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Ethnicity and infant mortality in sub-Saharan Africa: The case of Ghana.

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Abstract

This study is premised on the hypothesis that ethnic specific socio-cultural practices such as dietary taboos and food avoidances on mothers and infants, as well as perceptions of disease aetiology and treatment patterns may be salient to infant mortality differentials in Ghana. To inform policy the paper explores if there are significant ethnic differences in the risk of infant death, and whether such differences are due to intrinsic cultural norms or socio-economic disparities. Using data on 3298 recent births from the 1998 Ghana Demographic and Health Survey, the bivariate results indicated significant ethnic differences. Relative to Asante children, the risk of death was significantly higher among children whose mothers were Mole-Dagbanis, Grussi, Gruma, Dagarti and Fanti. In the multivariate models, however, the ethnic differences (Fanti excepted) disappeared once socio-economic variables were controlled. This implies that observed ethnic differences in infant morality mainly reflect socio-economic disparities among groups rather than intrinsic cultural norms. To improve child survival, efforts should be geared towards enhancing the socio-economic status of women from the disadvantaged ethnic groups.

Key words: Culture; Ethnicity; Infant/child mortality; Ghana; sub-Saharan Africa

Introduction

Although sub-Saharan Africa has witnessed remarkable improvements in child survival since World War II, its childhood mortality conditions continue to be the worst among all major global regions. For instance, while almost all children in the developed world survive through the pre-school years, about a fifth of those in Africa die before reaching their fifth birth days compared with 8 and 5 percent in Asia and Latin America respectively (United Nations, 2002). Not surprisingly, of the twenty countries that the United Nations (2002) recently identified with the poorest infant and child mortality rates in the world, only East Timor was outside of sub-Saharan Africa. While Ghana's current infant mortality rate of 57 per 1000 and under five mortality rate of 107 per 1000 are better than the regional average for sub-Saharan Africa, they are still high by global standards and also vary considerably across groups (GSS and MI, 1999). Childhood mortality thus continues to be a major public health concern in much of the region and for the implementation of efficient programs, knowledge of its determinants is required.

While several previous studies have examined the socio-economic and bio-demographic correlates of childhood mortality in Ghana (e.g., Amankwah, 1996; Benefo and Schultz, 1996; Binka et al., 1995; Sullivan et al., 1994;Tawiah, 1989; Adansi-Papim, 1985), the relative role of culture has largely been ignored. Given the plethora of studies linking culture with fertility-related behavior in sub-Saharan Africa in general and Ghana in particular (Gyimah, 2002; Takyi and Addai, 2002; Addai, 1999a, 1999b; Dodoo, 1998; Benefo et al., 1994; Caldwell, 1987), such an omission is unfortunate. The present study extends previous research by examining the extent to which cultural factors in the form of ethnic specific practices influence the risk of infant mortality. To inform policy, it is essential to explore if ethnic differences in infant mortality mainly reflect socio-economic disparities rather than intrinsic cultural norms.

Studies elsewhere in sub-Saharan have found enormous ethnic differences in childhood mortality (e.g., Tabutin and Akoto, 1992; Kuate Defo, 1992, 1996; Hill and Randall,1984; Cantrelle and Livenais, 1980). As Brockerhoff and Hewit (1998) point out, however, no systematic theoretical mechanisms have been advanced to account for such variations. Within a political economy framework, Brockerhoff and Hewitt (1998) hypothesized a link between ethnic dominance in national political economy and child mortality in sub-Saharan Africa. They demonstrated that child survival chances are enhanced for members of groups that have dominated national politics as a result of favourable economic conditions at the household and community level. In this paper, a parallel socio-cultural paradigm is proposed by arguing that ethnicity carries certain behavior governing norms and values which have a bearing on infant health and ultimately survival.

Research Background

Although Ghanaian children are often the products of inter- ethnic marriages, we focus on the ethnicity of the mother given her heavy responsibility in child rearing. As in other parts of sub-Saharan Africa, ethnicity in Ghana is the basis of social organization in the traditional context and thus encompasses a mosaic of observable and unobservable norms, beliefs, and rituals that govern various life events. Each ethnic group has its own corpus of knowledge and practices in the sphere of health, nutrition and breastfeeding.

This study is based on the premise that adherence to, and the performance of ethnic specific rituals and beliefs may strengthen or weaken a child's defense against diseases. Customs and rituals such as dietary taboos and food avoidances placed on pregnant and lactating women can negatively impinge on the health, welfare and nutritional status of mothers and children. Among the Mole-Dagbani groups in northern Ghana, for instance, women are denied eggs and other protein food during pregnancy which is likely to affect their nutritional status hence the birth weight of the child. Similarly, pregnant Akan women are encouraged to avoid rich food such as mangoes and ripe plantain for fear of miscarriages, particularly in the early months of pregnancy (Ghana and UNICEF, 1990).

Again, while breastfeeding is universal in Ghana (GSS and MI, 1999), there are some ethnic specific practices which tend to deprive infants of the vital nourishment. Among certain groups[1], for example, the new born infant is denied the rich colostrum for the first few days because of the belief that the yellowish milk is not only dirty but also causes the baby's head to be big or ugly (Ghana and UNICEF, 1990). Besides the vital nutrients, the practice deprives the child of the immunity against diseases and infections, thus increasing the susceptibility of the child to illness or death. Also, weaning practices, feeding patterns and food taboos, which vary by ethnicity, are important determinants of infant nutritional status. For example, Akan mothers are discouraged from giving eggs to the young children because of the belief it predisposes the child to become a thief. Ewe mothers on the other hands are known to offer specially prepared nutritious food for their young children (Cantrelle and Locoh, 1990) which could potentially reduce the risk of infections and malnutrition.

Other aspects of culture and tradition that affect child survival centre on perceptions of disease aetiology, treatment patterns, and childcare practices. In the developing world, it is often presumed that households will rely on modern medicine given effective motivation and convenient accessibility. However, this is not always the case because in sub-Saharan Africa, some diseases and infections have mythological

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[1] An indication of this practice can be gleaned from an exploratory analysis of the DHS data which suggests that the proportion of children breastfed on the first day is significantly lower among the Mole-Dagbani, Grussi, Gruma and Dagarti. For example, only 29 percent of Grussi children are breastfed on the first day compared with compared with 69 percent of Ga-Adangbe children and 58 percent of Asante children.

underpinnings (Feyisetan and Adeokun, 1992), and as such, issues on hygiene and nutrition become secondary. As observed among the Kassena-Nankane, for instance, soothsayers are consulted on a number of issues including those pertaining to morbidity and mortality (Adongo et al.,1997). The Akans also explain convulsions in spiritual realms hence the local name *esoro* and treatment is often sought likewise. Traditional medicine in the form of charms, amulets and talisman is often applied to remove the bewitching spirit before resorting to modern medicine if need be.

As a corollary, some children are also regarded as gifts from the gods by the Akans and as such, their welfare and care are by the strict dictates of the deity. In times of sickness, for instance, considerable care is taken not to displease the gods by seeking modern medical attention without first consulting the deity. There are also the 'spirit children' who are believed to be destructive to their families and community and therefore not meant for this world. Among the Kassena-Nankana, the spirit children locally called *chichuru* or *kinkiriko* are killed immediately after birth once identified as suh by soothsayers (Allotey and Reidpath, 2001). It is also believed in some communities that difficult labour is the result of a woman's infidelity and thus the commensurate punishment from the gods. Instead of seeking immediate medical attention, the woman is often made to endure the excruciating process for unnecessarily long periods — with the objective of extracting confession— often resulting in fatalities. Again, while the practice of child fosterage– common among some groups in Ghana– offers a way of distributing the burden of childrearing within the lineage based kinship system, there might be a hidden cost behind this since mothers remain the best agents in the task of preserving the health of their children. As Bledsoe and Brandon (1992) observed in Sierra-Leone, fosterage of young children could lead to early weaning with its attendant risks. The matrilineal Akans are also known to be pronatalist and have institutionalized customs such as the *badu-dwan*[2] rites meant to sustain high fertility(Gyimah, 2001). Given the empirical regularity between parity and the risk of infant death, customs that encourage large number of births have a potential impact on infant survival.

On the basis of geography and similarities in language and socio-cultural systems, nine ethnic groups are identified from the data: Asante, Fanti, Other Akan, Ga-Adangbe, Ewe, Mole-Dagbani, Grussi, Gruma, Dagarti[3] and a residual class of others. As Gaisie (1990) points out, ethnic frameworks in Africa are the most important determinants of the degree of adaptation to modern conditions including changes in health seeking behavior. In the context of Ghana, while the modernizing influences of

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2 Although on the decline in urban Ghana, this is the customary practice where the wife's maternal family donates a ram to the husband on the birth of their 10th child as a gesture and appreciation for the husband's significant addition to the wife's matrilineal family.

3 The Asante, Fante and Other Akan constitute the matrilineal Akan group who are about half of Ghana's population while the Mole-Dagbani, Grussi, Gruma, Dagarti form the patrilineal Mole-Dagbani group, about 30 percent of the population. The Ewes and Ga-Adangbe account for about 13 percent and 8 percent respectively. Notwithstanding the similarities within the broad Akan and Mole-Dagbani groups, we used the individual ethnic groups because the aggregation conceals some cultural differences. For instance, some Other Akans notably the Akwapim do not conform to the classical matrilineal systems (Takyi and Addai, 2002).

formal education and urbanization are weakening socio-cultural practices that adversely affect child health and survival, the ethnic groups have been differentially impacted. In general, groups along the coast and the south have been more exposed to modernization over the years than those in the hinterlands. Since cultural practices are not static but rather constantly negotiated within changing socio-eonomic contexts, the degree of conformity to socio-cultural practices and their perceived impact on child survival are expected to be more pronounced among groups whose traditional institutions have been least affected by modernization. Consistent with this reasoning, children whose mothers belong to the least modernized ethnic groups notably, the Mole-Dagbani, Grussi, Gruma and Dagarti are hypothesized to associate with the highest risk of death. The extent to which the hypothesized ethnic differences are mediated by other factors will be assessed in multivariate models.

Data and methods

The data for this study come from the 1998 Ghana Demographic and Health Survey (GDHS), the third in the series of similar surveys undertaken by Macro International in conjunction with the Ghana Statistical Service. The GDHS is a nationally representative, stratified, self-weighting probability sample of women in the reproductive ages of 15 to 49 years. The total sample included 4843 women from whom birth history, background and household information was collected. The quality of DHS data collected through retrospective birth histories has been extensively discussed in the literature (Gage, 1995; Rustein and Bicego, 1990) and will therefore not be highlighted here.

Since children are the basic units of this analysis, the data were transformed such that each child constitutes a unit of observation. The sample of women contributed a total of 3298 births in the five years preceding the survey on which this study is based. The restriction of the study to recent births serves three purposes. First, the quality of information on recent births tends to be better than births that occurred years ago which are associated with a higher likelihood of displacement of vital events such as age at death for deceased children. Again, focusing on recent births reduces the problems associated with period effects of infant mortality and also ensures that background maternal and household characteristics relate to current conditions.

The dependent variable is the risk of death within the first year of life with ethnicity as the main independent variable. We focus on infant mortality mainly because such deaths form a significantly larger fraction of all childhood deaths. Since not all children have had the chance to survive to the oldest age under investigation by the time of the interview, Cox's proportional hazards model is used to account for censoring in the estimation of exposure time. Unlike parametric models, the proportional hazard model does not make any assumption on the functional distribution of the timing function and thus appropriate for events whose empirical distribution is unknown. The model is based on the assumption that the ratio of the hazard functions of two individuals is constant throughout the period of observation. The basic form of the model is given as

$$\lambda(t) = \lambda_0(t)\exp(\beta_i x_i),$$

where $\lambda_i(t)$ is the force of mortality at age (months) t for an individual, $\lambda_0(t)$ is the baseline hazard at age t, β_i is the regression coefficient estimated by Partial-Likelihood method and x_i is an array of theoretically relevant variables. The ratio of the hazard is therefore independent of time and indicative of the relative risk of a given event occurring among individuals characterised by time invariant covariates vectors x_i and x_j. For a more intuitive understanding, all coefficients have been transformed by exponentiation (e^{β}) and can be interpreted as relative risk. The relative risk is a statistical estimate of the extent to which specific attributes predispose children to differential risk of death. A risk ratio significantly greater than one indicates that children with this attribute have a higher risk of death than the reference category. Conversely, if the relative risk ratio is less than one, children with this attribute are expected to have lower risk than those in the reference category.

Control variables and measurement

Besides ethnicity, a number of bio-demographic, socio-economic and household factors traditionally known to affect child mortality need to be statistically controlled (Hobcraft et al., 1985; Palloni and Millman, 1986; Pebley and Millman,1986; Kuate Defo, 1992, 1996; Majumder et al., 1997; Rafalimanana and Westoff, 2000; Pedersen, 2000). Moreover, ethnic groups in Ghana differ considerably on these factors as shown in Table 1.

The bio-demographic factors include maternal age at birth, birth order of child, birth spacing and the duration of breastfeeding. Generally, the probabilities of child survival are significantly lower among closely spaced infants. The theoretical pathway has been explained through the dynamics of sibling competition and maternal depletion syndrome. Closely spaced births may physiologically deplete the mother of energy and nutrition which may lead to premature births or pregnancy-related complications, therefore increasing the risk of infant or maternal death or impairing the mother's ability to nurture her children. Additionally, women with closely spaced births may still have very young children and, as such, are less likely to attend prenatal care services. Also, the early arrival of a new child necessitates the premature weaning of the previous child, often exposing the weaned child to malnutrition and increasing their vulnerability to infectious and parasitic diseases. In this paper, the duration of preceding and succeeding intervals is measured as a nominal variable with three categories: under 2 years; 2-3 years; above 3 years. Consistent with the literature, closely spaced children are expected to have the highest risk of death.

Further, the relationship between child mortality on one hand, and maternal age and birth order on the other has been found to be non linear and U-shape– the risk being highest at both the lower and upper ends. The risk of death is higher for first order births, decreases for second and third order births and rises gradually thereafter. There is also an age band in the fertility span of a woman during which reproductive risks are at a minimum. In general, children born to very young mothers are associated with high mortality risk because of the physiological immaturity combined with the social and psychological stress that comes with it. The high risk at older ages are due to maternal depletion associated with pregnancy complications and repeated childbirths. Maternal age at birth[4] is measured as a categorical variable with five response categories: under 20 years; 20-24 years; 25-29 years; 30-34 years, above 34 years. Birth order is also nominal with responses: 1; 2-3; 4-6; 7+. In agreement with previous research, we expect the risk of death to be higher among very young and old mothers, and also among first and higher order births.

The duration of breastfeeding has also been found to be a significant correlate of

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Mother's age birth was obtained using the formula $(CMC_c\text{-}CMC_m)/12$ where; CMC_c and CMC_m are the Century Month Codes (see DHS documentation manual for definition) dates of birth of a particular child and mother respectively.

child survival. Infants who are adequately breastfed not only have normal growth but are also protected against malnutrition, diseases, and infections (Knodel and Kintner, 1977). On the basis of this, infants are categorized into: never breastfed; breastfed for 1-6 months; and breastfed for more than 6 months. The risk of death is expected to be higher infants who are not breastfed and least among those breastfed for more than six months.

The socio-economic and locational factors include maternal education, rural-urban place of residence and north-south region of residence. Starting with maternal education, its key role in reducing mortality among young children has been well recognised around the world (Bicego and Boerma, 1993; Marindo and Hill, 1997; Rajna et al., 1998; Caldwell, 1979). A number of theoretical links have been identified; first, educated women are less likely to experience childhood deaths because they supposedly have a better understanding and appreciation for health related matters. In a study on immunization patterns in Ghana, for example, Matthews and Diamond (1997) found that the odds of a child not being vaccinated was 7.22 times higher for mothers with no education compared with mothers with at least secondary education. On the socio-cultural front, educated women are also less subservient to norms and practices that adversely affect the health and welfare of their children. Maternal education is measured as a categorical variable with the following responses: none; primary; secondary or more. In agreement with previous research, the risk of death is expected to be lower among children whose mothers have secondary education.

Studies in diverse regions of the developing world have also found higher mortality rates in rural than urban areas. The general presumption in the literature is that rural-urban residence distinguishes clearly between poor and good sanitation, housing structure and availability of health resources. In Ghana, not only are rural populations disadvantaged socio-economically, but they are historically under served in health infrastructure and health personnel (Brown, 1986). Besides the availability of health facilities, urban residents are also more likely than their rural counterparts to flout customs and taboos that could negatively affect child survival.

Again, Ghana displays a distinctive north-south regional disparity in development with roots in colonial development policy (Aryeetey,1987). Though far from homogenous, socio-economic development and modernization in the south are far superior to those in the north. The health situation in north, for example, has been described as poor with grave consequences on all components of the health care delivery system namely, curative, preventive, promotive and rehabilitative services (Nabila, 1992). The north-south distinction is also relevant to mortality analysis as it relates not only to socio-economic and public health resources but also to agroclimatic differences. The savanna climate of the north with its relatively long and dry harmattan season has a deleterious effect (direct and indirect) on child health. The role of region is taken into account by using a binary north-south variable consistent with the geography of the country. The north comprises the three northernmost regions of Northern, Upper East and Upper West while Brong-Ahafo, Ashanti, Eastern, Western, Central, Volta, and Greater Accra regions constitute the south. Given its lower degree of modernization and inadequate public health facilities, northern residents are expected to have a higher risk of infant death than their counterparts in the south.

Finally, the impact of household environmental conditions is also considered. Better water supply and the provision of sanitation facilities for the safe disposal of human excreta is important for child health. Studies elsewhere have demonstrated that the risk of infant and child mortality is associated with water supply and sanitation facilities (Gubhaju et al., 1991; Woldemicael, 2000). The availability of safe drinking water and modern sanitary conditions protects against disease and infections which go a long way in reducing child mortality. To test the hypothesis that children born in households that are less exposed to bacterial contamination have the lowest risk, the effects of source of drinking water and toilet facilities in the household were examined. The source of household drinking water is categorised into piped, well, borehole, and stream while toilet facility is classified as flush, pan, pit, and none.

Findings

Table 2 shows the distribution of each variable on both births and deaths. In general, about 6.4 percent of the 3298 children died in their first year of life. An examination of the unadjusted risk ratios shows a close correspondence with the hypothesized associations. Starting with ethnicity, the gross effects indicate significant differences. In agreement with theoretical expectations, the risk of death is significantly higher among Mole-Dagbani, Grussi, Gruma, and Dagarti children. Using Asante as reference, the risk of infant death is 2.26 times higher among the Mole-Dagbani and 2.46 higher among the Dagarti. Given that these are the least modernized groups and therefore more likely to indulge in socio-cultural practices detrimental to infant survival, this is not a surprising finding. What is surprising, however, is the high risk (2.82) associated with infants born to Fanti women on account of the fact that they have been exposed to modern influences than many other groups in Ghana. An earlier study on contraception made similar observations about the Fanti (Addai, 1999a). There is thus the need for more qualitative studies to throw more light on specific practices.

The findings on the bio-demographic variables are also consistent with theoretical suppositions. First births, closely spaced births, children born to younger mothers and those never breastfed or breastfed for shorter durations are associated with the highest risk of death as infants. In particular, the risk of dying as an infant is 74 percent higher for the first order birth compared with second and third order births, and about 22 percent higher for fourth and higher order births although the effects of the latter are not significant. Also, children born to mothers under age 20 are associated with a 97 percent increase in the risk of dying compared to those born to mothers in the late twenties. Similar risks are associated with children born to older women. Again, while shorter preceding and succeeding intervals associate with a higher risk of death, the latter has a larger impact. The overriding influence of succeeding interval on survival could be attributed to the fact that the early arrival of a new child may not only necessitate the weaning of the index child but also attention and resources may be shifted to the new born and thus increasing the vulnerability of the previous child. The duration of breastfeeding also has a significant effect on the risk of infant death. Invariably, children who are not breastfed or breastfed for shorter durations have a higher risk of death. Using infants who were breastfed for 1-6 months as reference, the risk of death is about 3.7 times higher for those never breastfed but 0.05 times lower for those breastfed for more than 6 months.

The socio-economic and household factors also show expected effects at the bivariate level. Secondary education and urban residence associate with significantly lower risks while northern residence associates with a higher risk of death. In particular, children whose mothers have secondary education are associated with a 30 percent reduction in the risk of death compared to their counterparts whose mothers have no formal education. Similarly, the risk of death is reduced by about 38 percent for children who live in urban areas compared to rural residents. Conversely, children who live in north are associated with a 50 percent increase in the risk of dying than their counterparts in the south. Among the household factors, residence in a house with piped water associates with 35 percent reduction in the risk of death compared with household whose source of drinking water is river or stream. Furthermore, children in households with flush toilets are about 63 percent less likely to die as infant compared with those in households with no toilet facility.

The bivariate results thus suggest significant ethnic differences as well as varying degrees of the control variables on the risk of infant death. However, because no controls are introduced at this level, we are unable to assess the net effects of ethnicity and the control variables. As shown in Table 1, the ethnic groups vary considerably on the bio-demographic and socio-economic factors. In general, children whose mothers are Mole-Dagbanis, Grussis, Grumas or Dagartis seem to be the most disadvantaged. For instance, about 68.2 percent of Asante children have mothers with secondary education compared to only 4.2 percent of their Mole-Dagabnis counterparts. Similar patterns are seen with respect to residence and household facilities.

Against this background, the modelling strategy in the multivariate analysis explores if the ethnic differentials can be explained by some measured factors. This is done by controlling for the bio-demographic and socio-economic factors as separate block sets. Three nested models are therefore estimated and tested against the bench mark ethnic effects in the bivariate model (Table 2). Model 1 assesses the net impact of ethnicity in the presence of bio-demographic factors and vice-versa, Models 2 examines the impact of socio-economic factors and Model 3 assesses the effects of all the theoretically relevant covariates. Following Brockerhoff and Hewitt (1998), the percentage change in risk associated with an ethnic group as a set of factors are added can be assessed using the formula $\left(\frac{Riskassociatedwithethnicgroupin Model_k}{Riskassociatedwithethnicgroupin Model_1}\right) - 1$, where Model_1 is the bivariate model with only ethnicity and Model_k is the model with ethnicity and a set of either bio-demographic or socio-economic factors. The multivariate results are presented in Table 3.

As Model 1 indicates, the effects of ethnicity are still large, consistent and significant after controlling for the bio-demographic factors. Indeed, the magnitude of the effects for many ethnic groups are larger in Model 1 than the bivariate model discussed earlier. For example, the risk associated with being a Dagarti increases from 2.46 to 3.18, suggesting that bio-demographic factors tend to mask ethnic differences. In sum, Model 1 suggests that the observed ethnic differences are not due to bio-demographic differences. With respect to the bio-demographic factors, they show a robust and consistent effects although the magnitudes are substantially lower than in the bivariate model. For example, the risk associated with children with succeeding birth interval of less than 2 years attenuates from 9.9 in the bivariate model to 6.3 in Model1.

In Model 2 , however, the effects of ethnicity are substantially attenuated and non significant after the socio-economic controls. With the exception of Fanti and Other Akan, none of the groups is significantly different at the conventional alpha of 0.05. The risk of being a Dagarti, for example, diminishes from 2.46 in the gross bivariate model to 1.25 in Model 2. In relative terms therefore, socio-economic differences account for almost half of the higher risk associated with infants whose mothers are Dagarti. In other words, if children of Dagarti women have the same socio-economic profile as their Asante counterparts, they will be associated with only a marginally non significant risk of death. With the exception of the Fanti, similar patterns are noticeable among the other groups notably, the Mole-Dagbani, Grussi, and Gruma.

This finding suggests that the association between ethnicity and infant mortality in Ghana is partly due to socio-economic disparities relating to maternal education and residence rather than intrinsic socio-cultural norms and practices. This is in agreement with findings in Cameroon where excess mortality among Fulbe-Fulani children is explained mainly by lack of formal education (Kuate Defo, 1996) but contrasts other studies where ethnic differences persist after socio-economic and demographic controls (e.g.,Tabutin and Akoto, 1992; Suwal, 2001).In the full model, the risk associated with ethnicity are further reduced, corroborating the hypothesis that for the most part a mother's ethnicity per se does not differentially predispose her children to a higher risk death if other factors are held constant. The most important determinants of infant mortality as suggested by the Model 3 are the bio-demographic factors and the socio-economic factors which are consistent with previous work in Ghana (Amankwah, 1996; Benefo and Schultz, 1996; Sullivan et al., 1994;Tawiah, 1989; Adansi-Papim, 1985). The likelihood ratio statistics however, suggest that the bio-demographic model (1) provide a better fit. Although not significant, Model 3 also suggests that the risk of death is higher in household with pan or pit latrine as compared with households with no toilet facility. While this seems surprising at first, an explanation could be sought in the environmental hazards and insanitary conditions posed by those toilet facilities. In urban settlements where the bucket is widely used, the collection system has broken down in many places while the traditional pit latrines create obvious odours and attract flies.

Conclusion

This study was premised on the hypothesis that ethnic specific socio-cultural practices might be salient to infant mortality differentials in Ghana. While this was substantiated in the bivariate analysis, the multivariate results suggested that ethnicity per se has no direct major influence on infant mortality once socio-economic factors are considered. This implies that ethnic differences in infant mortality are mainly due to socio-economic disparities among groups and partly underscore the importance of the modernization paradigm. At the core of this perspective is the notion that differences in demographic behaviour is more of a reflection of socio-economic inequalities (World Bank, 1986). It is worth emphasizing that even though ethnic specific socio-cultural practices might predispose children to a higher risk of death, the modernizing influences of education and urban residence play a meaningful mediating role. As individuals become educated and modernized, they become less subservient to cultural deterministic mode of behaviour to one based on rationality. The results also add to the growing body of recent literature that suggests that ethnic affiliation per se may be less influential in impacting demographic behaviour in Ghana (Gyimah, 2002; Takyi and Addai, 2002; Addai, 1999a).

Since the ethnic differentials mainly reflect socio-economic disparities, improvements in child survival can be achieved by bridging socio-economic inequalities among ethnic groups particularly, through formal education. Given that the disadvantaged ethnic groups are mostly based in rural areas and northern Ghana, there is the need for a sustained effort at narrowing the north-south inequality in development. The problems in the north and rural areas are compounded by insufficient health awareness and ignorance about their importance resulting in low use of existing health facilities and services (Ghana and UNICEF, 1990). Against this backdrop, there is the urgent need to create a heightened awareness among the populace on the usefulness of pre- and antenatal programs and their potential impact on child survival.

Besides socio-economic factors, our findings also validate the overarching influence of bio-demographic factors as significant determinants of infant survival in Ghana. In the light of this, efforts to encourage wider birth spacing and longer breastfeeding through the Maternal and Child Health Programs need to be sustained. Also, since early age at birth increases the risks of infant deaths, there is the need for a persistent campaign against customs and traditions that see motherhood as the most desirable role for women. Lastly, the persistence of significant differences among the Fanti needs further clarification. While this could partly be attributed to the practice of child fosterage, a qualitative study may be useful in assisting the design and implementation of maternal and child health services for this group.

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Table 1: Percent Distribution of Bio-demographic and Socio-economic Factors by Ethnicity

	Asante	Other Akan	Fanti	Ga-Adangbe	Ewe	Mole-Dagbani	Grussi	Gruma	Dargarti
MATERNAL AGE AT BIRTH									
under 20	15.78	13.49	9.59	17.59	11.11	12.00	10.53	10.66	5.96
20-24	29.11	26.15	27.46	25.13	26.83	23.25	28.95	27.67	21.70
25-29	20.67	25.66	29.27	23.62	23.85	23.25	21.05	25.07	21.70
30-34	16.67	17.60	15.80	20.10	18.97	20.50	11.84	17.00	20.85
35+	17.78	17.11	17.88	13.57	19.24	21.00	27.63	19.60	29.79
BIRTH ORDER OF CHILD									
First	26.67	23.85	22.28	25.13	26.83	19.25	22.37	17.00	15.74
2-3	34.67	35.36	35.23	42.21	34.15	33.00	32.24	34.29	31.49
4-5	19.11	20.89	20.47	18.59	20.60	26.25	24.34	27.09	24.68
6+	19.56	19.90	22.02	14.07	18.43	21.50	21.05	21.61	28.09
LENGTH OF PREVIOUS INTERVAL									
Under 2 years	8.89	10.69	12.44	9.05	7.86	12.00	5.92	14.70	10.21
2-3 years	25.56	24.84	22.02	21.61	21.95	24.75	26.97	33.43	32.77
Above 3 years	65.56	64.47	65.54	69.35	70.19	63.25	67.11	51.87	57.02
LENGTH OF SUCCEEDING INTERVAL									
Under 2 years	6.44	6.09	8.55	8.04	4.34	5.50	3.95	9.80	4.26
2-3 years	15.11	12.66	10.88	8.04	12.20	10.75	9.87	16.71	14.47
Above 3 years	78.44	81.25	80.57	83.92	83.47	83.75	86.18	73.49	81.28
BREASTFEEDING STATUS OF CHILD									
Never breastfed	1.78	2.80	3.63	3.02	2.98	2.00	-	2.02	1.28
1-6 months	15.11	13.98	16.06	16.08	15.18	14.00	18.42	17.00	17.45
7months+	83.11	83.22	80.31	80.90	81.84	84.00	81.58	80.98	81.28
MATERNAL EDUCATION									
None	13.33	20.72	32.38	27.14	29.27	90.00	76.32	87.03	83.83
Primary Education	18.44	21.88	26.42	31.66	24.12	5.75	17.11	7.20	8.09
Secondary Education	68.22	57.40	41.19	41.21	46.61	4.25	6.58	5.76	8.09
PLACE OFRESIDENCE									
Urban	23.56	24.18	36.01	53.27	16.26	15.50	5.92	4.61	8.94
Rural	76.44	75.82	63.99	46.73	83.74	84.50	94.08	95.39	91.06
REGION OF RESIDENCE									
South	98.89	98.36	99.48	100.00	99.19	15.50	14.47	21.61	6.81
North	1.11	1.64	0.52	-	0.81	84.50	85.53	78.39	93.19
HOUSEHOLD DRINKING WATER									
River/stream	29.11	31.41	13.21	25.63	48.24	37.25	17.11	48.41	18.30
Piped water	29.33	28.13	61.40	53.27	21.68	8.75	7.89	5.48	9.36
Well	14.67	17.11	7.77	8.54	15.72	24.00	11.84	15.27	11.49
Borehole	26.44	22.70	16.32	6.03	12.47	30.00	63.16	30.84	60.85
Other	0.44	0.66	1.30	6.53	1.90	-	-	-	-
HOUSEHOLD TOILET FACILITY									
None	10.89	8.72	14.51	19.60	16.53	74.00	81.58	83.29	81.70
Flush	4.44	4.11	4.66	8.04	5.69	0.75	-	0.58	0.85
Pit/KVIP	80.89	78.78	74.61	62.31	74.25	25.00	17.76	15.56	16.60
Bucket/Pan	3.78	8.39	6.22	10.05	3.52	0.25	0.66	0.58	0.85
SAMPLE SIZE	450	608	386	199	369	400	152	347	235

Notes: Based on births that occurred 5 years before the survey. The residual class of other group has been omitted.

Table 2: Distribution of Births and Deaths and Unadjusted Risk Ratios

ETHNICITY	Births	Infant Deaths	Bivaraite Hazard of Infant Mortality
Asante	450	16	1.00[a]
Other Akan	608	41	1.90*
Fanti	386	38	2.82***
Ga	199	7	0.99
Ewe	369	17	1.31
Mole-Dagbani	400	32	2.26**
Grussi	152	11	2.08*
Gruma	347	25	2.06**
Dagarti	235	20	2.46**
Others	152	3	0.56
MATERNAL AGE AT BIRTH			
Under 20 years	398	37	1.97***
20-24	878	56	1.34
30-34	593	39	1.40
35 years and above	638	41	1.37
25-29	791	37	1.00[a]
BIRTH ORDER OF CHILD			
First	741	65	1.74***
4-5	732	45	1.21
6 and Above	683	42	1.22
2-3	1142	58	1.00[a]
LENGTH OF PREVIOUS INTERVAL			
Under 2 years	344	37	1.85***
2-3 years	858	51	1.02
Above 3 years	2096	122	1.00[a]
LENGTH OF SUCCEEDING INTERVAL			
Under 2 years	212	79	9.92***
2-3 years	420	24	1.32***
Above 3 years	2666	107	1.00[a]
BREASTFEEDING STATUS OF CHILD			
Never breastfed	79	58	3.69***
7 months or more	2711	58	0.05***
Under 7 months	508	94	1.00[a]
MATERNAL EDUCATION			
None	1542	111	1.00[a]
Primary Education	598	40	0.93
Secondary Education	1158	59	0.70*
PLACE OFRESIDENCE			
Urban	711	31	0.62*
Rural	2587	179	1.00[a]
REGION OF RESIDENCE			
South	2274	126	1.49***
North	1024	84	1.00[a]
HOUSEHOLD DRINKING WATER			
River/stream	1047	71	1.00[a]
Piped water	852	38	0.65*
Well	490	31	0.94
Borehole	878	68	1.16
Other	31	2	0.93
HOUSEHOLD TOILET FACILITY			
None	1220	88	1.00[a]
Flush	111	3	0.37!
Pit/KVIP	1832	112	0.84
Bucket/Pan	135	7	0.70
TOTAL	3298	210	

Notes: [a]=reference category

Significance: ***<0.00; **<0.01; *<0.05; !<0.10.

Table 3: A Multivariate Hazard Model of Infant Mortality

ETHNICITY	Model 1	Model 2	Model 3
Other Akan	1.70!	1.86*	1.68!
Fanti	2.56***	2.87***	3.03***
Ga-Adangbe	0.84	1.07	0.89
Ewe	1.45	1.24	1.41
Mole-Dagbani	2.73***	1.22	1.11
Grussi	2.92**	1.07	1.19
Gruma	2.19*	1.10	0.84
Dagarti	3.18****	1.25	1.19
Others	0.50	0.43	0.32
Asante (Reference)	1.00	1.00	1.00
MATERNAL AGE			
Under 20 years	1.65*		1.62!
20-24	1.70*		1.65*
30-34	1.89*		2.02**
35 years and above	2.24***		2.23**
25-29 years (Reference)	1.00		1.00
BIRTH ORDER			
First	1.65*		1.58*
4-5	1.42		1.25
6 and Above	0.84		0.70
2-3 (Reference)	1.00		1.00
PRECEDING INTERVAL			
Under 2 years	1.46!		1.40
2-3 years	1.20		1.11
Above 3 years (Reference)	1.00		1.00
SUCEEDING INTERVAL			
Under 2 years	6.32***		6.32****
2-3 years	1.64*		1.65*
Above 3 years (Reference)	1.00		1.00
BREASTFEEDING STATUS			
Never breastfed	2.67***		2.87***
More than 6 month	0.05***		0.04***
1-6 months (Reference)	1.00		1.00
MATERNAL EDUCATION			
Primary Education		1.12	0.93
Secondary Education		0.91	0.67!
None (Reference)		1.00	1.00
RESIDENCE			
Urban		0.66*	0.94
Rural (Reference)		1.00	1.00
REGION			
North		1.88*	2.10*
South (Reference)		1.00	1.00
HOUSEHOLD TOILET FACILITY			
Flush			0.46
Pit/KVIP			1.11
Bucket/Pan			1.29
No toilet (Reference)			1.00
HOUSEHOLD DRINKING WATER			
Piped			0.50*
Well			0.95
Borehole			1.07
Other			0.94
Stream/river (Reference)			1.00
-2 Log Likelihood	2689	3328	2655
Model Chi-square	648***	11*	683***

Significance: ***<0.00; **<0.01; *<0.05; !<0.10.

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