

The Effect of Contraceptive Practice on Fertility in Ghana: A Decade of Experience

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Abstract

This study examines some factors that influence fertility behaviour in Ghana, with particular emphasis on the influence of contraception as an intermediate variable. The decade examined covers the period 1988 to 1998 and the factors analyzed are age, residence, education, religion and ethnicity. Employing multivariate regression analysis and path models, the study observes that among all the factors, age is the only variable that has a moderate effect on fertility. Also of significant interest is that the positive influence of contraceptive use on fertility in 1988 is reversed in 1998. The study notes that given the non—significant effects obtained save the moderate effect of age, it is not possible to draw a definitive conclusion regarding the impact that any of these factors might have contributed to the observed reduction in fertility during the period. In light of this, the study recommends that more effort would be required if fertility is to be reduced substantially. Nonetheless, the reversal in the effect of contraceptive use between the two periods is seen as encouraging.

Key Words: Fertility, contraceptive use, fertility differentials, Ghana

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Résumé

This study examines some factors that influence fertility behaviour in Ghana, with particular emphasis on the influence of contraception as an intermediate variable. The decade examined covers the period 1988 to 1998 and the factors analyzed are age, residence, education, religion and ethnicity. Employing multivariate regression analysis and path models, the study observes that among all the factors, age is the only variable that has a moderate effect on fertility. Also of significant interest is that the positive influence of contraceptive use on fertility in 1988 is reversed in 1998. The study notes that given the non—significant effects obtained save the moderate effect of age, it is not possible to draw a definitive conclusion regarding the impact that any of these factors might have contributed to the observed reduction in fertility during the period. In light of this, the study recommends that more effort would be required if fertility is to be reduced substantially. Nonetheless, the reversal in the effect of contraceptive use between the two periods is seen as encouraging.

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Introduction

This study examines some factors that influence fertility behaviour in Ghana, with particular emphasis on contraception as a proximate determinant. The role of fertility as a factor in population growth is widely recognized and over the last decade or two, world-wide fertility surveys have confirmed substantial decline of births since the demographic transition in the western world and, in recent years, in many developing countries of Asia and Latin America. At the global level, the rate of population growth has declined from 1.7% per annum in the 1980s to 1.4% per annum in the 1990s (World Population Data Sheet, 1989; 1999).

Data from two demographic surveys conducted in Ghana over the last decade specifically, in 1988 and 1998 provide ample evidence of the fertility transition experienced over this period. The studies reveal that total fertility rate (TFR) has declined dramatically from 6.4 children per woman in 1988 (Ghana Statistical Service [GSS] and Institute for Resource Development [IRD], 1989) to 4.6

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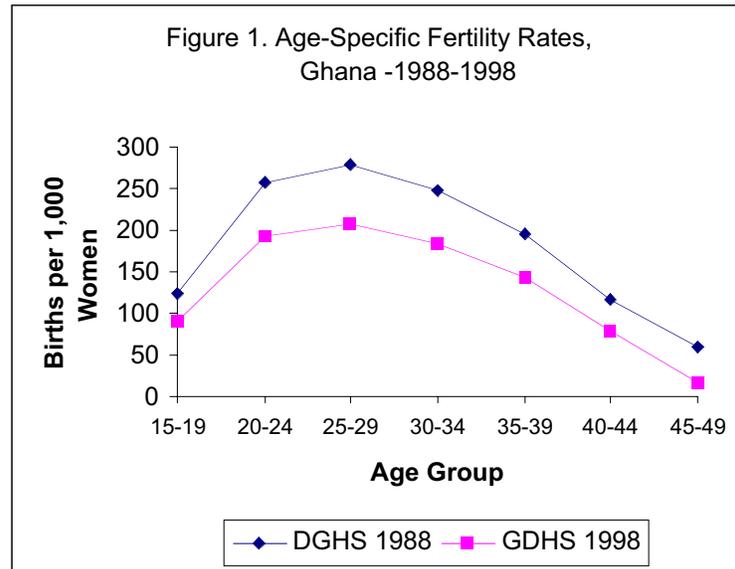
children per woman in 1998, a nearly 2 child drop in fertility over the decade (Ghana Demographic and Health Survey [DHS], 1998). Table 1 shows the age-specific fertility rates for the two periods under study. It is observed that during the decade 1988 to 1998, fertility declined in every age group, averaging a 26 percent drop among women under age 39 to as high as 73 percent for women in the age group 45-49. This decline is depicted in Figure 1.

In spite of this massive reduction in fertility levels, the change in the average number of births for the same period was not as substantial. Table 2 shows that the change in the mean number of children ever born (CEB) for all women and currently married women between ages 15 and 49 for the same period was 0.6 and 0.5, respectively. Not surprisingly, Ghana's population is projected to double in 29 years time, and expected to reach 26.5 million by the year 2025 and 32.0 million by 2050 (PRB, 2000). These scenarios have given rise to the on-going debate concerning the relative importance of family planning programs

Table 1
Age-Specific Fertility Rates (per 1,000 women) for Ghana
Demographic and Health Surveys 1988 and 1998

Age Group	GDHS 1988	GDHS 1998
15-19	124	90
20-24	258	192
25-29	278	206
30-34	248	183
35-39	195	143
40-44	117	79
45-49	60	16

Source: Ghana Demographic and Health Survey (GDHS), 1998, p. 29



and necessary changes in the motivations for children as stimuli for fertility transition in developing societies (Demeny, 1992). Demeny notes that this controversy is particularly significant in Sub-Saharan Africa where fertility has been most resistant to change in view of the on-going family planning programs and the introduction of modern contraceptive practices in this region over the past two decades. Fundamental to this debate is the question of whether in these societies, there is a latent motivation for fertility reduction at all.

In a bid to understand this seemingly complicated issue, increasing attention has been focused on the concept of the proximate determinants of fertility developed by Bongaarts (1945). Bongaarts argues that the most important intermediate variables of fertility are contraception, lactation, sexual exposure and induced abortion. And undoubtedly, for most areas of the world, research has shown that contraceptive adoption has been a major determinant in the transition from high to low fertility (Gaisie, 1984; Bumpass, 1987; Rutenberg et al., 1987; Goldscheider and Mosher, 1988; Stephen et al., 1988). As well, knowledge and practices of contraception in Ghana and some other African countries have been documented in KAP studies dating back to 1963. Research by Caldwell (1968), Pool (1967), Gaisie (1971) and Armar (1983) all showed the increasing spread of both knowledge and practice of family planning in Ghana.

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Table 2
Percent Distribution of All Women and Currently Married Women by
Mean Number of Children Ever Born (CEB), According to Age, Ghana
Demographic and Health Surveys (GDHS) 1988 and 1998

Age Group	GDHS 1988		GDHS 1998	
	All Women	Currently Married Women	All Women	Currently Married Women
15-19	0.2	0.7	0.1	0.7
20-24	1.3	1.6	1.0	1.4
25-29	2.7	2.8	2.0	2.3
30-34	4.2	4.3	3.4	3.5
35-39	5.5	5.6	4.5	4.6
40-44	6.6	6.8	5.4	5.6
45-49	7.3	7.4	5.9	6.3
Total	3.2	4.0	2.6	3.5

Source: Ghana Demographic and Health Surveys (GDHS), 1988, p. 25; 1998, p.33

In a bid to understand this seemingly complicated issue, increasing attention has been focused on the concept of the proximate determinants of fertility developed by Bongaarts (1945). Bongaarts argues that the most important intermediate variables of fertility are contraception, lactation, sexual exposure and induced abortion. And undoubtedly, for most areas of the world, research has shown that contraceptive adoption has been a major determinant in the transition from high to low fertility (Gaisie, 1984; Bumpass, 1987; Rutenberg et al., 1987; Goldscheider and Mosher, 1988; Stephen et al., 1988). As well, knowledge and practices of contraception in Ghana and some other African countries have been documented in KAP studies dating back to 1963. Research by Caldwell (1968),

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Pool (1967), Gaisie (1971) and Armar (1983) all showed the increasing spread of both knowledge and practice of family planning in Ghana.

Table 3 below shows the percent distribution of all women and currently married women by current use of any contraceptive method, according to age. The table shows that contraceptive use increased overall between 1988 and 1998 from 12 percent to 18 percent and 13 percent to 22 percent for all women and currently married women, respectively. The data suggests contraceptive practice rises with age, but not throughout. In fact, in 1988, it peaked at age group 40-44 for both categories of women, even though for all women, a decline was experienced in the age group prior to the apex. In reference to the year 1998, contraceptive use is highest in age group 35-39, even though for all women, the age group 30-34 equals that level. The percent use declines thereafter. Data from the two surveys also reveal that currently married women in urban areas are twice as likely in 1988, and nearly twice as likely in 1998 to use any contraceptive method as their rural counterparts.

As background information, it must be mentioned here that family planning practice was introduced in Ghana in 1970. The objective then, according to the Ghana National Family Planning Program (GNFPP) was to make family planning services available to all couples with a view to encouraging them to adequately plan their families. Implicit in this objective was fertility control. However, the lack of any more than moderate success of the program, as measured in terms of the adoption rate and aggregate fertility reduction has led to the criticism that this shortcoming may reflect the failure to recognize the unique demographic and socio-cultural characteristics of the Ghanaian society. This is against the background of the fact that the relative importance of cultural variables in the explanation of fertility differentials has come to be accepted as a reality.

Coale and Watkins (1986) in the European Fertility Study reported that group characteristics such as religion, language and other factors account for variation and change in fertility, over and above that accounted for by the traditional demographic variables such as mortality, urbanization, income and industrialization. As a matter of fact, there are a number of socio-demographic factors as well as cultural practices and norms that tend to influence childbearing in Ghana. However, this paper argues that the latter are strongly latent factors that do not lend themselves to easy measurement, but instead, give significant meaning to the expression of the former.

Table 3
Percent Distribution of All Women and Currently Married Women by
Current Use of Any Contraceptive Method, According to Age, Ghana
Demographic and Health Surveys (GDHS) 1988 and 1998

Age Group	GDHS 1988		GDHS 1998	
	All Women	Currently Married Women	All Women	Currently Married Women
15-19	5.8	4.6	8.6	19.2
20-24	13.5	11.1	19.3	20.7
25-29	14.1	13.2	21.1	22.2
30-34	15.1	14.4	23.5	24.8
35-39	14.5	15.2	23.5	26.3
40-44	16.5	18.4	18.4	19.3
45-49	7.9	7.7	12.2	15.8
Total	12.3	12.9	18.0	22.0

Source: Ghana Demographic and Health Surveys (GDHS), 1988, p. 36; 1998, p.44

Study Objective

In connection with above argument, this study examines the effect of contraceptive practice on fertility in Ghana for the decade spanning 1988 and 1998. Contraception in this study is investigated as a proximate determinant that mediates the influence of other factors such as education, age, religion, ethnicity and place of residence on fertility behaviour. The study proposes that socio-cultural norms and practices are manifestly expressed in these factors which, in turn, influence fertility behaviour indirectly through contraceptive practice. In

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light of this, a brief insight of some socio-cultural norms and practices in Ghanaian society, as well as some socio-economic factors that influence fertility behaviour would help situate this study in proper perspective.

Socio-cultural and Economic Factors that influence fertility in Ghana

To begin with, it is worthy to note that marriage and childbearing are important and cherished values of Ghanaian society, at the same time that they are a source of social status and prestige. The social prestige of an adult in traditional Ghanaian society is enhanced by their marital status and the number of children that they have. Marriage, legal or common law is virtually a universal phenomenon in Ghana. However, there has been a marked decline in proportion of married women (15-49 years) over the decade, from 70 percent in 1988 to 65 percent in 1998. This represents a five-percent decline as observed in Table 4 below. It would be observed that although this decline is obvious across all ages, it is highest in the younger age groups; 15-19 (7.1%), 20-24 (7.0%), 25-29 (9.0%), and lowest in the age group 40-44 (0.2%).

Childlessness is also frowned upon in Ghanaian society and carries with it some degree of social stigma. Unmarried adults and childless couples would normally be regarded as immature and irresponsible and may not be invited to participate in certain traditional and social functions. Customarily, large family sizes are the preferred norm and the prayer offered for potential couples is “may you have thirty children” (Gaisie, 1969). The child is regarded as the consummation of a marriage hence sterility, barrenness and childlessness may constitute sufficient grounds for the dissolution of a marriage.

Voluntary childlessness is rare in Ghana and the level of primary sterility is quite low, with 77 percent of all women of reproductive age having at least one child, according to the 1988 Ghana Demographic and Health Survey (GDHS 1988, p.24). Here too, it must be recognized that just as the number of children ever born is a function of age, childlessness is no different. According to the survey, as many as 81 percent of all women in age group 15-19 have never had a child, while this percentage is 28 for women aged 20-24, and declines sharply to 8 percent for those aged 25-29, and an average 2 percent for women 30-49 years of age (p.25).

Comparing the two surveys, one observes an overall increase in the proportions of women childless between 1988 and 1998, except for the 40-44 year group. Similarly in 1998, childlessness declines with age, save again for the unique case of the 40-44 year group. The proportion childless for the 15-19 year group is 88 percent, 39 percent for the 20-24, 18 percent for 25-29 and an average 3 percent for women aged 35-39 and 45-49, while it is only one percent for the 40-44 year group (GDHS, 1998, p.33). Correspondingly, the mean number of children ever born to currently married women in 1988 is 4.0, rising from a low

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of 0.7 for the 15-19 age group, through 1.6 for 20-24, 2.8 for 25-29, 4.3 for 30-34, 5.6 for 35-39, 6.8 for 40-44 and 7.4 for the 45-49 age group (see Table 2). For the year 1998, the mean number of children ever born is 3.5, progressing from 0.7 for age group 15-19, through 1.4 for 20-24, 2.3 for 25-29, 3.5 for 30-34, 4.6 for 35-39, 5.6 for 40-44 and 6.3 for the 45-49 age group. The same trend is observed for all women.

Table 4
Percent Distribution of Women Currently Married/Living Together,
According to Age, Ghana, 1988 and 1998.

Age Group	Percent Distribution		
	GDHS 1988	GDHS 1998	Percent Difference
15-19	20.5	13.4	7.1
20-24	68.4	61.4	7.0
25-29	86.8	77.8	9.0
30-34	88.4	84.4	4.0
35-39	89.0	83.6	5.4
40-44	85.2	85.0	0.2
45-49	77.7	73.9	4.0
Total	70.3	64.6	5.7

Source: Ghana Demographic and Health Surveys (GDHS), 1988, p.9; 1998, p.59.

Still with respect to marriage, the fact that a second or subsequent marriage does not carry any social stigma in Ghanaian society ensures that the opportunity to have children does not end with the dissolution of a first marriage. Hence this practice is another contributory factor to large families. In fact, it is observed that even though economic support is an important reason for remarriage, reproduction and the perpetuation of the lineage and clan are of prime essence, just as the inability to have children is the principle cause of divorce. As well,

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the high level of mortality, especially infant and child mortality may also compel couples to have large numbers of children so that in the event of deaths, there may still remain some survivors.

The most obvious socioeconomic reason that explains high births is that in a largely agrarian society such as obtains in Ghana children are regarded as a source of labour. And related to this is the fact that the low level of education of women and their consequent low level of participation in the formal sector and the relatively low level of urbanization also tend to support high fertility. Working in jobs that do not interfere with maternal roles makes the raising of larger families possible. On the other hand, high level of education, urbanization and employment in the formal sector give women access to facilities such as better nutrition, increasing incomes and other socioeconomic advantages that make large families not only undesirable but also costly to maintain.

Literature Review

To begin with, it must be mentioned that among the several variables that are known to influence fertility behaviour, age stands out as one of the most important indirect influence on childbearing, as has already been illustrated. This is possible through a number of ways. A longer waiting time before marriage shortens exposure to the risk of childbearing. As well, age at marriage affects the pattern of birth intervals, with early marriage being associated with high fertility levels (Anderson and Bean, 1985; Bumpass et al. 1973; Trussell and Menken, 1978). But it can be argued that education is also a function of age and marriage.

Age determines when a girl would start attending school, how long she would be in school, and eventually, when she would complete school and start childbearing. As well, it is commonly assumed that age is positively correlated with knowledge. This, in effect, means that at a certain age, even the uneducated woman is presumed to have acquired some basic knowledge that would enable her make rational decisions regarding fertility choices. Age, therefore, in addition to its direct influence, also represents a factor that works through education and contraceptive use to determine fertility behaviour.

Indeed, several studies have established that formal education is one of the main avenues through which the transition from natural to deliberate fertility takes place (Gaisie, 1969; Caldwell, 1982; Cochrane, 1980; Oppong, 1981; Karsada, 1986). First, formal education gives access to information through mass media and printed materials to broaden the woman's horizon. With access to information, the educated woman is more likely to know of, and practice modern contraception to prolong birth intervals or cease childbearing when the desired number is attained. Second, formal education socializes the individual into new behaviour patterns like the rejection of traditional norms of

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procreation. The acquisition of new values undermines traditional practices that inhibit the application of scientific knowledge. Third, formal education generally improves the standard of living of women and exposes them to better facilities and nutritional practices that reduce infant mortality, thus offsetting the need to have many children.

Also, education equips women with the necessary skills that ensures their qualification for engagement in high-paying jobs in the modern sectors of the economy. This provides economic incentives for them to desire smaller families. As the familial economy is reversed, women are more likely to enhance their status outside the home than within it (Caldwell, 1982; Coale and Watkins, 1986). Mothers working away from home tend to have shorter lactation periods than other group of mothers (Aikin et. al., 1981), but contraceptive adoption enables the former to delay or space childbearing in order to reduce overload and stress that are often associated with maternal employment. By improving the income-earning potentialities of women, formal education also reduces the demand for children by increasing women's decision-making power regarding fertility and its alternatives.

Lastly, there is greater commitment on the part of the educated to ensure that their children obtain formal education which involves substantial cost. The cost component of putting a child through school means a reversal flow of wealth from parent to child (Caldwell, 1982). With each additional child, the household expenditure becomes greater. Therefore, to attain higher standards of education for children, there is the need to trade off quantity for quality. As a result, the educated woman would more likely control fertility by spacing and/or limiting births through the adoption of contraception. Hence, it is argued in this paper that formal education has an indirect effect on fertility through contraceptive use.

An equally important factor in the Ghanaian context of fertility analysis is the cultural environment. Due to cultural backgrounds and normatively accepted ways of doing things, ethnicity can play an important role in the adoption of contraception. At the same time, it is acknowledged that ethnic variations in contraceptive practices in Ghana might be operating through such mechanisms as formal education, urbanization and place of residence. These factors, as would be noted, reflect to a large extent modernization and socioeconomic development. It is therefore expected that given the disparity in socioeconomic development, ethnic groups of southern and northern Ghana would be different in the level of adoption of scientific knowledge and practices related to childbearing. This is based on the historical fact that the major ethnic groups of southern Ghana, having experienced greater exposure to cultural and scientific innovations from the western world are more likely to adopt modern birth control practices. Ethnic groups of northern Ghana, on the contrary, are expected to be much more traditional with regard to childbearing as a result of little, or lack of exposure to western culture. But in a study by Oheneba-Sakyi (1990),

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ethnicity was seen as not having any significant impact on the use of any contraceptive method, although non-Akan women were slightly less likely to use an efficient method than Akan women. The above notwithstanding, this paper argues that the most probable means by which ethnicity would affect fertility behaviour is through contraceptive practice of any form.

Related to the issue of ethnicity is place of residence. Regional variations in contraceptive adoption have mainly been interpreted in terms of levels of socioeconomic development (see e.g. Stephen et. al., 1988) and health care. In areas where health care services are rudimentary and infant mortality is high, potential family size is also high, as intimated elsewhere. Since there are fewer surviving children, the motivation to limit births does not exist. Naturally, fertility then becomes a rational response to the parents' basic reproductive circumstances. Better health not only increases the survival rate of children, it also raises per capita income via the productive activities of a healthy population.

Expansion of health services and facilities also increases accessibility of programs of fertility control. Since health care in Ghana is heavily subsidized by government, fertility control services are provided at low cost. Thus, increased knowledge and accessibility of family planning services, and invariably the use of modern contraception is expected to be higher in regions, and more specifically, in urban centres and large towns where medical services are readily available. In a related study, Oheneba-Sakyi (1990) found out that urbanization appeared to have some impact on the use of efficient contraception, although the effect was not statistically significant. Women were about 20% more likely to use an efficient method if they lived in urban areas.

The study also notes that the household structures of predominantly rural areas make large numbers almost a necessity. Domestic chores, farm work and running errands are some of the major jobs for children. Specifically, most Ghanaian children help parents on the farm weeding, planting, harvesting, etc., and in the homes fetching water, cooking, marketing of farm produce and looking after the young ones. Given these economic realities, rural women are less likely than urban women to want to control their fertility through the practice of contraception as the benefits of having children far outweigh costs. Therefore, this study argues that access to, or lack of contraceptive knowledge through family planning programs has an indirect effect on fertility by virtue of where the individual resides.

It is also common knowledge that fertility and birth patterns vary by religious groups as a result of the different church doctrines concerning birth control. Some denominations like the Catholics, Mormons and Baptists maintain strong doctrinal positions against the use of contraceptive and other artificial means of controlling fertility, or promote large families in other ways (see, for instance, Chamie, 1981; Skolnick et al., 1978; Coale, 1986). However, according to the

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convergence hypothesis, modernization and secularization suppress such religious differences as the religious groups interact with the wider society. In fact, a recent study on changing fertility patterns in the United States (Goldscheider and Mosher, 1988) that compared Catholic and Protestant contraceptive usage found out that the large religious differences that existed in 1952 had largely disappeared by 1982. The study revealed that contemporary Catholics and non-Catholics alike desire smaller family sizes than they formerly did, and are also more likely to be using effective contraception to achieve their fertility goals. Thus, it is argued in this study that religion affects fertility behaviour largely through contraceptive practice.

The importance of religion in predicting fertility control in Ghana might also be partly reflected in attitudes towards the value of children, and in cultural practices and doctrines regarding the practice of birth control as mentioned earlier. Fertility differences have been reported between Christians, Moslems and Traditionalists. For example, Tawiah (1984) found that compared to all other religions in Ghana, Moslem women have the lowest fertility, while Christians have the highest. The author suggested that factors such as strict adherence to postpartum abstinence, prolonged breastfeeding, and poorer health that constrains fertility may be the potential causes of low Moslem fertility in Ghana. The study notes further that the fertility behaviour of women that practice Traditional African religion is similar to that of Christians, while the fertility level of people that do not practice any form of religion are just slightly higher than that of Moslems.

Also in the study by Ohenaba-Sakyi (1990) on socio-economic and cultural differentials in contraceptive usage among Ghanaian women, the author observed that religion affects the use of any method of contraception as well as the use of an efficient method. For instance, the study revealed that non-Christians are less likely to use an efficient method; specifically, women are almost 75% less likely to use an efficient method if they are not Christians. The author notes that Protestant churches in Ghana on the whole have more liberal policies towards family planning.

Though not quite extensive, the foregoing review provides some fairly broad perspective of some of the factors that influence fertility behaviour in Ghana. This context is expected to facilitate an informed discussion of the outcome of the analysis that will be executed shortly.

Hypothesis

The literature review provides the study with a conceptual framework that enables the formulation of the hypothesis thus: contraceptive use mediates the influence of education, age, religion, ethnicity and place of residence on fertility. In other words, the study aims to assess the effect of contraceptive use as a proximate determinant of fertility behaviour in Ghana. This is based on the premise that contraceptive use has been cited as an important determinant of fertility transition in developing countries, and particularly in sub-Saharan Africa (Bongaarts, 1995; United Nations Population Fund, 1992).

Research Methodology

Data

The data utilized for this study are the 1988 and 1998 Ghana Demographic and Health Surveys (GDHS). These surveys are a nationally representative, stratified, self-weighting, probability samples of women aged 15-49. Households in the 1988 survey were identified using a three-stage cluster sampling procedure based on census enumeration areas, ecological zones, and rural-urban localities. One hundred and fifty census enumeration areas were selected, with probability proportional to the number of the 1984 census households. Ninety-eight percent of all eligible women (women within the stated age range of the study, who spent the previous night in a selected household) were successfully interviewed, resulting in a final sample of 4488 women.

Similarly, in the 1998 GDHS, the list of Enumeration Areas (EAs) with population and information from the 1984 Population Census was used as the sampling frame. Unlike the 1988 survey, the 1998 survey is based on a two-stage stratified sample of households. A total of 4,843 women were successfully interviewed, representing ninety-seven percent of eligible women. Personnel engaged for the conduct of the two surveys were given adequate training to ensure that data collected were accurate and reliable. In the case of the 1988 survey, coding, data entry and machine editing went on concurrently as the fieldwork progressed. There were no systematic re-interviews to assess the quality of the GDHS data, however, some comparisons were made with data from other surveys and the 1984 census. The comparison of the age distribution of the GDHS respondents with the 1984 census suggested the GDHS data to be reliable and of reasonably high quality, at least, with respect to some key demographic variables. For the 1998 survey, on the other hand, call-backs and re-interviews were conducted and the data were processed at the end of the interviews.

Variables of Measurement

The dependent variable in this study is the cumulative fertility of the respondents measured by the total number of children ever born. This is the most frequently used dependent variable in fertility analysis. For the predictor variables, contraceptive use is employed as an intermediate variable having a direct effect on fertility. The background variables are formal education, age, religion, ethnicity and place of residence. Following Furstenberg et al. (1987), some variables were dichotomized to avoid problems of functional form of effects. These variables are described as below;

Contraceptive Use: This variable is classified as whether or not a woman has ever used any contraceptive method (coded Yes = 1; No = 0).

Education: Formal education is measured as the highest level of school attended and the number of years completed at that level.

Age: Age is measured in years as at the last birthday of the respondent at the time of the interview.

Religion: Religion is classified into two categories; Christians (Catholics and Protestants) and Non-Christians (comprising Moslem and traditional African religions). This variable is coded as "1" for Christians and "0" for non-Christians.

Ethnicity: Based on the relative size of the various ethnic groups in Ghana, two categories of ethnicity were created, namely, Akan (1) and non-Akan (0).

Place of Residence: The two categories of current place of residence are i) urban (consisting of all regional capitals, cities and towns with a population of 5,000 and above) and, ii) rural (all areas with population below 5,000). This is coded as Urban = 1 and Rural = 0.

Method of Analysis

The basic method employed in this study is path analysis. According to Land (1969:5), path analysis is a "method of measuring the direct influence along each separate path in such a system and thus of finding the degree to which variation of a given effect is determined by each particular cause." The particular objective of this study will therefore be accomplished by comparing the beta coefficients of the regression equation of the path model that specifies contraception as an intermediate variable with that of the original equation which seeks to measure the direct effects of age, religion, ethnicity, residence, education and contraception on fertility.

Results and Discussion

Correlation Matrix

The zero order correlation matrix of the variables is presented in Table 5. The results indicate a very high and positive correlation between age and fertility in the two periods under study. This is to be expected because age is a major determinant of family size as was illustrated earlier on. The rest of the variables all demonstrate very weak to moderate relationship with fertility. In 1988, residence, education, religion and ethnicity are shown to be negatively correlated with fertility whilst age and contraceptive use register a positive correlation. In 1998 on the other hand, education, ethnicity and contraception are the variables that post a negative correlation with fertility.

Multiple Regression

The first regression coefficients (unstandardized and standardized) represent the path model that seeks to measure the direct relationship between each one of the variables and fertility. The results (see Table 6) indicate an explained variance of 66 and 61 percent respectively, for 1988 and 1998. The findings also reveal that in both periods, all except one variable in 1988 are statistically significant at the .01 level. Religion is the only variable that is not statistically significant in 1988. The standardized beta coefficients reveal place of residence and education as having a negative relationship with fertility in 1988, but in 1998, education, ethnicity and contraceptive use are negatively correlated with fertility. The rest of the variables are otherwise positively correlated with fertility.

The second regression coefficients (Table 7) measure the relationships between contraceptive use and each one of age, residence, education, religion and ethnicity. The model equation explains only 8 and 6 percent respectively, in 1988 and 1998. The results of 1988 indicate that all the variables are statistically significant. As well, all the variables except ethnicity are positively correlated with contraceptive use. On the other hand, the 1998 results show two variables, age and education as negatively correlated with contraceptive use. In addition, ethnicity is not statistically important, while place of residence and religion are barely statistically significant. The positive correlation between age and contraceptive use in 1988 is to be expected, but the negative correlation in 1998

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Table 5
Correlation Matrix
(Ghana Demographic and Health Surveys, 1988 and 1998)

	1988						
	chn.	age	resid.	educ.	rel.	ethn.	cont.
# of chn.	1.000	.803*	-.119*	-.307*	-.091*	-.004	.116*
age		1.000	-.023	-.310*	-.086*	.023	.125*
residence			1.000	.160*	.178*	.006	.116*
education				1.000	.309*	.243*	.178*
religion					1.000	.274*	.103*
ethnicity						1.000	.019
contraceptive							1.000
	1998						
	fert.	age	resid.	educ.	rel.	ethn.	cont.
fertility	1.000	.752*	.140*	-.022	.019	-.074*	-.203*
age		1.000	-.028	.139*	-.032	-.017	-.222*
residence			1.000	-.193*	.038	-.014	.067*
education				1.000	-.046*	.035	-.120*
religion					1.000	.190*	.058*
ethnicity						1.000	.032
contraceptive							1.000

*p < .01

Table 6
Stepwise Regression (Dependent Variable = # of chn. ever born),
Ghana Demographic and Health Surveys

Variable	B	SE B	1988 Beta	T	Sig.
age	.244	.003	.776	82.826	.000
residence	-.587	.055	-.095	-10.637	.000
education	-.046	.007	-.066	-6.514	.000
religion	.005	.069	.001	.070	.944
ethnicity	.173	.054	.030	3.205	.001
contraception	.254	.056	.041	4.538	.000
(Constant)	-3.587	.108		-33.211	.000

Multiple R = .812; R-Square = .659; Adjusted R-Square = .659; Standard Error = 1.70

Variable	B	SE B	1998 Beta	T	Sig.
age	.191	.003	.758	65.393	.000
residence	.676	.055	.142	-12.399	.000
education	-.122	.014	-.102	-8.798	.000
religion	.344	.083	.048	4.164	.000
ethnicity	-.301	.055	-.063	-5.485	.000
contraception	-.269	.054	-.057	-4.941	.000
(Constant)	-3.358	.195		-17.197	.000

Multiple R = .781; R-Square = .610; Adjusted R-Square = .609; Standard Error = 1.47

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Table 7
Stepwise Regression (Dependent Variable = contraceptive use),
Ghana Demographic Health Surveys

Variable	B	SE B	1988 Beta	T	Sig.
age	.010	.001	.199	13.128	.000
residence	.076	.015	.076	5.148	.000
education	.025	.002	.223	13.730	.000
religion	.060	.018	.050	3.220	.001
ethnicity	-.043	.014	-.045	-2.970	.003
(Constant)	-.111	.029		-3.842	.000

Multiple R = .278; R-Square = .077; Adjusted R-Square = .076; Standard Error = .455

Variable	B	SE B	1998 Beta	T	Sig.
age	-.011	.001	-.207	-11.796	.000
residence	.045	.018	.044	2.503	.012
education	-.021	.005	-.082	-4.577	.020
religion	.064	.027	.041	2.335	.169
ethnicity	.025	.018	.024	1.375	.000
(Constant)	1.700	.057		29.964	.000

Multiple R = .249; R-Square = .062; Adjusted R-Square = .060; Standard Error = .485

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defies any logical explanation. The argument can be made that contraceptive use increases with age, reaching a peak in childbearing years, and declining thereafter. So a negative correlation is possible at some point, but not throughout. The same would apply to a positive correlation. The same observation can be made with respect to education as well. The positive correlation in 1988 is consistent with the norm compared with the negative correlation in 1998.

Figures 2 and 3 are path model representations of the relationships described above. Considering the rather weak coefficients, coupled with the inconsistent correlations observed, it is not possible to establish any meaningful causal relationships over the two periods. That age is seen as exhibiting the most consistency in posting a direct and significantly positive relationship with fertility in the two periods (.78 in 1988 and .76 in 1998) is not surprising because that is consistent with the widely acknowledged thesis that fertility behaviour is a function of age. As a matter of fact, the importance of age in determining family size in Ghana may be influenced by other variables such as education and place of residence, however, the fact still remains that a woman has to attain the legal age before entering marriage. Therefore, age would certainly determine a woman's overall exposure to the risk of birth and hence fertility, even without the mediating effect of contraception.

But perhaps the most revealing finding is the positively direct relationship between contraceptive use and fertility as observed in 1988, contrary to the widely held view of the role of contraception in fertility behaviour. This may be attributed to the fact that in the African, and specifically, the Ghanaian context, certain cultural practices such as breastfeeding and postpartum abstinence operate to regulate family size. Therefore, the role of modern contraceptive practice in such a society may be very negligible, if practiced at all. Alternatively, the argument can also be made that rather than limiting family size, contraceptive adoption may be used to space births instead, and as a result, registers only minimal impact on family size. This might explain the moderate reduction in average number of births between 1988 and 1998.

Contraception as a Proximate Determinant

The effect of contraception as a proximate determinant can be estimated using the product of the beta coefficient of the direct relationship between the particular variable and fertility on the one hand, and the beta coefficient of the correlation between contraceptive use and fertility on the other. The results are presented in Table 7.

It is observed above that the mediating effect of contraceptive use on fertility virtually nil except in the case of age where some modest effect is observed. This result is consistent with reasons already advanced. But at the same time, it

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can also be argued, based on the totality of the evidence that contraceptive use has made some impact over the decade given that its effect on fertility was reversed from positive in 1988 to negative in 1998. This is again reflected in age and religion, though the effects are negligible.

Table 8
Estimating* the effect of Contraceptive use on fertility

	1988	1998
Age	-.157	.154
Residence	.006	-.007
Education	.008	-.015
Religion	.002	.000
Ethnicity	-.002	-.001

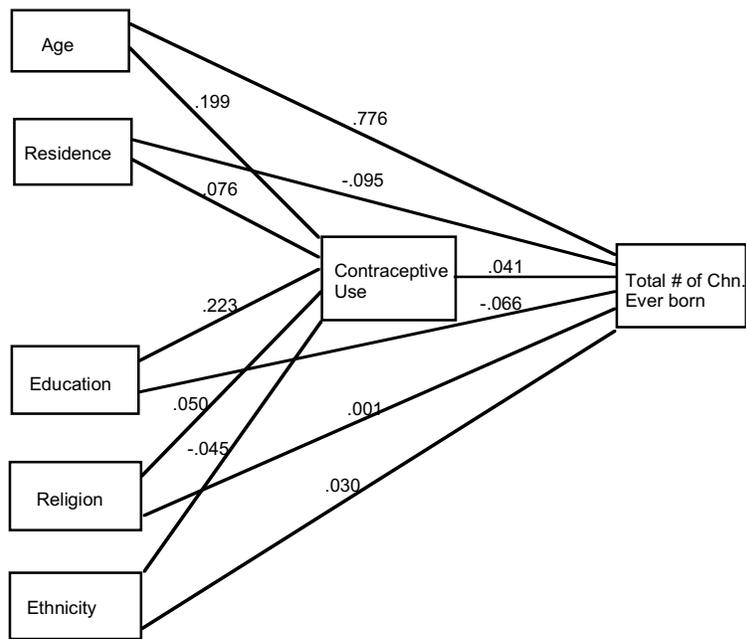
* value obtained by multiplying standardized beta coefficient of direct effects of particular variable on total number of children ever born and on contraceptive use in first equation model

Conclusions and Recommendations

From the foregoing, this study concludes that fertility behaviour in Ghana is influenced by a multitude of demographic, socioeconomic and cultural factors. These factors, in turn, affect contraceptive practice in a variety of ways. The outcome of the analysis appears to support the view that knowledge of, and contraceptive adoption is gradually making an impact on fertility behaviour in Ghana. Considering that in a period of ten years, the positive effect of contraceptive use on fertility is reversed, thereby reducing total fertility, however minimal, is encouraging. This may even be interpreted as a gradual shift in values regarding contraceptive behaviour and eventual transition to a low fertility regime. It is therefore imperative that more efforts are directed at factors perceived to have influenced this transformation.

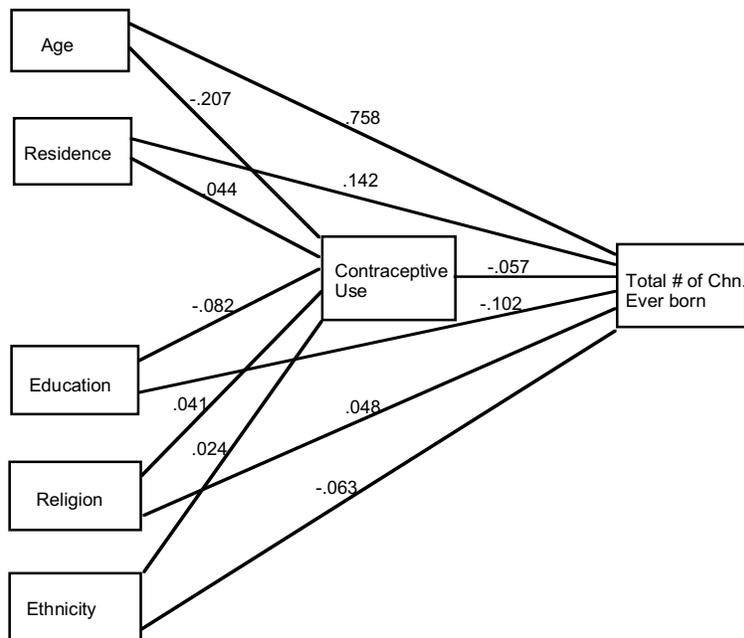
In light of this, it is recommended that educational programs geared towards increasing the level of contraceptive adoption be maintained and increased to

Figure 2. Path Model of Determinants of Fertility in Ghana, 1988



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**Figure 3. Path Model of Determinants of Fertility
in Ghana, 1998**



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achieve much improved results. Even though it has been suggested that the prospect of increased adoption is conditional on widespread education, this study does not see this as a problem despite the relatively low level of literacy in Ghana. The fact that the increase in level of adoption and the subsequent reversal in effect over the decade were achieved within this social environment negates that notion.

From a research perspective, it is important to point out that the analytic procedure adopted in this study is not very rigid considering the question investigated. Given the trends in marriage, contraceptive use, average number of births and total fertility, a more sophisticated approach that examines age-specific effects would be more efficient at providing better insights than the results obtained in this study. However, this study represents a good starting point in an attempt to uncover the reasons underlying the transition in fertility observed between the two periods.

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