# Fancy Things, Education and Variability in Self-reported Morbidity: the case of adult women in Accra, Ghana

MAAME B. NKETSIAH

Population and International Health Program, Harvard School of Public Health, Boston, Massachusetts, 02115, USA.

**Abstract: This paper uses data from the women's health study in Accra, Ghana to investigate the effect of poverty and low educational status on perceived general health, report of chronic conditions and report of infectious conditions. It was found that poorer women were more likely to perceive their general health as poor, while wealthier women were more likely to report having one or more chronic conditions. Report of infectious conditions was lowest among the wealthiest women. Although education did not have statistically significant associations with any morbidity indicator, it showed a gradient with perceived general health - the higher a women's educational level, the lower their odds of reporting ill-health. The study shows that intra-urban differentials in health exist by socioeconomic status in Accra. Also, the patterns observed are consistent with an epidemiologic transition, which has already been documented in Ghana.**

Angus Deaton asserted that: "poorer people die younger and are sicker than richer people; indeed, mortality and morbidity rates are inversely related to many correlates of socioeconomic status such as income, wealth, education or social class" (Deaton 2002). This inverse association between socioeconomic factors and physical and mental health status has been recognized in most other industrialised nations, including Australia (Turrell & Mathers 2000), Great Britain (Macintyre 1986; Marmot et al 1984; Marmot & Smith 1991), and the United States (Haan et al 1987; Kitagawa & Hauser 1973; Menchik 1993; Williams & Collins 1995).

In developing nations, much of the discussion and documentation of socioeconomic inequalities in health concentrates on rural-urban differences (Castro-Leal et al 2000; Timaeus & Lush 1995; Wagstaff 2000). Urban areas benefit from greater concentration of social and economic amenities – provision of piped water, waste disposal, electricity and schools. Moreover, the resulting positive externalities have been expressed in better average health status and economic development in urban areas. But, rapid urbanization in the less developed parts of the world is transforming the rural-urban dichotomy by making rural areas more urban and vice versa (Weeks 2004). For resource-poor nations, the technology and infrastructure developments that are needed to keep pace with urban population growth are almost impossible to come by. Poor residents are not only differentially exposed to environmental pollutants, but also lack the means to seek adequate care. Consequently, there is a case for increasing disparities in morbidity and mortality among different socioeconomic groups within the city. For example, Basta established that the health of the urban poor may

be as bad as that of rural residents, or worse (Basta 1977). Unfortunately, important intra-urban differences are obscured in most demographic analyses of developing countries that focus on urban-rural dichotomies.

From an ethical perspective, intra-urban inequalities fall within the category of "differences in health that are unnecessary, avoidable, unfair and unjust" (Whitehead 1991). But, beyond this ideological justification for addressing them, they have important economic implications. Traditionally, economic development has been led by urban areas, and it is in these same areas in developing countries that "almost all the world's population growth for the foreseeable future will occur" (Montgomery et al 2003). It follows then that the health of urban populations is essential to development in the least developed regions of the world. Therefore, research that illuminates the patterns and determinants of intra-urban inequalities in health is needed to guide policies and interventions that will ultimately safeguard the potential for economic development.

Finally, although the utility of social surveys in assessing socioeconomic differentials in health has been well established in industrialised countries, few research studies consider developing countries. Since surveys are easier and less costly to implement, establishing usefulness of self reported health status in social epidemiology studies in resource poor settings can open the door to further exploration of health differentials.

Given the noted gaps in research on intra-urban differentials in health status and its importance to the development agenda, this study was aimed at investigating socioeconomic status differences in morbidity using the case of adult women in Accra, Ghana. The first objective was to compare the scale and direction of the impact of wealth (a household-level SES measure) and education (an individual-level SES measure) on morbidity among women in Accra. Second, was to investigate the extent to which differentials in morbidity are mediated through health care access, health behaviours and social support.

### *The Setting*

Reflecting its heritage as a colonial capital and a traditional indigenous fishing village, deprived areas exist alongside privileged ones in Accra (Williams & Collins 1995). On the one hand, this is the nexus of economic wealth in Ghana; the greater Accra Metropolitan Area has 11% of the country's population and is estimated to contribute 10-15% of its GDP. It also has 56% of employment in the finance, insurance and real estate industries, 3% in construction, 30% in transport and communication, 22% in wholesale/rental, and over 30% in the manufacturing industry (Ministry of Local Government Rural Development and Environment 2006). The strict fiscal and monetary policies implemented during the structural adjustment years of the late 1980's and early 1990's have finally started to reflect in economic prosperity – the growth rate in 2005 was 6% (International Development Agency 2007). As a result, there is a growing middle and professional class, as well as increasing wealthy elite.

On the other hand, the fishing villages of the city have preserved pre-colonial cultural and socioeconomic characteristics. Some of the poorest people in the country are reside in these

enclaves, with no access to amenities, like running water, electricity and sanitation that are a foregone conclusion in most cities (Boadi & Kuitunen 2005). Joining the urban poor are a majority of the migrants from the hinterland seeking employment opportunities. Many of these migrants, especially those from the northern region of the country, have settled in slums and squatter communities across the city.

The recent "Patterns and Trends of Poverty in Ghana" report, highlights that whereas, on average, the poverty rate dropped from 39.5% in 1999 to 28.5% in 2006, the rate in Accra doubled from 5.2% to 11.8% over the same period. That this evidence reflects declines in rural poverty and increases in urban poverty provides further impetus for this study of the impact of social stratification on health in an urban area.

***Analytical Framework***

There are three main categories of explanations for observed patterns of the association between SES and health that have been found in the literature. The first one encompasses a set of causal mechanisms through which SES affects health status and the risk of dying. Selection or reverse causation, the second set of hypothesis, relates to pathways through which unhealthy individuals may move down the social hierarchy due to their lower health status. The final one, which is less often advanced, includes artefactual mechanisms, like measurements errors (Goldman 2001).

For this particular study, a framework consistent with the first hypothesis was adopted. Health status is generally affected by a host of factors that reflect biological and social-structural contexts. As already mentioned, variations in health status have been found to be due to differences in socioeconomic status. These effects may either be independent or direct or rather mediated through more proximate determinants of health status including health behaviours, medical care access and social support.

First, it is well documented that the health of individuals is strongly linked to the choices they make about health behaviours (Lantz et al 1998). Choices about smoking, alcohol consumption, drug use, physical exercises, sexual behaviour, diet, personal hygiene, especially, have a major impact on one's health and well-being. Beyond these, differences in health status may result from systematic differences in care-seeking behaviour, in access to health services, or in availability to other resources or characteristics that influence the effectiveness of health care (Andrulis 1998). Furthermore, studies of social relationships and morbidity as well as mortality reveal that family relationships are instrumental in protecting individual health. Umberson posits that family ties involve elements of meaning and obligation which contribute to social control; that social control is a mechanism by which social relationships affect health behaviours; and that health behaviours affect health outcomes (Umberson 1987).

Following the foregoing discussion, this study posits that morbidity is a function of socioeconomic status, with marital status, reported behaviour change and use of trained medical professionals acting as intervening factors (see Figure 1). However, the goal is not to prove a causal relationship as the alternate hypotheses of reverse causation and

measurement error are not dealt will not be dealt with in the analyses. The choice of an individual level and household level socioeconomic status measures follows the paradigm of considering components of SES as having distinct and separate effects. It is to assess whether there is a difference in how the two different dimensions of social stratification affect morbidity. Finally, the three morbidity indicators selected reflect a summary measure of health status, chronic disease co-morbidity and infectious disease co-morbidity. For a country like Ghana, where the epidemiologic transition is well on its way, it is expected that impact of socioeconomic status will differ between chronic conditions and infectious conditions.

## Data and Methods

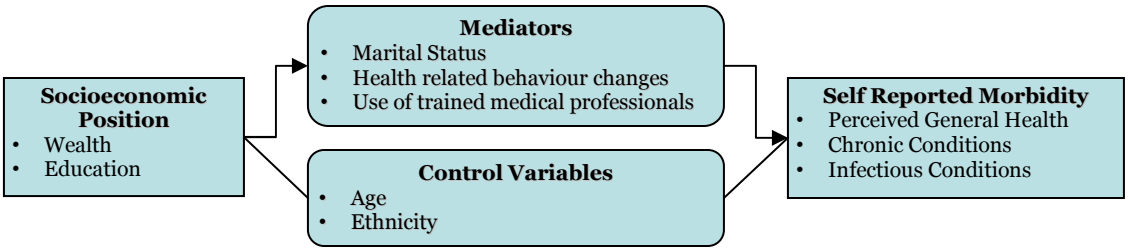


Figure 1 Operational Model of SES and Morbidity in Women in Accra, Ghana

### *Data Source and Study Population*

Data for this analysis are from the Women's Health Study of Accra (WHSA), a community-based population study. The purpose of this study was to assess the burden of disease in a representative sample of adult women living in Accra, Ghana (Hill et al forthcoming). The area chosen for the study, Accra Metropolitan Area, is the capital of Ghana and comprises 373,540 households as enumerated by the March 2000 census.

A total sample consisted of 3175 women, age 18 and above, currently living in Accra at the time of the interview were selected for the study using a two stage cluster probability sample stratified by socioeconomic status of enumeration area. An extensive program of mapping and listing of eligible households was done to ensure that the cohort of women was representative of women over age 18 in the city. Nurses and social workers conducted private interviews with each of the women using a household survey that included questions for self-reported illnesses, reproductive history and health practices, as well as Short Form 36 to measure general morbidity, risks for illnesses and social history (Duda et al 2007).

### *Measurement of Independent Variables – Socioeconomic Status (SES)*

The proxy measures for SES used in the study were an asset-based wealth index and the highest level of schooling achieved, as summarized in Table 1. Asset based wealth was constructed instead of income because data on the latter was based on a single question inquiring about average monthly income which was insufficient to construct and adequate indicator. Furthermore, income tends to be volatile; varying over a given period of time. Thus, collecting information on it at one point in time, like in this data set, does not adequately reflect spending power, housing conditions, diet and access to services. Another

shortcoming of the individual income data collected this survey data – specific to Ghana and other developing countries with similar cultural contexts – is that household income is more predictive of socioeconomic status, in terms of how access to material resources affects health status. This is because women either live in their marital homes or in family compounds if not in a marital or cohabiting union, and they depend on the collective earning of the household rather than on their personal earnings.

Table 1. Socioeconomic Status Indicators

| SES Indicator | Measure Socioeconomic Status | Coding |
|---|---|---|
| Wealth Index | Computed using factor loadings from dwelling characteristics and household assets: type of dwelling, light, existing fresh water, toilet, cooking fuel, bath, solid and liquid waste disposals, ownership of sewing machine, fridge, radio, TV and car. | 1 – very low SES<br>2 – low SES<br>3 – medium SES<br>4 – medium high SES<br>5 – high SES |
| Education | Highest level of schooling achieved or completed. Categories determined by cut-off points in Ghanaian educational system. | 1 – No schooling<br>2 – Primary School<br>3 – Middle/Junior Secondary School<br>4 – Secondary/Senior Secondary School<br>5 – Higher Education |

In the analysis, therefore, factor analysis was used to construct an asset based **wealth index** – as used in the Demographic and Health Surveys (DHS) – based on dwelling characteristics and household assets. Items that were not correlated with any of the factors were removed one at a time, and the changes in the subsequent factor analyses determined whether they would be retained in the final index. Factors of each woman were then calculated using factor loading and rotation on the first factor. The scores were then grouped into quintiles, with the first quintile representing the lowest socioeconomic class.

**Educational level** was measured as the highest level of education attained/completed. This variable was classified into five standard hierarchical levels, representative of applicable cut-offs in the Ghanaian educational system: no schooling, primary school, middle/Junior Secondary School (JSS), secondary/Senior Secondary School (SSS) and higher education. These were then coded from one to five, respectively, and in ascending order.

### *Measurement of Dependent Variable – Self Reported Morbidity*

Three morbidity indicators covering various aspects of a respondent's health were used as the dependent variables for the present study. Table 2 provides the exact definitions of the measures used. Perceived general health was measured by the question "In general, would you say your health is: excellent, very good, good, fair or poor?" This was transformed into a dichotomous variable, with the cut-point set between good and fair. Responses of good or better were coded as 0, and those of fair or poor were coded as 1.

The other two morbidity indicators were based on the respondents' self-reporting, for each condition separately, on whether they had suffered from a list of conditions during the last 12 months. From the sets of conditions for which data were available, seven chronic conditions and two communicable conditions were selected to construct a chronic conditions indicator and an infectious conditions indicator, respectively (see Table 2). Having none of the conditions was coded as 0, and one or more of the specified conditions was coded as 1.

Table 2. Health Status Indicators

| Morbidity Indicator | Measure of ill-health | Coding |
|---|---|---|
| Perceived general health | Respondents considering their present level of health as worse than good health | 0 – good or better health<br>1 – less than good health |
| Chronic conditions | Respondents indicating that they suffered from one or more chronic conditions in the past year (7 conditions: Hypertension, Diabetes, Heart attack, Stroke, Chronic lung condition, Cancer and Asthma) | 0 – suffered from none of the listed conditions<br>1 – suffered from one/more of the listed conditions |
| Infectious conditions | Respondents indicating that they suffered from either Malaria or Tuberculosis in past year | 0 – no malaria or TB<br>1 – either malaria or TB |

### *Measurement of Explanatory and Control Variables*

**Age** was used as a continuous variable calculated from the given years and months of birth collected from the survey; and in its quadratic form, $age^2$, to account for the fact that the variation of morbidity with age may be non-linear. Biologically, it is expected that as individuals progress over the life cycle, their health status will decline. Also, age is correlated with wealth, education and other variables, in a manner that is variable over the life cycle as well as non monotonic.

Cultural influences on health status involve such aspects of human behaviour and belief systems as religious practices, language, folk medicine, diet, and help-seeking behaviour. These cultural practices in turn have an impact on perceptions of symptoms, definitions of illness, delivery of health services, disease prevention, health promotion, medical practice, and patient adherence. The **ethnicity** variable was derived by condensing responses on a question about ethnicity according to the major ethnic classifications in Ghana. In this analysis, five categories coded from one to five reflecting the Akan, Ga, Ewe, Hausa/Mole-Dagbani and other ethnic groups.

Table 3. Control & Explanatory Variables

| Variable | Description | Coding |
|---|---|---|
| Age | | Age - continuous variable calculated from month and year of birth;<br>$Age^2$ – calculated from age*age |
| Ethnicity | | 1 – Akan<br>2 – Ga<br>3 – Ewe<br>4 – Hausa/Mole-Dagbani<br>5 – Other Ethnicities (Grussi/Guan/Gruma) |
| Marital Status | | 1 – Never Married<br>2 – Currently Married<br>3 – Ever Married |
| Reported behaviour change | Proxy for health behaviours & knowledge on "protective" health behaviours | 0 – no improvements made over previous year<br>1 – one or more improvement made over previous year |
| Use of Trained Medical Professionals | Proxy for access to medical care and advice | 0 – non use of trained medical professionals when ill<br>1 – use of trained medical professionals |

The explanatory variables used in the analysis were marital status, reported behaviour change and the use of trained medical professionals. **Marital status** was examined as: never

married, currently married, and ever married (comprising those widowed, separated or divorced), where never married was the reference category. The tabulation of marital status was done from a series of responses regarding marriage history. The survey included no explicit question on current marital status, thus, 127 women who reported being married at least once, but did not indicate their current status were dropped from the analysis.

**Reported behaviour change** (RBC) was chosen as a predictor in lieu of known risk factors like smoking, alcohol use, intake of fruits and vegetables and physical inactivity. This was found to be a good proxy as those who have changed behaviours are likely to be privy to information on health preserving behaviours and have the capacity to delay gratification. The data on smoking, alcohol use, intake of fruits and vegetables and physical activity, showed very little variability within the study sample. In addition, most of the women were below threshold levels defined in previous studies for risky or protective behaviour. For example, less than one percent of the respondents reported that they were current smokers. Intake of fruits and vegetables was universally low – mean intake of 1.76 servings (~141g), and median of 1.28 servings (102g). Only 0.5% of respondents in the sample reported higher intake than the minimum of 600g (7.5 servings) per day prescribed by the comparative risk assessment done for the Global Burden of Disease study. There were also methodological challenges with the measurement of physical inactivity as well as large non-response rates (up to 26%) for questions about risk factors.

The variable was derived from two questions about improvements made to health over the last 12 months. The first was a screening question on whether respondents had done anything to improve their health. Those responding yes then had to specify the improvements made from a list of options, including: *increased exercise, changed diet, quit smoking, reduced amount smoked, drank less alcohol, received medical treatment, learned to manage stress, reduced stress levels, took vitamins, religious prayers and other*. The variable was dichotomized as 0 and 1, reflecting women who responded "no" or "do not know" to "have you done anything to improve your health"; and women who answered "yes" and engaged in any of the first nine activities, respectively. The choice of "religious prayers" or "other" was included with the "no reported behaviour change" category.

The **use of trained medical professionals** (UTMP) variable was constructed from a question on where care was sought. Visiting pharmacists, chemical shops, churches, spiritualists or self medicated was coded as not consulting trained medical professionals, while attending a clinic/health centre, doctor's office, hospital emergency room, outpatient department, or maternity home was considered making use of trained medical professionals.

***Cross-tabulation Analysis***

A descriptive analysis, using selected variables, was done to gain a broad knowledge of crude associations between: (1) the SES indicators and explanatory variables; (2) Morbidity indicators and the explanatory variables; and (3) SES indicators and the morbidity indicators. Chi-square tests were used to assess associations.

***The Regression Model***

On the basis of the specified analytic framework (Figure 2), three basic logistic regression models were derived to predict the effect of SES on morbidity. The first model was to predict the direct effect of each SES indicator on morbidity, controlling for ethnicity and age. In the second model, the intervening variables, marital status, reported behaviour change and use of trained medical professionals were introduced to asses to what extent they mediate the effects observed in model 1. Model three included both SES indicators in addition to all variables in the preceding models. Each dependent variable – perceived general health, chronic conditions and infectious conditions – was evaluated separately.

The model predictions for the expected probability of being in ill-health as discussed above are summarized in the following regression equations:

$$hs = f(constant + wealth5 + ethn + agec + age^2) \quad (1)$$
$$hs = f(constant + wealth5 + m\_stat + rbc + utmp + ethn + agec + age^2) \quad (2)$$

$$hs = f(constant + education + ethn + agec + age^2) \quad (3)$$
$$hs = f(constant + education + m\_stat + rbc + utmp + ethn + agec + age^2) \quad (4)$$

$$hs = f(constant + wealth5 + education + m\_stat + rbc + utmp + ethn + agec + age^2) \quad (5)$$

where;

| | |
|---|---|
| hs | = health status (three morbidity indicators) |
| wealth5 | = asset based wealth index grouped by quintiles |
| education | = educational level completed |
| m_stat | = marital status |
| rbc | = reported behaviour change |
| utmp | = use of trained medical professionals |
| ethn | = ethnicity |
| agec | = age (as continuous variable) |
| $age^2$ | = age squared |

All analysis was conducted in Stata version 9 (StataCorp 2005).

## Results

The analysis was restricted to the 2,640 women (83.3% of the study population) for whom data for all variables of interest were available. Table 4 shows that the study population had relatively low educational levels, with a fifth (20.11%) not having been too school and close to half completing middle school/JSS (43.9%). Only a small percentage of the women, 7.46%, had finished higher education. Most of the respondents, 40%, were currently married, while, about equal proportions were never married and ever married (divorced, widowed or separated). With respect to ethnicity, Akan and Ga made up 74% of the study sample, in almost equal proportions. Of the remaining women, about 13% were Ewe, and Hausas as well as other ethnicities together made up the other 13%. Finally, 41% of respondents reported making behaviour changes, whereas almost twice that proportion 81% reported making use of trained medical professionals.

**Table 4. Socio-demographic characteristics and health status measures of study sample**

| | |
|---|---|
| **Educational Level** | |
| No school | 20.11% |
| Primary | 11.93% |
| Middle/JSS | 43.9% |
| SSS | 16.59% |
| Higher | 7.46% |
| **Marital status** | |
| Never married | 28.79% |
| Currently married | 40.42% |
| Ever married | 30.8% |
| **Ethnicity** | |
| Akan | 36.21% |
| Ga | 36.78% |
| Ewe | 12.77% |
| Hausa/MoleD | 6.7% |
| Other ethnicities | 7.54% |
| **Reported behaviour change** | |
| No changes | 59.2% |
| Changes | 40.8% |
| **Use of trained medical professionals** | |
| Non use | 19.32% |
| Use | 80.68% |
| **Perceived General Health** | |
| Better than good health | 80.8% |
| Worse than good health | 19.2% |
| **Chronic conditions** | |
| None | 80.45% |
| One or more | 19.55% |
| **Infectious Conditions** | |
| None | 48.3% |
| One or more | 51.7% |

The prevalence of ill health among the study sample was similar for perceived general health and chronic conditions, at about 19%. For infectious conditions, prevalence of one or more conditions was much higher and more women reported to have had one or more infection, 51.7%, than had not.

### *Cross-Classification of Model Variables*

Compared to the other martial status groups, never married women were least represented in quintile 1 (13.82%) and has the highest proportion in quintile 5 (23.24%) (Table 5). Currently married women were almost evenly distributed across wealth quintiles. The third group, ever married women, were most likely to have fewer assets. Similarly, never married women were more likely to have completed higher levels of education, while there were larger proportions of ever married women at lower educational levels (Table 6).

Akans had lower proportions in quintile 1 and higher proportions in higher wealth quintiles. Ewes had a similar distribution to the Akan, with slightly lower proportions at the higher end. Ga women were almost evenly distributed across quintiles, whereas the Hausa/Mole-Dagbani and other ethnicities were more likely to be at the lower end of the wealth scale. Likewise, Table 6 shows that higher proportions of Akan and Ewe women had completed middle, secondary and higher education, whereas, the Hausa/Mole-Dagbani and the other ethnicities were more represented at lower educational levels.

**Table 5. Level of wealth by control and explanatory variables**

| | Wealth Quintiles n(%) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| **Ethnicity** | | | | | | |
| Akan | 110 (11.5%) | 180 (18.8%) | 219 (22.9%) | 196 (20.5%) | 251 (26.3%) | 956 (100%) |
| Ga | 222 (22.9%) | 187 (19.3%) | 197 (20.3%) | 181 (18.6%) | 184 (18.9%) | 971 (100%) |
| Ewe | 57 (16.9%) | 56 (16.6%) | 62 (18.4%) | 95 (28.2%) | 67 (19.9%) | 337 (100%) |
| Hausa/Mole | 46 (26%) | 55 (31.1%) | 25 (14.1%) | 25 (14.1%) | 26 (14.7%) | 177 (100%) |
| Other Ethnicities | 58 (29.2%) | 54 (27.1%) | 37 (18.6%) | 36 (18.1%) | 14 (7.0%0 | 199 (100%) |
| **Marital Status** | | | | | | |
| Never Married | 105 (13.8%) | 143 (18.8%) | 161 (21.2%) | 173 (22.8%) | 178 (23.4%) | 760 (100%) |
| Currently Married | 180 (16.9%) | 226 (21.2%) | 237 (22.2%) | 207 (19.4%) | 217 (20.3%) | 1,067 (100%) |
| Ever Married | 208 (25.6%) | 163 (20%) | 142 (17.5%) | 153 (18.8%) | 147 (18.1%) | 813 (100%) |
| **Reported Behaviour Change** | | | | | | |
| No change | 368 (23.5%) | 367 (23.5%) | 338 (21.6%) | 269 (17.2%) | 221 (14.1%) | 1,563 (100%) |
| Change | 125 (11.6%) | 165 (15.3%) | 202 (18.8%) | 264 (24.5%) | 321 (29.8%) | 1,077 (100%) |
| **Use of Trained Medical Professionals** | | | | | | |
| Non use | 160 (31.4%) | 118 (23.1%) | 109 (21.4%) | 69 (13.5%) | 54 (10.6%) | 510 (100%) |
| Use | 333 (15.6%) | 414 (19.4%) | 431 (20.2%) | 464 (21.8%) | 488 (22.9%) | 2,130 (100%) |

**Table 6. Level of education completed by explanatory variables**

| | Educational Levels | | | | | |
|---|---|---|---|---|---|---|
| | No school | Primary | Middle | Sec/SSS | Higher | Total |
| **Ethnicity** | | | | | | |
| Akan | 116 (12.1%) | 108 (11.3%) | 463 (48.4%) | 186 (19.5%) | 83 (8.7%) | 956 (100%) |
| Ga | 209 (21.5%) | 119 (12.3%) | 447 (46.0%) | 129 (13.3%) | 67 (6.9%) | 971 (100%) |
| Ewe | 57 (16.9%) | 36 (10.7%) | 149 (44.2%) | 62 (18.4%) | 33 (9.8%) | 337 (100%) |
| Hausa/Mole | 80 (45.2%) | 17 (9.6%) | 40 (22.6%) | 34 (19.2%) | 6 (3.4%) | 177 (100%) |
| Other Ethnicities | 69 (34.7%) | 35 (17.6%) | 60 (30.2%) | 27 (13.6%) | 8 (4.0%) | 199 (100%) |
| **Marital Status** | | | | | | |
| Never Married | 54 (7.1%) | 57 (7.5%) | 310 (40.8%) | 250 (32.9%) | 89 (11.7%) | 760 (100%) |
| Currently Married | 219 (20.5%) | 128 (12%) | 520 (48.7%) | 120 (11.3%) | 80 (7.5%) | 1,067 (100%) |
| Ever Married | 258 (31.7%) | 130 (16%) | 329 (40.5%) | 68 (8.4%) | 28 (3.4%) | 813 (100%) |
| **Reported Behaviour Change** | | | | | | |
| No changes | 365 (23.4%) | 205 (13.1%) | 701 (44.9%) | 226 (14.5%) | 66 (4.2%) | 1,563 (100%) |
| Changes | 166 (15.5%) | 110 (10.2%) | 458 (42.5%) | 212 (19.7%) | 131 (12.2%) | 1,077 (100%) |
| **Use of Trained Medical Professionals** | | | | | | |
| Non use | 127 (24.9%) | 74 (14.5%) | 234 (45.9%) | 55 (10.8%) | 20 (3.9%) | 510 (100%) |
| Use | 404 (19%) | 241 (11.3%) | 925 (43.4%) | 383 (18%) | 177 (8.3%) | 2,130 (100%) |

For reported behaviour change (RBC) and use of trained medical professionals (UTMP), larger proportions of poorer women reported no changes and non-use; and wealthy women were more likely to have made changes and used medical professionals (Table 5). A similar pattern was seen with education (Table 6): compared to those who made no changes nor used medical professionals, women who did were more likely to be better educated.

Across all morbidity categories, never married women were the least likely to report ill-health, while ever married women were the most likely (Table 7). Chronic conditions showed the widest disparity in prevalence of ill-health between marital status categories – the proportion of never married with chronic conditions was 2.76% compared to 35.92% among those ever married. The narrowest disparity was in infectious diseases. Among different ethnic groups, prevalence of ill-health across morbidity categories was lowest in other ethnicities and highest among Ga women. For both RBC and UTMP, women who

reported changes and use had higher proportions reporting ill-health. Overall, the inequality in prevalence of ill-health between subgroups was widest for marital status and narrowest in UTMP. In addition, the chronic conditions morbidity indicator had the greatest inequalities across explanatory variables, while infectious conditions showed the least variability.

**Table 7. Prevalence of ill-health by explanatory variables**

| | Perceived Health | | Chronic Conditions | | Infectious Conditions | | Total n(%) |
|---|---|---|---|---|---|---|---|
| | >Good | <Good | None | One/More | None | One/More | |
| **Ethnicity** | | | | | | | |
| Akan | 805 (84.5) | 148 (15.5) | 813 (85) | 143 (15) | 464 (48.5) | 492 (51.5) | 956 (100) |
| Ga | 725 (75) | 242 (25) | 724 (74.6) | 247 (25.4) | 452 (46.6) | 519 (53.4) | 971 (100) |
| Ewe | 277 (82.2) | 60 (17.8) | 265 (78.6) | 72 (21.4) | 163 (48.4) | 174 (51.6) | 337 (100) |
| Hausa/Mole-D | 148 (85.1) | 26 (14.9) | 148 (83.6) | 29 (16.3) | 91 (51.4) | 86 (48.6) | 177 (100) |
| Other Ethnicities | 170 (85.4) | 29 (14.6) | 174 (87.4) | 25 (12.6) | 105 (52.8) | 94 (47.2) | 199 (100) |
| **Marital Status** | | | | | | | |
| Never Married | 692 (91.4) | 65 (8.6) | 739 (97.2) | 21 (2.8) | 379 (49.9) | 381 (50.1) | 760 (100) |
| Currently Married | 880 (82.7) | 184 (17.3) | 864 (81) | 203 (190 | 531 (49.8) | 536 (50.2) | 1,067 (100) |
| Ever married | 553 (68.4) | 256 (31.6) | 521 (64.1) | 292 (35.9) | 365 (44.9) | 448 (55.1) | 813 (100) |
| **RBC** | | | | | | | |
| No changes | 1,284 (85.6) | 271 (17.4) | 1,316 (84.2) | 247 (15.8) | 800 (51.2) | 763 (48.8) | 1,563 (100) |
| Change | 841 (78.2) | 234 (21.8) | 808 (75) | 269 (25) | 475 (44.1) | 602 (56) | 1,077 (100) |
| **UTMP** | | | | | | | |
| Non use | 429 (85.5) | 79 (15.5) | 457 (89.6) | 53 (10.4) | 259 (50.8) | 251 (49.2) | 510 (100) |
| Use | 1,696 (79.9) | 426 (20.1) | 1,667 (78.3) | 463 (21.7) | 1,016 (47.7) | 1,114 (52.3) | 2,130 (100) |

Finally, the cross tabulation of ill-health by SES indicators showed that disparities across both educational levels and wealth quintiles were generally narrow. For perceived general health, education showed wider inequality than did wealth. The direction of the association between SES and self-report of one or more chronic conditions was opposite in education and wealth. Wealthier women were more likely to report ill-health, whereas better educated women were less likely to. Education showed a wider range in prevalence of ill-health – 10 to 30% - than did wealth. Lastly, infectious conditions showed only slight differences between the proportions reporting one/more conditions and those reporting no conditions. There was almost a 50-50 split across different levels of both education and wealth.

## *Regression Results*

*Impact of SES on Perceived General Health*

The model for the direct effect of wealth (1)† in Table 8 showed that women at higher wealth levels had lower odds of reporting worse than good health. For those in quintiles 2, 3, and 5, for which results are significant, the odds ratio for ill-health was reduced by 30%. Introduction of marital status, RBC and UTMP into the regression resulted in a statistically significant increase in model chi-squares values between columns (1)† and (2)†. The significance of the added predictors was due to the impact of (RBC), associated with a 25% increase in odds of worse than good health. In addition, the odds ratios for the wealth quintiles were minutely attenuated, but they remained significant.

For the marital status variable, odds of reporting worse than good health was 1.4 times larger among ever married women when compared to women who were never married, but this was not significant. None of the ethnic groups, showed a statistically significant change in odds compared to the referent group, the Akan, nor did UTMP.

**Table 8. Effect of Wealth and Educational Level on Perceived General Health**

| | Asset-based Wealth | | | | Educational Level | | |
|---|---|---|---|---|---|---|---|
| | (1)† | (2)† | (5)† | | (3)† | (4)† | (5)† |
| (Wealth Q1) | - | - | - | (No schooling | - | - | - |
| Wealth Q2 | 0.704 | 0.715 | 0.740 | Primary | 1.131 | 1.089 | 1.096 |
| | (2.08)* | (1.98)* | (1.76) | | (0.69) | (0.47) | (0.51) |
| Wealth Q3 | 0.696 | 0.707 | 0.741 | Middle | 0.840 | 0.824 | 0.855 |
| | (2.17)* | (2.04)* | (1.74) | | (1.24) | (1.36) | (1.06) |
| Wealth Q4 | 0.808 | 0.805 | 0.870 | Secondary | 0.792 | 0.764 | 0.800 |
| | (1.31) | (1.30) | (0.80) | | (1.19) | (1.33) | (1.06) |
| Wealth Q5 | 0.709 | 0.701 | 0.800 | Higher | 0.622 | 0.605 | 0.626 |
| | (2.10)* | (2.06)* | (1.21) | | (1.90) | (1.96) | (1.74) |
| (Akan) | - | - | - | (Akan) | - | - | - |
| Ga | 1.218 | 1.213 | | Ga | 1.244 | 1.242 | 1.018 |
| | (1.57) | (1.53) | | | (1.76) | (1.72) | (0.09) |
| Ewe | 0.951 | 0.949 | | Ewe | 0.974 | 0.970 | 1.333 |
| | (0.28) | (0.30) | | | (0.15) | (0.17) | (1.41) |
| Hausa/Mole | 0.855 | 0.880 | | Hausa/Mole | 0.831 | 0.853 | 1.277 |
| | (0.64) | (0.52) | | | (0.75) | (0.65) | (2.21)* |
| Other | 0.897 | 0.903 | | Other | 0.883 | 0.887 | 0.999 |
| | (0.46) | (0.44) | | | (0.53) | (0.51) | (0.00) |
| Agec | 1.094 | 1.080 | | Agec | 1.090 | 1.078 | 1.219 |
| | (6.49)** | (4.63)** | | | (6.17)** | (4.51)** | (1.57) |
| Age2 | 0.999 | 1.000 | | Age2 | 1.000 | 1.000 | 0.953 |
| | (3.85)** | (2.79)** | | | (3.65)** | (2.75)** | (0.27) |
| (Never Married) | | - | | (Never Married) | | - | - |
| Currently Married | | 1.063 | | Currently Married | | 1.021 | 0.840 |
| | | (0.33) | | | | (0.11) | (0.71) |
| Ever Married | | 1.419 | | Ever Married | | 1.361 | 0.862 |
| | | (1.73) | | | | (1.51) | (0.63) |
| RBC | | 1.248 | | RBC | | 1.268 | 1.080 |
| | | (2.01)* | | | | (2.18)* | (4.60)** |
| UTMP | | 0.980 | | UTMP | | 0.976 | 1.000 |
| | | (0.14) | | | | (0.17) | (2.85)** |
| Observations | 2460 | 2640 | | Observations | 2640 | 2640 | 2640 |
| Model Chi (2) | 265** | 274.9** | | Model Chi(2) | 256.6** | 275.8** | 280.2** |

Absolute value of z statistics in parenthesis
*significant at 5%; **significant at 1%

†corresponds to equations used to estimate

Similar to the results for wealth, the odds of ill-health were lower at more advanced levels of education ((2)† in Table 8). Secondary and higher education conferred the greatest protection, with reduction in odds ratios of about 20% and 40%, respectively. However, these results were not statistically significant. Adding the explanatory variables to the model yielded significant odds ratios for RBC similar to that in wealth. Also, the 1.36 times higher odds of worse than good health among ever married women was not significant.

Controlling for education in addition to other variables (5†), wealthier women still had lower odds of ill-health. But the magnitudes of the effects were attenuated by 10% in the two highest quintiles and none of the predictors were significant. Similarly, holding wealth constant, women in more advanced levels of education had lower odds of disease than uneducated women. Of the included predictors, RBC and UTMP were significant, but the odds ratios for both were 1. Also, being women who were Hausa/Mole-Dagbani had a 1.27 times higher odds that was significant.

*Impact of SES on Self-Report of One/More Chronic Conditions*

Table 9 shows that odds of reporting one/more chronic conditions increased at higher levels of wealth. The odds of ill-health were about 25% higher for women in quintiles 2 and 3, and about 75% higher for those in the two highest wealth quintiles. Currently married and ever

married women had increased odds of 2.1 and 2.8, respectively; and those reporting behaviour changes had 1.48 times higher odds of one or more chronic conditions.

Women at advanced levels of education had higher odds of chronic conditions than those with no education. However, after running the full regression model, (4)†, the higher odds persisted for only those with primary education. Like in the wealth model, marital status, RBC and age were good predictors of ill health.

Holding education constant, wealth remained significantly associated with report of chronic conditions at the highest wealth quintiles (5)†.

**Table 9. Effect of Wealth and Educational Level on Self Report of Chronic Conditions**

| | Asset-based Wealth | | | | Educational Level | | |
|---|---|---|---|---|---|---|---|
| | (1)† | (2)† | (5)† | | (3)† | (4)† | (5)† |
| (Wealth Q1) | | | | (No schooling | | | |
| Wealth Q2 | 1.243 | 1.245 | 1.293 | Primary | 1.458 | 1.337 | 1.250 |
| | (1.14) | (1.14) | (1.33) | | (1.97)* | (1.50) | (1.14) |
| Wealth Q3 | 1.250 | 1.234 | 1.306 | Middle | 1.031 | 0.939 | 0.813 |
| | (1.19) | (1.10) | (1.38) | | (0.21) | (0.42) | (1.33) |
| Wealth Q4 | 1.771 | 1.698 | 1.862 | Secondary | 1.022 | 0.926 | 0.727 |
| | (3.15)** | (2.85)** | (3.23)** | | (0.10) | (0.35) | (1.37) |
| Wealth Q5 | 1.736 | 1.602 | 1.853 | Higher | 1.123 | 0.972 | 0.730 |
| | (3.09)** | (2.51)* | (3.06)** | | (0.47) | (0.11) | (1.16) |
| (Akan) | | | | (Akan) | | | |
| Ga | 1.203 | 1.199 | | Ga | 1.121 | 1.140 | 2.004 |
| | (1.37) | (1.33) | | | (0.86) | (0.97) | (2.60)** |
| Ewe | 1.192 | 1.190 | | Ewe | 1.188 | 1.196 | 2.598 |
| | (0.95) | (0.93) | | | (0.94) | (0.97) | (3.43)** |
| Hausa/Mole | 1.140 | 1.219 | | Hausa/Mole | 1.040 | 1.093 | 1.516 |
| | (0.52) | (0.78) | | | (0.15) | (0.34) | (3.52)** |
| Other | 0.939 | 0.937 | | Other | 0.848 | 0.842 | 1.299 |
| | (0.24) | (0.25) | | | (0.63) | (0.65) | (1.48) |
| Agec | 1.254 | 1.206 | | Agec | 1.257 | 1.211 | 1.203 |
| | (13.11)** | (9.54)** | | | (13.14)** | (9.78)** | (1.35) |
| Age2 | 0.998 | 0.999 | | Age2 | 0.998 | 0.999 | 1.190 |
| | (10.26)** | (7.52)** | | | (10.29)** | (7.72)** | (0.93) |
| (Never Married) | | | | (Never Married) | | | |
| Currently Married | | 2.116 | | Currently Married | | 1.952 | 1.147 |
| | | (2.82)** | | | | (2.51)* | (0.53) |
| Ever Married | | 2.785 | | Ever Married | | 2.432 | 0.883 |
| | | (3.71)** | | | | (3.21)** | (0.47) |
| RBC | | 1.481 | | RBC | | 1.611 | 1.206 |
| | | (3.36)** | | | | (4.11)** | (9.47)** |
| UTMP | | 1.268 | | UTMP | | 1.393 | 0.999 |
| | | (1.34) | | | | (1.89) | (7.55)** |
| Observations | 2460 | 2640 | | Observations | 2640 | 2640 | 2640 |
| Model Chi (2) | 610.27** | 640.65** | | Model Chi(2) | 599.86** | 634.14** | 648.17** |

Absolute value of z statistics in parenthesis
*significant at 5%; **significant at 1%

†corresponds to equations used to estimate

*Impact of SES on Self-report of Infectious Conditions*

Odds ratios obtained from analysis of direct effect of wealth on report of one or more infectious diseases were not statistically significant except for women in quintile 5 whose odds were reduced by 25% (Table 10). Of the predictors included in the model, only RBC was significant. It was associated with 1.4 times higher odds of reporting ill-health (2)†. Education did not have a significant association with reporting of infectious conditions. But, holding it constant, the decrease in odds among the wealthiest women remained. Also, Hausa women had a 1.37 times higher odds of one/more conditions.

**Table 10. Effect of Wealth and Educational Level on Self Report of Infectious Conditions**

| | Asset-based Wealth | | | | Educational Level | | |
|---|---|---|---|---|---|---|---|
| | (1)† | (2)† | (5)† | | (3)† | (4)† | (5)† |
| (Wealth Q1) | | - | - | (No schooling | | - | - |
| Wealth Q2 | 0.966 | 0.947 | 0.942 | Primary | 1.127 | 1.087 | 1.091 |
| | (0.28) | (0.42) | (0.47) | | (0.81) | (0.57) | (0.58) |
| Wealth Q3 | 1.072 | 1.037 | 1.037 | Middle | 1.107 | 1.064 | 1.099 |
| | (0.55) | (0.28) | (0.28) | | (0.89) | (0.54) | (0.79) |
| Wealth Q4 | 1.227 | 1.132 | 1.117 | Secondary | 0.978 | 0.887 | 0.967 |
| | (1.61) | (0.95) | (0.82) | | (0.16) | (0.82) | (0.22) |
| Wealth Q5 | 0.776 | 0.694 | 0.679 | Higher | 1.241 | 1.102 | 1.281 |
| | (1.99)* | (2.72)** | (2.71)** | | (1.24) | (0.54) | (1.30) |
| (Akan) | - | - | | (Akan) | - | - | - |
| Ga | 1.042 | 1.047 | | Ga | 1.061 | 1.070 | 0.885 |
| | (0.44) | (0.48) | | | (0.63) | (0.72) | (1.03) |
| Ewe | 0.961 | 0.961 | | Ewe | 0.994 | 0.996 | 1.075 |
| | (0.31) | (0.31) | | | (0.05) | (0.04) | (0.50) |
| Hausa/Mole | 0.879 | 0.892 | | Hausa/Mole | 0.921 | 0.934 | 1.367 |
| | (0.78) | (0.69) | | | (0.49) | (0.40) | (3.72)** |
| Other | 0.822 | 0.816 | | Other | 0.870 | 0.867 | 1.083 |
| | (1.24) | (1.28) | | | (0.88) | (0.89) | (0.77) |
| Agec | 1.024 | 1.023 | | Agec | 1.022 | 1.019 | 1.045 |
| | (2.26)* | (1.77) | | | (2.04)* | (1.51) | (0.46) |
| Age2 | 1.000 | 1.000 | | Age2 | 1.000 | 1.000 | 0.960 |
| | (2.10)* | (1.88) | | | (1.88) | (1.68) | (0.32) |
| (Never Married) | | - | | (Never Married) | | - | - |
| Currently Married | | 0.893 | | Currently Married | | 0.892 | 0.925 |
| | | (0.97) | | | | (0.97) | (0.46) |
| Ever Married | | 1.075 | | Ever Married | | 1.094 | 0.829 |
| | | (0.51) | | | | (0.63) | (1.16) |
| RBC | | 1.380 | | RBC | | 1.328 | 1.022 |
| | | (3.86)** | | | | (3.43)** | (1.68) |
| UTMP | | 1.080 | | UTMP | | 1.069 | 1.000 |
| | | (0.74) | | | | (0.65) | (1.75) |
| Observations | 2460 | 2640 | | Observations | 2640 | 2640 | 2640 |
| Model Chi (2) | 23.29** | 42.6** | | Model Chi(2) | 11.46** | 27.95** | 45.88** |

Absolute value of z statistics in parenthesis
*significant at 5%; **significant at 1%
†corresponds to equations used to estimate

## Discussion

In this paper, morbidity differences according to SES – measured here as wealth and education – were studied in a representative cohort of women living in Accra, Ghana. Three indicators of morbidity were included and a logistic regression analysis was done to estimate the effect of SES on self reported morbidity, controlling for age and ethnicity. The role of marital status, ethnicity, behaviour changes, and use of trained medical professionals were also examined as potential mediators of the link between SES and self-reported ill-health.

Wealth was found to impact on perceived general health, chronic conditions and on self reported infectious conditions. For perceived general health, wealth exhibited a threshold effect – women in all quintiles above the reference groups had about a 30% reduction in odds of worse than good health. This supports theoretical hypotheses advanced by some social epidemiologists that material resources matter for health until some threshold is reached (e.g. adequate nutrition) (Marmot 2002). Above this, increments in wealth no longer produce corresponding gains in health. The seemingly low cut point for the wealth threshold is plausible, given the urban setting of the study. Even though some segments of the population in Accra are extremely poor, greater access to better public works infrastructure, albeit maldistributed, reduces outbreaks of water and sanitation related diseases. In addition, as the extremely poor is a hard segment to reach, especially within census-identified households, it is also possible that the survey did not adequately capture them.

For chronic conditions, the effect of wealth was reversed – women in the two wealthiest quintiles had about 1.7-times higher odds of one or more chronic conditions. The odds for those in the middle two quintiles were increased 1.25-fold. It is important to note that this contradicts findings in most developed nations about the direction of the association. For example, the landmark Whitehall study in Britain found that civil servants in higher occupational grades had lower prevalence of chronic disease morbidity and lower mortality incidence (Marmot & Smith 1991). Within the context of a developing nation, where epidemiologic transitions are underway, it is the rich that first bear the larger burden of chronic disease morbidity. This is because they are the first to enjoy the benefits of modernization which translate to high caloric intake and sedentary lifestyles – resulting in onset of chronic diseases. Bunker et al.'s study of Nigerian civil servants, for instance, found that higher socioeconomic status and other related factors were strong determinants of hypertension (Bunker et al 1992).

That education did not yield statistically significant impacts on any of the morbidity indicators is the most intriguing finding from these analyses. This is an especially contrary result, given the assertion by Michael Grossman, one of the foremost researchers on the education-health connection, that "years of formal schooling completed is the most important correlate of good health" (Grossman 2003). Additionally, most studies in both developed and developing countries have found lower educational status to be a strong and significant and consistent predictor of ill-health and mortality (Arriaga & Hobbs 1982; Bicego & Boerma 1993; Fuchs 2004; Timaeus & Lush 1995).

The underlying cause of this finding may be linked to an analysis done by Hurd and Johnson that concluded that patterns of social selection ensures the placement of the elite in high occupational positions (Hurd & Johnson 1967). This implies that the value of education, in terms of access to resources and social participation, is smaller compared to countries where just having an education facilitates social mobility. Moreover, the economics literature points out that countries may have substantial variation in schooling quality, which is evidently the case in Ghana (Behrman & Birdsall 1983). Given this variation, using schooling quantity (year of schooling) as a proxy for earnings may have biased the estimated returns of schooling towards zero. Large variations in quality could also attenuate the effect of education on health that works through the education-third variables (e.g. self-efficacy)-health pathway.

Another possibility is that the better educated are healthier, but they are also more likely to recognize and report health problems. Thus, a positive effect is offset by a negative reporting bias. Yet still, the non-significant finding for education may have resulted from the negative correlation between age and education among the study population. Younger women tended to be better educated than older women. Given, that older women are more likely to be ill, just as a function of ageing, the effect of controlling for age was to inadvertently undermine the significance of the impact of education on morbidity.

For infectious conditions, significant associations were only observed for very high wealth status; implying that at this early stage in the demographic transition, benefits of reduction in infectious disease morbidity have started to accrue to the richest in the city. In addition, the

insignificant and inconsistent association with education and lower wealth quintiles is consistent with several studies of socioeconomic consequences of malaria in developing countries. For example, Boadu's analysis of a nationally representative health survey of households in Ghana found that social class has no effect on malaria prevalence (Boadu 2002). Accra is a coastal city that has year round transmission of malaria. However, those of high SES are expected to have lower prevalence through safe and adequate living conditions and vector control within their households. But, due to the endemicity of the disease and high parasitemia rates, transmission is frequent among most of the population. So, the way in which those of the medium SES ranges are better off is likely through reduction in frequency, duration and severity of episodes. Therefore, the lack of statistically significant differences in odds of ill-health between wealth and educational groups may have resulted from the low sensitivity of the study design to the ways in which infectious disease prevalence differs by socioeconomic status. A simple "yes" response to a question that seeks to know whether a respondent suffered from malaria or TB in a given time frame is not sufficient to clearly define difference in frequency, severity and duration.

Overall, asset-based wealth appeared to have more of an effect on morbidity differences than did education. When perceived general health was modelled as a function of wealth and education, the magnitude of the effects of wealth remained similar, however they were no longer significant. This was a likely result of multi-colinearity between the two SES variables increasing the standard errors. Also, Fuchs argues that when health is modelled as a function of both income and education, the latter variable dominates (Fuchs 1993). But, for, chronic conditions and infectious conditions, the observed significant associations with wealth, persisted even after introduction of education into the model, suggesting that the two dimensions are not redundant measures of SES. Consequently, it can be concluded that in this sample education was not the primary determinant of wealth, and that these two dimensions were not redundant measures of SES.

The second aim of the study was to investigate the role of reported behaviour change, use of trained medical professionals and marital status in shaping socioeconomic differences in morbidity. For all morbidity outcomes, reported behaviour change consistently showed significant associations with ill-health, increasing odds of ill health by about 30% to 50%. This suggests that change in behaviour follows a feeling or diagnosis of illness, rather than mediates the association between SES and morbidity. This appears to contradict theoretical accounts that hypothesize that higher SES individuals are more willing to delay gratification and have more effective control over their behaviour (Fuchs 2004). Marital status was only significant for chronic conditions, with currently married and ever married women having increased odds of ill-health – 2.1 and 2.8 times greater, respectively. Although, never married women appeared to be best off in terms of chronic conditions, the finding can be explained by the age pattern of marriage. By age 40, only 0.6% of the female population has never been married (ORCMacro 2007). Therefore, never married women are likely younger than those currently and ever married to whom they are compared. If however, the appropriate comparison group for currently married women was taken to be ever married women, then marriage is protective against chronic conditions. The finding affirms the hypothesis if marriage as a support mechanism that positively contributes to better health, as demonstrated by several studies in both developed and developing countries.

With respect to the effect of control variables, age demonstrated strong and positive correlation with ill health across all morbidity indicators. The largest effect was seen in chronic conditions, which is consistent with the fact that these conditions are lifestyle related and manifest at older ages. The effect to ethnicity was most pronounced in chronic conditions, with the Ga, Ewe, Mole-Dagbani and other ethnicities demonstrating higher odds in the range of 1.3 times to 2 times higher, of one or more chronic conditions, than the Akan. Again, this reflects that cultural beliefs and practices impact more on general habits and health related behaviours.

***Limitations***

Data on self reported morbidity have been found to be sensitive to respondent's perception of health problems and their illness behaviour (Blane et al 1996). Thus, the explanation that all the differences in odds of ill-health demonstrated among different socioeconomic groups are due to class-related variations in reporting cannot be completely ruled out.

With reference to the SES indicators, the construction of the wealth index was influenced by data availability. As a result, the index may not have succeeded in including all dimensions that contribute to permanent household wealth in Ghana. In addition, the measurement of education may have been biased as quality was not accounted. Consequently, even though the magnitude of the observed effects on morbidity varied with wealth and education, these variations may not only be a result of the different socioeconomic dimensions of that comprise each of the measures, but also due to varying degrees of measurement errors.

Another shortcoming is that the impact of occupation could not be assessed. In order to use occupation as a measure of class, some assumptions would have had to be made about a hierarchy and grades. Unfortunately, the data generated from the survey could not be parsed out to generate a hierarchy consistent with validated occupational class schemas. Also retirees, students, homemakers and unemployed persons would have had to be dropped from the analysis, as they do not fit into any particular category of occupational hierarchy.

It is known that risks of ill-health are accumulated over the lifecycle. Meaning that childhood SES is an important confounder in assessing the impact of adult socioeconomic conditions on morbidity. However, there were no variables in the survey that could adequately serve as a proxy for accumulated risk from socioeconomic conditions during childhood. Thus, dilution of the higher wealth and educational categories with those with already accumulated risk could have attenuated the effects of SES on morbidity.

Finally, the results cannot be generalized to men or populations in rural areas in Ghana. Also, the use of cross-sectional data made it difficult to adequately test mediation and analyses did not deal with reverse causation, so no causal conclusions can be drawn.

## Conclusions and Policy Implications

Intra-urban differentials in health exist by socioeconomic status in Accra. The results of the present study show that the household level measure for SES – wealth index – yields more statistically significant results than the individual level indicator – educational level. Also, the patterns observed are consistent with an epidemiologic transition, which has already been documented in Ghana.

The validity and reliability concerns around use of self-reported health notwithstanding, the outcome of the study provides further insights into social and economic determinants of morbidity. As Ghana pursues its goal of attaining middle income status by 2015, it important that growth of social services in urban areas focuses on the historically poor enclaves as well as on rural-urban migrants. Relying on the paradigm of urban-rural dichotomies of disparities will merely shift the burden of adverse health outcomes onto the urban poor as is already starting to show with the finding that, while rural poverty declined between 1999 and 2006, urban poverty increased.

Reported behaviour change, age and ethnicity are key predictors of chronic conditions in the adult female population. Thus, efforts to improve women's health should shift from focusing on that part of their well-being that pertains to their reproduction, as has traditionally been the case. For chronic conditions, especially, changes in behaviour are fundamental to reducing premature mortality. However, the results indicate the individuals are making challenges only following symptoms or diagnosis of disease. Thus, as the public health institutions set priorities for which health interventions to undertake, it is important that they incorporate education on chronic disease risk factors.

Finally, infectious diseases, particularly Malaria, still outpace all other conditions in the burden they impose on the population. Thus, the drive to prevent accumulation of risk for chronic conditions must be undertaken with care, so as to not shift the focus off the major causes of morbidity within the country.

## References


Andrulis DP. 1998. Access to Care Is the Centerpiece in the Elimination of Socioeconomic Disparities in Health. *Annals of Internal Medicine* 129:412-6

Arriaga E, Hobbs F. 1982. Infant mortality differentials in selected East and South Asian countries. In *Mortality in South and East Asia: a review of changing trends and patterns 1950-1975*. Manila: WHO/ESCAP

Basta SS. 1977. Nutrition and health in low income urban areas of the third world. *Ecology of Food and Nutrition* 6:113-24

Behrman JR, Birdsall N. 1983. The Quality of Schooling: Quantity Alone is Misleading. *The American Economic Review* 73:928-46

Bicego GT, Boerma JT. 1993. Maternal education and child survival: a comparative study of survey data from 17 countries. *Social Science & Medicine* 36:1207-27

Blane D, Power C, Bartley M. 1996. Illness Behaviour and the Measurement of Class Differentials in Morbidity. *Journal of the Royal Statistical Society. Series A (Statistics in Society)* 159:77-92

Boadi KO, Kuitunen M. 2005. Environment, wealth, inequality and the burden of disease in the Accra metropolitan area, Ghana. pp. 193 - 206: Taylor & Francis; Francis

Boadu K. 2002. Social class and health status in Ghana. *Current Sociology* 50:531-53

Bunker CH, Ukoli FA, Nwankwo MU, Omene JA, Currier GW, et al. 1992. Factors associated with hypertension in Nigerian civil servants. *Preventive Medicine* 21:710-22

Castro-Leal F, Dayton J, Demery L, Mehra K. 2000. Public spending on health care in Africa: Do the poor benefit? *Bulletin of the World Health Organisation* 78:66-72

Deaton A. 2002. Policy implications of the gradient of health and wealth. *Health Affairs* 21:13-30

Duda RB, Kim MP, Darko R, Adanu RMK, Seffah J, et al. 2007. Results of the women's health study of Accra: Assessment of blood pressure in urban women. *International Journal of Cardiology* 117:115-22

Fuchs VR. 1993. Poverty and health: asking the right questions. In *Medical Care and the Health of the Poor*, ed. DE Rogers, E Ginzberg, pp. 9–20. Boulder: Westview Press

Fuchs VR. 2004. Reflections on the socio-economic correlates of health. *Journal of Health Economics* 23:653-61

Goldman N. 2001. Social inequalities in health: disentangling the underlying mechanisms. *Annals of the New York Academy of Sciences* 954:118-39

Grossman M. 2003. Education and non-market outcomes. In *Handbook of the Economics of Education*, ed. E Hanushek, F Welch. Amsterdam: North-Holland, Elseiver Science

Haan M, Kaplan GA, Camacho T. 1987. Poverty and health: prospective evidence from the Alameda county study. *American Journal of Epidemiology* 125:989-98

Hill AG, Anarfi JK, Adanu RM, Seffah J, Darko R, Duda RB. forthcoming. Measuring population health: the design and conduct of a community-based study of women's health in Accra, Ghana. In *Bulletin of the World Health Organisation (Submitted)*

Hurd GE, Johnson TJ. 1967. Education and social mobility in Ghana. *Sociology of Education* 40:55-79

International Development Agency IDA. 2007. *Ghana: Accelerating growth to halve poverty*. http://siteresources.worldbank.org/IDA/Resources/IDA-Ghana.pdf

Kitagawa EM, Hauser PM. 1973. *Differential mortality in the United States: a study in socioeconomic epidemiology*. Cambridge: Harvard University Press

Lantz PM, House JS, Lepkowski JM, Williams DR, Mero RP, Chen J. 1998. Socioeconomic factors, health behaviors, and mortality: results from a nationally representative prospective study of US adults. *Journal of the American Medical Association* 279:1703-8

Macintyre S. 1986. The patterning of health by social position in contemporary Britain: Directions for sociological research. *Social Science & Medicine* 23:393-415

Marmot M. 2002. The influence of income on health: views of an epidemiologist. In *Health Affairs*, pp. 31-46

Marmot MG, Shipley MJ, Rose G. 1984. Inequalities in death - specific explanation of a general pattern? *The Lancet* 323:1003-6

Marmot MG, Smith GD. 1991. Health inequalities among British civil servants: The Whitehall II study. *The Lancet* 337:1387

Menchik PL. 1993. Economic status as a determinant of mortality among Black and White older men: does poverty kill? *Population Studies: A Journal of Demography* 47:427 - 36

Ministry of Local Government Rural Development and Environment MoLRE. 2006. *GhanaDistricts.com*. http://www.ghanadistricts.com/districts/?news&r=1&_=3

Montgomery MR, Stren R, Cohen B, Reed HE, eds. 2003. *Cities transformed: demographic change and its implications in the developing world.* Washington, DC: The National Academies Press

ORCMacro. 2007. *MEASURE DHS STATcompiler*. http://www.measuredhs.com

StataCorp. 2005. Stata statistical software: release 9. College Station, Texas: StataCorp LP

Timaeus IM, Lush L. 1995. Intra-urban differentials in child health. *Health Transition Review* 5:163-90

Turrell G, Mathers C. 2000. Socioeconomic status and health in Australia. *Medical Journal of Australia* 172:434-8

Umberson D. 1987. Family Status and Health Behaviors: Social Control as a Dimension of Social Integration *Journal of Health and Social Behavior* 28:306-19

Wagstaff A. 2000. Socioeconomic inequalities in child mortality: comparisons across nine developing countries. *Bulletin of the World Health Organisation* 78:19-29

Weeks J. 2004. Variability in health within urban areas. *Population-Environment Research Network Cyberseminar on Urban Spatial Expansion (29th Novermber - 15 December 2004)*

Whitehead M. 1991. The concepts and principles of equity and health. *Health Promotion International* 6:217-28

Williams DR, Collins C. 1995. US socioeconomic and racial differences in health: patterns and explanations. *Annual Review of Sociology* 21:349-86