

## Female Literacy and Access to Information in Asia - Assessing Maternal Health Impacts

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### Abstract:

*The purpose of this paper is to explore the gap in literacy rates of women in developing areas of Asia and the correlation of these gaps with women's literacy that consequently affect their reproductive health. While it is generally accepted among those who live in industrialized nations that literacy and information are related to economic progress and social wellbeing, access to them remains unequal and many who live in developing regions remain excluded from the benefits that accompany them. The research reported in this paper focuses on this problem as it relates to the lives of women with special attention to literacy and reproductive and child health issues. The first section treats this topic from an historical perspective. The remaining section looks at current conditions. A quantitative data analysis is conducted to demonstrate the current correlations between female literacy and indicators of reproductive and population health in Asia. The quantitative findings of this paper are that there is a definite correlation between female literacy and better health outcomes for mothers and children.*

**Keywords:** Female literacy, infant mortality, under five mortality, Millennium Development Goals, Asia

1990 there was cause for celebration. The United Nations Development Programme's Human Development Report found that developing countries had reduced their average infant mortality rate, often considered an aggregate of the disparate measures to ascertain regional health, by more than 50 percent over the past four decades. This reduction went from nearly 200 deaths per 1,000 live births to 88.<sup>1</sup> In addition, life expectancy of the developing world overall was up and the adult literacy rate had risen from 43 percent to 60 percent.<sup>1</sup> Those points in the report shone as beacons of hope over grim next findings. The literacy rates for women were two-thirds of those for men, and the maternal mortality rate in the developing world was 12 times the rate in the north.<sup>1</sup> 900 million adults were unable to read or write and 14 million children died each year before their fifth birthday.<sup>1</sup>

During the 30 years before this report female literacy had risen dramatically, from 33 percent to 50 percent of the population in the developing world.<sup>1</sup> This progress mirrored that of men in growth, though still lagged behind in numbers. Male literacy started out at 53 percent in 1960 and also rose slightly faster than that of female literacy, achieving 71 percent by 1985.<sup>1</sup> However, there is no argument that a 17 percent rise in the literacy rates among women was anything other than growth in the right direction.

The progress since 1969 has been disheartening. According to current estimates by the United Nations Educational, Scientific and Cultural Organization, Institute for Statistics<sup>2</sup> the current female literacy rates in low income countries was approximately 54 percent, and in lower middle income countries only reaches 62 percent. What can explain the difference that between 1960 and 1985 female literacy rates rose 17 percent, but in the poorest countries of the world have only risen between 4 and 12 percent in the 30 years since? How have these poor literacy rates affected the women they afflict? The purpose of this paper is to explore the gap in literacy rates of women in developing areas of Asia and the correlation of how these gaps affect their reproductive health.

While it is generally accepted among those who live in industrialized nations that literacy and information are related to economic progress and social well-being, access to them remains unequal and many who live in developing nations remain excluded from the benefits that accompany them. The first section of this paper treats this topic from an historical perspective. The remaining section looks at current conditions.

Throughout this paper specific measures will be used to assess wellbeing. They are maternal mortality, infant mortality, child, or under-five, mortality, and fertility. Female life expectancy, internet penetration, and HIV prevalence will also be mentioned as variables examined in the data analysis.

#### An historical perspective

A study of child health from 1947 reported that, "A family with a good mother can withstand a feckless or even vicious father, but rarely can a family survive if the mother fails."<sup>3</sup> The research over the last 50 years seems to agree; historically children did better if the mother was healthy and literate. In the developed world, women had not only been able to write for centuries, but because of it were granted expanded influence beyond their own household.<sup>4</sup> However, in regions of the developing world literacy was not a key to social mobility, but instead a barometer by which to predict maternal and child survival.

The literature regarding the link between child and infant mortality rates and literacy or education of the mother is prolific and worth brief examination here. Several studies have established a positive correlation between maternal literacy and infant and child survival. In Caldwell's seminal work in 1979 he writes of a 1960 census in Ghana regarding child survivorship, "The proportion of children dead was almost twice as high for mothers with no education as for mothers with elementary education, and over four times as high for mothers with no education as for mothers with secondary education."<sup>3</sup>

A number of studies since the 1960's have tried to measure the effect of education on child health. One such study in 1972 found that in a United Nations analysis of 115 countries the "...correlation between literacy and expectation of life at birth was higher than between any other specific factor considered."<sup>3</sup> While the explanation is complex and beyond the scope of this paper, these findings are verified in additional studies. There is an indisputable link between mothers who are literate and lower infant and child mortality rates. Caldwell goes on to cite one survey of eight Latin American countries during the first half of the 1970's in which the rates of child survivorship increased sharply with education-so much so that one to three years of elementary schooling correlated with an increase of 25 percent. This benefit became four times greater than when the mother had ten or more years of education. In another study of India during 1981 to 1991 it was found that an increase in female literacy leads to declines in both child mortality and fertility.<sup>5</sup>

In examining the two decades from 1968 to 1988 Cleland & Van Ginneken found that for every one year of schooling a woman completed there was a 7-9% decline in the mortality rate of their children under age five.<sup>6</sup> The relationship between education and decreased child mortality was greater in early and later childhood than infancy. Four to six years of education leads to a 20% drop in infancy, but a 42-73% reduction in later childhood.<sup>6</sup>

While for the purposes of this paper both literacy and education are being discussed, a powerful 1995 study clarified that literacy without formal education is as powerful as traditional schooling. An investigation conducted in 1995 in Nicaragua found that the children of women who became literate entirely through adult education had lowered mortality rates and decreased risk of malnutrition. After having been followed for ten years post-treatment, the women who had become literate through adult literacy courses had comparable infant mortality rates with women who had been enrolled in formal schooling as children. This demonstrated that literacy alone created better outcomes, and that they were not solely the result of formalized education.<sup>7</sup>

Caldwell<sup>3</sup> also found that the mother's education played a more significant role than the father's in determining child mortality. When the wife had not been to school a father with some schooling will have a ten to 20 percent decline, while a mother with equal schooling and an unschooled husband has a decline of 61 to 85 percent). He speculates that this is due to child care falling primarily to the mother. Similar dramatic results were found by Dreze and Sen.<sup>8</sup> In their foundational research in Kerala during the early 1990's they discovered that with other variables being kept constant, an increase in the female literacy rate from 22 percent to 75 percent reduces the under-five mortality from 156 per thousand to 110 per thousand. A comparable improvement in literacy rates for men reduces the under-five mortality only from 167 per thousand to 141 per thousand.

Easterlin wrote that the primary difference between the developed world and the developing world was one of mass education which he also admits is certainly not a new idea.<sup>9</sup> In stating this, however, it must be examined that mass-education cannot exist in a society that chooses not to educate half of its population. Barro found that the average years of schooling for females in the developing world in 1960 was 1.16.<sup>10</sup> This did rise over the next decades but not as dramatically as one might hope. In 1975 the average was 1.84 and in 1985 it rose only to 2.85. In 1996 the world had one billion illiterate adults; two-thirds were women.<sup>11</sup> However, in 1981 Easterlin speculated that "this mass education was growing in the third world and would contribute to such economic progress by the end of the 20th century that their long-term per capita growth rates will be at least as high as those that the developed countries had so far experienced." Has this come to pass?

The numbers speak for themselves. In an examination of two of the critical measures listed above, infant mortality and maternal mortality, there has been clear, yet limited, progress. Using the earliest available data from the Central Intelligence Agency the following trends can be observed regarding infant mortality in Asia: In 1970 the infant mortality rate was approximately 101 per 1,000 live births.<sup>12</sup> Over the next decades great strides were made and the rate was cut by nearly 60 percent to 40 per 1,000 live births in 2000. Over the next ten years despite advancements in communications infrastructure and medical technology progress only demonstrated a further reduction to an infant mortality rate of 26 in 1,000.<sup>12</sup> The data on maternal mortality followed suit. In 1990 the maternal mortality rate in Asia was 281 per 100,000 births. In 2000 it had decreased to 179 per 100,000. However, ten years later the maternal mortality rate was still 107 per 100,000 births.<sup>12</sup> While clearly there is progress in rates of maternal mortality rate and infant mortality, they both fall significantly short of meeting the millennium development goals.<sup>13</sup>

In 1999 Shen & Williamson wrote of the 585,000 maternal deaths in 1990 that "rates of maternal mortality show a greater disparity between rich and poor nations than do any of the other commonly used public health indicators."<sup>14</sup> They went on to posit that maternal mortality is perhaps the most powerful indicator of inequality in social development. These inordinate disparities continued into the next decade when in 1991 women who became pregnant in the developing world faced "a risk of death due to pregnancy that (was) 80 to 600 times higher than women in developed countries."<sup>14</sup>

One of the reasons for this was maternal age or the very young ages at which women in the developing world become mothers. Shen & Williamson described a cycle in which early childbearing impeded women's opportunities to advance, thus continuing the cycle of a disadvantaged mother giving birth to a more vulnerable daughter.<sup>14</sup> This cycle negatively impacted not only the women's social status, but also their health. Adolescent girls have a 20-200% higher risk of dying due to pregnancy related causes depending on their age of adolescence.<sup>15</sup>

Another major factor in heightened maternal mortality was a lack of family planning. In 1990 there were at least 300 million couples in the Developing World who did not want any more children, yet lacked the education and resources to effectively take means to prevent them.<sup>14</sup> "If women were able to avoid unwanted pregnancy, at least a quarter of the maternal deaths would be avoided; each year some 150,000 fewer women would die of pregnancy related causes."<sup>14</sup>

In 1850, only a little more than a century ago, virtually the entire population of the world outside of north-western Europe and Northern America had little or no exposure to formal schooling. Even by 1940 this was still largely the case in Africa, most of Asia, and a substantial part of Latin America.<sup>9</sup> In many parts of Europe women had enjoyed the benefits of literacy and education for several centuries by this point, using this tool as a means by which to operate in the public sphere, much the same as men.<sup>4</sup> However in the developing world the adult literacy rate was only 43 percent in 1960, with two-thirds of those literate being men.<sup>1</sup>

"At some point, we may look back and ask what produced this world-how we got where we are. Such inquiry will show, I believe, that the proximate roots of the epoch of modern economic growth lie in the growth of science and diffusion of modern education."<sup>9</sup> Despite Easterlin's hope, last year UNICEF estimates that in the developing world only 32 percent of girls made it to secondary school.<sup>16</sup> This is incredibly unfortunate given the strength of the relationship between maternal literacy and education.

It is often believed that maternal education is not simply an indicator of wellbeing as much as a predictor of economic advantage, and that it is this advantage that secures the benefit. This is not the case. In the previously referenced research of Cleland & Van Ginneken it was found that economic advantages associated with education accounted for only half of the education-mortality association.<sup>6</sup> They also found that after adjustment for economic factors one to three years of schooling is associated with a 20 percent decline in childhood mortality. This relationship is consistent throughout developing countries across the world, and without regard to the quality of their primary health care systems.<sup>6</sup> In 1995 Dreze and Sen also found that a 50 percent reduction in poverty only reduces the under-five mortality from 156 per thousand to 153 per thousand. In 2006 Bhattachary stated that, "maternal education has a positive effect on child health in its own right and not merely as an indicator of general economic development or socioeconomic status." In fact, Dreze and Sen speculate that the educational achievements of women in Kerala during the 1980's and 90's were responsible for the longer life-expectancies of the entire population.<sup>8</sup>

### The Current Situation

The United Nations Millennium Development Goals Report of 2014 states that 781 million adults and 126 million youth worldwide lack basic literacy skills.<sup>13</sup> While this may not sound like substantial progress from the 1990 UNDP, there are far more people in the developing world. This change reflects an increase in the youth literacy rate from 83 to 89 percent and in the adult literacy rate from 76 to 84 percent. Still, a disproportionate two thirds of the illiterate are women.<sup>13</sup>

Research into the effect of maternal education or literacy is still being conducted. In 2011 it was found that children in Kenya born to mothers with a primary education were 1.85 times more likely to be immunized against childhood diseases and children born to mothers with a secondary education were 2.16 times more likely.<sup>17</sup> The same study also found that children born to mothers with a primary school education were 94 percent less likely to be stunted due to poor nutrition.<sup>17</sup> These

findings are significant for Asia where slightly under half of all under five deaths are due to preventable illnesses and infections, and nearly the entire other half are related to undernutrition.<sup>18</sup> In 2014 just under half of all stunted children in the world lived in Asia.<sup>18</sup>

Other studies have looked at the strong correlation of the Human Development Index, which takes into account education and literacy, and variables such as infant mortality, maternal mortality, and the percentage of children underweight for age.<sup>19, 20</sup> McAlister found that “of the countries with low human development, the rates of maternal mortality range between 350 and 1,800 deaths per 100,000 live births.”<sup>20</sup> The gender development index also has been positively correlated with economic development.<sup>19</sup> These studies speculate that higher female secondary education rates correlate with improved economic growth.<sup>21</sup>

On the other hand, research still correlates poor access to education as a factor of poor reproductive health.<sup>22</sup> In a study in Pakistan it was found that a lack of education dramatically decreases the likelihood of a woman seeking antenatal care regardless of her risk in pregnancy.<sup>22</sup> Maternal mortality has been found to be at its highest in countries where the female literacy rate is below the male literacy rate.<sup>20</sup> This is also true for gaps in primary and secondary education between the sexes.

Adolescent pregnancy continues to be a serious, dangerous issue that affects maternal and infant mortality. Of the 14 million births each year to women aged 15 to 19, 91 percent are in low and middle income countries.<sup>23</sup> Maternal conditions are the leading cause of death among women of this age, and their babies have a 50-100 percent increased risk of mortality within the first month.<sup>23</sup>

In looking at the key indicators discussed in the introduction of this paper, every day 800 women die from causes relating to pregnancy. 99 percent of these women are in the developing world.<sup>24</sup> Under five mortality has dropped to 46 deaths per 1,000 globally, but they disproportionately affect the developing world. Finally, infant mortality rate in lower income countries is 53 deaths per 1,000 live births.<sup>2</sup>

What follows next is an assessment of the data to determine the correlations with these variables and other measures of quality of life.

### An Analysis of the Data

In order to assess the correlation between female literacy and reproductive and child health data were gathered from several public data repositories including the World Health Organization, The World Bank, The United Nations Institute for Statistics, and the CIA World Factbook. Data was compiled for each country in Asia individually. Each variable including infant mortality,<sup>2</sup> child under five mortality,<sup>25</sup> female fertility,<sup>26</sup> maternal mortality,<sup>27</sup> female life expectancy,<sup>28</sup> and internet penetration<sup>29</sup> were compared to female literacy<sup>30</sup> for each country. Number of HIV infected women<sup>31</sup> were also compared to the percentage of illiterate women in the population.<sup>30</sup> Rates of correlation were found for each of these variables which are displayed in the chart below.

Variables correlated with female literacy	r value
Infant Mortality Rate	-0.81
Maternal Mortality Rate	-0.84
Child Mortality Under 5	-0.71

Fertility (Children per woman)	-0.55
Female Life Expectancy	0.68
Internet Penetration (Users per 100 people)	0.51
<b>Separate Correlation Analysis</b>	
HIV Infected Women and Percentage of Females in Illiterate population	0.72

There are significant negative correlations between female illiteracy and infant mortality, child mortality, maternal mortality, and fertility. There are strong correlations between female literacy and female life expectancy. In Asian countries with lower literacy rates female life expectancy is also lower. There is also a strong correlation between a lack of internet access and female literacy. Finally, the percentage of illiterate females in the population is a significant predictor of the number of HIV infected women.

An examination of the past research exploring female literacy and maternal and child survivorship in Asia is difficult to undertake. There is a significant lack of collective information on either the subject of female literacy or the health outcomes of women and children before the 1990's. One substantial limitation in the writing of this paper was the historical record of these statistics. While it was sometimes possible to find information for specific regions many countries have limited historical records.

With regard to the years prior to the 1990's, the most likely reason that this information is difficult to find is that there was not a central agency keeping track and some of the countries lacked the infrastructure and resources to compile the information for themselves. Many of the women and children who factor into these statistics would have been without the ability or awareness to represent themselves. Without intent much of this information would have slipped away into history.

However, it also seems worth speculating that if female literacy is a great indicator of equity between the sexes and the standing of the woman in society, many of these statistics may not be known simply because they were not considered important enough to compile.

## Conclusion

What clearly can be surmised from the quantitative findings of this paper is that there is a definite correlation between female literacy and better health outcomes for mothers and children. The findings of the review of the literature indicate that historically and currently literate women were and are less likely to die as a result of pregnancy or childbirth, and their children had increased odds of surviving delivery and past the first five years of their lives even after controlling for economic variables and for paternal literacy and education. This effect remains consistent with both women who were formally educated and those who are simply literate. The correlative relationships in this study coupled with findings in the literature have powerful implications that implore further research into establishing the causes for these relationships.

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