FEMALE LITERACY & ITS RELEVANCE WITH MATERNAL AND INFANT MORTALITY RATES

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ABSTRACT

When a female is educated the next generation is bound to be educated hence education has many folds impact on the social and economical development of any nation. Education as such, results in positive externalities. Not only does it have an intrinsic value in the sense of the joy of learning, reading etc, but it also has instrumental, social and process roles. Moreover education may spread through interpersonal motivation. When one family sends their child to school, their neighbor is likely to do so as well. Women’s education too, often spreads this way, more specifically, through same sex effects. i.e. an educated woman is far more likely to send her daughter to school than an uneducated woman. Also, she is likely to maintain better conditions of nutrition and hygiene in her household and thereby improve her family’s health (Sen 1997).

Literacy is directly related to the status of a woman, her age at marriage, her decision power and to mention especially capability to access health care services. Literacy not only increases women’s self-confidence but also makes them more exposed to information and thereby altering the way others respond to them. Female literacy improves the chances that women will obtain meaningful employment, reduces their demand for children and improves health-seeking behavior, makes them aware of Nutritional requirements - all these combined improve the chances of survival of both - the mother and the baby.

The present paper focuses on the relationship between the female literacy and mortality rates (IMR and MMR) and establishes an inverse relationship between them.

INTRODUCTION

Not only might women residing in countries with higher female literacy enjoy greater personal safety and physical integrity, they may also have greater inheritance rights, ownership rights in land and loans, and labour market rights (Jütting et al., 2008; Magadi, Madise, & Rodrigues, 2000). Countries with higher female literacy may also devote more resources to the provisioning of maternal health care services along a range of maternal health care delivery models, including physicians, nurses, and traditional birth attendants. In terms of the “inverse equity hypothesis,” the greater range of services available to women in
countries with higher female literacy may contribute to lower inequalities in use compared to those found in countries with lower female literacy.

The United Nations Millennium Development Goals have identified improving women’s access to maternal health care as a key target in reducing maternal mortality in the world. Individual socio-demographic and national-level environmental factors may affect women’s use of maternal health care. At the individual level, age, income, education, and urban or rural residence may all play a role in women’s use of maternal health care services (Gyimah, Baffour, & Addai, 2006; Magadi, Agwanda, & Obare, 2007; Magadi, Zulu, & Brockenhoff, 2003; Obermeyer & Potter, 1991). Differences between countries along such dimensions as female literacy rates or levels of economic development may play a pivotal role in women’s reproductive health, and maternal and infant mortality (Frey & Field, 2000; Obermeyer, 1993; Shen & Williamson, 1997; Shiffman, 2000; Wang, 2007). National female literacy rates are an important indicator of women’s status and autonomy in society (Frey & Field, 2000; Magadi, Agwanda & Obare, 2007).

Mortality, which is one of the major structural variables of demography, has continuously been affecting the population structure, particularly in developing countries like India. Most of the countries in the world, developed as well as developing, have experienced drastic improvement in life expectancy. Among various factors responsible for decline in mortality, economic factors: increase in per capita income, social factors: improvement in nutrition, housing and clothing, sanitation, water supply, cleanliness, individual hygienic practices and developments of medical science have played an important role. However, women and children do not equally enjoy fruits of these developments. Women and children are still the deprived sector of the society and maternal and infant mortality remain high in spite of a striking fall in general mortality rate.

CONCEPTS OF MATERNAL AND INFANT MORTALITY

Maternal mortality is a sensitive indicator of health and general socioeconomic development of a community or of a nation. It is one of the leading causes of death among women in their reproductive age. In India like most developing countries, women of reproductive ages constitute a little more than one-fifth of the total population and are exposed repeatedly to the risk of pregnancy. More maternal deaths occur in India in one week than in all of Europe in one year. In a single day in India, the total number of casualties due to pregnancy and child birth-related complications is more than recorded in one month in the entire developed world. Maternal mortality is difficult to measure (Campbell and Graham 1990). The tenth revision of the International Classification of Diseases (ICD-10) defines a maternal death as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

While many health indicators are required to arrive at a comprehensive assessment of the health status of a population, a particularly sensitive and widely used summary indicator is the Infant Mortality Rate (Visaria 1985). Infant Mortality refers to death of children in age group 0-1. Infant Mortality Rate (IMR) is the number of infant deaths that occur per thousand live births in a population in one calendar year. It is one of the universally accepted indicators of health status of not only infants but also of the whole population and of socio-economic conditions under which they live.

EDUCATION AS AN INTERVENING VARIABLE IN MATERNAL AND INFANT MORTALITY DECLINE

It is universally accepted that the higher the female literacy rate, the lower the MMR. Studying at school /college for a longer period will prevent early marriage and early motherhood. Educated women will seek proper antenatal and intra-natal supervision. The female literacy rates in Sri-Lanka and Thailand are over 80 percent and the MMR in these

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The reduction of maternal and infant deaths is high priority for the international community, especially in view of the increased attention on the Millennium Development Goals. Maternal deaths arise from the risks attributable to pregnancy and childbirth as well as from the poor quality care from health services.

Ecological analyses have found direct associations between female literacy and national economic development for outcomes such as maternal and infant mortality in positive direction (Jütting, Morrisson, Dayton-Johnson & Drechsler, 2008; Wang, 2007).

A number of studies have examined empirical evidences concerning the influence of demographic and socio-economic factors of child survival (Gandotra et al. 1980; Clealand and Ginneken et al. 1988; Miller 1983; Das Gupta 1990; Caldwell 1979; Griffith et al. 2001). All these studies reinforce the existing argument for a greater emphasis on the schooling of girls to give women themselves and the next generation a greater chance of survival. Several authors have discussed the mechanism of literacy influence on infant survival (Caldwell 1979, 1986; Cohrane 1980; Hobecraft et al. 1984; United Nations 1985; Ware 1984; Gokhale et al. 2002; Govindasamy and Ramesh 1997). Ruzika and Kanitkar (1972) found mother’s literacy to be the most effective single factor determining the level of infant mortality in an urban setting.

Pooled data from the Demographic and Health Surveys (DHS) of South-Asian countries from the late 1990s to examine the association between female literacy and antenatal care visits and found that women in countries with higher female literacy were more likely to start antenatal care late in their pregnancy, but less likely to make an inadequate number of visits.

Women’s literacy and their use of health facilities go hand in hand. Krishnan (1985) examined overall death rates in terms of literacy, doctor, hospital and bed population ratio, per capita income expenditure on medical and health services. He observed that literacy was the most important factor while health services also had some explanatory power.

A number of cross-section studies for India have explored the impact of female literacy on maternal and child death. Sharma and Retherford (1999) have used 1991 Census data, aggregated to district level, for 326 districts. They show that female literacy would have a significant negative impact on maternal and child deaths.

High maternal and infant deaths can be attributed to low status and low capability of women. These deaths are preventable if more and more women are literate thereby exposing them to new ideas. Literacy can make them aware of a range of services from antenatal to nutrition, personal hygiene, immunisation, birth spacing, maternal skills, breast-feeding and overall health.

In order to reduce the high maternal mortality in the developing countries, government should work on the causes which are multiple, inter-related and tiered. The most superficial of
all the planes are the “direct and indirect” causes of maternal deaths. The direct causes account for 7% of maternal deaths and are the following:

1) Sepsis including septic abortion 20-25%  
2) Obstetric hemorrhages 20-22%  
3) Eclampsia 5-15%  
4) Accidents of labor (e.g. rupture of uterus) 10-30%

The indirect causes account for 25% cases and are due to associated medical diseases that worsen during pregnancy, the commonest being anemia followed by jaundice and heart diseases.

The causes mentioned above are only the tip of the iceberg. The underlying causes of maternal deaths in developing countries, particularly in India are the following.

1) Illiteracy  
2) Ineffective health services  
3) Inadequate obstetric care  
4) Inadequate essential supplies  
5) Poor maternal mortality audit  
6) Unregulated fertility  
7) Infection and infestations  
8) Early marriage  
9) Poverty  
10) Malnutrition  
11) Ignorance.

These underlying causes can be effectively managed by a single most strong remedy i.e. educate the females, as it is shown already in the developed world by reducing their MMR and IMR to the significant level.

If the food habits and nutrition of girls and especially of pregnant women are properly taken care of, infant and maternal mortality may be brought down considerably. At the pre-pregnancy stage as well as during pregnancy, level of nutrition is an important determinant of complications during pregnancy or childbirth. Various studies confirm the relatively poor nutritional and health status of young women and wide ranging gender disparities in feeding practices. Poor nutrition contributes to poor maternal health and underlies poor pregnancy outcomes in a variety of ways. Literacy is supposed to make women aware of nutritional requirements of pregnant women, young girls and infants as well. It is also possible to change age-old food habits of people through educating them. Maternal health, nutrition and literacy are important for the survival and well-being of women in their own right and are key determinants of the health and well-being of infants.

The cause of the high rates of infant mortality, especially neonatal mortality are linked to untimely pregnancies, low birth weight and unsafe delivery, etc. These are also major causes of maternal mortality. Dealing with one of the significant causes of infant and maternal deaths - unsafe deliveries, it is evident from all accounts that literate women are more likely to have their deliveries in an institution or at least attended by trained practitioners. Literacy definitely enhances women’s exposure to the modern health sector and the ease and confidence with which they can deal with this sector. This increased confidence leads to an increased ability to deal with emergency situations during pregnancy, delivery, infant illness and therefore to improved women’s survival and infant survival. Literate women are more likely to avail
themselves of antenatal care, tetanus toxoid injection, iron and folic acid tablets, institutional delivery and complete immunization for the infants. Reviews suggest that birth intervals have a noticeably larger impact on infant and maternal mortality than does maternal age, even maternal age at first birth (IIPS 2002). However, this association is not always found true. Literate women generally delay first childbearing and complete their family in a shorter span so as to be free to work outside.

A few studies (Jejeebhoy and Kulkami 1989; Mason 1993; Krishnamurthi 1998) have shown that interspouse consultation is an important factor in the process of decision-making with regard to family size and the adoption of family planning practices. Srinivasan (1995) stressed the role of schooling in creating greater access to birth control information and more extensive use and approval of contraceptive technology. Literacy plays a catalytic role in enhancing female autonomy, in achieving a greater say in decision-making, which in turn result in decline in the number of unwanted births, repeated pregnancies and further to infant and maternal deaths. More recent studies have found that there is a minimum threshold of education (at least 5-6 years) that must be achieved before there are significant improvements in female autonomy, particularly in a highly gender stratified society such as India (Jeffery and Basu 1996; Jejeebhoy 1995).

The influence of female literacy as a major factor affecting child health in India was examined using data from the second National Family Health Survey between 1998 and 1999, as well as microlevel data on rural Indian mothers (n=374) and their children (n=281) aged 0–3 years. After considering the collinearity between several independent variables, comprehensive models were developed for predicting the outcome variables such as stunting, underweight, anaemia, and under-five mortality. The major variables that determined these models were low maternal body mass index (BMI), lack of colostrum, maternal anaemia, hospitalized deliveries, treatment with Oral Rehydration Solution (ORS), and complete vaccinations.

Addition of female illiteracy in these regression models improved prediction of outcome variables significantly. Mean predicted prevalences, after adjusting for these variables were significantly higher (p<0.01) for the states with high female illiteracy ($\geq$median) than for those with low female illiteracy (44.3% vs. 34.1% for stunting, 45.1% vs. 34.6% for underweight; 74.0% vs. 60.7% for anemia and 97.4 vs. 63.9 per thousand live births for under-five mortality).

Microlevel data also revealed that less-educated mothers married at an early age (16.5±2.0 vs. 17.8±2.0 years; p<0.01), had less duration between onset of menarche and first conception (2.6±1.41 vs. 3.2±1.9 years; p<0.05), delivered first child at an early age (18.5±1.9 vs.19.4±2.0 years; p<0.01), did not seek antenatal care (48.2% vs. 31.6%; p<0.05), and opted less for hospital deliveries (47.7% vs. 74.3%; p<0.01) compared to women with education higher than fourth standard. As these variables are known to be determinants of low birth weight that increases risk for child undernutrition and mortality, our findings highlight the possible underlying pathways between female literacy and child health. Improving female literacy mainly for creating health awareness will thus be beneficial for improving health of rural children in India.

Having a look at the causes of infant deaths makes it evident that among the medical causes of infant deaths, causes peculiar to infancy and cough are two main factors along with low coverage of institutional deliveries (26.3 per cent only). Causes peculiar to infant deaths which contributes to about two-third of the total infant deaths include prematurity, respiratory infection to new born, diarrhoea cord infection including tetanus, congenital malformation and birth injury (SRS 1998). Among these too, prematurity contributes more than half of the
infant deaths (53.5 per cent) which leads to the conclusion that almost one-third of the total deaths in India occur due to prematurity, cause of which is malnutrition. The report entitled “Wasting Away: The Crisis of Malnutrition in India” (World Bank 1998) points to malnutrition as the main factor retarding improvements in human development and hindering further reduction in infant mortality. Malnutrition is, in many respects, the common denominator of the disease and deprivation processes that increase infant mortality. The risk of death from common childhood diseases is doubled for a mildly malnourished child, trebled for a moderately malnourished child and may be as high as eight times for a severely malnourished child (Ghosh 1996). For a malnourished child, every infection is a potentially fatal illness. Several studies and reports have shown a higher rate of malnutrition among girls compared to boys, which would contribute to higher mortality among the girls (Ghosh 1987). The cycle goes on. Today’s malnourished girls grow up to be a malnourished mother and she, in turn, gives birth to a small undernourished baby. And the life of both the mother and baby are at stake.

Child mortality rates are about five times higher among illiterate mothers compared to graduates (Registrar General of India 1989). Better child survival among the educated group may be due to several factors such as better hygiene, improved nutrition and feeding practices, and timely medical intervention. A study conducted by NIN (Brahman et al. 1988) showed that, controlling for income, the energy content of the diet of children whose mothers were literate tended to be better than those whose mothers were illiterate. There are other case studies showing that maternal education has a significant influence on the nutritional status of the children (Walker and Ryan 1990).

Results from a nationwide study of 4434 women show that among the children of women who became literate exclusively by adult education, mortality and risk of malnutrition are significantly lower than among those women who remained illiterate. Furthermore, when the infant mortality rates are given approximate time locations, a sharp reduction is found following the adult education campaign for the adult-education group, but not for the illiterate or formal-schooling groups. The survival advantage conferred by education was significantly greater among those with poor access to health services. The results also suggest that the effect of education in reducing the risk of malnutrition operates independently of its effect on mortality, and that both are independent of wealth and their parents’ decision to educate their daughters.

A strong association exists between the level of women’s education and use of reproductive-maternal health services. Literacy improves women’s status, increases age at marriage, reduces unwanted fertility and improves utilisation of health services (Pebbley, Goldman and Rodriguez 1996) by contributing to women’s self-confidence, improving their maternal skills, increasing their exposure to information and thereby altering the way others respond to them (Das Gupta 1990). Illiterate women are more likely to get married at an early age, to start childbearing at a younger age, to have children too close together and to prolong child bearing. Female literacy improves the chances that women will obtain meaningful employment, reduces their demand for children and improves health-seeking behavior.
Studies suggest that national policies that are able to address female literacy and women’s status in India such as programs that cover costs for tuition, school uniforms and textbooks, may encourage female education and in the long-run help reduce income-related inequalities in maternal health care use. As such, female literacy at the national level may be associated with maternal health care use for all women in the country due to the greater maturity of the system and the greater resources and autonomy available to all women. We might therefore anticipate that the benefits of living in a country with higher average female literacy will be experienced differently by individual women depending on women’s relative household income.

There have been efforts to correlate female literacy with age at marriage, fertility rates and child mortality. In rural areas, a higher proportion of married women are illiterates as compared to urban areas. Further, among illiterates, around two-thirds of women got married before reaching the age of 18 years, suggesting a positive correlation between age at marriage and level of education. Available data also suggest an inverse correlation between a woman’s level of education and her fertility.

**STATISTICAL RELATIONSHIPS**

Table below presents data for IMR, MMR and adult female literacy in major states of India. As hypothesized, the inverse correlation between (i) female literacy and IMR and (ii) female literacy and MMR and positive correlation between (iii) IMR and MMR is statistically true.

However, large variations are seen in mortality rates corresponding to more or less similar levels of female literacy. For example, IMR ranges from 98 in Orissa and Madhya Pradesh to 64 in Gujarat and 53 in West Bengal in the same band of female literacy (50 to 60 per cent). At the same time, estimates of MMR for some states like Gujarat and Tamil Nadu prima facie appear to be on the lower side (SRS 1999). Interstate variations are even greater in MMR for the same band of female literacy. For example, it is as low as 29 in Gujarat, 105 in Haryana, and 154 in Andhra Pradesh and as high as 498 in Madhya Pradesh and 401 in Assam. It may be conceived that several factors block some of the postulated pathways of influence and erode the positive influence of women’s education (Shivakumar 1995). There are no evidences to show that education leads to favourable shifts in maternal behaviour, since factors such as age at marriage, child spacing, family size and so on appear to be strongly influenced by socio-cultural norms of society (Ware 1984; Cleland 1990). However, it does not reduce the role of women’s literacy in any way. It only reiterates to focus on other factors as well which enhance women’s capabilities.
### TABLE

**Female literacy and mortalities in India:**

<table>
<thead>
<tr>
<th>States</th>
<th>Female Literacy</th>
<th>IMR**</th>
<th>MMR**</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>54.2</td>
<td>71</td>
<td>408</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>51.2</td>
<td>66</td>
<td>154</td>
</tr>
<tr>
<td>Assam</td>
<td>56</td>
<td>78</td>
<td>401</td>
</tr>
<tr>
<td>Bihar</td>
<td>33.6</td>
<td>67</td>
<td>451</td>
</tr>
<tr>
<td>Gujarat</td>
<td>58.6</td>
<td>64</td>
<td>29</td>
</tr>
<tr>
<td>Haryana</td>
<td>56.3</td>
<td>69</td>
<td>105</td>
</tr>
<tr>
<td>Karnataka</td>
<td>57.5</td>
<td>58</td>
<td>195</td>
</tr>
<tr>
<td>Kerala</td>
<td>87.9</td>
<td>16</td>
<td>195</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>50.3</td>
<td>97</td>
<td>498</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>67.5</td>
<td>49</td>
<td>135</td>
</tr>
<tr>
<td>Orissa</td>
<td>51</td>
<td>98</td>
<td>361</td>
</tr>
<tr>
<td>Punjab</td>
<td>63.6</td>
<td>54</td>
<td>196</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>44.3</td>
<td>83</td>
<td>677</td>
</tr>
<tr>
<td>Tamil Naidu</td>
<td>64.6</td>
<td>53</td>
<td>76</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>43</td>
<td>85</td>
<td>707</td>
</tr>
<tr>
<td>West Bengal</td>
<td>60.2</td>
<td>53</td>
<td>264</td>
</tr>
</tbody>
</table>

Source: * - Census of India, 2001   ** - SRS, Registrar General of India.
Table: - Effect of Female literacy on four RCH indicators [According to Census 2011, Govt Of India]

<table>
<thead>
<tr>
<th>Location</th>
<th>Female Literacy Rate</th>
<th>Infant Mortality rate (No. of death / 1,000 live birth)</th>
<th>Fertility rate (No. of child born/woman)</th>
<th>Maternal Mortality rate (No. of deaths/1,00,000 live birth)</th>
<th>Under 5 Mortality rate (No. of death / 1,000 live birth)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year</td>
<td>Year</td>
<td>Year</td>
<td>Year</td>
<td>Year</td>
</tr>
<tr>
<td></td>
<td>54.20</td>
<td>65.46</td>
<td>63.19</td>
<td>47.57</td>
<td>3.04</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>42.85</td>
<td>59.26</td>
<td>68.45</td>
<td>51.42</td>
<td>3.72</td>
</tr>
</tbody>
</table>

![Graphs showing the relationship between female literacy rate and infant mortality rate, fertility rate, maternal mortality rate, and under 5 mortality rate for India and Uttar Pradesh from 2001 to 2011.](image-url)
Table: Effect of Female literacy on four RCH indicators

<table>
<thead>
<tr>
<th>Location</th>
<th>Female Literacy rate (%)</th>
<th>Infant Mortality rate [No. of death / 1,000 live birth]</th>
<th>Fertility rate [No. of child born/woman]</th>
<th>Maternal Mortality rate [No. of deaths/1,00,000 live birth]</th>
<th>Under 5 Mortality rate [No. of death / 1,000 live birth]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanpur Nagar</td>
<td>76.89</td>
<td>31.27</td>
<td>1.59</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Lucknow</td>
<td>73.88</td>
<td>34.57</td>
<td>1.68</td>
<td>156</td>
<td>8</td>
</tr>
<tr>
<td>Saharanpur</td>
<td>60.72</td>
<td>48.63</td>
<td>3.15</td>
<td>227</td>
<td>18</td>
</tr>
<tr>
<td>Jhansi</td>
<td>56.60</td>
<td>53.45</td>
<td>3.24</td>
<td>235</td>
<td>21</td>
</tr>
<tr>
<td>Budaun</td>
<td>40.92</td>
<td>69.35</td>
<td>3.63</td>
<td>339</td>
<td>69</td>
</tr>
<tr>
<td>Shrawasti</td>
<td>37.07</td>
<td>72.18</td>
<td>4.02</td>
<td>363</td>
<td>72</td>
</tr>
</tbody>
</table>

There exists a direct correlation between Female Literacy and Infant Mortality.
Effect of Literacy Rate

<table>
<thead>
<tr>
<th>District</th>
<th>FL</th>
<th>R.A.</th>
<th>GP &amp; LB</th>
<th>EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanpur</td>
<td>76.89</td>
<td>84.57</td>
<td>86.11</td>
<td>88.42</td>
</tr>
<tr>
<td>Lucknow</td>
<td>73.88</td>
<td>81.26</td>
<td>82.74</td>
<td>84.96</td>
</tr>
<tr>
<td>Saharanpur</td>
<td>60.72</td>
<td>66.79</td>
<td>68</td>
<td>69.8</td>
</tr>
<tr>
<td>Jhansi</td>
<td>56.6</td>
<td>62.26</td>
<td>63.39</td>
<td>65.09</td>
</tr>
<tr>
<td>Budhaun</td>
<td>40.92</td>
<td>4.01</td>
<td>45.83</td>
<td>47.05</td>
</tr>
<tr>
<td>Shrawasti</td>
<td>37.07</td>
<td>40.77</td>
<td>41.51</td>
<td>42.63</td>
</tr>
</tbody>
</table>

FL - Female Literacy.
RA - Female Literacy Promotion in Rural Area.
GP & LB - Female Literacy Promotion y Gram Pradhan and Local Body.
EA - Female Literacy Promotion economic Aspect.
CONCLUSION

There are a number of factors including economic, social, cultural, biological and medical, which influence infant and maternal deaths. It is the product of an enormous number of complex and interrelated forces. However, they are intimately connected with maternal capabilities. It is a sorry state of affairs that the majority of maternal and infant deaths occurring in India are preventable and yet consistently remain on unacceptably high levels. Given the close, strong and direct association of maternal and infant survival to the capabilities of the mother, it only reflects the lack of seriousness of government and society in addressing the issues of primary concerns. A large number of studies throwing light on the mechanisms whereby female literacy is converted to low maternal and infant mortality have shown almost convincingly that a dramatic universal exists relationship between them. However, the actual behaviour or attitudes or abilities that work behind them remain an area of social research.

Female literacy is the one, which may go a long way not only in reducing mortalities but also indirectly influencing the number of economic, sociocultural, and health conditions related to the low status of women. Thus, increasing female literacy leads to a win-win situation. India spends far less on health and education compared to many other countries. Taking cognisance of the multiple channels through which female education is translated into lower infant and maternal mortality, its significance hardly needs to be emphasized. It is high time that the
government, nongovernment organisations and civil society, all take up a challenge for a better tomorrow.

REFERENCES