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Examining the Relationship between Maternal Education and Maternal & Child Mortality Rates

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A significant body of recent scholarly research has established a link between maternal education and maternal and child mortality rates; this paper examines the nature of that relationship. Using case studies of intervention strategies in Nepal and Bangladesh, as well as an examination of statistical analyses conducted in sub-Saharan Africa, this paper examines the feasibility of using maternal education as an intervention strategy for improving child and maternal health. It concludes that increasing women's educational attainment is an advantageous strategy to decrease maternal and child mortality rates. Finally, this paper discusses criticisms from feminist scholars stating that such intervention strategies are "too gendered," failing to consider women in other roles than motherhood, and analyzes how to best address such critiques in the intervention process.

Recently the United Nations (UN) and its affiliates began to encourage the use of gains in women's education (hereafter referenced as maternal education for contextual reasons) to accelerate decreases in maternal and child mortality rates. This new strategy comes too late to achieve Millennium Development Goals (MDGs) 4 (reduce child mortality) or 5 (improve maternal health), leaving key targets unmet. The time to achieve the Sustainable Development Goals (SDGs), however, has only begun – and MDGs 4 and 5 both reappear in SDG goal 3, ensuring healthy lives and promoting wellbeing for all at all ages. Universal primary education (a subcategory of MDG 2 being maternal education), also unmet, becomes SDG 4 (ensuring inclusive and equitable quality education and lifelong learning

opportunities for all) (United Nations, n.d.; United Nations, 2015). This paper explores the precise relationship between maternal education and maternal and child health (the education-mortality relationship) in order to examine the feasibility of intervention strategies using the former (SDG 4) to influence the latter (SDG 3).

It is possible to examine the impact of maternal education on maternal *and* child mortality due to the well-documented positive correlation between child and maternal health: interventions in maternal health have similar impacts on child health rates. Greenwood et al. (1987) describe maternal mortality as "almost inevitably a double tragedy" when their study of pregnant women and their newborns in rural Gambia found all infants (n=9) in the study, who were born to women who had died in childbirth, also died before reaching the age of one (p. 642). Numerous other scholars have found maternal health to be an important indicator of fetal, neonatal, perinatal, and under-five mortality risks (Barros et al., 1987; Lawn et al., 2005). Noting that maternal behaviors, health, and health care before, during, and after pregnancy are associated with health impacts for mother and child, many researchers conclude that interventions to improve child health should begin with improvements in maternal care (Bloland et al., 1996; Beck et al., 2002). The extent of this correlation therefore allows exploration of the education-mortality relationship while taking maternal and child health as a correlated unit. This paper will study the nature of that relationship. Then, examining case studies and statistical analyses of interventions, it will evaluate the feasibility of maternal education as an intervention strategy to decrease maternal and child mortality rates.

Scope of the Problem

The international community largely failed to meet MDGs 4 and 5. Approximately 16,000 children under the age of five died in 2015, mostly from preventable causes; in sub-Saharan Africa, which has the world's highest under-five mortality rate, child mortality rates have dropped since 1990,

but the number of under-five deaths are expected to increase in coming decades if progress cannot outpace population growth. Similarly, maternal mortality rates have been nearly halved across the world since 1990, yet in 2013, 800 women died each day during childbirth; many of these deaths could have been prevented if delivery had occurred in the presence of a skilled attending health physician (United Nations, 2015).

Some statistics are more optimistic, however. Though around the world one in four women gives birth without skilled care (United Nations, 2015), educated mothers in Burkina Faso are *twice* as likely to deliver in health facilities compared to uneducated women. UNESCO (2011) finds that each year a mother remains in school decreases the chances of her child dying before age five by 5 to 10 percent, and a child with a literate mother is 50 percent more likely to live to age five. In fact, one study attributes *over half* of the reduction in under-five deaths between 1970 and 2009 to gains in women's educational attainment (Gakidou et al., 2010). These statistics give reason to hope that while the decline in child and maternal mortality rates did not reach the intended two-thirds reduction of MDG 4 or the three-quarters reduction of MDG 5, the targets set in the SDGs may yet be reached with new knowledge of effective strategies.

How Maternal Education Affects Maternal and Child Mortality Rates

Three general explanations emerge as scholars attempt to isolate the mechanisms by which maternal education impacts child and maternal mortality rates: (1) educated mothers place greater respect in health/medical care; (2) educated mothers better engage in family planning; and (3) the social model of teacher-pupil interaction positively impacts a mother's parenting approach. Few scholars, however, advocate that any one mechanism can fully account for the relationship and instead look toward the interplay of these mechanisms to thoroughly explain positive impacts.

The Medical Care model claims education improves a mother's likelihood to seek medical help (Ahmed et al., 2010) and follow medical advice (Le Vine, 1982). This trend is based on the finding that mothers with greater educational attainment have greater knowledge of health and wellness practices (such as prenatal and reproductive services); this enables them to make better, more informed health decisions. Multiple studies link increased maternal education levels to increased childbirth survival rates, finding that while there is not a statistically significant difference in frequency of health facility usage based on educational attainment, maternal and child mortality rates are significantly higher for educated (versus uneducated) mothers delivering in health facilities, and this disparity is not explainable by a difference in the quality of services available (Caldwell, 1979; Karlsen et al., 2011). Such studies indicate that even with frequent use of health facilities, more educated mothers receive better care. Some scholars assert this trend occurs because educated mothers are more likely to view health care as their right and are consequently more likely to demand treatment even if a doctor or nurse is apathetic or resistant to providing it (Caldwell, 1979; Bicego & Ties Boerma, 1993; Burchfield et al., 2002; Kagitcibasi et al., 2005). Other scholars note that more educated mothers may receive better care because their educated status improves their worth/esteem in society, so that their health is valued more; this improves their chances of receiving quality care by making men more apt to take their mothers, wives, or daughters to a health facility (Robinson-Pant, 2006).

The Family Planning model centers on the negative correlation between maternal education and fertility. Much of this relationship is attributed to time constraints, while the rest is a result of heightened family planning knowledge. In the former, scholars cite that girls who remain in school longer tend to delay marriage until at least graduation; since early marriage is linked to high fertility rates (Cochrane, 1982; Egbo, 2000), delayed marriages tend to produce smaller family sizes by shortening the time in which a woman's reproductive years (ages 15-49) coincide with her marriage (Gupta & Mahy, 2003; Le Vine, 1982). Scholars also note that delayed marriage can be a result of

women's increased opportunities – particularly in the labor market – resulting from their education; thus, educated women are less likely to view marriage and motherhood as their sole means of social validation/status and are thus less likely to marry only to appease societal norms (Egbo, 2000). Additionally, researchers find education leads to greater awareness of family planning methods – which can relate to greater knowledge of contraception (Koening et al., 1987) or of birth spacing (Le Vine, 1982; Egbo, 2000; Karlsen et al., 2011) – so mothers are better able to decide how many children to have and when, as maternal education tends to decrease a woman's disposition toward a large family size (King & Hill, 1997). Egbo (2000), for instance, notes that educated mothers are more likely to pursue involvements outside the home; those time commitments compete with the large amount of time necessary for parenting, so women must reallocate time that non-working mothers devote to childbearing and rearing, using it instead to participate in the formal economic sector. Le Vine (1982) dubs these "parental investment strategies," arguing that educated mothers are more likely to choose when to have children with considerations to available financial resources, living space, healthcare, and educational opportunities (p. 284-5). With greater attention to a household's resource capacity, each member is better able to have more than the bare minimum needed for survival, improving overall familial happiness and health (King & Hill, 1997).

The third mechanism, Maternal Dispositional Changes, focuses on the behavioral changes that result from the *process* of formal education. This argument principally cites Le Vine et al.'s (1991) research in Mexico and Joshi's (1994) research in Nepal. The first study focuses on women's internalized social roles and scripts; it claims the model of social interaction learned through the formal education process allows women to identify as a student (so they can seek knowledge long after leaving school) *and* as a teacher (so they are more responsive in their parenting, mirroring that of a teacher-pupil relationship) (Le Vine et al., 1991). The latter study concentrates on social and psychosocial "identity acquisition" through the education process; it concludes women who have engaged in schooling are

more likely to emulate the "educated" and therefore to imitate Western norms of cleanliness and hygiene, decreasing chances of child mortality (Joshi, 1994). These studies indicate that *only* formal education, which stresses teacher-pupil interaction, can account for the education-mortality relationship, while the other two models can also discuss informal education.

Yet most, if not all, researchers rely on the interplay of multiple mechanisms to account for this relationship. For instance, Caldwell (1979) discusses medical care and draws on dispositional explanations, stating that a girl's education is likely to become "maternal indulgence" in her interactions with her children (p. 412). Le Vine et al.'s (1991) study is most known for discussing the teacher-pupil relationship, but later also discusses family planning and the negative education-fertility relationship. Furthermore, Comings & Smith (1994) discuss all three factors – medical care, family planning, and dispositional changes – when explaining a Nepalese adult education program's success. Such findings suggest that the benefits of education are compounded as a result of the activation of *multiple* mechanisms.

Notably, several variables are not discussed in studies that consider indices of female education rates. When the education-mortality relationship was initially proposed, many scholars questioned if maternal education was merely a proxy for socioeconomic status (SES) or another variable; research in past decades, however, indicates it is not. Caldwell (1979) is the oft-cited researcher to first investigate the relationship; he found maternal education the most significant studied determinant of mortality. Since then, many researchers have re-examined these factors, their conclusions ultimately supporting his; neither paternal education (Cochrane, 1982; Grosse, 1989), place of residence (Grosse, 1989), nor access to health services (Grosse, 1989; Bicego & Ties Boerma, 1993; Karlsen et al., 2011) have as great an impact on mortality rates as maternal education. The most studied variable has been SES under the assumption women with greater financial resources have greater access to social opportunities (such as education and health services), making education merely a proxy for wealth. Le Vine (1982) finds,

however, that "the relationship between schooling and fertility is *increased* when income is held constant, indicating that it is *not* simply a function of their economic position [emphasis added]" (p. 286); this conclusion is supported by further studies (Caldwell, 1979; Luo et al., 2006; Chowdhury et al., 2007). These concurrent findings indicate maternal education – more so than paternal education, residence, access to health services, or SES – is a better determinant of mortality rates.

Further Examining the Relationship in Action

Second only to sub-Saharan Africa in mortality rates (World Health Organization, 2014), South Asia has in recent decades implemented major intervention programs. Nepal and Bangladesh have incredibly similar demographics – being ranked, respectively, 59 and 60 in under-five mortality rates, having total adult literacy rates of 57.4 and 57.7 percent, and having lifetime risks of maternal deaths of 1 in 190 and 170 women (UNICEF, 2013a and 2013b). As a result of these parallels, intervention strategies in both countries have been remarkably similar.

The Nepal Family Health Program (NFHP II) and Safe Motherhood Programme (also in Nepal) used health education and increased access to contraceptives and obstetric care to improve maternal and child health. The NFHP II also had a literacy program component (Riggs-Perla et al., 2011; Halim et al., 2011); the Nepalese programs worked to increase maternal education by specifically encouraging women and girls to enter the formal education system and become literate. The NFHP II reported participants in education classes had approximately a 20 percent increase in use of contraception, and the increased contraceptive use was tied to improved health for women and children and decreased mortality rates. The Nepalese maternal mortality rate decreased from 539 per 100,000 live births in 1996 to 281 in 2006 and then to 229 in 2009, while the child mortality rate decreased from 117 to 61 deaths per 1000 live births in 14 years (Riggs-Perla et al., 2011).

Intervention programs conducted in Matlab, Bangladesh – a sub-district of the country and subject of several longitudinal studies in past decades – were similar. They too stressed health education, access to safe abortions and family planning methods, emergency obstetric care, and the presence of midwives or other skilled professionals during labor (Chowdhury et al., 2007), but focused less on formal maternal education as a priority. In Matlab, the child mortality rate declined from 110 deaths per 1000 live births in 1983 to 75 in 1989 and further to 65 in 1995, and maternal deaths related to obstetric causes declined from 4.4 to 1.4 per 1000 live births in the three years after the implementation of the program (versus a decline of only 0.1 deaths in the control area without the intervention in the same time frame). These studies find better-educated women have fewer children due to greater knowledge of birth control and family planning methods as well as greater utilization of prenatal and child care services. The activation of the medical care and family planning mechanisms led to decreased child mortality rates (Joshi & Schultz, 2007). Chowdhury et al. (2007) also concludes that while maternal mortality can be decreased with increased access to medical care, maternal educational attainment is the more significant determinant of child and maternal health.

Riggs-Perla et al. (2007) also concludes that maternal and child morbidity and mortality, preventable child diseases, complications during childbirth, malnutrition, and endemic diseases have strong relationships with low maternal education and literacy rates and are further exacerbated by the under-utilization of resources (also associated with low education and literacy). Their research finds that "improving literacy is a strong determinant of improved health for women and children" (p. 28). However, the success of both intervention strategies (noting the decreased emphasis on literacy and formal maternal education in Matlab) indicates while "maternal education" typically involves literacy and formal schooling, in some cases, targeted, subject-specific information (such as health education on pre and antenatal care) can substitute.

Prima facie, one finding from the study of the Nepalese Safe Motherhood Programme (which indicates that paternal education may be equally important as maternal education) seems to contradict the education-mortality relationship (Halim et al., 2011). However, upon closer examination, these researchers' conclusions do not disprove the relationship; they simply assert paternal education has a greater effect on mortality than previous studies suggest by proposing that paternal education has an *independent* effect on maternal care. Halim et al.'s (2011) research indicates that while maternal education increases a woman's propensity to seek antenatal care, it is paternal education that increases her opportunities to *access* that care by counter-balancing patriarchal norms that deny her worth and need for health care. This position is not mutually exclusive, however, with the previously established relationship which identifies maternal education as the strongest indicator of maternal and child mortality. The study noted that even a few years of maternal schooling increased the likelihood that a mother regularly uses professional, skilled care regularly throughout her pregnancy, while there must be several years more of formal paternal schooling to accomplish the same effect. This finding, therefore, adds a nuance to this relationship by encouraging the inclusion of fathers into the strategy, but does not flatly contradict the premise of the education-mortality relationship.

Similar trends to Nepal and Bangladesh have also been noted in sub-Saharan Africa, where one study shows national policies addressing maternal literacy and women's status reduce income-related inequalities in maternal health care use (McTavish et al., 2010). This study concludes maternal literacy moderates the effect of income and use of health care services, as countries with high literacy rates see little differential in maternal health care use between the rich and poor whereas countries with low literacy rates have much higher health care use differentials between rich and poor individuals. This study reinforces the education-mortality relationship by demonstrating that while SES has an independent effect on mortality rates, maternal literacy has a congruent effect; it can therefore provide a similar decrease as SES by decreasing the rich-poor health disparity. A similar analysis of 31 countries

(21 African) demonstrates investments in maternal education accelerate efforts to increase utilization of maternal health services (Ahmed et al., 2010). This study highlights the importance of "parallel efforts," contending that while increased access to health facilities creates opportunities for maternal health services, health service expansion by itself is unlikely to be enough. Without maternal education those health services will not be properly utilized, the study finds; it is the *compound* effect of increased maternal education and access to health facilities that best decreases mortality.

Discussion and Conclusion

The primary implication of this paper is that interventions to decrease child and maternal mortality ought to better incorporate maternal education as a component of their strategy. In fact, King & Hill (1997) profess that "a country's failure to raise the education of women to the same level as that of men imposes a substantial cost on its development efforts;" so achieving gender parity in education must be a multinational priority (p. 21). Noting the three main mechanisms of the education-mortality relationship, interventions ought to use literacy programs, coupled with health education and formal schooling to create long-lasting, far-reaching, impactful change.

Some scholars, however, criticize strategies using maternal education to influence other issues as being "too gendered." Harman (2012) writes that such strategies frame women entirely as mothers or care givers, without recognizing their separate identities, and conflate maternal health with women's health. This, she argues, leads interventions to address maternal mortality at the expense of women's other needs and wholly lump maternal health with child health; the sum result is a reinforcement of gender stereotypes. Perhaps some of her arguments ring true, but some are overly critical. Yes, if a country were to see a reduction in child mortality and consider issues of child *and* maternal health resolved, it would be problematic. However, if the relationship between both issues is so strong that interventions to address one have consequent effects on both – and the intention is to address maternal

and child mortality (regarding them as distinct issues with similar solutions) – this does not judge women by their children. This is not to say Harman's (2012) concerns are unfounded or illegitimate. There *is* a lack of discussion of women's sexual and reproductive health outside of maternal care and the strength of strategies discussing women's empowerment outside the home is lacking in comparison to those discussing women's roles as wombs. We ought to focus on such gaps in the MDGs when discussing further courses of action and the development of the SDGs. The lack of progress in one area should not stall progress in another, however. Lack of opportunity for women in the labor market – and lack of discussion or recognition of it – is not a reason to neglect issues concerning maternal health.

Appreciating the importance of the education-mortality relationship and respecting concerns for its theoretical implications, the international community ought to better capitalize on using maternal education as a catalyst for positive change in numerous other areas and use progress is SDG 4 to impact SDG 3. As Ahmed et al.'s (2010) "parallel efforts" finding demonstrates, a multi-faceted, multi-pronged approach more effectively achieves desired results; while maternal education itself has multiple benefits – among them the proper utilization of health services, a change in family planning habits, and improved parental strategies – research indicates it is insufficient as a solitary strategy. Thus, to create lasting change in maternal and child mortality rates, maternal education – through formal education, literacy efforts, and increased health knowledge – must be a core element of interventions, coupled with other efforts (among them increased access to obstetric care and skilled attendance during childbirth & incorporation of men into interventions to change norms of gender inequity). Though the UN has only recently begun to employ the education-mortality relationship, a more forceful advocacy of its utility as is necessary as a means for systematic societal change. This will result in sharp declines in maternal and child mortality rates, helping the SDGs meet a more accomplished fate than the MDGs.

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