender equality and women's empowerment. While the promotion of gender equality is important in and of itself, global health organizations are also considering gender equality as a key strategy to improve health not just for women but also for their children. An example of such a strategy is seen with the United States' Global Health Initiative (GHI), which has seven pillars, the first of which is "Focus on women, girls and gender quality." UNAIDS and UNICEF also have a gender focus as a means to protect the health and well-being of women and children.

In this study we seek to understand the role of specific constructs of gender equality, namely women's autonomy and gender norms, on maternal and child health outcomes in Africa. *Autonomy* is defined as the ability to make decisions through control over information and resources, and it includes the ability to act upon those decisions (Basu & Basu, 1991; Dyson & Moore, 1983). Autonomy within the household or household decision-making has been shown to be particularly important for the study of individual health outcomes and behaviors (Basu & Basu, 1991; Bloom, Wypij, & Das Gupta, 2001; Jejeebhoy, 2000). Household decision-making is often dependent on the social context (i.e., cultural norms and social institutions) in which a woman lives (Mason, 2003), thus the importance of attitudes toward gender norms.

Studies in Asia have demonstrated a clear positive relationship between gender equality and a woman's ability to seek and advocate for services for herself and her children (Visaria 1993; Beegle, Frankenberg, & Thomas, 2001; Bloom, et al., 2001; Mistry, Galal, & Lu, 2009). Few researchers have explored the significance of gender equality for African women and children, and only a handful have explored associations between gender equality and the particular maternal health (facility delivery and low body mass index, or BMI) and child health outcomes (treatment for an acute respiratory infection, or ARI, and full vaccination for children) that we explore here. Researchers studying women in the slums of Nairobi, Kenya found that among poor and middle income households, gender measures were weakly associated with facility delivery (Fotso, Essendi, & Ezech, 2009). Woldemicael(2010) found for women in Ethiopia and Eritrea, gender measures were not significantly associated with facility delivery after controlling for socioeconomic factors. They were, however, associated with a child being fully vaccinated. Researchers studying women in Northern Nigeria also found a gender measure, decision-making, to be associated with a child being fully vaccination (Babalola, 2009). Hindin (2000) found that women in Zimbabwe who did not have a say in household decisions were more likely to have low BMI than women who did have some say. Researchers studying women in Nigeria have recently found that gender equality is significantly associated with whether a woman has a facility delivery (Singh, Bloom, Haney, Olorunsaiye, & Brodish, 2012) and whether her child is fully immunized (Singh, Haney, & Olorunsaiye, 2012).

The rationale for studying the specific health outcomes chosen for this study is their close theoretical association with maternal and child mortality, which are the focus of MDGs 4 and 5. The promotion of *skilled delivery* is widely regarded as a key strategy to reduce maternal mortality (Campbell, Graham, & Series, 2006; World Health Organization, 2004). *Low BMI* is often sign of chronic energy deficiency (CED) which can lead to increased risk for both mortality and morbidity. In addition, CED during pregnancy can lead to low birth weight babies, who have greater risk of mortality than normal weight babies. Low birth weight is actually one of the strongest predictors of neonatal, infant and under-five deaths. Thus low BMI has consequences for a woman herself, her birth outcomes and her ability to take care of her family. Though two million under-five deaths are prevented through *immunizations*, tragically, 2.5 million children still die every year from vaccine-preventable diseases (WHO, UNICEF & the World Bank 2009). Finally, pneumonia, the most common and severe form of an *acute respiratory infection (ARI)*, is the leading cause of mortality for children under five, resulting in 1.8 million deaths per year or 18% of under-five deaths (WHO 2011). Thus we seek to understand whether gender equality enables women to access immunization services for their children and treatment for the leading cause of under-five mortality.

Methods

Data

We looked at diverse African countries for which recent Demographic and Health Surveys (DHS) data were available—Democratic Republic of the Congo (2008), Egypt (2008), Ghana (2008), Liberia (2007), Mali (2006), Nigeria (2009), Uganda (2006) and Zambia (2007) (ICF International, 2012). The DHS surveys include questions on household characteristics, socioeconomic variables, and maternal and child health, among other topics. Questions are largely standardized across countries and standardized training, data collection and data processing procedures are used. We restricted the full sample to currently-married women with a birth in the last five years.

Gender equality variables—The DHS datasets include several gender equality measures including questions on decision-making and attitudes regarding inequalities in gender roles. We used four specific questions to create a household decision-making variable: decisions regarding health care, the purchase of major household goods, the purchase of daily goods, and visits to family/friends. (These questions were asked in all eight countries with the exception of decisions regarding health care, which was not asked in Liberia.) We categorized women who made all decisions either alone or jointly as having high decision-making authority, while those not involved in all four (or three in the case of Liberia) decisions we categorized as having low decision-making authority.

We also included in the analysis an indicator regarding attitudes toward gender norms. The DHS includes questions about the acceptability of a form of gender-based violence, wife-beating, under specific circumstances (a wife going out without telling her husband, neglecting the children, arguing with her husband, refusing to have sex with her husband and burning food). We categorized respondents who indicated that a husband is not justified

in beating his wife for any of these reasons as believing wife beating is not acceptable. We classified those who indicated that wife beating is justified for at least one of the items on the list as indicating that it is acceptable.

Outcome measures

Facility delivery: We classified delivery of the last child in the past five years as either a facility or non-facility delivery. Facility deliveries comprised the response categories hospital, clinic, and health center. Non-facility deliveries included other sites, such as the home. We used the delivery site for the youngest child if a woman had more than one birth in the past five years.

BMI: We categorized women (who were not currently pregnant and who had not been pregnant in the past three months) as having either low or normal BMI. We excluded women having high BMI because high BMI is also a negative outcome and associations between gender equality measures and high BMI would not have strong programmatic or policy recommendations. BMI was calculated by the formula:

$$\text{BMI} = \text{weight (in kg)} / \text{height (in meters)}^2$$

Following international standards, we classified women with a BMI below 18.5 as having low BMI, and those with a BMI between 18.5 and 24.9 as having normal BMI.

Fully Immunized Child: We defined a fully immunized child as a child between 12 and 23 months who received three doses of oral polio vaccine (OPV), three doses of diphtheria, pertussis and tetanus (DPT), one dose each of Bacille Calmette-Guerin (BCG) and measles vaccine before 12 months of age.

Treatment for an ARI: We calculated a treatment fraction for children with an ARI. We calculated this fraction as the number of children under age two who were sick with cough and had difficulty breathing in the past two weeks and who were taken for treatment to a health facility, divided by the number of children under age two who were sick with cough and had difficulty breathing in the past two weeks.

Socio-demographic Factors—We studied several covariates likely to be associated with the outcomes: age, parity, residence (urban/rural), education level, wealth and working status (whether worked outside the home in the past 12 months). Unfortunately, the dataset did not include potentially important community-level factors such as distance to the nearest health facility were available.

Analysis

We pooled data across the eight countries and used multilevel logistic regression analysis to analyze the data. Using multilevel analysis we could determine whether, after accounting for differences and similarities among the countries, the gender measures were associated with the outcomes. We used a random intercepts model approach with country at the second level and all other variables at the first level. (We could not use a random slopes and intercepts model because we did not have enough observations at the second level.) We applied

sampling weights and accounted for the cluster sampling approach of the DHS. We used Stata's gllamm command for the analysis. This program fits GLLAMMs (Generalized Linear Latent and Mixed Models), which are a class of multilevel latent variable models that includes multilevel generalized linear models or generalized linear mixed models (Rabe-Hesketh & Skrondal, 2012). We included (in Model 1) only the key gender equality measures in the regression, and then added the socioeconomic variables into Model 2 to determine if the associations remained after adding in these control variables.

Results

In Table 1 we present the descriptive statistics of the socioeconomic and gender variables for the full sample of 50,246 currently-married women with a birth in the past five years. About 43% percent of women had no education, compared to 57% with at least a primary education. Sixty-nine percent of the sample were rural residents, compared to 31% who were urban residents. Sixty-three percent of women were currently working, while about 43% were in the two lowest wealth quintiles. In terms of the gender measures, 47% of women in the sample had high household decision-making authority and 43% believed that wife-beating is never acceptable.

In Figure 1 we plot descriptive statistics for the outcome variables. For the maternal health outcomes, about 14% of women had low BMI and 50% delivered their last child in a health facility. For the child health outcomes, 38% of children under one year were fully immunized and 60% of children under two years who had been sick with an ARI were taken to treatment.

In Table 2 we show the multilevel logistic regression results. As expected we find associations between education and wealth such that wealthier and more educated women tend to have better health outcomes for themselves and their children. Wealth was strongly associated with facility delivery, with an odds ratio (OR) of 6.93 ($p<0.001$) in Model 2 for women in the highest wealth quintile compared to the lowest wealth quintile. Women who were currently working were significantly less likely to be of low BMI and more likely to have a facility delivery than women who were not currently working. In terms of the gender measures, high household decision-making was significantly associated with a lower odds of having low BMI ($OR=0.78$, $p<0.05$) and a higher odds of taking a child sick with an ARI to a health facility ($OR=1.31$, $p<0.01$). Women who believed that wife beating is not acceptable were significantly less likely to have low BMI ($OR=0.88$, $p<0.001$), more likely to have a facility delivery ($OR=1.10$, $p<0.001$) and more likely to have a one year old child who is fully immunized ($OR=1.27$, $p<0.001$).

Conclusions

There is a global focus on the promotion of gender equality and women's empowerment as seen in MDG-3, however, few previous studies have explored associations of gender equality and maternal and child health outcomes in African countries (Babalola, 2009; Fotso, et al., 2009; Hindin, 2000; Singh, Bloom, et al., 2012; Singh, Haney, et al., 2012;

Woldemicael, 2010). Notably this study is unique in that it looks not just at one country but at Africa as a region.

After controlling for socioeconomic variables including wealth and education, we find that household decision-making was significantly associated with two of the four outcomes. Women with high decision-making were less likely to have low BMI and more likely to take a child sick with an ARI for treatment. The measure capturing attitudes toward wife beating was significantly associated with three of the four outcomes. Women who felt that wife beating is not acceptable were less likely to be of low BMI, more likely to have a facility delivery, and more likely to have a fully immunized child. Thus there is potential for the promotion of gender equality to improve maternal and child health by increasing the ability of a woman to access services for herself and her children. While developing countries are aiming to improve accessibility of services, which is essential, the concurrent promotion of gender equality can enable women to access existing services. The promotion of gender equality may also enable women not only to access services, but to achieve better overall health, as evidence by the protective effect of both gender measures against low BMI.

Also important are the significant associations between the outcomes and education, working status, and wealth. These socioeconomic variables are key inputs into the causal pathway linking equality to improved health outcomes. For example it may be difficult for a woman in the lowest wealth quintile to have autonomy because the concept of autonomy implies that an individual has choice. A woman in dire poverty may not have much choice—the ability to obtain a treatment for a sick child may not be feasible because of a complete lack of resources. Thus the significance of the gender measures after controlling for these key inputs implies that a focus on gender equality, in addition to a focus on education and poverty-reduction, can do more to improve maternal and child health than a focus on education and poverty-reduction alone.

A key limitation of this analysis is the lack of a variable measuring accessibility or distance to the nearest health facility. In some cases a woman may have high decision-making and positive gender attitudes but the nearest health facility is too far away. We believe this limitation is somewhat mitigated by the inclusion of the residence (urban/rural) variable, which may account for some of the differences in accessibility. Another limitation is endogeneity, particularly for the low BMI analysis, such that a woman may have low decision-making and thus little say in her health, or the converse could be true: a woman may have low decision-making because she is not in good health.

Despite the limitations of this analysis, we find the global focus on gender equality as a means to improve maternal and child health outcomes is warranted. A programmatic and policy focus on gender has particularly important implications for improving maternal and child health outcomes in Africa, where the burden of maternal and under-five mortality is so high. By enabling women to have the autonomy to have a say in their own health and an ability to obtain and advocate for potentially life-saving services for both themselves and their children, we can enable countries to see vast improvements in the health status of their citizens. Studies have shown that women who are more highly educated and those with independent sources of income or cash demonstrate high levels of empowerment than other

women (Bloom, et al., 2001). Micro-credit schemes that extend small business loans to women have been successful in giving women a consistent source of independent income and in raising empowerment levels in Asia and Africa (Norwood, 2011; Rao, 2011). Programs such as Stepping Stones in South Africa have changed gender norms that contribute to gender-based violence, and this change was correlated with a reduced incidence of intimate partner violence (Jewkes, Dunkle, Nduna & Shai, 2010). In the countries studied, a combination of programs aimed at providing women with an independent means or support along with those seeking to influence a change towards more equitable gender norms should raise levels of women's empowerment and eventually impact maternal and child health outcomes positively.

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Figure 1.
Summary statistics for four maternal and child health outcomes, pooled data for eight countries (n = 50,246)

Table 1

Maternal, socioeconomic and gender measures, pooled data for eight countries

Explanatory variables	Percent
<i>Maternal background characteristics</i>	
Age	
15–19	6.14
20–24	22.02
25–34	47.25
35+	24.59
Parity	
1	17.07
2–3	34.58
4+	48.35
Education	
None	43.47
Primary	27.04
Secondary+	29.49
Residence	
Urban	30.66
Rural	69.34
Working	
No	36.86
Yes	63.14
Wealth Index	
Poorest	21.71
Poor	21.62
Middle	20.09
Rich	19.25
Richest	17.33
<i>Gender equality measures</i>	
Household Decision-making Authority	
High	46.85
Low	53.15
Attitudes Toward Wife Beating	
Never acceptable	43.30
Acceptable	56.70
Number of observations	50,246

Table 2Parameter estimates^a (odds ratio) for the multilevel models for four maternal and child health outcomes

	Low BMI (n = 23,535) OR (95%CI)	Facility Delivery (n = 49,468) OR (95% CI)	Fully Immunized (n = 14,150) OR (95% CI)	ARI Care (n = 3,468) OR (95% CI)
Explanatory variables				
<i>Fixed effects</i>				
Household decision-making authority				
Low (RC)	1.00	1.00	1.00	1.00
High	0.78 (0.63,0.97)*	1.25 (0.92,1.72)	1.31 (0.92,1.87)	1.31 (1.12,1.54)***
Attitudes toward wife beating				
Acceptable (RC)	1.00	1.00	1.00	1.00
Never acceptable	0.88 (0.84, 0.92)***	1.10 (1.05,1.16)***	1.27 (1.16,1.40)***	1.11 (0.99,1.25)
Age				
15–19	1.35 (1.20,1.53)***	0.74 (0.61,0.90)**	0.62 (0.40,0.95)*	0.68 (0.46,1.00)*
20–24	1.10 (1.02,1.18)*	0.79 (0.67,0.93)**	0.89 (0.72,1.09)	0.75 (0.63,0.90)**
25–34 (RC)	1.00	1.00	1.00	1.00
35+	0.95 (0.76,1.19)	1.13 (0.99,1.30)	1.06 (0.98,1.16)	0.96 (0.76,1.22)
Parity				
1 (RC)	1.00	1.00	1.00	1.00
2–3	0.92 (0.78,1.09)	0.61 (0.53,0.69)***	0.94 (0.79,1.12)	1.02 (0.81,1.27)
4+	1.01 (0.84,1.22)	0.46 (0.36,0.57)***	0.86 (0.65,1.15)	0.79 (0.62,1.02)
Education				
None (RC)	1.00	1.00	1.00	1.00
Primary	0.76 (0.65,0.90)***	1.96 (1.27,3.01)**	1.49 (0.91,2.44)	1.29 (1.01,1.65)*
Secondary+	0.63 (0.51,0.78)***	3.51 (1.83,6.73)***	2.50 (1.36,4.61)**	1.29 (0.86,1.94)
Residence				
Urban (RC)	1.00	1.00	1.00	1.00
Rural	0.98 (0.86,1.11)	0.49 (0.33,0.73)***	0.96 (0.86,1.06)	1.24 (0.83,1.86)
Working				
No (RC)	1.00	1.00	1.00	1.00
Yes	0.88 (0.78,0.99)*	1.33 (1.09,1.61)**	1.20 (0.98,1.46)	1.06 (0.88,1.27)
Wealth Index				
Poorest (RC)	1.00	1.00	1.00	1.00
Poor	0.87 (0.72,1.05)	1.29 (1.11,1.50)**	1.13 (0.85,1.51)	1.07 (0.82,1.40)
Middle	0.77 (0.57,1.03)	1.71 (1.18,2.48)**	1.45 (1.02,2.05)*	1.17 (0.81,1.69)
Rich	0.65 (0.49,0.85)**	3.04 (1.84,5.00)***	1.58 (0.82,3.02)	1.56 (0.97,2.49)
Richest	0.64 (0.41,0.98)*	6.93 (3.98,12.06)***	2.36 (1.18,4.71)*	2.08 (1.16,3.70)*
Random effects				
Country-level Variance ^b	1.86*	1.74***	4.64***	1.63***

	Low BMI (n = 23,535) OR (95%CI)	Facility Delivery (n = 49,468) OR (95% CI)	Fully Immunized (n = 14,150) OR (95% CI)	ARI Care (n = 3,468) OR (95% CI)
Log likelihood	-8803.99	-25251.61	-6657.08	-2080.47
AIC	17624	50517	13330	4175
Log likelihood Ratio Test (X^2) ^c	226.09***	12154.63***	711.38***	65.23***

RC = reference category

^aParameters for predictors (fixed effects) are reported as odds ratio; for random effects, the parameter is the variance

^bSignificance of random effects evaluated by comparing model with a similar one in which random effects have been constrained to be zero.

^cCompared to null model with no covariates

*
p<0.05

**
p<0.01

p<0.001