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The Proximate Determinants of Fertility in Ghana

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The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.
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Preface

One of the major objectives of the World Fertility Survey programme is to assist the participating countries in reaching a better understanding of their levels of fertility. To this end a number of countries included as part of their fertility questionnaires a module designed to gather information on the proximate determinants of fertility. This module, called Factors other than Contraception Affecting Fertility (FOTCAF), asked questions pertaining to the onset, patterns and termination of childbearing, elucidating such matters as menarche, menopause, breastfeeding, abstinence and sterility.

In order to promote the analyses of these data and to provide specialized training in the relevant techniques, it was decided to organize a workshop on the proximate determinants of fertility. This workshop was held at the London headquarters of the WFS between March and June 1982 with the participation of researchers from six of the countries that had used the FOTCAF module: Ghana, Haiti, Lesotho, the Philippines, Syria and Tunisia. Working in close collaboration with WFS staff and consultants, the participants analysed the data from their respective national fertility surveys after receiving formal training in the relevant demographic and data processing techniques.

The present document reports on the findings from the analysis of the Ghana Fertility Survey 1979–80.

Shea Oscar Rutstein, as the co-ordinator of the workshop, Benoît Ferry and Hilary Page, as consultants, and Andrew Westlake, as the data processing co-ordinator, assumed major responsibilities in the successful completion of the work. Many other staff members also made significant contributions, in particular Gigi Santow, whose assistance and co-operation was invaluable in the later stages of producing the report, and Kathryn Swift in providing editorial assistance.

HALVOR GILLE
Project Director

1 Introduction

1.1 FERTILITY LEVELS AND DIFFERENTIALS IN GHANA

The data obtained through censuses, post-enumeration and special demographic surveys since the Second World War show that Ghana's fertility is high and constant: the estimated total fertility rates lie in the neighbourhood of 6.9–7.0 live births per woman and completed family size is reported and estimated to be six or more children per woman. Notwithstanding these observations, we note that Ghana's reported as well as estimated total marital fertility rate of about 7.5 live births per married woman is one-third lower than the total marital fertility rate of over 11 estimated for Hutterites. The gap between the level of fertility prevailing in Ghana and that of the Hutterites – the highest reliably recorded natural fertility rate – is indicative of the existence of fertility inhibiting factors.

Ghana's subpopulations exhibit significant fertility differentials; total fertility rates vary from 5.9 in Accra Capital District to nearly 8.0 in Ashanti and Brong Ahafo Regions. The regions are, however, large geographical units harbouring a number of different subgroups such as rural, urban and metropolitan populations as well as different ethnic groups. The latter, for instance, have been grouped into three broad fertility categories.

1 High fertility: Asante, Ahafo, Boron, Akyem and Adangbe.
2 Moderately high fertility: Fante, Nzema, Akuapem, Ga, Ewe, Dagaba etc.
3 Low Fertility: Grusi, Builsa, Frafra, Kusasi, Mossi, Konkomba and Dagomba.

It has been suggested that the marked north-south fertility differential, noted among the ethnic groups as well as the administrative regions, can be traced to physical separation of spouses and sex imbalance due to the seasonal and long-term migration of adult males to the south. But, on the other hand, educational levels, degree of urbanization and economic development are higher in the south than in the north. If education and urbanization were the dominant correlates of lower fertility at the national level (which they are within each region) one would expect the southern population to exhibit lower and not higher total fertility rates than the northern group.

Obviously, other factors are at work and analysis of data from the WFS-Ghana pilot survey has already suggested that a fair part of the explanation may well be found in differentials with respect to post-partum variables, breastfeeding, post-partum amenorrhoea and post-partum abstinence (Gaisie 1981).

However, the pilot survey data covered only a very small purposive sample of about 500 ever-married women and the analysis was restricted to just a few variables. The information collected in the main Ghana Fertility Survey 1979-80, therefore, offers us the opportunity of undertaking a much more comprehensive examination of the proximate determinants of fertility in Ghana and of the contribution of each to fertility itself.

1.2 GHANA FERTILITY SURVEY (GFS)

The Ghana Fertility Survey (GFS) was conducted in 1979-80 by the census office of the Central Bureau of Statistics. Before this survey, however, a pilot survey for the WFS had been carried out in Ghana by the Institute of Statistical, Social and Economic Research (ISSER) in collaboration with the Regional Institute for Population Studies. The primary aim of the pilot was to test the hypothesis that proper use of multi-lingual questionnaires would yield better quality data. The questionnaires tested were both the WFS core questionnaire and the module, Factors other than Contraception Affecting Fertility. Besides testing the effectiveness of using local languages in collecting better quality data, the Ghana pilot survey also looked into the merits and demerits of using male and female interviewers. The invaluable experience gained from the study provided a solid foundation for launching the main survey in 1979.

The GFS was based on a two-stage self-weighting sampling design which was intended to yield a minimum sample size of 7500 householders. The first stage consisted of the selection of 300 census enumeration areas (EAs) stratified by region and degree of urbanization (rural, urban and large urban). The rural stratum consisted of all EAs in localities with estimated population of less than 500 and the urban stratum included all EAs in localities with population of 500 or more but less than 10 000. The EAs in localities with a population of 10 000 or more, covering largely the regional capitals, were grouped into a single large urban stratum. The second stage was concerned with the selection of the sample households from the listings of all households in the selected EAs. The entire design yielded 300 sample EAs with 198, 50 and 52 EAs in the rural, urban and large urban strata respectively and a total of 7208 households was selected for interviewing. The total enumerated population was 28 671, comprising 13 987 males and 14 684 females with 42.8 per cent (ie 6285) of the latter aged between 15 and 49 years.

The GFS adopted both the WFS core questionnaire and the revised version of the module, Factors other than Contraception Affecting Fertility. The data collected with the module include, among other things, information on birth intervals, duration of breastfeeding, post-partum amenorrhoea and abstinence, temporary absences of spouses, menstruation characteristics and contraceptive use. These data, together with the respondents' background information such as place of residence, education and ethnic origin as well as maternity and marriage history, provide the basic materials for this study.

1.3 ORGANIZATION AND SCOPE OF THE ANALYSIS

The analysis of the intermediate fertility variables is organized around four main themes.

1 Starting patterns of family formation and their proximate determinants.
2 Birth-spacing patterns and their proximate determinants.
3 Stopping patterns of family formation and their proximate determinants.
4 Contribution of each of the major intermediate fertility variables to overall fertility levels and differentials.

The analysis is carried out at national level as well as for three major subgroups (ethnic, residential and educational groups) which are divided into three broad age groups (15–24, 25–34 and 35–49). The choice of these subgroups is based on findings of previous studies which identified the most important elements relating to the diversity within the Ghanaian population with respect to post-partum variables (see Gaisie 1981). In addition to dampening some of the effects of age misstatement, the broad age categories used in this study provided relatively reasonable sample size for analysis at subgroup level.

Most of the variables we are interested in are duration variables which measure the time elapsed before a particular event occurs (eg age at first union, duration of breastfeeding, post-partum amenorrhoea etc). In most cases, the information is incomplete because insufficient time has elasped for all those concerned to have experienced the event in question. Thus, the information from those who have not yet experienced the event is censored. The analytical strategy adopted, therefore, includes appropriate techniques for handling censored data sets which take into account the information that these persons have not yet experienced the event, namely classic life-table methods or use of current status data.

The detailed distributions of the variables are summarized by a series of quantiles (ie T_x), the time elapsed before x per cent of the persons concerned have experienced the event. We have chosen to present the quantiles T_{10}, T_{25}, T_{50}, T_{75} and T_{90} which show the time elapsed before 10, 25, 50, 75 and 90 per cent of the respondents have experienced the event under study. As overall measure of central tendency we use the trimean, a weighted average of the quantiles that gives twice as much weight to the medium than to the other two quartiles, defined as $(T_{25} + 2T_{50} + T_{75})/4$. Where current status procedures are used rather than classic life-table procedures, the arithmetic mean is given because it can often be estimated more easily or more reliably than the trimean. In a relatively few instances, prevalence-incidence ratio method is used (eg estimation of the exposure interval).

Finally, for non-universal events an estimate of the proportion who do experience the event in question is given.

2 Starting Patterns of Family Formation

2.1 INTRODUCTION

The major fertility variables, which will be considered in connection with starting patterns of family formation are (1) proportion remaining childless, and (2) the age at first birth for those who bear children. Since marriage is virtually universal in Ghana and voluntary childlessness in unknown, the main proximate determinants of (1) are the incidence of primary sterility, and of (2) are age at puberty, age at entry into sexual union, contraception and pregnancy wastage at the outset of childbearing.

2.2 AGE AT FIRST LIVE BIRTH

It will be seen from table 1 that 75 per cent of Ghanaian women have their first birth before their 23rd birthday with nearly all those who do bear children experiencing their first birth before they are 26 years old. The estimated average age at first birth is 19.7 years with a spread of five years. The estimated trimeans for the birth cohorts range from 19.2 years among the cohort currently aged 15–19 to 20.6 years among the oldest cohort. It appears though that the trimeans for the older cohorts are distorted by inflation of T_{75}, due largely to misreporting by older women who tend to omit or misdate their first birth (see figure 1).

There is not much difference in age at first live birth between the subgroups. The median age at first birth lies in the neighbourhood of 20 years for all the ethnic groups and for the separate birth cohorts of each ethnic group. However, women resident in the cities have their first birth about a year later than those resident in towns and rural areas (ie 21 years as against 20 years). More strikingly, women with secondary or more formal education experience their first birth at a median age of about 25 years whilst those with middle and primary education have their first birth at 20 and 19 years respectively. There is, however, no difference between the latter group and the women with no schooling (appendix A, tables A2).

2.3 THE PROXIMATE DETERMINANTS OF AGE AT BIRTH

Age of puberty

The performance of puberty rites in a traditional African society is a very important landmark in the reproductive career of a young girl. She is now physically mature to undertake reproduction, and the recognition of this fact by the community confers on her a social status which permits her to indulge in open courtship or enter marriage without any infringement of the moral sanctions relating to pre-pubertal sexual activity. There is thus a need to study the phenomena as one of the structural elements of the beginning of family formation.

Puberty rites may be performed immediately at the first menstruation, but they may be postponed for a period of time for a number of reasons. Nevertheless the community has a fair knowledge of a relatively narrow age range within which the majority of young girls are expected to experience their first menstrual period although people may not know with any precision the age at which menarche occurs in individual cases.

In the Ghana Fertility Survey the respondent was asked: 'How old were you when you had your first menstrual period?'. A summary of the results of the analysis of the responses to this question is presented in table 2 and figure 2. Life tables for age at menarche were computed by current age of woman (in five-year groups) and selected quantiles, denoted by T_{10}, T_{25}, T_{50}, T_{75} and T_{90} (the ages at which 10 per cent, 25 per cent, 50 per cent, 75 per cent and 90 per cent of the women reach menarche) were calculated. We then calculated the trimean as a measure of central tendency and the inter-quartile range, $S = (T_{75} - T_{25})$ as a measure of dispersion. As can be seen from table 2, there is no significant variation between the estimated ages at menarche among the various birth cohorts, the trimean ranging from 15.4 years among the youngest cohort to 15.5 years among the oldest with a spread of only 1.2 years in both cases. As noted above, the strict observance of puberty

Table 1 Estimated age at first birth by current age

Current age	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average trimean	Inter-quartile range (S)	N
15–19	16.7	18.8	19.0	19.9	19.2	–	1.1	1371
20–24	16.2	17.6	19.5	21.0	24.1	19.4	3.4	1220
25–29	16.1	17.7	19.9	22.6	25.6	20.0	4.9	1011
30–34	15.5	17.4	19.8	22.9	26.0	20.0	5.5	802
35–39	15.4	17.2	19.6	22.7	26.6	19.8	5.6	703
40–44	16.1	17.7	20.1	24.0	28.1	20.5	6.3	579
45–49	16.1	17.8	20.4	24.0	28.5	20.6	6.2	439
15–49	15.8	17.7	19.7	22.7	26.1	19.7	5.0	6125

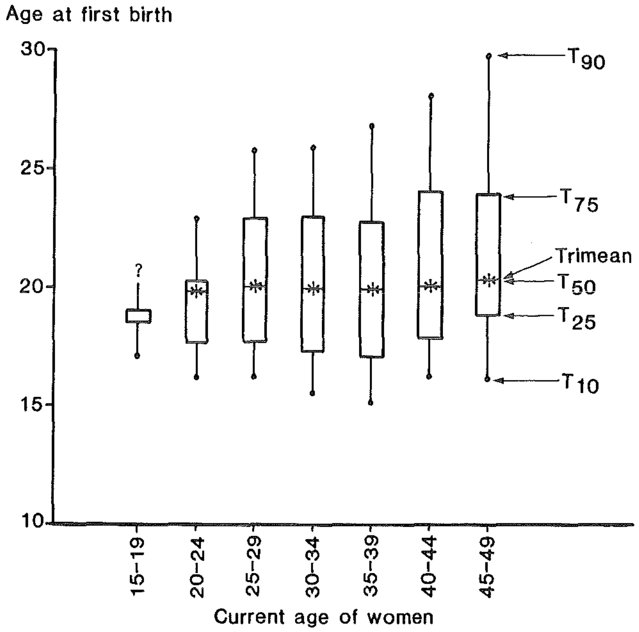

Figure 1 Quantiles of women having a first birth, by age and cohort (current age)

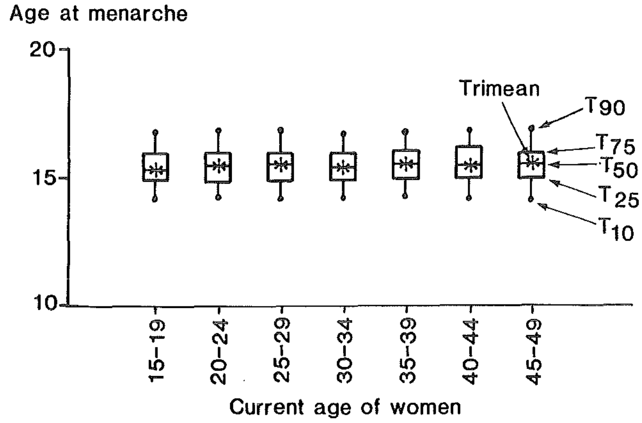

Figure 2 Quantiles of women reaching menarche, by age and cohort (current age)

rites in pre-transitional African societies over the years has generated a consensus concerning the age or narrow age range within which young girls are expected to experience their first menses. It is, therefore, not surprising that the apparent trimeans cluster tightly around 15.5 years with an inter-quartile range of only one year. The figures presented in table 2 may reflect the average ages quite well, but stereotyping has probably dampened out much of the variations which might be of interest to the analyst.

There is no significant difference between the estimated ages at menarche among the subgroups examined in this study. The median ages at menarche among the ethnic groups, for example, range from 15.4 to 15.7 with virtually no difference between the birth cohorts within each group (appendix A, table A1); reinforcing the suggestion that people have a stereotype of the average age at menarche but little idea of the exact age at menarche for individuals.

Age at first marriage

In many societies, age at first marriage is practically synonymous with age of entry into sexual relations and is thus a major determinant of the start of family formation. This is not true, however, in contemporary Ghana.

According to traditional practice, a young female for whom the puberty rites have been performed can indulge in sexual relations without infringement of the taboo or application of moral sanctions against pre-pubertal sexual intercourse. However, although sexual relations are condoned at this stage in the life of the girl, an early entry into marriage becomes an overriding preoccupation of her family. Thus, if a young girl becomes accidentally pregnant during her forays into sexual activity, marriage is quickly and, in some cases, forcibly arranged. In most cases marriage precedes first pregnancy. Moreover, the importance attached to virginity testifies to strict moral sanctions against premarital sexual activity. Thus age at first marriage or union was quite a good indicator of exposure to sexual intercourse in pre-transitional African society. The situation has, however, changed considerably since the beginning of the current century.

Among the problems encountered in handling the type of data at our disposal is the definition of marriage. For instance, among virtually all the ethnic groups in Ghana customary rites are performed over a period of time and in most cases the completion of the performance of the marriage rites may eventually take place only after the woman has been impregnated. Ability to conceive is a determining factor in the stability of marriage. It is, therefore, not surprising to find a number of pregnancies occurring during the period in which the customary rites are being completed.

Table 2 Estimated age at menarche by current age

Current age	Quantiles					Average inter-quartile		
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Trimean	Range	N
15–19	14.1	14.8	15.4	15.9	16.7	15.4	1.2	1332
20–24	14.1	14.8	15.5	16.1	16.8	15.5	1.3	1158
25–29	14.0	14.9	15.5	16.0	16.7	15.4	1.1	913
30–34	14.0	14.8	15.4	16.0	16.8	15.5	1.2	706
35–39	14.0	14.9	15.5	16.1	16.9	15.5	1.2	630
40–49	14.1	15.0	15.5	16.1	16.9	15.5	1.2	509
45–49	14.1	14.9	15.5	16.1	16.8	15.5	1.2	384
15–49	14.0	14.9	15.5	16.0	16.8	15.5	1.2	5632

Table 3 Estimated age at first marriage by current age

Current age	Quantiles					Average inter-quartile		
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Trimean	Range(s)	N
15–19	15.5	17.3	18.8	–	–	–	–	1371
20–24	15.0	16.4	18.5	20.3	23.3	18.3	4.0	1220
25–29	14.9	16.2	18.3	20.7	–	18.4	4.5	1011
30–34	14.4	16.1	17.9	20.5	23.5	18.1	4.5	802
35–39	14.4	15.8	17.8	20.4	24.2	18.0	4.5	703
40–44	14.8	16.2	18.2	20.9	24.8	18.4	4.7	579
45–49	15.1	16.3	18.3	20.4	23.0	18.3	4.0	439
15–49	15.0	16.3	18.2	20.7	23.9	18.4	4.0	6125

The determination of the apparent interval between exposure to sexual activity and age at first marriage cannot be undertaken with most WFS data sets since the distinction was not made. In a transitional African society, since reported age at first marriage may not be a good indication of exposure to sexual activity, one may be tempted to regard age at menarche instead as a reasonably fair indicator of exposure to sexual intercourse, at least in the majority of cases.

The figures shown in table 3 indicate very little variation in age at first marriage between the birth cohorts with an estimated average of 18.4 years (ie three years later than average age at menarche). There is a wide variation between individuals; the interquartile spread is 4.5 years, and 10 per cent are already married by the age of 15 whereas another 10 per cent do not marry until they are 24 or older. There is no indication of any significant general trend in age at first marriage though T_{10}, T_{25} and T_{50} for the age group 15–19 show a slight rise in age at first marriage in this cohort (figure 3). There are, however, some variations within the socio-economic subgroups. The median age at first marriage is higher among the Ewe and the Ga-Adangbe than among the Akan by one year (19 years as against 18 years) with the Mole-Dagbani marrying one year younger (appendix A, table A1). The average age at first marriage ranges from 18.1 years among the rural women to 18.7–19.4 years among the town and city dwellers respectively,

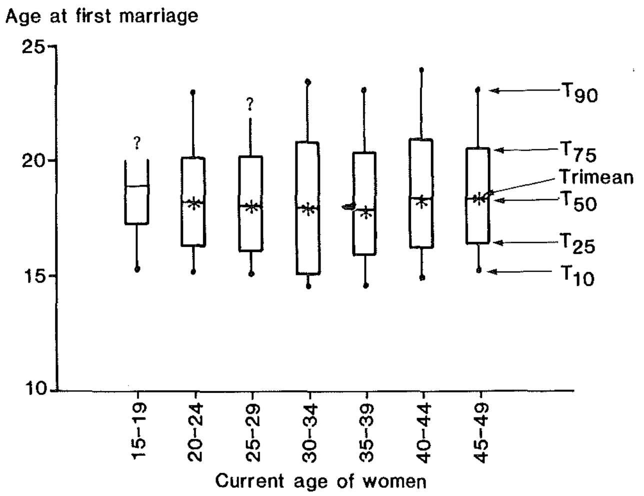

Figure 3 Quantiles of women marrying for the first time, by age and cohort (current age)

indicating an increase in age at first marriage with urbanization (table 4). Formal education also has some impact on the age at first marriage. Women with middle and secondary or higher education marry about one and three years later respectively than those with no schooling or only primary education (see table 5). The median figures as well as the trimeans for the entire age group (ie 15–49) are quite consistent in portraying the picture described above. A recent rise in age at first marriage within each subgroup can also be inferred from the figures for the birth cohorts, with the youngest cohort (15–24) marrying, on average, a year later than their older counterparts. This differential among the birth cohorts is quite noticeable among the Asante, Ewe, Ga-Adangbe, town and city dwellers and women with middle and secondary or higher formal education. The influences of urbanization and education on age at first marriage are clearly reflected in tables 3, 4, 5 and appendix A, table A1.

Marriage and first birth

Table 6 presents figures on the apparent relationship between date of first marriage and date of first live birth. The figures indicate that 1.1 per cent of all women were never married at the time of the survey and had at least one live birth and 6.3 per cent were ever-married women who had given birth to a child either before marriage or within nine months of marriage; corresponding proportions for the oldest cohort are 0.3 and 9.9 and for the youngest cohort are 1.8 and 3.0. These figures are indicative of the prevalence of pre-marital births in the Ghanaian society.

A much more detailed examination of the relationship reveals that nearly one-quarter of the births to the older cohorts (25–34 and 35–49) are reported as having occurred within the first 12 months of marriage. The corresponding figures for the first 24 months following marriage are 60 and 56 per cent respectively. Selected summary measures (based on life-table analysis) of the first birth interval are presented for the subgroups in table 7. There seems to be very little variation in the timing of the first birth relative to the timing of marriage; the estimated trimeans for the different birth cohorts cluster closely around 17 months, except for the 25–29 age group and the last two cohorts which exhibit durations of two months lower and one month higher than the overall trimean respectively. Ninety per cent of the first births occur within five years of marriage. The pattern portrayed by the figures in table 7 may be distorted by a tendency among older women to omit

Table 4 Estimated age at first marriage by current age and residence

Residence and current age	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average inter-quartile range Trimean	S	N
A Large urban								
15–24	15.6	17.2	19.0	22.7	–	19.8	5.3	481
25–34	14.9	16.9	19.0	22.2	24.7	19.3	6.2	337
35–49	15.2	16.6	18.7	22.8	26.3	19.2	6.2	242
15–49	15.2	17.0	19.1	22.3	25.7	19.4	5.3	1060
B Urban								
15–24	15.7	17.0	18.9	21.2	23.2	19.0	4.2	442
25–34	15.1	16.5	18.3	20.7	24.1	18.5	4.2	313
35–49	14.9	16.3	18.3	21.2	26.0	18.5	4.9	264
15–49	15.3	16.6	18.5	21.1	24.5	18.7	4.5	1019
C Rural								
15–24	15.1	16.5	18.0	19.9	22.4	18.1	3.4	1668
25–34	14.5	15.9	17.8	20.3	23.0	18.0	4.4	1163
35–49	14.6	16.0	17.9	20.2	23.7	18.0	4.2	1215
15–49	14.8	16.2	17.9	20.2	23.2	18.1	4.0	4046

Table 5 Estimated median age at first marriage by current age and level of education

Current age	Level of education No schooling	Primary	Middle	Secondary +
15–24	17.2	17.8	18.9	23.4
25–34	17.5	18.4	18.7	22.4
35–49	17.9	18.2	19.0	24.0
15–49	17.6	18.0	18.8	23.0
Quartiles for all women aged 15–49				
T_{10}	14.6	14.9	15.7	18.1
T_{25}	15.9	16.1	17.2	20.0
T_{50}	17.6	18.2	18.8	23.0
T_{75}	18.8	20.4	21.3	26.3
T_{90}	21.5	23.1	24.0	29.3
Trimean	17.5	18.2	19.0	23.1
S	2.9	4.3	4.1	6.3

first born children who failed to survive (see appendix A, table A3).

Among the major ethnic groups between 47 and 55 per cent and between 91 and 95 per cent of the women have their first child by 15 months and five years of first marriage respectively. There is, however, some time differential among the ethnic groups: the average (trimean) timing ranging from 14 among the Ewe to 17 months among the Akan, with the Mole-Dagbani exhibiting the longest duration of nearly 26 months, and a relatively lower proportion of 35 and 79 per cent having their first child within 15 months and five years of marriage respectively (see appendix A, table A6).

The average interval as measured by the trimean ranges from 15.5 months among the town dwellers to 18 months among the city dwellers with the rural women spending 17 months in the interval. Nearly nine out of every ten first births occur within five years after marriage among all the three groups. It must be noted that though there is a slight timing differential, the contribution to the quantity of fertility (first births) within 15 months and five years following marriage is greater among the town dwellers than the other two residential groups (see appendix A, table A4).

Table 6 Percentage distribution of women by interval between first union and first live birth

Birth cohort	Ever-married women: No live birth	Interval from 1st union to 1st live birth (years) ⩽–5	–4	–3	–2	–1	0	1	2	3	⩾4	Never-married women: No live birth	⩾1 live birth	Total %	N
15–24	11.0	.3	.3	.5	.8	1.1	14.4	19.1	5.4	1.7	1.6	42.0	1.8	100.0	2591
25–34	5.0	1.4	.0	.7	1.9	3.0	23.9	36.3	11.7	5.1	8.1	1.3	.8	100.0	1813
35–49	1.8	2.7	1.0	1.5	1.8	2.9	24.1	31.7	11.5	5.0	15.4	.3	.3	100.0	1721
15–49	6.6	1.3	.6	.8	1.4	2.2	20.0	27.7	9.0	3.7	7.4	18.2	1.1	100.0	6125

Table 7 Selected summary measures for first birth interval by birth cohort, ethnicity, residence and education

	Summary			Measures	
	B_0	B_9	B_{15}	Q	T
Birth cohort					
15–19	1.9	13.6	49.5	95.8	17.3
20–24	7.5	22.2	50.1	94.8	17.2
25–29	7.4	21.2	45.7	92.7	15.2
30–34	9.9	24.5	46.7	88.7	16.8
35–39	11.2	22.7	45.1	89.2	17.4
40–44	10.1	26.1	48.3	85.5	17.7
45–49	9.4	23.1	42.7	86.5	17.9
15–49	8.3	22.2	46.7	90.4	17.1
Ethnic group					
Twi	8.0	21.0	49.2	94.6	16.7
Fante	9.2	27.2	52.0	90.6	15.6
Mole-Dagani	7.8	22.9	34.7	79.4	25.6
Ewe	8.3	25.2	55.0	93.5	14.4
Ga-Adangbe	9.0	24.9	47.2	92.8	16.4
Other	9.2	20.8	39.2	85.2	20.9
Residence					
Large urban	8.3	22.8	42.2	90.9	18.2
Urban	8.1	25.4	49.6	92.9	15.5
Rural	8.5	24.6	47.0	89.7	17.4
Education					
No schooling	8.6	23.6	43.5	88.0	18.8
Primary	7.7	25.5	50.0	94.7	15.4
Middle	8.3	26.8	54.1	94.5	14.0
Secondary +	6.5	20.6	37.5	90.8	19.4

B_0 – First births occurring in the negative interval (majority of them are pre-marital births).
B_9 – Cumulative proportion of first births occurring during the first nine months after marriage.
B_{15} – Cumulative proportion for first births occurring within 15 months following marriage.
Q(quintum or B_{60}) – Cumulative proportion of first births occurring within five years after marriage.
T – Trimean = $(T_{25} + 2T_{50} + T_{75})/4$.

The educational subgroups reveal interesting patterns. The shortest first birth interval is noted among the women with primary and middle education with 50 per cent giving birth to their first child within 15 months after marriage and 95 per cent of them bearing their first child within five years after marriage. On the other hand though the 'No schooling' and 'Secondary +' groups experience nearly the same average interval (ie 19 months), they differ with regard to quintum and B_{15} as well as other indices such as B_0 and B_9. Thus, whilst the uneducated women's pattern bears some resemblance to that of the old cohorts as well as rural women, those with secondary and higher education exhibit a pattern not significantly different from that of the city dwellers. It is also interesting to note that the proportion of women who apparently conceive their first child before marriage is highest among the women with relatively very little formal education (primary and middle). The proportions range from between 27 and 26 per cent among them, to 21 per cent among the more educated women who reported the lowest proportion of pre-marital births. The proportion of women who are estimated to have had their first births before marriage is slightly higher among the rural and the uneducated women than those living in urban areas and those with secondary or more education respectively. The prevalence of pre-marital births has the effect of making the method of treating age at first marriage as an indicator of exposure to sexual activity unworkable under the conditions prevailing in transitional Ghanaian society. However, three broad patterns of reproductive behaviour emerge from the data described above:

1 A relatively long average first birth interval and high quintum[1] is noted among young cohorts, city dwellers and highly educated women.
2 The older cohorts and the uneducated women exhibit a long average first birth interval with low quintum, a phenomenon which appears to have stemmed from misreporting by the older cohorts and rural women.
3 A relatively short timing period with high quintum pattern which characterizes those living in urban areas and the women with primary and middle education.

We note, therefore, that education, residence and current age of the women have some effect on the proportion of women who have their first birth within the fifth year following marriage as well as on the timing of the first birth, education presumably exercising the greatest impact on the differentials noted (see Appendix A, table A5).

Primary sterility

There is no direct way of measuring primary sterility from the WFS data sets. Nevertheless, since voluntary childlessness is not a common feature of Ghanaian society, we can take the proportion remaining childless as a fair indicator of either primary sterility or very marked sub-fecundity. It will be seen from table 8 that nearly one-quarter of the women aged 15–49 reported themselves as never having had a live birth and about 21 per cent of them have never had a single pregnancy. It must be noted, however, that the majority of these women were young and were either not yet married or who had been married for a very short period only. Among women aged 30 years and over the proportion reported as childless is only 4.4 per cent and the corresponding proportion for those who had been married for five years or more is 3.7 per cent. Incidence of primary sterility is, therefore, reported to be about 4 per cent; a figure which is moderate.

Contraception and pregnancy wastage

No questions were asked about the use of contraception before the first birth. Data were, however, obtained on women who had never been pregnant – a small subgroup dominated by girls aged 15–19, the majority of whom had not yet embarked on childbearing for diverse reasons. The percentage using efficient contraceptive methods is about

[1]Quintum refers to quantity or quantum achieved within a five-year period.

Table 8 Percentage never having had a live birth and percentage never having had a pregnancy, by current age: (A) all women, (B) women married ⩾ 5 years

Current age	All women			Women married ⩾ 5 years		
	No live birth	No pregnancy		No live birth	No pregnancy	
	%	%	N	%	%	N
15–19	78.7	71.6	1371	18.2	13.6	22
20–24	24.1	17.4	1220	2.7	1.7	475
25–29	7.7	4.5	1011	3.1	1.7	840
30–34	4.4	3.4	802	3.7	2.8	785
35–39	1.6	1.3	703	1.0	0.7	692
40–44	2.6	2.3	579	2.4	2.3	574
45–49	2.3	2.1	439	2.1	1.8	438
15–49	24.9	21.1	6125	2.7	1.9	3826

16 per cent for all women and 30 per cent for those aged between 20–29 with none of the women aged 35 and over using any method (table 9). It appears, therefore, that the proportion of all women who use contraception to delay the first birth is very low.

Miscarriages and still births are so under-reported (see chapter 3) that no attempt has been made to determine the extent to which the time elapsed before the first birth is affected by spontaneous foetal wastage.

2.4 CONCLUSION

The estimated average age at first birth is 19.7 years with an inter-quartile spread of five years. Nearly all those who do bear children experience their first birth before they are 26 years old. There is little variation in age at first live birth. The most striking difference is noted among the women with secondary or tertiary education who experience the event at a median age of about 25 years compared with a median age of between 19 and 20 years among the middle and primary school leavers.

The trimeans of age at menarche cluster around 15.5 years with an inter-quartile range of only one year; stereotyping has eliminated much of the variation.

Ninety per cent of Ghanaian women marry before the age of 24 years with an estimated average (trimean) age at marriage of 18.4 years; about three years higher than the average age at menarche. The estimated trimeans also suggest a difference of 4.2 years between average age at menarche and that of age at first birth; indicating a little over one year interval between age at first marriage and age at first birth.

The difficulty of analysing the interval between first marriage and first live birth is compounded by the high incidence of pre-marital births and conceptions. Besides problems of truncation, reporting and imputation which are not easy to handle on the basis of the available data sets, the definition of marriage and the protracted nature of the performance of the customary rites associated with it makes it extremely difficult to draw any clear-cut line between first sexual union and first union and thereby measure the interval between either of them and first birth. Age at first marriage or union, therefore, does not seem to be a very good indication of exposure to childbearing.

However, the analyses carried out so far indicate quite clearly that a woman's reproductive career begins at a relatively early age in Ghana (eg average age at first marriage is 18.4 years with first sexual union often preceding marriage) and that in situations where formal education delays entry into sexual or first marital union, the time lost is quickly made up with more than 25 per cent of the women with formal education apparently conceiving their first birth before marriage and 95 per cent having their first child by the end of the fifth year after marriage. This subgroup of women exhibit the shortest average marriage—first birth interval (between 14 and 15 months, compared with a national average of 17 months and 19 months for the uneducated and those with secondary or more formal education respectively). The increase in age at first marriage among women with middle education has practically no effect on the quintum of their first birth (ie B_{60} or Q).

Table 9 Percentage of nulliparous women who have ever used contraception by current age

Current age	Never used	Used inefficient method	Used efficient method	Total %	N
15–19	74.7	13.8	11.5	100.0	1079
20–24	57.5	12.2	30.3	100.0	294
25–29	59.0	11.5	29.5	100.0	78
30–34	82.9	5.7	11.4	100.0	35
35–39	81.8	18.2	–	100.0	11
40–44	100.0	–	–	100.0	15
45–49	100.0	–	–	100.0	10
15–49	71.2	13.6	15.8	100.0	1522

Finally, notwithstanding the distortions in the reported proportions having their first child at various times after marriage, the following broad starting patterns may be noted:

1 City residents with secondary and tertiary education exhibit a relatively long average marriage–first birth interval with a relatively high quintum.

2 Young residents of large towns with primary and middle education have a relatively short average marriage–first birth interval with a high quintum.

3 The old uneducated rural women tend to have a relativeley long average marriage–first birth interval with a low quintum. This is greatly affected by the tendency among them to misreport first born children, particularly the unsurviving ones by reporting a later surviving child as the first child.

3 Birth-Spacing Patterns

3.1 BIRTH INTERVALS

Family formation can be thought of as a series of stages where a woman moves successively from one event (eg first birth) to the next (eg second birth) and so on until she reaches her completed family size. In this section we examine the duration of the inter-birth intervals themselves. In subsequent sections we examine the components and proximate determinants of the birth interval, particularly the post-partum non-susceptible period and the exposure intervals.

Although data on the length of all the birth intervals that each woman had experienced were collected in the Ghana Fertility Survey 1979–80, detailed questions on the proximate determinants of these intervals were confined to the two most recent births for each woman. The analysis that follows is, therefore, restricted to recent intervals. The analysis of the intervals themselves is restricted to intervals started in the six years preceding the survey. The analysis of the proximate determinants is based on a shorter period preceding the survey (typically 2–3 years), though one may go further back in time as a result of lack of data for some births. The analysis gives equal weight to each interval started in the period used rather than giving equal weight to each woman. This approach has been adopted here because it has the advantage of being easier to integrate in an evaluation of the relative contribution made by each of the various determinants of fertility to overall fertility levels. A series of the tables by age group of mother (and by birth order) was constructed for the entire sample population. The tables provide, among other things, information on the estimated proportion of intervals that are closed within six years and of durations at which certain proportions have been closed. Data for certain subgroups are summarized in table 12 and presented in full in appendix B.

Table 10 demonstrates that the younger cohorts (ie 15–24 and 25–34) experience shorter birth intervals than the older ones (ie 35+), their trimean being lower than that of the entire sample by about three months. Although the first two cohorts exhibit the same length of inter-birth intervals, they differ slightly in the quantity of fertility during the six years preceding the survey; the proportion of intervals closed vary from 87 to 91 per cent between the 15–24 and 25–34 cohorts respectively. The relatively low proportion of intervals closed among the oldest cohort (68 per cent) may be attributed to the fact that a fair proportion of them have reached a stage in their reproductive careers where it is unlikely that they will ever close their intervals.

A similar pattern can be seen with regard to classification by birth order (table 10). As we move from lower to higher birth orders the proportion of intervals closed within the period under discussion decreases, ranging from 89 per cent among those with first birth to 71 per cent among those with six or more children, though there is about one month difference between the trimeans.

A classification of birth intervals by birth order and also by current age of mother (table 11) shows that for the youngest cohort the interval starting with the first birth is the longest whilst its quantum (ie B_{72}) is the same as that of the intervals starting with second and third births. The oldest cohort on the other hand, experiences relatively shorter birth intervals for the first birth order with the proportion of intervals closed after six years ranging between

Table 10 Estimated live birth interval length by age and birth order (A) by current age of the mother, (B) by order of birth (all intervals started in six years preceding the survey)

	Quantiles (months)					Trimean	Q^a	Per cent closed in 6 years[b]	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A Current age									
15–24	21.6	22.2	35.7	48.8	–	35.6	81.2	86.9	1767
25–34	20.4	26.0	35.1	46.4	66.8	35.7	85.3	91.0	2874
35–49	21.2	27.5	41.4	–	–	–	65.8	68.2	1808
15–49	19.9	26.7	36.8	54.7	–	38.8	77.9	82.6	6449
B Birth order									
1	21.7	26.8	35.5	48.5	–	36.6	83.4	89.1	1402
2–3	20.9	27.0	36.2	54.6	–	38.5	81.7	85.4	2168
4–5	19.5	25.4	35.9	55.2	–	38.1	77.1	83.8	1378
6	21.2	27.7	40.1	–	–	–	67.9	71.3	1503

[a] Q = Quintum cumulative proportion closed by the end of the fifth year.
[b] Or B_{72}.

Table 11 Estimated live birth interval length by current age of the mother and order of birth (all intervals started in six years preceding the survey)

Age and birth order	Quantiles					Trimean	Q[a]	Per cent closed in 6 years[b]	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
15–24									
1	22.3	21.8	36.5	49.2	–	36.0	79.5	85.7	1030
2–3	20.6	26.0	34.8	46.2	–	35.5	86.3	86.2	678
4–5	25.1	30.1	33.3	–	–	–	–	51.9[c]	59
6	–	–	–	–	–	–	–	–	–
25–34									
1	19.9	25.2	33.2	45.9	61.3	34.4	87.9	92.1	357
2–3	21.0	27.3	36.4	48.9	–	37.3	83.9	88.2	1323
4–5	18.3	24.9	34.0	46.1	66.6	34.8	86.9	100.0	862
6	21.1	26.2	32.9	48.5	–	35.1	81.4	87.6	332
35–49									
1	25.7	27.7	30.3	48.8	55.4	34.3	90.8	90.8	15
2–3	21.2	27.4	39.3	–	–	–	66.6	66.6	167
4–5	20.8	26.4	40.2	–	–	–	66.4	68.6	455
6	21.3	28.0	42.8	–	–	–	65.5	68.1	1171

[a]Q = Cumulative proportion closed by the end of the fifth year.
[b]Or B_{72}.
[c]Last period in 42.5 months.

91 and 92 per cent. The middle cohort exhibits virtually the same pattern at the higher birth orders with slight decreases in the quantum of fertility except for birth order 2–3 where the interval appears to be longer. The quantum for the oldest cohort, however, decreases substantially as one moves from first birth (91 per cent) to between 67 and 69 per cent at the higher orders, indicating the effect of a selection bias as well as the non-closure of intervals by a fair proportion of older women at higher birth orders.

Table 12 Selected summary measures for birth intervals (all intervals started in six years preceding the survey)

Subgroup	Summary measures	
	T[a]	B_{72}[b]
Residence		
Large urban	41.2	78
Urban	39.9	77
Rural	37.8	85
Education		
No schooling	39.2	77
Primary	36.1	85
Middle	37.3	84
Secondary +	44.1	79
Ethnicity		
Twi	38.1	82
Fante	35.9	83
Mole-Dagbani	42.8	83
Ewe	39.0	82
Ga-Adangbe	36.3	94

[a]T = Trimean.
[b]B_{72} = Cumulative proportion of intervals closed during the six-year period.

The subgroup analysis (see table 12) shows that the city and town residents experience longer birth intervals than their rural counterparts and their contribution to the quantity of fertility during the six years' period is lower than that of the latter by eight percentage points. Among the educational groups, the women with primary and middle education have relatively short inter-birth intervals and higher proportions of closed intervals. We note, however, that the best-educated women experience the longest interval, being five months longer than that of the uneducated women, although the two groups close virtually the same proportion of intervals by the sixth year.

The patterns noted among the birth cohorts at national level appear to be reflected among the cohorts within each educational subgroup (see appendix B, tables B1 and B2). Average birth intervals vary from 44 months among women with secondary or more education to 36 months among those with only a little formal education. Similarly the trimeans range from 41 among the city dwellers to 40 months among town dwellers, down to 38 months among rural women.

Inter-birth intervals based on closed intervals during the past six years

The preceding analysis included some intervals that will never close, and the birth interval measures would thus tend to be overestimates. This is particularly serious where there is a sizeable number of intervals which will never be closed, as among the oldest cohorts. An attempt is, therefore, made to adjust these estimates in order to obtain more plausible estimates for inter-birth intervals. We need, however, to have some knowledge about inter-birth intervals

Table 13 Estimated live birth interval length (in months) by ethnicity, education, residence and current age

	Quantiles					Average trimean	$\bar{X}$
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}		
Ethnic group							
Twi	21.3	24.8	32.5	40.4	51.9	32.6	33.1
Mole-Dagbani	21.3	28.7	35.0	46.2	55.4	36.2	37.3
Ewe	20.5	25.1	32.7	42.7	52.5	33.3	33.8
Ga-Adangbe	18.8	24.9	32.7	46.0	67.7	34.1	34.1
Education							
No schooling	19.1	24.9	32.9	42.9	57.5	33.4	33.6
Primary	18.9	22.8	30.8	40.1	52.4	31.1	32.3
Middle	19.4	25.2	32.5	42.7	49.4	33.2	33.3
Secondary +	20.6	26.8	32.8	52.0	66.9	36.1	38.4
Residence							
Large urban	17.4	23.3	30.9	40.3	49.3	31.4	35.4
Urban	18.9	22.5	29.2	36.9	46.3	29.5	31.6
Rural	19.2	22.9	30.9	39.9	51.9	31.2	33.8
Current age							
15–24	19.8	25.2	32.5	39.6	49.4	32.5	34.1
25–34	18.9	24.3	32.2	40.0	51.7	32.2	34.0
35–49	18.2	23.4	31.0	37.4	49.0	30.7	32.1
15–49	20.0	25.0	32.4	39.7	49.2	32.4	34.1

in order to estimate certain important spacing pattern parameters, such as the exposure interval. We have recalculated estimates to refer only to intervals that close using the estimated proportion of intervals that close within six years, assuming that those intervals not closed after six years will never close and should, therefore, be excluded. The cumulative proportions surviving to the upper limit of each duration interval in our life tables were adjusted so that the series declines to zero by duration 72 months.[2] The results are presented in table 13.

The younger cohorts are now seen to have longer inter-birth intervals than the oldest cohort by two months (34) as against 32 months; showing that the previous estimates of the average live birth interval for the oldest cohort were heavily influenced by the preponderance of open intervals among the oldest cohort. The relatively low proportions of intervals closed by this cohort is a reflection of the fact that some of these open intervals will never be closed. The rural and the city women exhibit virtually the same inter-birth interval (ie between 44 and 35 months) with the urban women experiencing shorter intervals. The pattern is compatible with previous analyses except that the urban women now have shorter inter-birth intervals. As regards the educational groups, the same pattern is revealed by the new estimates; primary and middle school leavers have relatively short inter-birth intervals whilst the longest interval is found among women with higher education. The inter-birth interval for those women with higher education is longer than that for women with no schooling by nearly five months, as noted earlier. The Mole-Dagbani still exhibit the longest inter-birth intervals (37 months) with the Ewe and the Ga-Adangbe having virtually the same inter-birth interval and the Twi (ie Asante etc) maintaining the lowest position.

The patterns produced by the new estimates do not differ significantly from those already discussed: age, level of education and type of residence have differing effects on inter-birth intervals; average inter-birth intervals vary from about 38 months among women with secondary and tertiary education to 34 months among those with no schooling, whilst the women with little education experience inter-birth intervals between 32 and 33 months. The new estimates, however, show that it is the younger cohorts who have the longer inter-birth intervals, with the city dwellers still maintaining the longest inter-birth intervals followed by the women of rural and urban areas who have average durations of 34 and 32 months respectively. The implications of the longer inter-birth intervals among the younger women, higher educated women and city residents will be discussed below in connection with the determinants of fertility levels.

3.2 THE POST-PARTUM NON-SUSCEPTIBLE PERIOD AND ITS DETERMINANTS

Introduction

The post-partum non-susceptible period is the period during which a woman is temporarily infecund (anovulatory) following child birth. Data on anovulation would be the best to use in measuring the length of the non-susceptible period, but this type of data cannot be collected adequately

[2] For standardization of this type, see Rodríguez and Hobcraft 1980: 12.

through surveys. Data on amenorrhoea are usually used as a proxy for the post-partum non-susceptible period. The period of amenorrhoea is closely linked to the anovulatory period although the two periods do not last exactly the same number of months.

The duration of both post-partum amenorrhoea and the anovulatory period is dependent on the duration of frequent and intense breastfeeding. There is a general, though far from perfect, relationship between the duration of breastfeeding (regardless of frequency and intensity) and post-partum amenorrhoea: a one-month difference between two populations in their mean duration of breastfeeding corresponds, on average, to about a one-half month difference in their mean duration of amenorrhoea (Page, Lesthaeghe and Shah 1982). It has also been observed that, in the absence of breastfeeding, post-partum amenorrhoea normally lasts for about two months whilst it can average between one and two years where breastfeeding is prolonged and intensive (Page *et al* 1982).

Besides its physiological impact, breastfeeding can also have an impact on fertility through its effect on post-partum abstinence since in traditional Ghanaian society sexual relations are either totally proscribed or restricted for a nursing mother for a period that ranges from a few months to between two or three years. Abstinence is supposed to be observed for two to three years by the Lowilli of the Northern Region, who regard sexual relations during this period as an impediment to the 'flow of milk' and the 'satisfactory development of the infant' (Goody 1956: 47). A Kusasi man should not cohabit with his wife for two or even three years after childbirth, depending on how soon the child learns to walk. A Tallensi couple is also customarily constrained to abstain for two or three years while the child is being breastfed, although Fortes notes that observance of post-partum abstinence 'is a question of conscience and self-control and few men get through life without a lapse' (Fortes 1949: 20). Among the Bono of Brong Ahafo, although a mother is expected to abstain for at least six months following the birth of her first child, a period of only 40 days is deemed to be sufficient after subsequent births (Warren 1975: 25). Similarly the Asante abstain for between three and four months although by custom they are required to abstain for a longer period.

These examples show the importance of post-partum abstinence as a determinant of the duration of the post-partum non-susceptible period in Ghanaian societies. A strict adherence to the traditional taboo relating to post-partum abstinence may lead to the period of abstinence being longer than the post-partum anovulatory period. Contravention of the customary period of sexual proscription may reduce the impact of post-partum abstinence on fertility, or even make post-partum abstinence shorter than post-partum amenorrhoea. In the former situation, abstinence is the dominant determinant of the two; in the latter, amenorrhoea is the dominant determinant. Post-partum abstinence can be treated in the same way as post-partum amenorrhoea for analytical convenience: both variables start at delivery and they come into existence precisely because a birth has occurred. Demographers may define an overall post-partum non-susceptible and non-exposed period (nsp/nep) following each birth as whichever is longer – the period of post-partum amenorrhoea or the period of post-partum abstinence.

Data and methodology

The detailed questions about the post-partum variables (amenorrhoea, abstinence and breastfeeding) sought information for at most two pregnancy outcomes per woman (the last two for non-pregnant women, the most recent for pregnant women). Some of the biases (ie selection and censoring) inherent in data sets which are restricted to the two most recent births have been extensively discussed (see Page *et al* 1982) and we need not repeat them here.

Many of the problems can be avoided if, instead of using these data directly, we use current status data (whether the woman is still amenorrhoeic, whether she is still abstaining, whether she is still breastfeeding since the birth in question) for *all* births in a period immediately preceding the survey. For the most recent births we use responses to the direct questions: for any earlier pregnancies we can reasonably assume that the woman has resumed menstruation and sexual activity and that she has weaned the child.

The births are grouped according to the number of months elapsed since the birth, d, and the proportions for which the mothers are still breastfeeding their children, are still amenorrhoeic and still abstaining are computed. These proportions, P(d), are taken directly as estimates of the life-table survivorship function l_x and employed in estimating mean duration and quantiles. The observed P(d) values are irregular (see figures 4 and 5) because of fragmentation of the sample into small subsamples of births which occurred d months ago. In order to estimate quantiles it was therefore necessary to smooth the series of P(d) values by taking three-month moving averages, and in some cases where the smoothed curve was still irregular certain values were interpolated graphically. The unsmoothed data can, however, be used to estimate the mean.[3]

Another estimation procedure, based on the relationship between the prevalence, incidence and average duration of a condition, is also used for estimating the mean durations of the post-partum variables; $\bar{X} = P/I$, where $\bar{X}$ is the mean duration in months, P is the number of births for which the mother is still in the post-partum condition (irrespective of when those births occurred) and I is the average number of births per month. The procedure is particularly useful for analysis of subgroups whose sample sizes are small. It is, however, based on an assumption of a constant flow of births in the recent past. This assumption is often violated for the youngest and oldest women leading to an over-estimate of $\bar{X}$ for the youngest women and underestimate for the oldest women. Estimates based on the number of births reported to have occurred during the 12 months or 24 months before the survey show that there was a tendency to telescope events occurring in the distant past into the 12-month period, thereby inflating I and deflating the estimated mean duration based on the 12-month period as compared with those based on the 24-month period. The estimates based on births in the last 24 months are, however, found to be more consistent with estimates obtained by other methods than those based on 12-month period. It appears, therefore, that the 24-month period provides a more reliable estimate of I and this is employed in preparing estimates for the subgroups.

[3] See Ferry and Page (1982).

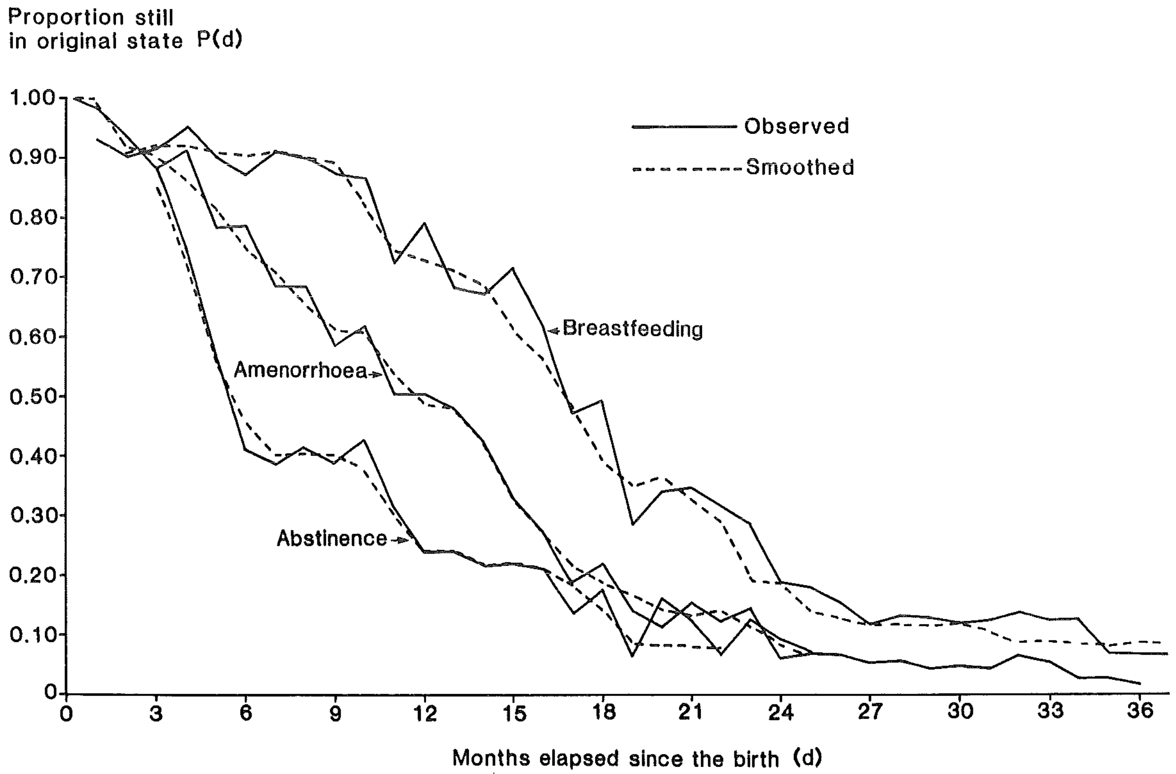

Figure 4 Proportion of women abstaining, amenorrhoeic, and breastfeeding by time since last birth

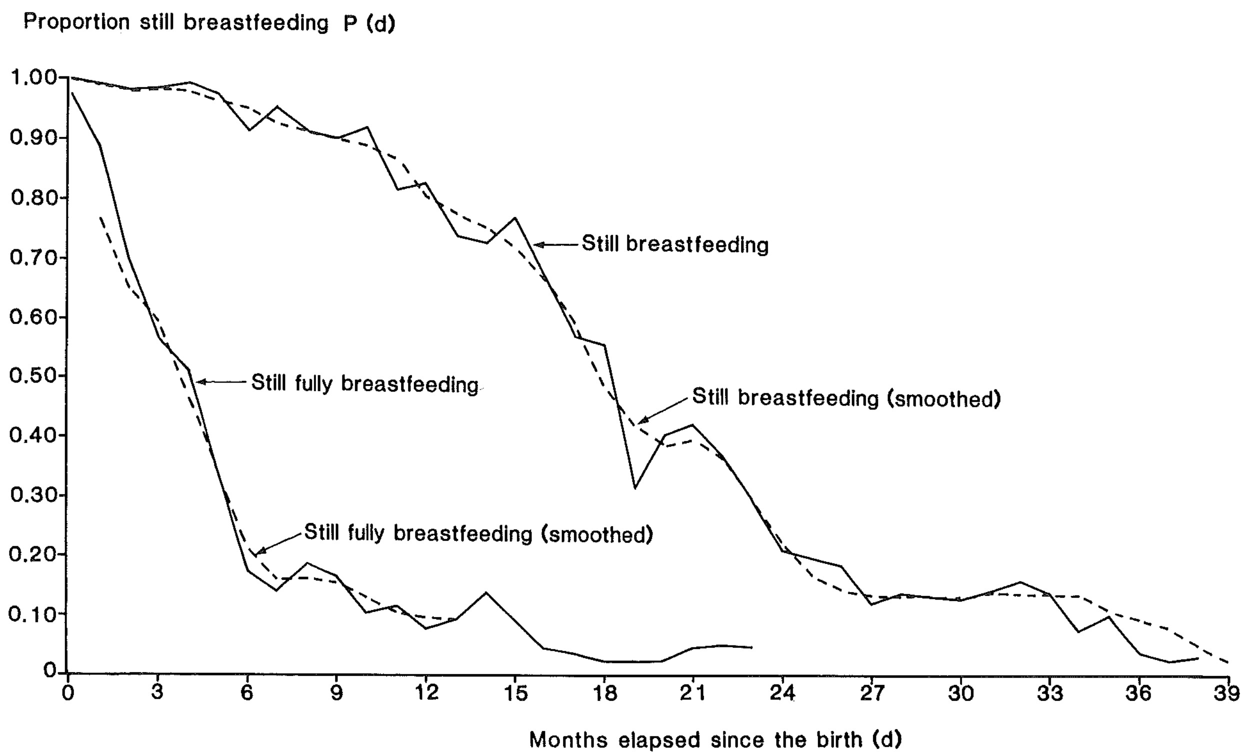

Figure 5 Proportion of women breastfeeding and fully breastfeeding their last child at the time of the survey, by time since the last birth, for only mothers of children who survived to the time of the survey

Table 14 Duration of post-partum amenorrhoea (in months) following live births by current age of mother

Current age of mother	Estimates based on births in last four years					Average trimean	$\bar{X}^a$	P/I[b]	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A All live births									
15–24	3.1	5.3	9.6	15.5	22.6	10.0	11.8	13.5	1439
25–34	3.5	6.0	10.6	15.4	20.0	10.7	12.3	13.5	1903
35–49	2.6	6.0	11.6	17.1	24.4	11.6	14.1	14.9	1076
15–49	2.2	4.9	10.8	15.2	21.8	10.4	12.5	13.9	4418
B Children still surviving at time of survey									
15–24	3.6	7.0	10.5	15.9	22.5	11.0	12.6		1299
25–34	3.8	6.0	11.8	15.8	23.2	11.4	12.6		1746
35–49	3.1	7.0	15.4	20.6	24.4	14.6	14.5		982
15–49	4.5	7.5	13.9	18.0	24.6	13.3	13.0		4027

[a] Survivorship mean estimated by life-table relationship $\bar{X} = \frac{1}{2}P(0)\ \Sigma\ P(d)$ (for $d > 0$).
[b] Prevalence/incidence estimate of mean duration.

Post-partum amenorrhoea

The estimates for amenorrhoea are presented in table 14 and are also summarized in figure 6. The use of broad age groups is intended to circumvent the difficulties stemming from small sample sizes which almost invariably give rise to very irregular patterns of P(d) values. The estimated mean duration ranges from 13 to 14 months and it will be seen from table 14 that all the estimation procedures yield estimates which lie within this range, except the trimean for all births which is estimated as 10 months. The estimates show that the younger women experience, on average, shorter durations than the older women with the difference between durations of amenorrhoea after all births to women aged 15–24 and 35–49 being 1.5 months, and over 2 months for surviving children.

Post-partum abstinence

As noted above, Ghanaian societies traditionally prescribe long periods of post-partum abstinence, although very few individuals adhere rigidly to the stipulated periods.

The estimates presented in table 15 show that the current status mean duration of abstinence lies in between 9 and 11 months for both all births and surviving children, with the average duration for surviving children being slightly higher than that for all births. Although the trimeans tend to yield comparatively lower mean durations, the trimean for the surviving children born to the oldest cohort is consistent with estimates obtained with other methods for the cohort. There is also a general trend of an increase in average duration of abstinence with increasing age, the mean durations ranging from between 9 and 10 months among

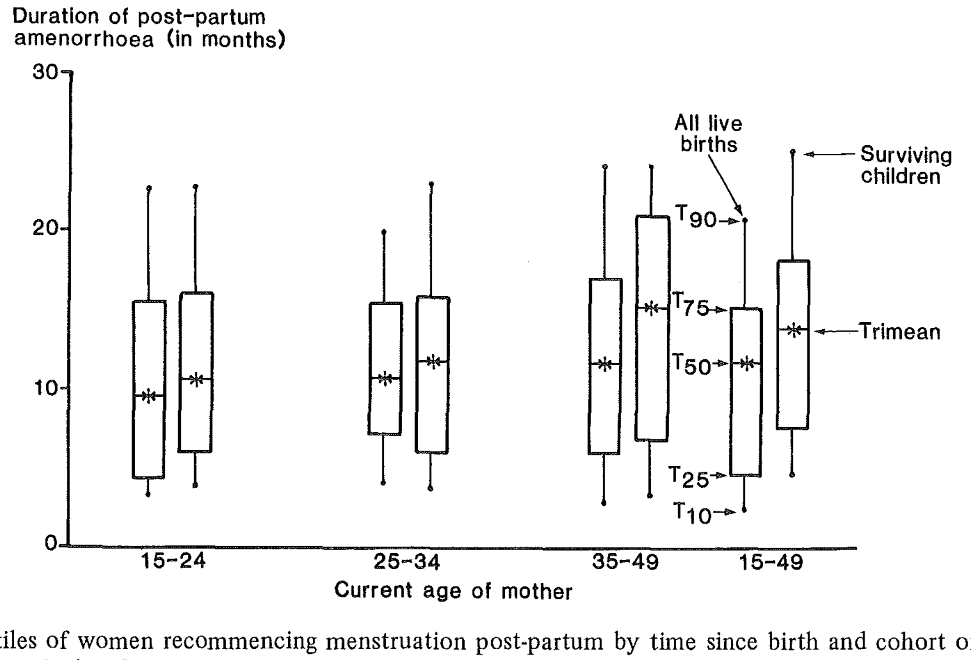

Figure 6 Quantiles of women recommencing menstruation post-partum by time since birth and cohort of mother (current age), for all births in the last four years

Table 15 Duration of post-partum abstinence (in months) following live births by current age of mother

Current age of mother	Estimates based on births in last four years					Average trimean	$\bar{X}$[a]	P/I[b]	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A All live births									
15–24	2.2	4.2	6.0	11.0	18.8	6.8	9.0	10.9	1369
25–34	2.1	3.7	5.2	12.4	22.4	6.9	9.3	10.9	1879
35–49	2.2	3.6	6.1	15.9	26.9	7.2	11.4	12.6	1057
15–49	2.2	3.9	5.6	13.3	25.6	7.1	10.2	11.3	4305
B Children still surviving at time of survey									
15–24	2.4	4.3	6.2	14.0	19.6	7.7	9.5		1235
25–34	2.4	3.7	5.3	12.4[c]	17.0	6.7	9.6		1723
35–49	–	3.6	9.0	21.3	27.6	10.7	11.8		964
15–49	2.4	4.0	5.7	13.8	26.5	7.3	10.6		3922

[a]See table 14, footnote [a].
[b]Prevalence/incidence estimate of mean duration.
[c]I value read from smoothed curves.

births to the relatively younger generations to between 11 and 13 months among births to the oldest cohort with the mean difference between the two groups being 2 months. The overall duration between 10 and 11 months compares closely with 10.8 months estimated from the 1975 pilot survey data (see Gaisie 1981). Although the estimates fall far short of the traditionally proscribed periods, the quantiles (eg T_{90}) indicate that abstinence could last for between 1½ years among births to the young cohorts and 2 years among births to the oldest cohort.

A comparison between the estimates displayed in table 15 with those for Kenya show that the mean duration of post-partum abstinence in Ghana is three-fifths longer than the average Kenyan duration (3–4 months). The Kenyan figures also indicate that the average duration after delivery by which 90 per cent of the women have resumed sexual activity is seven months for all births and eight months for surviving children as compared with 26 and 27 months in Ghana respectively.

The combined impact of post-partum amenorrhoea and abstinence

As noted above, post-partum abstinence is long enough to exercise a separate impact on the birth interval. It will be seen from tables 14, 15 and 16 that the duration of overall non-susceptible/non-exposed (nsp/nep) period lies in the neighbourhood of 13–16 months showing that amenorrhoea and abstinence together contribute between 12–14 months to the average birth interval beyond the minimum possible average period of post-partum non-susceptibility. The nsp/nep is, therefore, 2–3 months longer than the amenorrhoea alone, indicating that abstinence exercises a separate impact over and above amenorrhoea.

Breastfeeding

The Ghana Fertility Survey attempted to distinguish between breastfeeding with no additional food (full breastfeeding) and partial breastfeeding. This was made quite clear in the local langugage versions of the module questionnaire. For both open and closed intervals the actual questions asked were:

512 Did you breastfeed ....?
(Name of last or your most recent child).

513 For how many months altogether did you breastfeed him/her?
Probe: How many months old was he/she when you completely stopped breastfeeding him/her?

.... months Still breast feeding Until he/she died

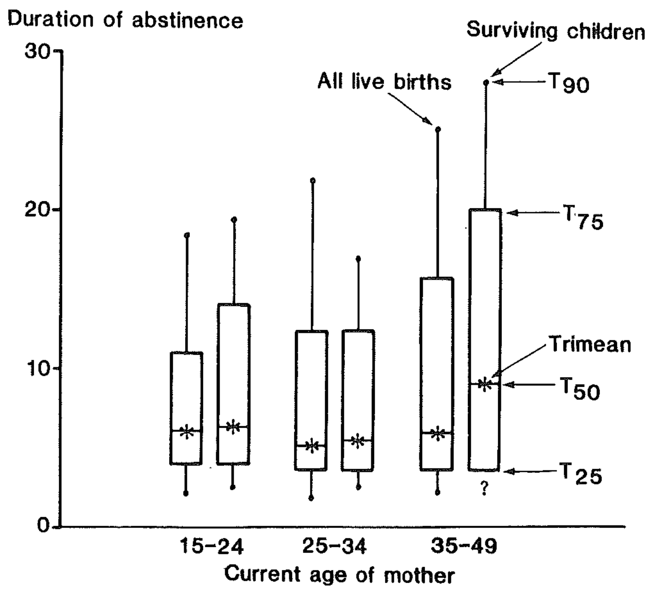

Figure 7 Quantiles of women recommencing sexual relations post-partum by time since birth and cohort of mother (current age), for all births in the last four years

Table 16 Combined effect of post-partum amenorrhoea and abstinence: duration of combined non-susceptible/non-exposed period (in months) following live births by current age of mother

Current age of mother	Estimates based on births in last four years					Average trimean	$\bar{X}^a$	P/I[b]	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A All live births									
15–24	4.3	7.8	13.4	17.2	24.6	13.0	13.6	15.7	1416
25–34	4.2	7.0	12.8	17.1	28.0	12.4	14.0	15.6	1895
35–49	5.0	10.1	15.7	21.0	29.9	15.6	16.2	17.6	1066
15–49	4.4	7.8	13.8	17.6	27.7	13.3	14.2	16.0	4377
B Children surviving at time of survey									
15–24	4.6	8.2	13.9	17.8	23.8	13.5	14.9		1279
25–34	4.5	8.2	14.1	18.4	24.9[c]	13.7	14.9		1739
35–49	5.0	9.9	16.0	22.2	27.8	16.0	17.2		972
15–49	4.7	9.1	14.3	18.2	28.0	14.0	15.1		3990

[a]See table 14, footnote[a].
[b]Prevalence/incidence estimate of mean duration.
[c]I value read from smoothed curves.

515 How many months old was the child when you began giving him/her bottle milk or any solid food along with breastfeeding?

.... months	No additional bottle milk or food yet	Child died before given additional food

In the local languages versions of the module questionnaire an additional question was asked to find out whether the duration of breastfeeding given in Q513 included any period during which additional food was given to the child.

The question was phrased, for example, in Asante and Ga as follows:

Twi: Saa abosome . . . yi nyinaa no emmere a worema no nnuane foforo ka wo nufoo ho no ka ho?
Ga: Ani oha le niyennii pen (loo ooha le) niyenni kroko kefata fufohamo le he?

In other words, Do these months include the period you gave him/her food in addition to breast milk? (literally).

Women who responded affirmatively were then asked the following question which was designed to sort out the period during which there was full breastfeeding:

Twi: Abosome sen na womaa no nufoo nko ara a na womma no aduane biara nka ho?
Ga: Nyoji enyie abifao le ye ni oboi niyenii krokomei hamo ye fufohamo le see?

In addition to these questions the interviewers' instructions manual contained unambiguous definitions of what was meant by full breastfeeding and partial breastfeeding (Republic of Ghana 1978: 52).

The estimates of mean duration of breastfeeding are summarized in table 17 and figure 8. The mean duration of breastfeeding ranges from about 17 to 19 months among

Table 17 Duration of breastfeeding (in months) following live births by current age of mother

Current age of mother	Per cent breastfed	Estimates based on births in last four years					Average trimean	$\bar{X}^a$	P/I[b]	N
		T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A All live births										
15–24	100.0	4.1	11.1	17.3	22.5	27.5	17.1	17.5	18.4	1439
25–34	100.0	6.8	11.6	16.8	23.1	28.5	17.1	17.4	18.2	1903
35–49	100.0	7.0	12.7	17.6	24.0	31.0	18.0	19.4	20.0	1076
15–49	100.0	5.7	11.7	16.4	22.3	32.1	16.7	17.9	18.7	4418
B Children still surviving at time of survey										
15–24	100.0	9.4	14.9	17.3	21.3	27.9	17.7	20.2		1299
25–34	100.0	9.2	12.1	17.2	24.2	32.3	17.7	19.5		1746
35–49	100.0	9.8	15.2	20.2	24.2	32.4	20.0	21.7		982
15–49	100.0	9.0	13.8	17.8	23.5	33.5	18.2	19.3		4027

[a]See table 14, footnote [a].
[b]Prevalence/incidence estimate of mean duration.

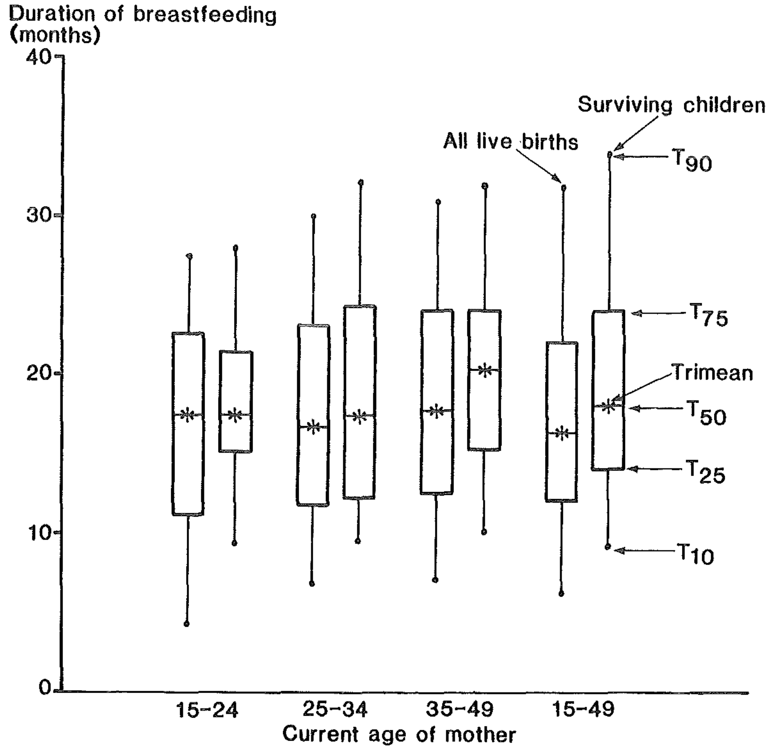

Figure 8 Quantiles of women stopping breastfeeding post-partum by time since birth and cohort of mother (current age), for all births in the last four years

both all births and surviving children, with children born to the oldest cohort (ie women 35–49 years) being breastfed, on average, about two months longer than those born to the other two cohorts.

The estimates presented in table 17 refer to partial as well as full breastfeeding and it is likely that administration of additional food is a determining factor of the duration of amenorrhoea. It will be seen from table 18 that 10 per cent of the children are fully breastfed for nearly 11 months with the mean duration of full breastfeeding lying in the neighbourhood of 5–6 months. Thus, in the majority of cases lengthy breastfeeding included a significant period of supplementation. However, one interesting feature of table 18 is that among surviving children no child received other food at less than three months of age and that one-quarter of the children are not given any additional food before age six months. A comparison of the figures presented in tables 17 and 18 with data for Kenya show that Ghanaian children are breastfed, on average, twice as long as Kenyan children. In Kenya, moreover, full breastfeeding lasts an average of only two months as compared with between five and six months in Ghana.

Table 18 Duration of full breastfeeding (in months) following live births by current age of mother

Current age of mother	Per cent breastfed	Estimates based on births in last four years					Average trimean	$\bar{X}^a$	P/I[b]	N
		T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
A All live births										
15–24	100.0	–	–	3.2	5.8	9.8	–	4.9	6.0	1439
25–34	100.0	–	–	2.7	6.3	7.7	–	4.6	4.9	1903
35–49	100.0	–	–	3.6	6.2	12.1	–	5.5	6.1	1076
15–49	100.0	–	–	3.4	5.6	10.6	–	5.0	5.6	4418
B Children still surviving at time of survey										
15–24	100.0	–	1.1	3.9	6.1	10.4	3.8	5.3		1299
25–34	100.0	–	1.0	3.5	5.3	6.7	3.3	4.4		1746
35–49	100.0	–	1.2	3.8	6.3	15.1	3.8	5.7		982
15–49	100.0	–	1.1	3.7	5.8	10.9	3.6	5.0		4027

[a]See table 14, footnote [a].
[b]Prevalence/incidence estimate of mean duration.

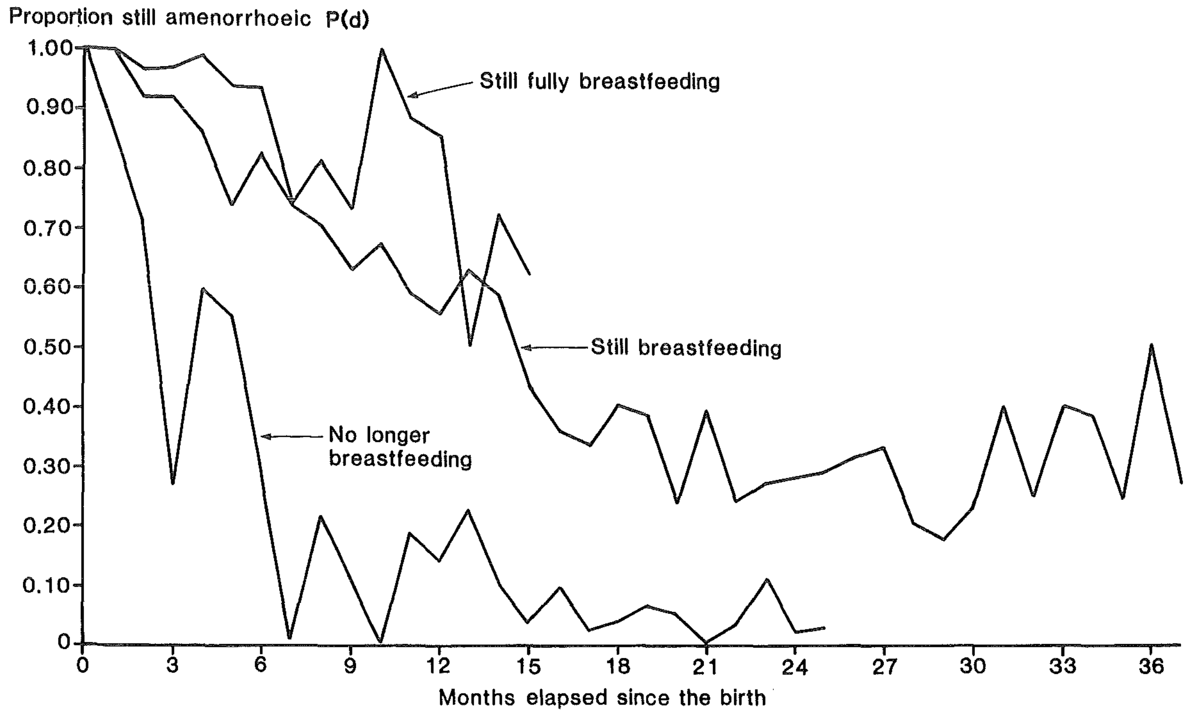

Figure 9 Proportion of women amenorrhoeic at the time of the survey by time since last birth, according to whether not breastfeeding, breastfeeding or fully breastfeeding

Relationship between breastfeeding and amenorrhoea

The relationship between breastfeeding and amenorrhoea can be inferred from figure 9 which compares the proportion of women who are amenorrhoeic at each duration post-partum from among those women no longer breastfeeding, those who are still breastfeeding and those who are still fully breastfeeding. Among women no longer breastfeeding, all of them are still amenorrhoeic when the birth was less than one month ago but the proportion still amenorrhoeic falls sharply as we look at women who gave birth 2–3 months earlier.

The proportions still amenorrhoeic as displayed in figure 9 should be interpreted with some caution because they are

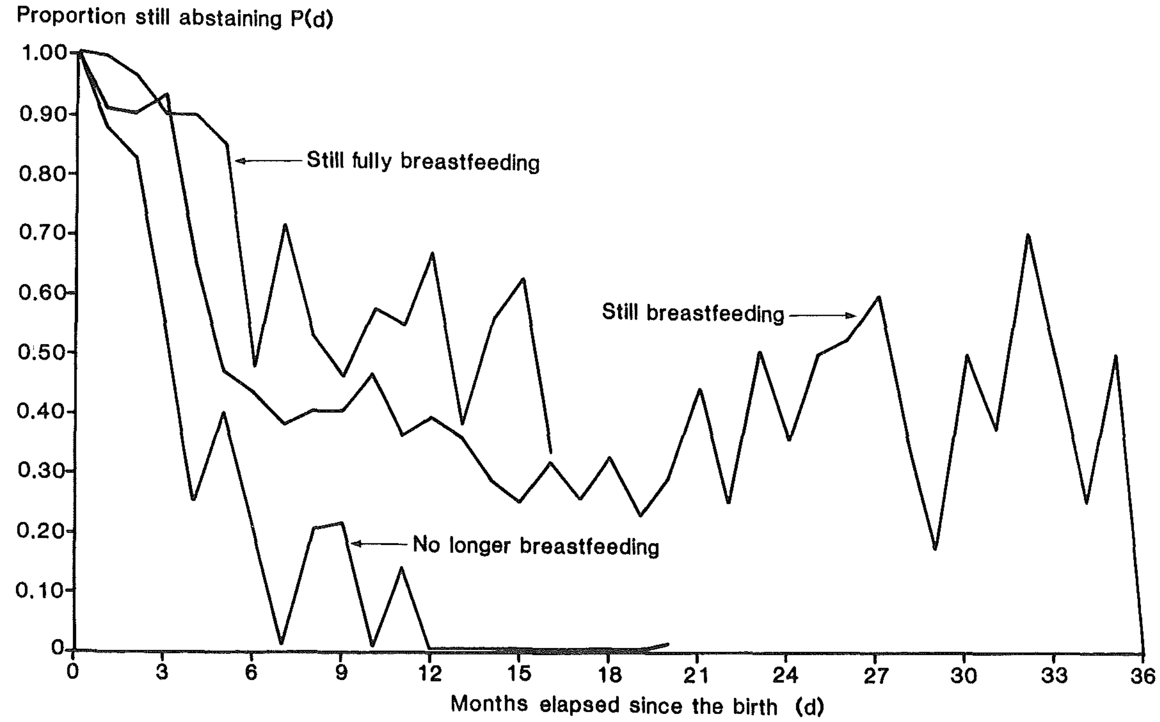

Figure 10 Proportion of women abstaining post-partum at the time of the survey by time since last birth, according to whether not breastfeeding, breastfeeding or fully breastfeeding

Table 19 Duration[a] of post-partum variables (in months) following live births in the last two years by current age of mother and ethnic group

Current age of mother	Ethnic group						
	Asante	Fante	Ewe	Akuapem	Ga	Mole-Dagbani	Others
Amenorrhoea							
15–24	13.2	10.6	13.6	14.5	8.9	14.9	12.7
25–34	13.5	11.2	14.3	12.4	8.5	15.6	12.9
35–49	13.8	12.1	15.4	15.4	8.6	18.2	14.2
15–49	13.4	11.1	14.8	13.8	8.6	16.2	13.2
Abstinence							
15–24	7.0	6.5	11.6	6.8	7.6	22.2	9.2
25–34	6.1	8.2	12.2	6.2	3.8	22.9	10.8
35–49	6.3	5.8	14.6	8.5	7.1	23.6	11.5
15–49	6.5	7.1	13.0	6.9	5.7	23.1	10.4
nsp/nep							
15–24	13.8	11.4	16.1	14.5	10.0	23.8	14.0
25–34	13.6	12.0	15.9	12.4	9.2	25.0	15.5
35–49	14.1	12.1	18.6	15.4	10.0	25.5	16.7
15–49	13.8	11.8	17.2	13.8	9.3	25.0	15.2
Breastfeeding							
15–24	17.4	14.4	18.9	18.2	19.0	25.1	17.0
25–34	17.0	13.7	19.8	15.5	13.1	26.9	17.9
35–49	18.1	15.8	21.4	18.5	15.7	24.8	20.5
15–49	17.3	14.4	20.5	17.0	15.4	26.0	18.1
Full breastfeeding							
15–24	6.0	3.2	4.8	7.7	5.1	8.1	6.3
25–34	4.5	5.1	3.7	4.1	–[b]	7.1	5.4
35–49	5.6	4.2	7.1	6.2	7.1	6.2	4.8
15–49	5.3	4.3	5.1	5.8	3.6	7.8	5.7

[a]Mean duration estimated by prevalence/incidence procedure with births based on 24 months period.
[b]Subsample too small to yield reasonable results.

subjected to severe sampling fluctuations and the subsamples are relatively small. Nevertheless, the curves do show that women who are no longer breastfeeding are far less likely to be amenorrhoeic than are those who are still breastfeeding. Among those still breastfeeding at the time of the survey, about 58 per cent are reported as still amenorrhoeic as compared with 1.8 per cent among those who are no longer breastfeeding. Among those still breastfeeding the proportion still amenorrhoeic at one month is unity, but the proportion still amenorrhoeic declines gradually as the time since the birth increases, with about 75 per cent still amenorrhoeic among those whose birth was seven months before the survey (the corresponding durations for 50 and 25 per cent still amenorrhoeic are 15 months and 20 months respectively). Among those still fully breastfeeding nearly 75 per cent were still amenorrhoeic among those whose births occurred as long as 14 months before the survey. Figure 9 therefore demonstrates quite clearly the extent to which post-partum amenorrhoea is heavily dependent on frequency and intensity of breastfeeding.

A similar pattern is illustrated in figure 10 between breastfeeding and abstinence, with the proportion still abstaining being lower among those who are not breastfeeding than among those still breastfeeding, and being much higher among those who are fully breastfeeding. It is, however, difficult to assess the extent to which abstinence is determined by breastfeeding. Although nursing mothers are constrained by certain normative sanctions not to resume sexual relations within a proscribed period of time, the proscribed periods are not strictly adhered to in many Ghanaian societies and the duration of abstinence is contingent on other factors besides breastfeeding, eg a woman in a polygynous marriage is more likely to abstain for a long period than her counterpart in an monogamous marriage.

Post-partum variables: differentials among the subgroups

Ethnicity

Table 19 presents a summary of the duration of post-partum variables among a number of ethnic groups in Ghana. Mean durations of post-partum amenorrhoea range from about 9 months among the Ga through 13 and 14 among the Asante and Akuapem to 16 months among the Mole-Dagbani. Despite the fact that the figure for the Ga may be subject to distortion by the small sample size, it reflects certain elements of modernity to which the Ga have been exposed for a considerable length of time. An interesting feature is a slight decline in the duration of post-partum amenorrhoea among the younger cohorts (ie 15–24 and 25–34), a pattern which is emerging among all the ethnic groups with the exception of the Ga who have already reduced their amenorrhoea considerably in all age groups.

As regards abstinence, the Mole-Dagbani abstain more than three times as long as the Asante, Fante, Akuapem and the Ga (23 months as against about 7 months). The Ewe and the other ethnic groups occupy an intermediate position between the two extremes with a mean duration ranging from 10 to 13 months.

The patterns noted above are also reflected in the figures for the combined effects of post-partum amenorrhoea and abstinence: the Mole-Dagbani experience the longest mean duration of 25 months followed by the Ewe with a mean duration of 17 months; the mean for the other ethnic groups ranges from 12 (among the Fante) to 15 (among the other ethnic groups); the exception is the Ga who have a mean duration of only 9 months. Children are breastfed, on average, for 26 and 21 months among the Mole-Dagbani and the Ewe respectively whilst about 1½ years appears to be an average age at weaning among the Asante, Akuapem and the other ethnic groups. It must be noted that no ethnic group breastfeeds for less than 14 months on average. Full breastfeeding lasts for between 4–6 months among all the ethnic groups except the Mole-Dagbani who exhibit a mean duration of 8 months.

The ethnic groups may be divided into three broad categories on the basis of the post-partum patterns portrayed in table 19: the Mole-Dagbani exhibiting the highest mean durations, followed by the Ewe, with the remainder of the ethnic groups experiencing comparatively moderate durations. The exception to these categories are the Fante and the Ga whose durations are the lowest among the Ghanaian ethnic groups: the figures for nsp/nep are 25, 17, 12–14 and 9 months (only the Ga) respectively; the corresponding figures for breastfeeding are 26, 21, 17 and 14–15 months. Table 19 also shows that the net increase in the post-partum non-susceptible period due to post-partum abstinence is virtually negligible among the Asante, Fante, Akuapem and the Ga, whilst its contribution ranges from over two to nine months among the Ewe and the Mole-Dagbani respectively.

Residence
The pattern of post-partum variables among the three residential groups (large urban, urban and rural) is reflected in the summary indices presented in table 20. It will be seen from this table that the rural areas have the highest mean durations, in respect of the five variables, followed by urban areas, with cities exhibiting the lowest mean durations. The largest differences between the three groups are noted in respect of abstinence and breastfeeding. In rural areas, abstinence lasts on average, about four months longer than in the cities: breastfeeding continues for about six months and three months longer than in the cities and towns respectively. Within each residential group, there is a general movement towards a reduction in the mean durations among the young cohorts of mothers with regard to virtually all the variables.

Table 20 Mean duration[a] of post-partum variables (in months) following live births in the last two years by current age of mother and residence

Current age of mother	Residence		
	Large urban[b]	Urban	Rural
Amenorrhoea			
15–24	10.2	11.7	14.1
25–34	9.5	13.1	14.1
35–49	12.9	14.0	15.2
15–49	10.5	12.7	14.3
Abstinence			
15–24	7.2	8.3	11.0
25–34	7.9	8.9	11.7
35–49	8.3	10.3	13.4
15–49	7.8	8.9	11.8
nsp/nep			
15–24	11.6	13.3	16.3
25–34	11.5	14.8	16.6
35–49	13.8	14.3	18.6
15–49	12.0	14.1	16.9
Breastfeeding			
15–24	14.8	16.7	19.4
25–34	13.1	17.1	19.8
35–49	16.3[c]	16.7	21.8
15–49	14.4	16.9	20.0
Full breastfeeding			
15–24	3.4	5.2	6.8
25–34	3.0	4.0	5.6
35–49	5.0	4.3	6.6
15–49	3.5	4.5	6.3

[a]Mean duration estimated by prevalence/incidence procedure with I based on 24 months period.
[b]Ie Accra-Tema, Kumasi and Sekondi-Takoradi.
[c]Subsample too small – births per month = 2.4.

Education
The results presented in table 21 throw light on the relationship between post-partum variables and formal education. There is an inverse relationship between mean durations of the post-partum variables and the number of years the mother spent in acquiring formal education. The mean duration of amenorrhoea ranges from 10 months after births to women with secondary or more formal education to 15 months after births to women with no schooling. As regards abstinence, the data for the educated women exhibit virtually the same duration as amenorrhoea (8 months), whilst those for women with no formal education indicate abstinence for a longer period (13 months).

Table 21 Mean duration[a] of post-partum variables (in months) following live births in the last two years by current age of mother and education

Current age of mother	Education			
	No schooling	Primary	Middle	Secondary +
Amenorrhoea				
15–24	14.6	12.4	12.4	9.9
25–34	14.1	12.2	12.7	8.8
35–49	14.9	15.6	11.3	– [b]
15–49	14.5	12.8	12.4	10.3
Abstinence				
15–24	13.1	6.5	8.6	7.1
25–34	13.2	7.3	7.4	7.6
35–49	13.4	8.8	5.3	– [b]
15–49	13.3	7.2	8.0	7.8
nsp/nep				
15–24	17.8	13.1	13.8	9.9
25–34	17.7	12.9	13.6	9.6
35–49	17.8	17.5	12.0	– [b]
15–49	17.7	13.5	13.6	10.9
Breastfeeding				
15–24	21.1	18.0	16.3	11.3
25–34	20.7	17.8	15.4	10.4
35–49	20.7	20.0	17.3	– [b]
15–49	20.8	18.2	16.1	11.9
Full breastfeeding				
15–24	7.4	3.7	4.6	5.6
25–34	6.2	4.0	3.5	– [b]
35–49	6.2	5.6	4.7	– [b]
15–49	6.5	4.1	4.8	4.1

[a]Mean duration estimated by prevalence/incidence precedure with I based on 24 months period.
[b]Subsample too small to yield reasonable results.

The results of the combined effect of these two variables show that the nsp/nep following births to the non-educated women is longer than that for the women with primary and middle schooling and for those with secondary or more formal education by four and seven months respectively. The impact of education on post-partum variables is also reflected in the data on breastfeeding. Children born to women who have no schooling are breastfed, on average, for 21 months whilst those born to women with secondary or more formal education are weaned within 12 months. On the other hand, among women with an intermediate education (ie primary and middle) children are breastfed, on average, between 6 and 4 months longer (ie 18 and 16 as against 12) but not as long as children born to women with no schooling. The greatest difference between the educational groups in terms of the duration of full breastfeeding was between women with some education who fully breastfed for a period of about four months, and women with no education, with a duration of nearly seven months. It is interesting to note that there is a tendency among children born to young women with primary and secondary education to be breastfed for a shorter period than those born to their older colleagues: durations of breastfeeding range from 18 to 20 months among the primary education groups aged 15–34 and 35–49 respectively – the corresponding figures for middle education are 15–16 and 17 months respectively.

The nsp/nep among non-users of contraception is about three months longer than that prevailing among users, but it is quite likely that the difference may be largely explained in terms of educational and residential differentials among the two groups (table 22).

Conclusion

Both post-partum amenorrhoea and post-partum abstinence are important determinants of the duration of the post-partum non-susceptible period in Ghanaian society. Post-partum amenorrhoea is heavily dependent on the frequency and intensity of breastfeeding which is relatively long in Ghana. Duration of post-partum abstinence tends to be longer than the post-partum anovulatory period. The

Table 22 Mean duration[a] of post-partum variables (in months) following live births in the last two years by current age of mother and any method used for closed and open intervals

Current age of mother	Amenorrhoea: Ever used	Amenorrhoea: Never used	Abstinence: Ever used	Abstinence: Never used	nsp/nep: Ever used	nsp/nep: Never used	Breastfeeding: Ever used	Breastfeeding: Never used	Full breastfeeding: Ever used	Full breastfeeding: Never used
15–24	12.2	13.9	9.1	10.7	14.0	16.0	17.9	18.7	5.1	6.7
25–34	11.6	14.5	9.1	11.9	13.4	17.2	16.7	19.5	3.6	6.0
35–49	15.6	14.3	11.9	12.6	17.5	17.3	20.4	20.4	6.0	6.1
15–49	12.6	14.2	9.7	11.6	14.4	16.8	17.9	19.4	4.6	6.3

[a]Mean duration estimated by prevalence/incidence procedure with I based on 24 months period.

estimated mean duration of post-partum amenorrhoea is about 13.5 months, with the younger cohorts experiencing shorter duration than the older women by two months. The average estimated duration of post-partum abstinence is 10.5 months and there is a general trend of an increasing average duration of abstinence with increasing age – the mean durations ranging from 4.5 months among the younger generations to 12 months among the older cohorts. Although the average duration of abstinence is shorter than the average duration of amenorrhoea, abstinence exceeds amenorrhoea in a significant number of cases.

The overall non-susceptible and non-exposed period is longer than the duration of amenorrhoea by between two and three months, indicating that abstinence plays a significant separate role over and above that of amenorrhoea. Amenorrhoea and abstinence combined contribute almost 12–14 months to the average birth interval beyond the minimum possible average period of post-partum non-susceptibility.

The estimated average duration of breastfeeding is about 18 months with the children born to the oldest cohort (35–49 years) breastfeeding, on average, for two months longer than those born to the younger cohorts. Full breastfeeding lasts, on average, for about 5.5 months. Thus, in the majority of cases the length of the breastfeeding period does not include a significant period in which additional food is given to the child. No child receives other food before it is three months old and one-quarter of the children are not given any additional food before the age of six months.

Among the ethnic groups, the Ga and the Mole-Dagbani have the shortest and the longest duration of post-partum amenorrhoea (ie 9 and 16 months). The Mole-Dagbani also experience the longest post-partum abstinence – 23 months as compared with 7 months among the Akan (including the Akuapem). The Ewe lie between the two with an estimated mean duration of 11.5 months. The ethnic groups may be divided into four broad categories: (1) the Mole-Dagbani with the highest mean durations of post-partum variables, followed by (2) the Ewe with high to medium durations, (3) the Akan with relatively moderate mean durations, and (4) the Ga (and Fante) with the lowest mean durations.

The rural areas experience the highest mean durations in respect of all the five post-partum variables, followed by the urban areas and cities. There is an inverse relationship between mean duration of the post-partum variables and the number of years the mother spent in school. For instance the non-susceptible and non-exposed period among women with no formal education is four and seven months longer than that among the primary and middle educational groups, on the one hand, and the secondary and tertiary groups, on the other. The average durations of breastfeeding range from 21 months among the 'No schooling' group to 18, 16 and 12 months among the primary, middle and the secondary and over groups, respectively.

3.3 THE EXPOSURE INTERVAL AND ITS COMPONENTS

The exposure interval is one of the main components of the inter-birth interval, and is the period between the resumption of risk of conception and the next conception that leads to a live birth (including any period added by foetal wastage). Direct questions relating to the exposure interval were not asked in the Ghana Fertility Survey and it is, therefore, extremely difficult to estimate the duration of exposure within the interval between successive live births. There are, however, a number of ways by which the exposure interval may be indirectly estimated. One method uses the prevalence/incidence ratio as used for the post-partum variables, and another is based on the last closed birth interval.

A prevalence/incidence ratio can be estimated where P is the number of women currently in the exposure interval, and I is the average monthly number of women entering an exposure interval. These quantities cannot be derived from the observed data since no direct questions were asked in respect of P and I as defined above. The following proxies are, therefore, adopted: I is estimated as the number of births per month (if there has been a constant stream of births then it is often not unreasonable to assume that the number of mothers becoming exposed again by reaching the end of post-partum amenorrhoea and abstinence is roughly constant); P is estimated as the number of women who had borne at least one child and who were not currently in either of the other two components of the birth interval (ie women who were neither currently in post-partum amenorrhoea or abstinence, nor currently pregnant).

In an attempt to estimate the exposure interval between successive births, women who were likely never to close their current birth intervals were excluded by removing all those who reported themselves as menopausal or otherwise infecund, as having been sterilized or as practising terminal abstinence. The results are presented in table 23. The estimated exposure of 11.1 months for the younger women might be a slight overestimate in a society with little use of contraception, and little evidence of fecundity

Table 23 Estimated duration of recent exposure intervals (in months) by current age of women

Current age	All recent birth intervals (including current open intervals, except those known to be likely to remain unclosed)[a]	Last closed birth interval per woman[b]
15–24	11.1	11.7
25–34	19.2	12.8
35–49	36.0	11.7
15–49	19.6	12.2

[a]Estimates based on prevalence/incidence ratio (P(nsp/nep)/I).
[b]Estimates on last closed birth interval – retrospectively reported duration of post-partum abstinence, using P(nsp/nep)I ratios.

Table 24 Estimated duration of recent exposure intervals (in months) by current age of women, residence and education

Current age				Residence			Education			
15–24	25–34	35–49	15–49	Large urban	Urban	Rural	No schooling	Primary	Middle	Secondary +
9.4	9.4	5.5	9.1	14.4	8.5	7.9	6.9	9.8	10.7	18.5

[a]Estimates based on prevalence/incidence ratio (P(nsp/nep)/I).

impairments or of unusually high levels of foetal wastage. P might indeed be inflated by under-reporting of current pregnancies. Moreover, estimates for the older age groups might be inflated both by under-reporting of current pregnancies and our inability to identify and exclude all those women who will never close their present interval.

The second method of estimating an average exposure interval is to consider the different components of the last closed inter-birth interval. These consist of the duration of post-partum amenorrhoea or abstinence (the longest of the two) together with additional periods of temporary absence of spouse, the length of pregnancy, and any time lost through pregnancy wastage. They are subtracted from the observed last closed birth interval to obtain an estimate of the exposure interval. The estimated intervals lie between 12 and 13 months with an average of 12 months for the entire country.

In an attempt to estimate the average interval of exposure by a different method, we re-examined our estimates of live birth intervals. Using the life-table technique, we have already estimated the quartiles, trimeans and means for closed intervals by assuming that intervals that do not close within six years will never close. These estimates were employed in computing the average exposure interval by adding the period of gestation (ie nine months) to the duration of nsp/nep and then subtracting the sum from the estimated inter-birth interval. The results are presented in table 24. The estimated exposure interval is about nine months for the interval for women aged 15–24 and 25–34 and six months for the oldest cohort. The estimates for the subgroups range from seven among the rural women to ten months among those with primary education. The estimates for the city dwellers and those with middle and above formal education appear to be relatively high but, with the exception of the figures for the oldest cohort and the 'No schooling' education category, they seem to be reliable.

Determinants of the exposure interval

The main determinants we shall examine here are the waiting time to conception which is determined largely by coital frequency, separation of husband and wife, contraception and time lost as a result of foetal wastage.

Estimates of fecundability

The information available on the proximate determinants of the exposure interval is scanty and unreliable. The type of data usually used to estimate fecundability (eg distribution of first births by time elapsed since marriage) do not lend themselves easily to the computation of fecundability here, largely because of the difficulties in interpreting marriage as the start of sexual activity, and the sizeable number of pre-marital births (which constitute about 22 per cent of the first births) and other pre-marital conceptions. Women with pre-marital conceptions must be excluded from the analysis since we do not know anything about their exposure period, but they are quite likely to be a typical group in terms of their fecundability. It can be argued, for example, that the more fecund women are likely to be over-represented among women with pre-marital births.

Exclusion of pre-marital births from the analysis yields a plausible fecundability[4] estimate of 0.21. However, the estimates range from between 0.18 and 0.19 among women currently aged 25 and over to 0.27 among the younger generation. This variation suggests some problems with the data since the estimates refer to fecundability round about the time of the first birth, rather than current fecundability.

[4]Fecundability is estimated as the proportion of first births occurring > 9 months after first marriage which occur in months 9–11. Half of the births coded as having occurred 12 months after marriage were taken as having occurred in less than one full year.

Table 25 Percentage distribution of currently married women by coital frequency, by age of women and residence

Birth cohort	Weekly coital frequency 0	1	2	3	4	5+	N
15–24	1.5	18.9	39.6	37.1	7.9	5.0	619
25–34	1.1	23.2	43.0	23.9	5.6	3.2	918
35–49	1.1	31.2	43.3	15.8	6.0	2.6	1038
15–49	1.1	25.4	42.3	21.4	6.3	3.5	2575
Residence							
Large urban							
15–24	1.8	13.4	48.2	25.9	8.0	2.7	112
25–34	1.0	18.1	51.3	24.9	2.6	2.1	191
35–49	1.2	29.4	42.9	14.1	11.0	1.4	161
Urban							
15–24	2.0	23.5	44.1	19.6	6.9	3.9	102
25–34	1.8	29.9	41.9	18.6	3.6	4.2	165
35–49	1.8	34.5	43.6	10.9	4.2	5.0	164
Rural							
15–24	1.2	18.9	35.4	28.9	8.0	7.6	406
25–34	0.9	22.7	40.0	24.8	6.9	4.7	565
35–49	0.7	30.7	43.2	17.3	5.2	2.9	713

Coital frequency
About 42 per cent of currently married respondents claimed to have sexual relations twice a week, with nearly three-quarters reporting their frequency of sexual intercourse as twice or more per week (table 25). Besides the uncertainty about the quality of information of this nature, the extent to which coital frequency affects the exposure interval is difficult to quantify. It must also be noted that the information is restricted to currently married women although, in the population under study, sexual activity is in fact not restricted to these women.

Contraception
Table 26 shows that about 9 per cent of apparently fecund currently married women use modern contraception and 7 per cent use traditional methods. The table also indicates differentials by education and residence in the use of contraception among this group of women. A higher proportion of urban women than rural women use modern contraception, the proportions ranging from 28 per cent among the 25–34 year olds residing in the cities to between 11 and 16 per cent among the urban women aged 25–49 years, with only between 6 and 4 per cent of the rural women using modern contraception. Nevertheless, the city and urban residents also use traditional methods and they do this to the same extent as the rural women. The differentials are more pronounced between the educational groups than the residential groups. The proportions using modern contraception increase quite markedly with the level of education. Once again, the uneducated women do not have any monopoly with regard to the use of the traditional methods, although the oldest cohort among the 'No schooling' group tend to prefer these to modern methods. The relatively long exposure and birth intervals noted among the comparatively highly educated and urbanized women may be explained, in part at least, in terms of greater use of contraception.

Separations
Information was also collected on separations of the spouses that occurred during the last closed or open pregnancy interval to see whether this had a significant impact on birth intervals. The average duration of temporary absences after resumption of sexual relations and menstruation by age of mother are given in table 27. Temporary separations outside the periods of post-partum amenorrhoea and abstinence do not seem to exercise any significant impact on the length of birth interval, contributing not more than one month in either interval. Separations may well serve, however, to support and facilitate prolonged post-partum abstinence (for example among the Mole-Dagbani), but this is a possibility that we have not been able to investigate in any detail.

Time lost through foetal wastage
Time lost through foetal wastage is particularly hard to estimate because of under-reporting and misreporting of all the pregnancies reported as terminating in the last 48 months preceding the survey. Only 7.7 per cent were reported as resulting in non-live births; proportions ranged from only 1 per cent during the five months immediately before the survey to 9.4 per cent and 8.1 per cent during the 6–11 and 12–23 months respectively. The proportion of reported non-live births is higher among the youngest cohort (ie 15–24) than among the other cohorts, and

Table 26 Percentage using modern[a] and traditional[b] forms of contraception among currently married women by age, residence and education

Birth cohort	Subgroup	All currently married women using: Modern	Traditional	Apparently fecund currently married women using: Modern	Traditional
15–24		5.4	3.7	6.0	4.1
	Large urban	7.4	4.1	8.6	4.7
	Urban	9.8	3.7	10.9	4.1
	Rural	4.0	3.6	4.4	3.9
25–34		9.0	5.4	11.5	6.8
	Large urban	22.2	5.8	28.1	7.4
	Urban	10.5	6.3	14.0	8.4
	Rural	4.9	5.0	6.1	6.3
35–49		3.1	4.7	7.0	10.8
	Large urban	6.7	3.1	15.5	7.1
	Urban	2.0	5.5	6.9	12.6
	Rural	2.4	4.9	5.3	11.1
All cohorts		5.9	4.7	8.5	6.8
15–24					
	No schooling	0.4	3.6	0.5	3.9
	Primary	4.8	4.0	5.6	4.7
	Middle	9.3	26.7	10.1	3.5
	Secondary +	26.7	10.0	42.5	13.0
25–34					
	No schooling	2.8	4.4	3.6	5.8
	Primary	8.0	8.7	10.2	11.0
	Middle	17.5	5.2	21.2	6.3
	Secondary +	31.8	9.1	39.4	11.3
35–49					
	No schooling	1.7	4.9	3.9	11.2
	Primary	5.8	2.9	13.3	6.7
	Middle	7.4	4.1	16.4	9.1
	Secondary +	30.8	7.7	57.1	14.3

[a]Excluding sterilization.
[b]Excluding post-partum abstinence.

women with primary and middle formal education report twice as high a proportion of non-live births as those with no formal education.

The highest proportion of non-live births (ie 21 per cent) is reported by women with secondary and higher education and the data show that the proportion is higher among city residents than among those living in rural areas (table 28). It appears, therefore, that although foetal wastage rates are generally under-reported, the educated urban women tend to report non-live births more completely than the rural women, because it is unlikely that women with better health and higher social economic standards (including nutrition) should experience more non-live births than the relatively under-privileged. On the other hand, relatively high reported proportions of non-live births among educated city residents may well be a pointer to the practice of induced abortion among the urban population.

Table 27 Mean duration of absences (in months) by current age

Current age	Last closed interval: $\bar{X}$	Number of cases	Open interval: $\bar{X}$	Number of cases
15–24	0.5	547	0.2	659
25–34	0.5	931	0.2	1575
35–49	0.6	1077	0.2	1650
15–49	0.5	2555	0.2	3884

Conclusion

The relatively long exposure interval noted among the urban residents and educated women results from widespread use of contraception and perhaps from greater recourse to induced abortion. This pattern is reflected in the differentials between the fertility levels exhibited by these women and their rural uneducated counterparts. Modern contraception is used by only 9 per cent of the apparently fecund currently married women. The proportions using modern contraception, however, increase quite markedly with the level of education. Although

Table 28 Percentages of pregnancies resulting in non-live births among all pregnancies terminated in the last 48 months, by age of woman and subgroups

Birth cohort	Subgroup	0–5	6–11	12–17	18–23	24+	Total	N
15–24		10.7	11.9	7.1	11.0	7.5	9.1	1558
	Large urban	22.7	28.1	16.0	14.8	17.8	19.7	229
	Urban	7.7	7.1	4.7	22.2	10.0	9.6	251
	Rural	8.8	10.1	6.3	7.3	4.4	6.8	1078
25–34		9.5	7.3	9.5	4.2	5.2	6.6	1994
	Large urban	22.0	7.0	14.0	6.2	11.0	11.8	347
	Urban	7.7	6.1	5.4	6.9	6.5	6.5	323
	Rural	7.6	7.9	9.1	3.1	3.2	5.2	1324
35–49		10.0	7.9	7.0	10.6	7.3	7.9	1146
	Large urban	15.0	15.4	15.0	8.3	7.5	10.3	145
	Urban	5.6	10.0	8.0	–	12.2	9.8	173
	Rural	9.8	6.2	5.2	12.5	6.2	7.1	828
All Cohorts		10.1	9.4	8.1	8.1	6.4	7.7	4698
15–24	No schooling	5.5	7.0	3.8	5.7	3.0	4.6	562
	Primary	11.1	14.3	6.3	13.8	8.6	10.2	225
	Middle	13.2	12.6	9.4	10.7	6.8	9.8	723
	Secondary +	30.0	75.0	20.0	42.9	54.5	45.8	48
25–34	No schooling	5.3	4.2	7.2	1.1	2.5	3.6	1084
	Primary	18.8	15.4	8.3	13.8	6.3	10.0	250
	Middle	15.9	6.8	13.7	5.9	7.9	9.6	542
	Secondary +	5.0	20.0	12.5	–	17.3	12.7	118
35–49	No schooling	7.5	6.6	6.0	11.1	7.4	7.5	941
	Primary	–	15.4	7.1	20.0	10.3	10.1	99
	Middle	35.7	11.1	18.2	–	4.0	10.8	93
	Secondary +	–	–	–	–	–	–	13
15–49	No schooling	6.0	5.7	6.0	5.9	4.6	5.3	2587
	Primary	13.0	14.9	7.3	14.3	7.9	10.1	574
	Middle	15.4	10.8	11.7	8.1	7.0	9.8	1358
	Secondary +	12.9	30.0	13.6	13.6	25.0	20.7	179

temporary separations do not seem to have any significant impact on birth interval outside the periods of post-partum amenorrhoea and abstinence, they may well serve to support or facilitate post-partum abstinence. Although relatively high reported proportions of non-live births among the educated city dwellers may well point to the practice of induced abortion among the urban population, foetal wastage is certainly woefully under-reported by rural and uneducated women.

4 Patterns of Stopping Family Formation

4.1 INTRODUCTION

The main fertility variable to be estimated in this chapter is age at last birth and the major proximate determinants to be examined are ages at menopause and secondary sterility, definitive widowhood/divorce/separation, terminal abstinence within marriage, sterilization and contraception. The analysis of stopping patterns requires identification of women who will bear no more children and is often restricted to those women who have completed reproduction. In practice this means looking at older women whose reproductive career started about 30 years ago, and was largely conditioned by circumstances prevailing almost as long ago. The stopping patterns of such women may be quite different from those of younger women. Unfortunately, the stopping patterns of the latter cannot be adequately analysed because they have not yet completed their childbearing. Furthermore, the restriction of the WFS surveys to women in the reproductive period (ie 15–49/50) means that even if we take the older cohorts (40–44, 45–49) we cannot be sure that all these women have stopped childbearing. It is difficult to estimate the number who will have more children before they eventually become infecund. There is, therefore, a very large element of uncertainty even in the narrow range where the analysis is focused.

The only variable that we are quite certain means the end of childbearing is sterilization, but this has not acquired any popular acceptance as a stopping method within the Ghanaian community. Only 21 out of the 6125 women interviewed claimed to have been sterilized. The influence of sterilization on Ghanaian stopping patterns is thus not of great significance.

For the other variables the level of uncertainty can be very high. Widowhood, for example is a variable that must be handled with care, because a widow is not necessarily always debarred from the risk of childbearing in the culture under discussion. In traditional society, for example, a widow may be involved in sexual activity with a brother of the deceased who is customarily acting *in loco patris* to the children of the deceased. In the case of a divorced woman, the stage of the divorce proceedings or the nature of inter-lineage links and pressures may ensure the continuation of sexual intercourse between the two parties: in fact, the continuation of the sexual relationship during the transition from marital break-up to final physical separation has been a major source of the paternity conflicts which are so common in Ghanaian society. In such a society, therefore, definitive widowhood or divorce is highly contingent on the fecundity status of the woman. If she is too old to bear a child or if she is in a post-menopausal condition, her marital status can be described as definitive: in other cases it cannot easily be described so.

For certain other variables, such as terminal abstinence or menopause, we must depend heavily on the woman's own perception of whether she has reached the point of no return or not.

In most cases, we may, however, be able to develop some indirect indications that suggest that the woman has reached the end of exposure to conception. For instance, a woman aged 45 who has been divorced or widowed for a considerable length of time and has not married is unlikely to remarry during her remaining potentially fecund years. A woman who has not menstruated for two or three years although not breastfeeding is probably menopausal. Finally, we should note that some of the so-called stopping variables occur gradually over a period of time, not at a well-defined single point in time. Menopause, for example, is usually considered not as an event but as a transitional period during which menstruation becomes increasingly irregular and infrequent until it finally ceases completely. There is, therefore, no clear-cut distinction between spacing and stopping, and the situation is further aggravated by the fact that the oldest women for whom we have information have not quite completed their potential childbearing period. Nevertheless, an attempt has been made here to construct the best estimates we can, given the data available, namely an age at last birth, indicators of ceasing to be fecund and age at ceasing to have sexual intercourse.

4.2 AGE AT LAST LIVE BIRTH

Age at the most recent birth was recorded for all women, and for most women aged 45 and over their most recent birth will in fact be their last birth. Since for the very oldest women in this age group the proportion which will have another child is so small as to be negligible, we can assume that their frequency distribution by age at most recent birth corresponds to their frequency distribution by age at last birth. This can then be used to adjust the frequency distribution by age at most recent birth for the next youngest cohort in order to allow for the small proportion of this cohort who will go on to have another child. Each succesively younger cohort within the 45–49 age group can then be adjusted on the basis of the adjusted figures for the cohorts above it with more complete information (see appendix C). The results are presented in table 29.

The mean age at last birth is estimated to be about 39 years, one year higher than that for the mean age at most recent birth. The trimean is about 41 years with 90 per cent of the women having their last child before age 47 years (table 30). The mean age at last birth is higher among the rural women and women with no formal education than their urban counterparts and those with formal education. The proportions reporting a birth at the oldest ages are very high compared with reliable data from other populations, most probably because of misreporting of age. (A similar observation has been made in the case of Kenya.)

Table 29 Age at last live birth, women currently aged 45 years and over, recorded percentage distribution by age at most recent birth and estimated distribution by age at last birth

Age at last live birth	Most recent birth (recorded)	Last birth (estimated)
15–19	2.7	2.6
20–24	3.2	2.9
25–29	7.7	7.2
30–34	11.7	10.8
35–39	25.6	23.7
40–44	36.5	33.4
45–49	12.6	19.4
Mean age	37.7	38.8

The overall mean age at last birth of 39 years is quite close to those recorded in pre-transitional European populations with their means centering around 40 years (Charbonneau 1979; Dupaquier 1979). The high age at last birth suggests that few women end family formation before they are forced to by the natural processes of ageing. This is consistent with the earlier observation that few fecund women who are widowed or divorced fail to remarry fairly quickly and that few women in the older cohorts use contraception or sterilization.

4.3 THE PROXIMATE DETERMINANTS OF AGE AT LAST BIRTH

Age at ceasing to be fecund

Several questions were asked concerning each woman's current fecundity status. These include her own perception of whether she and her husband would be physically able to have a child in the future if they wanted to, and her own judgement of whether she was menopausal. Questions were also asked to ascertain whether the respondent or her husband had been sterilized.

It is, however, very difficult to interpret the data presented in table 31. Determination of fecundity status requires knowledge of a large number of biological characteristics in addition to menstruation, many of which are not readily apparent and can be revealed only through detailed laboratory analyses. The majority of the women in our sample would not, therefore, be in a position to give accurate information about their fecundity status.

There may be a tendency for women to perceive or report themselves as fecund as long as they menstruate, even though their chances of conception and successful gestation may be zero or at least very low in the final years before menopause. On the other hand, they may perceive or report themselves as infecund as soon as they notice much irregularity in their menstrual cycle even though there is a slight probability that they may be fecund. Table 31 suggests a general decline in the proportions of women reporting themselves as fecund by age, but the proportion of the older women, say 40–49, reporting themselves as fecund is still improbably high. The proportion reporting themselves fecund among those reported as neither menopausal nor sterilized show a similar pattern, but the proportions are even higher at the old ages with the proportion reported fecund ranging from 57 per cent to 38 per cent among the 45–49 year olds.

Failure to have a live birth in five years of continuous exposure is highly suggestive of infecundity (or at least marked subfecundity) although some of the women will go on to have a subsequent birth. The proportions of women who have not had a live birth in the last five years among women who have been continuously married during the period are much higher than those reporting themselves as infecund (see tables 31 and 32). Although virtually no women aged under 25 years reported themselves as infecund, 4.2 per cent of them have not had a live birth during the last five years despite continuous exposure. Overall, there is a general tendency among the women to avoid reporting themselves as infecund in the absence of any concrete evidence to the contrary.

An attempt has been made to combine various characteristics indicating that a woman may have reached the end of her fecund life. The characteristics used were menopause and secondary sterility, sterilization, and no birth in the last five years. The proportions with at least one or more of these chracteristics are shown in table 33. A woman with

Table 30 Estimated age at last live birth, women currently aged 45 years and over, by education and place of residence

	Quantiles					Average trimean	Mean $\bar{X}$
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}		
A Education							
No schooling	28.0	35.8	40.8	44.5	46.8	40.5	38.6
Primary	19.3	35.0	40.0	43.8	44.7	39.7	37.6
Middle	31.7	33.9	38.3	42.9	46.1	38.4	37.6
Secondary +	–	–	–	–	–	–	–
B Residence							
Rural	26.7	36.1	41.5	45.1	47.2	41.1	39.1
Urban	27.7	34.7	40.4	45.5	48.0	40.3	37.7
Large urban	31.8	36.8	41.0	45.6	47.9	42.9	37.3
Total	28.3	36.0	40.8	44.7	47.0	40.6	38.8

Table 31 Percentage distribution of all ever-married women according to self-reported fecundity status by current age

Current age	Fecund	Uncertain	Infecund: Not menopausal	Infecund: Menopausal	Sterilized	Number of women	Per cent fecund (among those reported as neither menopausal or sterilized)
20	92.3	6.8	.0	.0	.0	368	93
20–24	93.0	6.2	.8	.0	.0	926	93
25–29	90.1	8.3	1.5	.0	.1	916	90
30–34	85.1	11.4	3.0	.3	.0	734	85
35–39	71.5	15.0	9.3	2.7	1.4	632	75
40	54.7	21.0	16.4	7.5	.5	214	59
41	59.3	22.0	13.6	1.7	3.4	59	62
42	57.0	20.4	11.8	8.6	1.1	93	63
43	41.7	18.3	16.7	20.0	3.3	60	54
44	47.2	20.8	13.9	16.7	1.4	72	58
45	47.3	17.1	18.6	16.3	.8	129	57
46	31.9	14.5	18.8	33.3	1.4	69	49
47	41.7	19.4	16.7	22.2	.0	36	54
48	32.4	19.1	10.3	36.8	1.5	68	52
49	23.3	11.7	26.7	36.7	1.7	60	38
Total	79.0	11.2	5.5	3.8	.5	4436	

Source: Based on table 6.7.2, Ghana First Country Report, volume II.

Table 32 Proportion of non-contracepting women who have not yet had a live birth in the last five years despite having been married throughout the period, by current age

Current age	Women not using contraception with no live birth in the last 5 years: %	N
15–19	.0	11
20–24	4.2	259
25–29	6.2	469
30–34	12.2	435
35–39	20.6	393
40–44	30.5	266
45–49	44.7	150

Table 33 Reported percentages of all ever-married women with a characteristic suggesting that their fecund period is over by age

Current age	Self-reported infecundity (non-menopausal)	Menopausal	Sterilized	No birth in last five years[a]	Any one or more of the preceding attributes
15–19	.0	.0	.0	.0	.0
20–24	.8	.0	.0	4.2	2.3
25–29	1.5	.0	.0	6.2	5.2
30–34	3.3	8.3	.0	12.2	11.4
35–39	12.2	2.7	1.4	20.6	27.5
40–44	25.1	10.0	1.4	30.5	43.6
45–49	46.1	27.6	1.1	44.7	66.2
Estimated mean age at acquiring the characteristic	45.9[b]	49.1[b]	–[c]	44.1[d]	42.8[d]
Observed or assumed percentage ever acquiring the characteristic	100.0	100.0		100.0	100.0

[a]Restricted to non-users of contraception who have been married throughout the five-year period.
[b]Assuming that all those who do not acquire the characteristic by age 50 would be so within the following 2½ years.
[c]Number of women sterilized is too small to provide any basis for meaningful analysis.
[d]Assuming that all those who do not acquire the characteristic by age 50 would do so within 1½ years.

Table 34 Estimated age of all ever-married women at acquiring a characteristic suggesting that the fecund period is over, by subgroups

	Subgroup						
	Residence			Education			
Characteristics	Large urban	Urban	Rural	No schooling	Primary	Middle	Secondary +
Menopause[a]	50.0	49.9	49.3	49.4	50.0	49.4	49.8
Self-reported infecundity (non-menopausal)[a]	46.5	46.2	46.0	46.0	46.0	41.5	47.3
No birth in last five years[b]	43.8	42.8	44.8	44.6	43.7	43.5	32.2
Any one or more of the preceding characteristics[b]	42.6	42.0	43.0	42.5	42.3	42.4	40.9

[a]Assuming that all those who do not acquire the characteristic at age 50 would do so within $2\frac{1}{2}$ years.
[b]Assuming that all those who do not acquire the characteristic at age 50 would do so within $1\frac{1}{2}$ years.

any one of these characteristics may be presumed to be infecund. Since acquisition of each of these characteristics is irreversible, the proportions with these characteristics can be used to estimate the mean age of becoming infecund.[5]

The estimated mean ages at acquiring each of the characteristics for residential and educational subgroups are shown in table 34.

The mean age at menopause ranges between 49 and 50 years among both the residential and educational subgroups. The estimated mean ages at menopause are similar to those recorded among European and non-European populations during the 1960s and 1970s. The mean or median ages at menopause in these populations cluster within a range of between 49 and 50 years with the figures for South African blacks ranging from 48 to 49.7 years (Gray 1979: 228). The mean age at menopause is about three years higher than the mean age of self-reported infecundity and about five years higher than the mean age at last birth for women aged 45 years and over.

Notwithstanding distortions due to age misstatements or optimistic reporting, the estimated mean ages indicate a plausible pattern of stopping. There are too few cases of sterilization to make any meaningful calculations, a clear indication that Ghanaians do not use sterilization as a stopping method. The general conclusion that one may draw from the figures presented in tables 33 and 34 is that Ghanaian women acquire one of the physiological stopping characteristics at an average age of 43 years.

[5]The current status data (the proportion who have not yet acquired a given characteristic, tabulated by age) were used to estimate the mean age X of becoming infecund with the following formula:

$$X = \alpha + \frac{\Sigma_{x=\alpha}^{n} nLx + B.\, l_B}{(1 - l_B)}$$

Where α and B represent the lower and upper ages at which the characteristics can be acquired, l_B is the proportion which have not acquired it by age B and nLx is estimated as observed proportion without the characteristic between exact ages x and xtm. This is simply a more general form of the expression used in estimating the survivorship mean in respect of the post-partum variables as well as singulate mean age at marriage (SMAM).

The end of sexual activity

The estimated mean age at definitive widowhood, divorce or separation is about 43 years (excluding union termination after age 50 for which we have no data and which has no impact on fertility), ranging between 38.8 and 44.6 among the subgroups. The overall proportion widowed, divorced or separated is only 2.1 per cent, and at the time of the survey only 7.5 per cent of the women aged 45–49 were in any one of the marital statuses mentioned above. The corresponding figures for the women aged 35–39 and 40–44 are 3.9 and 4.7 per cent respectively. These figures are highly indicative of relatively high rates of remarriage among the female population. As noted in the introduction to this chapter, there is a high probability of remarriage among widowed or divorced Ghanaian women unless they are too old to bear a child, and it can be gleaned from the proportions noted above that very few fecund women fail to marry. Marriage dissolution does not appear, therefore, to have a significant impact on stopping patterns of fertility.

As regards terminal abstinence, the current status data yield an estimated mean age at starting terminal abstinence of 44.8 years (again excluding those who start after age 50), with corresponding figures for the residential and education subgroups concentrated within a narrow range between 40 and 46 years. The overall proportion of women observing terminal abstinence is only 1.2 per cent increasing to 2.4 and 8.6 among the 40–44 and 45–49 year olds respectively. Among the rural, urban and the large urban groups aged 45 years and over 10, 2.4 and 2.5 per cent respectively reported that they were terminally abstaining (table 35). Ten per cent of the rural women in the oldest age group were abstaining whilst only two urban women in this age group claimed to be terminally abstaining. It is only among the Mole-Dagbani that there is a relatively widespread observance of terminal abstinence. The overall proportions abstaining range from 4.6 per cent among the Mole-Dagbani to 0.2 and 0.1 per cent among the Ewe and Twi respectively and no abstinence was reported among the Fante, the Ga and the Adangbe. Terminal abstinence is, therefore, not a strong fertility stopping mechanism either at the national level or among any of the subgroups, except perhaps among the Mole-Dagbani.

Table 35 Percentage of currently married women in terminal abstinence by age and residence

	All areas		Rural		Urban		Large urban	
Current age	%	N	%	N	%	N	%	N
15–19	0.0	368	0.0	266	0.0	52	1.0	50
20–24	0.1	926	0.0	621	0.0	151	0.6	154
25–29	0.2	916	0.2	576	0.0	162	0.6	178
30–34	0.4	734	0.6	485	0.0	121	0.0	128
35–39	0.9	632	1.4	426	0.0	101	0.0	105
40–44	2.4	498	3.1	357	0.0	74	1.5	67
45–49	8.6	362	10.3	281	2.4	41	2.5	40

Risk reduction through contraception and abortion as proximate determinants of the stopping pattern

We have no information on induced abortion and there is, therefore, no way of determining whether it is being used to stop family formation. Nevertheless induced abortion is not widespread among a large proportion of the female population (ie rural, no schooling women) and it is, therefore, not unreasonable to assume that its effect on stopping patterns of fertility in the rural areas is negligible. It is probably being used for spacing purposes by the urban women (table 28).

Table 26 showed that the use of contraception is very low among the general population and that efficient forms of contraception are used mainly by the young cohorts (ie 20–34) who are more concerned about child-spacing than about stopping childbearing. The proportion of the oldest cohorts (ie 40–49) using efficient forms of contraception is very low and the proportion using traditional methods is also very low among the oldest cohort (ie 45–49). It does appear, however, that women with secondary and tertiary education use contraception to stop family formation. A third of the currently married women aged 45–49 with this level of education are reported to be using modern methods and the proportions using these methods are relatively high in other age groups (see appendix C, table C3). The use of modern methods is also relatively widespread among the urban women (appendix C, table C5). The Ga-Adangbe and the Ewe tend to use contraception to a greater extent than the other ethnic groups, but it appears that the Ewe use it for spacing rather than anything else, whilst the Ga-Adangbe use it both for spacing and stopping (see appendix C, table C4).

4.4 CONCLUSION

Widowhood, divorce and separation as well as terminal abstinence have very little impact on the stopping patterns of fertility. Sterilization is scarcely used as a method of stopping, and contraception is used essentially by only a small group of women. It appears, therefore, that menopause or secondary sterility are the major proximate determinants of age at last birth. The proportion experiencing menopause or secondary sterility rises gradually from 1.5 per cent of 20–24 year olds to 9.6 per cent of women aged 30–34 and then climbs steeply to 22.9, 38.0 and 58.8 of the 35–39, 40–44 and 45–49 cohorts respectively. Similar patterns are noted among the subgroups (appendix C, tables C6–C11). All the information indicates quite clearly that between 6 and 7 out of every 10 women aged 45–49 have acquired a stopping attribute, and the single-year distribution shows that about 8 out of 10 women can be classified as infecund on the basis of these indicators by the time they reach 49 years old. The analysis also reveals that menopause and secondary sterility play a major role in the stopping patterns of fertility with an average age of acquiring any of the indicators of stopping being in the neighbourhood of 43 years.

5 The Fertility Reducing Impact of the Intermediate Fertility Variables

5.1 INTRODUCTION

We noted in the introduction that if education and urbanization were the dominant correlates of lower fertility at the national level, as they are within each region one would expect the southern population to exhibit lower and not higher total fertility rates than the northern groups. We intimated, therefore, that there were other factors at work and that a fair part of the explanation may well be found in differentials with respect to post-partum variables. The main intermediate fertility variables may be a major determinant not just of differentials but also of the actual level of fertility. In what follows, therefore, an attempt is made to determine the contribution of the intermediate fertility variables to overall fertility levels and differentials. An extended version of Bongaarts' model was employed in studying the relationship between fertility and the intermediate variables (ie post-partum amenorrhoea and abstinence, proportion currently married, contraception and abortion).

5.2 MODEL AND ESTIMATION METHODS USED

The original Bongaarts model is specified as follows:

$$TFR = TF \times C_m \times C_i \times C_c \times C_a$$

where C_m, C_i, C_c and C_a reflect the fertility inhibiting effects of non-marriage, lactational amenorrhoea, contraception and induced abortion respectively. The extended version is:

$$TFR = TF \times (C_{em} \times C_{diss}) \times (C_{ppam} \times C_{ppab}) \times (C_{st} \times C_{tab} \times C_{cm}) \times C_a.$$

C_m is split into two indices: C_{em}, which measures the proportionate reduction in fertility due to celibacy; and C_{diss}, which measures the further proportionate reduction due to marital dissolution (ie $C_m = C_{em} \times C_{diss}$). C_i is also split into two indices: C_{ppam}, which measures the proportionate reduction in natural marital fertility due to lactational amenorrhoea and C_{ppab}, which measures its further proportionate reduction due to post-partum abstinence beyond the period of post-partum amenorrhoea (ie $C_i = C_{ppam} \times C_{ppab}$). C_c is decomposed into three indices in order to separate the effects of various contraceptive methods, C_{st}, C_{tab} and C_{cm}, which reflect the effects on marital fertility of sterilization, terminal abstinence and other forms of contraception respectively.

The observed total fertility and marital fertility rates (ie TFR and TMFR) were taken as fixed points for calculating the indices. It must be noted that these rates are subject to omission and other errors which are not corrected in this present study. It is possible, however, that the division of one rate by the other might remove a significant proportion of the error elements in both rates though not all errors are accounted for in the exercise.

For the basic Bongaarts model the observed TFR and TMFR were used to derive C_m. The index of lactational infecundity, C_i was estimated using the mean duration of the combination of post-partum amenorrhoea and post-partum abstinence, i, (ie nsp/nep which was estimated using the prevalence/incidence ratio). The index of contraception C_c incorporated the effectiveness of different methods, e, and the proportions using them, u. Average use effectiveness of different methods were taken as 0.80 for condom and 0.60 for other, mainly traditional, methods (Bongaarts 1982: 25–6). The indices were calculated with the following formulas:

$$C_m = TFR/TMFR;$$

$$C_c = 1 - (1.08 \times u \times e)$$ where 1.08 is a correction factor for primary sterility; and

$$C_i = 20/(18.5 + i)$$

where i is the mean duration of combined effects of nsp/nep and a birth interval without lactation or post-partum abstinence is made up of average gestation and exposure periods totalling 18.5 months and post-partum amenorrhoea of 1.5 months. Results are presented in table 36 for the total country and subgroups defined by residence, education and ethnicity.

The calculations for the extended version of the model were carried out as follows: C_m – TEFR (total 'since first union' fertility rate; based on births and women-years since first union) was calculated from FERTRATE and together with the already computed TFR and TMFR, the C_{em} and C_{diss} were derived.

For C_i: $$C_{ppam} = \frac{20}{18.5 + amen}$$

where amen is the average duration of post-partum amenorrhoea and

$$C_{ppab} = \frac{18.5 + amen}{18.5 + nsp/nep}$$

where nsp/nep is the combined effect of post-partum amenorrhoea and post-partum abstinence.

For C_c: $$C_{st} = (1 - S * U_{st} * e_{st})$$

where U_{st} and e_{st} are proportions sterilized among currently married women by age and use effectiveness respectively and S is correction factor for primary sterility (1.08)

$$C_{tab} = 1 - \frac{(SU_{tab} \times e_{tab})}{(SU_{stt} \times e_{st})} \text{ or } 1 - \frac{(SU_{tab} \times e_{tab})}{(C_{st})}$$

Table 36 Summary of estimates of the indices of the intermediate fertility variables: Ghana and subgroups – using original Bongaarts model

	Index of marriage	Index of contraception	Index of abortion	Index of nsp/nep
National subgroup	C_m	C_c	C_a	C_i
All Ghana	.795	.929	(1.000)	.571
Large urban	.738	.887		.645
Urban	.769	.912		.612
Rural	.848	.942		.557
No schooling	.851	.959		.551
Primary	.810	.891		.599
Middle	.746	.888		.635
Secondary +	.681	.659		.707
Ga	.714	.807		.707
Ewe	.745	.900		.562
Fante	.738	.921		.658
Asante	.778	.927		.617
Mole-Dagbani	.843	.985		.461

Where U_{tab} and e_{tab} are proportions terminally abstaining among currently married women by age and use effectiveness respectively.

$$C_{cm} = 1 - \frac{(SU_{cm} * e_{cm})}{(C_{st} * C_{tab})}$$

where U_{cm} and e_{cm} are proportions currently contracepting among currently married women by age and use effectiveness; again a distinction was made between more or less efficient methods in the estimation of the overall C_{cm}.

5.3 RESULTS

The results of applying the extended model are shown in table 37. It will be seen from this table that non-marriage (or celibacy) and delayed marriage (C_{em}) have a greater inhibiting effect on fertility than dissolution of marriage in Ghana; they reduce the level of fertility below the level of marital fertility by about 16 per cent, with a range between subgroups from 29 per cent among women with secondary and over education to 12 per cent among the Mole-Dagbani ethnic group, whilst the effect of marriage dissolution is less than 10 per cent in almost all cases. The two factors together exhibit a fertility-inhibiting effect of about 21 per cent. As regards contraception, the proportionate reduction is very low, ranging from 0.5 per cent in the case of sterilization to 0.6 per cent in respect of terminal abstinence. It appears that the pill, IUD and condom exercise a much greater impact on fertility than sterilization and terminal abstinence. The proportionate reduction of fertility by post-partum amenorrhoea is also

Table 37 Summary of estimates of indices of the intermediate fertility variables: Ghana and subgroups, extended model

	Index of marriage			Index of contraception				Index of abortion	Index of nsp/nep[a]		
National subgroup	C_m	C_{em}	C_{diss}	C_c	C_{st}	C_{tab}	C_{cm}	C_a[b]	C_i	C_{ppam}	C_{ppabst}
All Ghana	.794	.842	.943	.957	.995	.992	.970	(1.000)	.571	.613	.931
Large urban	.743	.799	.930	.875	.996	.996	.882		.644	.673	.958
Urban	.769	.831	.925	.910	.993	.999	.917		.611	.633	.966
Rural	.817	.860	.950	.942	.995	.990	.957		.557	.604	.922
No schooling	.851	.894	.952	.955	.997	.988	.970		.551	.604	.912
Primary	.810	.869	.932	.912	.988	1.000	.923		.600	.622	.964
Middle	.747	.803	.930	.891	1.998	.999	.894		.635	.656	.968
Secondary +	.680	.708	.961	.707	.969	1.000	.730		.707	.717	.986
Ga	.715	.776	.921	.809	.985	1.000	.821		.706	.735	.961
Ewe	.745	.802	.929	.900	.989	.998	.912		.562	.604	.930
Fante	.738	.821	.899	.921	.992	1.000	.928		.658	.669	.984
Asante	.779	.842	.925	.924	.994	1.000	.930		.618	.625	.988
Mole-Dagbani	.843	.853	.989	.990	1.000	.995	.990		.461	.571	.808

[a]Combined effects of post-partum amenorrhoea and post-partum abstinence.
[b]C_a is assumed to have no impact or $C_a = 1.0$.

Table 38 Summary of estimates of the total fertility rate, the total marital fertility rate and intermediate fertility variables for all Ghana and subgroups

National subgroup	Total fertility rate[a]	Total marital fertility rate[a]	Prevalence of contraceptive use	Use effectiveness	Total: induced abortion	Duration nsp/nep[b]
All Ghana	6.46	8.13	.092	.715	1.000	16.5
Large urban	5.39	7.26	.136	.768	1.000	12.5
Urban	6.29	8.18	.114	.717	1.000	14.2
Rural	6.80	8.33	.076	.705	1.000	17.4
No schooling	6.86	8.06	.056	.677	1.000	17.8
Primary	6.82	8.42	.133	.757	1.000	14.9
Middle	5.74	7.69	.136	.762	1.000	13.0
Secondary +	4.05	5.95	.408	.775	1.000	9.8
Ga	5.84	8.18	.241	.741	1.000	9.8
Ewe	6.63	8.90	.136	.696	1.000	17.1
Fante	6.41	8.69	.095	.767	1.000	11.9
Asante	6.32	8.12	.088	.763	1.000	13.9
Mole-Dagbani	6.13	7.32	.019	.707	1.000	24.9

[a]Recorded rates.
[b]Combined effects of post-partum amenorrhoea and post-partum abstinence (in months).

much higher than that of post-partum abstinence, 39 per cent as against 7 per cent. Both factors, however, depress the level of fertility to a much greater extent than the other intermediate variables. It is important to note that we have assumed that induced abortion had no effect on the level of fertility though this might not hold in the case of the urban women and women with relatively high formal education. The observed fertility rates (TFR and TMFR) have not been subjected to any rigorous disciplining and the real situation is blurred by inherent distortions in the rates. Some of these rates suffer from under-reporting of births; particularly in the case of live births which resulted in infant deaths. The fertility rates for some subgroups are also affected by small numbers of both births and women. There is a tendency in such situations to encounter inflated rates such as, for example, TMFRs for the Ga and Fante. Nevertheless, the fertility rates listed in table 38 depict a pattern which reflects the underlying biological and behavioural factors as mirrored by the figures presented in table 37. The difference in fertility levels among the various subgroups are reflected in the variations in the intermediate variables. For instance, the fertility differentials (ie TFRs) among the residential and the educational groups are inversely related to variations in the combined effects of post-partum amenorrhoea and post-partum abstinence (nsp/nep or C_i) and positively related to variations in proportions currently married (C_m). In other words, the longer the average duration of nsp/nep the lower the fertility rate (ie TFRs or TMFRs) and the higher the proportion currently married (C_m) the higher the fertility rate. The inverse relationship is also reflected in the C_c values. The observed TFRs for the ethnic groups are indicators of prevailing relatively low levels of fertility among the Ga and the Mole-Dagbani with the other groups exhibiting fertility rates of more than six children per women.

A simple evaluation of the marital fertility rates shows that they have been exaggerated in most cases by unduly inflated fertility rates for the 15–19 age group. The highest rate is usually found in this age group ranging from 411.4 among the Ewe to 281.1 among the Mole-Dagbani. The need for a more detailed evaluation of the fertility rates cannot, therefore, be overemphasized. The estimated rates, however, provide an interesting and at the same time a much more reliable basis for discussion.

The index of non-marriage is highest among the Mole-Dagbani (ie 0.843) and it declines to 0.779 among the Asante with the Ga exhibiting the lowest proportion (ie 0.715). On the other hand, the Mole-Dagbani exhibit the lowest index of nsp/nep followed by the Ewe with the Akan steering a somewhat middle course between these two groups and the Ga. Effective use of contraception is relatively more marked (index of contraception is lower) among the Ga followed by the Ewe with the Mole-Dagbani making very little use of contraception. Table 39 shows that a combination of these intermediate factors affects the various fertility levels in a variety of ways. An attempt is made here to quantify the extent to which each variable contributes to the determination of the actual level of fertility by assuming an average total fecundity rate (TF) of 15.3 (see Bongaarts 1982: 5); the implied TF for Ghana is 14.9 ranging from 12 among the Ga to 16.0 among the Ewe and the Mole-Dagbani. It also centres around 15.0 among the rural and illiterate women.

Except for the Ga, post-partum amenorrhoea and post-partum abstinence, especially the former exercise a very strong impact, reducing the total fecundity rate by 54, 44, 38 and 34 per cent among the Mole-Dagbani, Ewe, Asante and Fante respectively. The fertility reducing impact is also strongly felt among the rural women and those with no formal education including primary school leavers with 40 per cent or more of the inhibiting effects attributable to nsp/nep.

The estimated total natural fertility rates (ranging between 7 and 11) are reduced to between 7 and 9 children

Table 39 Summary of estimates of fertility rates for Ghana and subgroups

	Residence				Education				Ethnicity				
	Ghana	Large urban	Urban	Rural	No schooling	Primary	Middle	Secondary +	Ga	Ewe	Fante	Asante	Mole-Dagbani
Estimates of fertility rates													
Total fecundity rate, TF	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Total natural marital fertility rate, $TN = C_i \times TF$	8.74	9.85	9.34	8.52	8.43	9.18	9.72	10.82	10.80	8.60	10.07	9.46	7.05
Total marital fertility rate, $TM = C_c \times C_a \times TN$	8.36	8.12	8.50	8.03	8.05	8.37	8.66	7.65	8.74	7.74	9.27	8.74	6.98
Total fertility rate, $TFR = C_m \times TM$	6.64	6.0	6.54	6.56	6.85	6.78	6.47	5.20	6.25	5.77	6.84	6.81	5.94

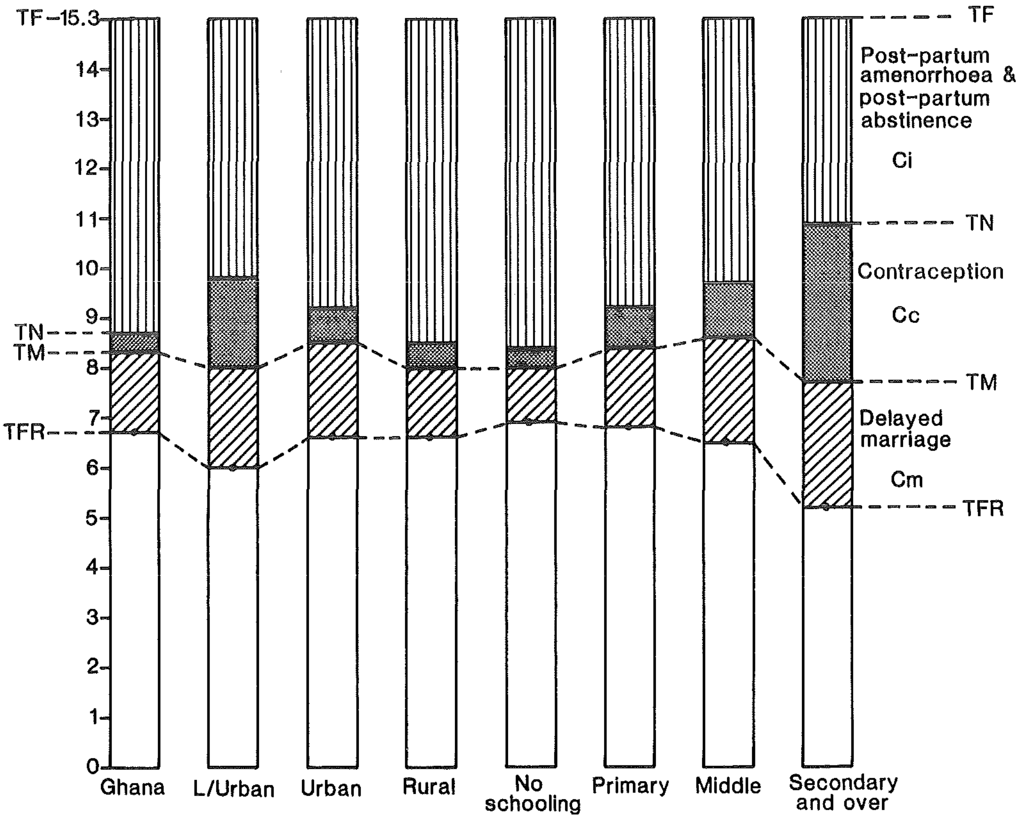

Figure 11 Shares of the difference between actual and potential fertility attributed to delayed marriage, contraception and post-partum effects by the proximate determinants of fertility model, for all Ghana, and by type of place of residence and education

per married women by delayed marriage. Table 39 also indicates that the influence of this variable is more marked among women with higher education, urban women and among the Ga. It is worthy of note that, among the Mole-Dagbani, what is lost through long duration of nsp/nep is, to a large extent, compensated for by a relatively small reduction of the total natural marital fertility of 7.05 to a total marital fertility rate of 6.98 by virtually non-use of effective contraception. Contraception, however, has a sustained depressing effect on fertility levels among women with middle or higher education, city dwellers and the Ga. The resultant total fertility rates range from about 7 among the Akan (Asante and Fante), women with primary or no formal education to about 5.8 and 5.9 among the Ewe and the Mole-Dagbani respectively. We note that the Asante achieve their total fertility rates with a comparatively moderate duration of nsp/nep coupled with a fairly high proportion of married women and very little use of contraception. The Mole-Dagbani have a very protracted duration of nsp/nep which is compensated for by virtual non-use of contraception and, once again a relatively high proportion of married women, but the achieved TFR is one of the lowest, indicating the strong fertility reduction impact of post-partum amenorrhoea and abstinence. A third pattern is noted among the groups with very short nsp/nep (ie city dwellers, urban women, those women with middle and secondary and higher education, graduates and the Ga) who manage to stabilize their total marital fertility rates at virtually the same level as the other groups (ie between 8–9) by effective use of contraception, and then reduce them to TFRs below that of the high fertility groups (eg the Asante) by relatively low proportions married, a pattern which is much more clearly reflected by the figures for the women with secondary and tertiary education. These patterns are graphically illustrated in figures 11 and 12.

5.4 CONCLUSION

The city and, to some extent, urban residents with relative high formal education experience longer inter-birth intervals including longer exposure intervals which stem largely from comparatively high foetal losses and fairly effective use of contraception including perhaps induced abortion. (We do not have any information on induced abortion and it is assumed in this study to exercise no impact on fertility.) Furthermore, these women are undergoing a process of the shortening of the durations of post-partum variables as noted in the chapter on birth-spacing patterns. The mechanisms which hold their fertility levels in check are contraception and delayed marriage, particularly among those with secondary and tertiary education and residents of cities and urban areas. Thus, the shortening of the durations of post-partum variables, effective use of contraception and delayed marriage appear to be associated with modernizing processes such as education and urbanization.

On the other hand, a relatively low level of fertility noted among the Mole-Dagbani is achieved with long durations of post-partum amenorrhoea and abstinence, and non-use of effective contraception. The Akan (ie the

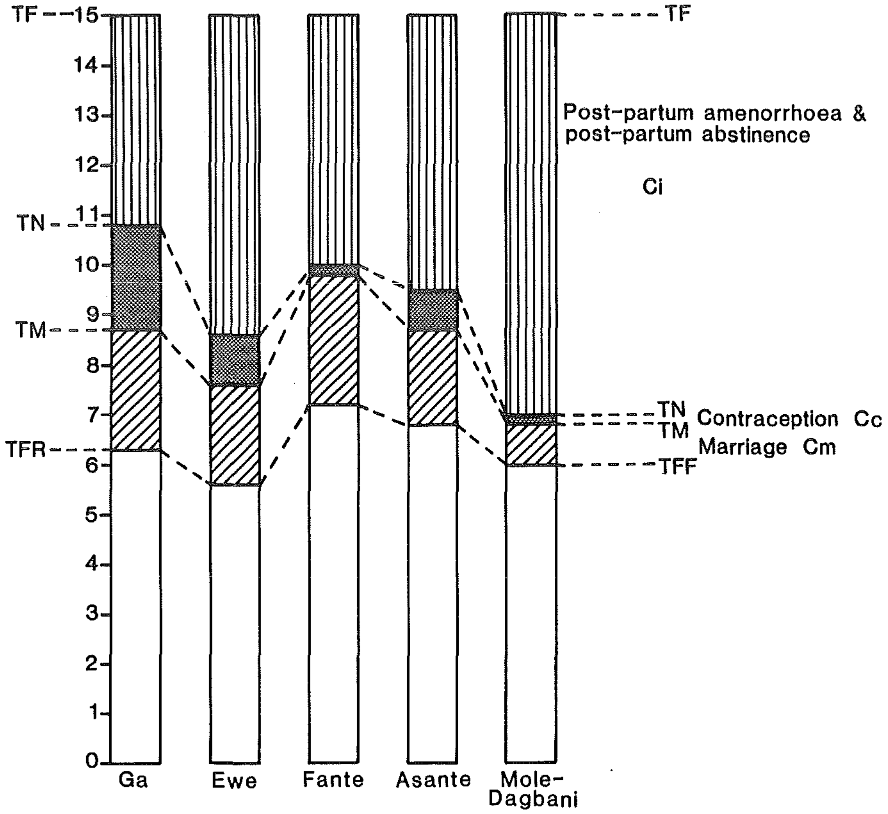

Figure 12 Shares of the difference between actual and potential fertility attributed to delayed marriage, contraception and post-partum effects by the proximate determinants of fertility model, by ethnic group, and by type of place of residence and education

Asante and Fante) achieve high levels of fertility with a combination of relatively shorter durations of post-partum variables with little use of effective contraception and comparatively high proportions married among the females. The Ewe are more or less sandwiched between the two with relatively more effective use of contraception, but lower proportions of married women and longer durations of post-partum variables compared with the Akan. The pattern depicted by the Ga is associated with the fact that the majority of them are exposed to the modernizing processes around them. Thus, the shortening of the post-partum variables is counteracted, to a large extent, by contraception and delayed marriage (see table 37).

The high fertility levels prevailing among the rural women is attributed to higher proportions married and little use of contraception. These are the women who constitute more than 60 per cent of the female population in Ghana and who are at the same time less equipped and less motivated to reduce the levels of fertility than are urban women.

Nevertheless, there is a need to undertake a detailed analysis of the considerable diversity within the subgroups with respect to the post-partum variables before firm conclusions can be drawn. Policy formulation and future intervention and implementation of integrated socio-economic programmes may benefit from an examination of the extent to which socio-economic characteristics are systematically associated with longer or shorter durations of breastfeeding and abstinence. Similarly, a further analysis of age at marriage and at first birth and characteristics relating to stopping patterns may throw more light on the implications of the findings presented here.

6 Summary and Conclusions

6.1 AGE AT FIRST BIRTH AND ITS PROXIMATE DETERMINANTS

Ninety per cent of Ghanaian women marry before the age of 24 years with an estimated average age at marriage of 18.4 years. The latter is three years later than average age at menarche. The estimated trimeans suggest a difference of 4.2 years between average age at menarche and average age at first birth. The estimated average age at first birth is 19.7 years with an inter-quartile range of five years. Nearly all those who do bear children experience their first birth before they are 26 years old. There is very little variation in age at first live birth among the subgroups. The most striking difference is noted among the women with secondary or tertiary education who experience their first birth at a median age of about 25 years as compared with between 19 and 20 years among the middle and primary school leavers.

The interval between menarche and sexual union and between the latter and the first live birth cannot be determined on the basis of the GFS data. Moreover, the difficulty in analysing the waiting time from first marriage to first live birth is compounded by the high incidence of pre-marital births and conceptions, and under such circumstances it is hard to determine the start of exposure to the risk of child-bearing with any precision. Age at first marriage does not seem, therefore, to be a good indicator of exposure to childbearing. The definition of marriage, and the protracted nature of the performance of the customary rites associated with it, makes it extremely difficult to draw any clear-cut line between first sexual union and first union and thereby measure the interval between either of them and first birth. Nevertheless, the analyses carried out so far have given an indication of the reproductive career. In situations where formal education delays entry into first union, the time lost is quickly made up with more than 25 per cent of the educated women apparently conceiving their first birth before marriage and 95 per cent having their first child by the end of the fifth year after marriage. This subgroup of women exhibits the shortest average marriage–first birth interval of between 14 and 15 months compared with a national average of 17 months and 19 months for the uneducated and those with secondary or more formal education respectively. The increase in age at first marriage among the women with middle education has practically no effect on the quintum of their first birth (ie B_{60} or Q).

Finally, notwithstanding the distortion of proportions having their first child at various times after marriage, the following broad starting patterns may be noted:

1 City residents with secondary and tertiary education exhibit relatively long average marriage–first birth intervals with a relatively high quintum.
2 Young residents in large towns with primary and middle education have relatively short average marriage–first birth intervals with high quintum.
3 The old, uneducated women with rural background tend to have a relatively long average marriage–first birth interval with an apparently low quintum; both, however, may be the result of a tendency among these women to misreport (omit or misdate) their first born children.

6.2 BIRTH SPACING: BIRTH INTERVALS AND THEIR PROXIMATE DETERMINANTS

Current age of mother, education and residence exercise varying degrees of impact on inter-birth intervals; average birth intervals vary from 44 months among women with secondary and tertiary education to 36 months among those with relatively little formal education. Younger cohorts exhibit a relatively shorter interval of 36 months whilst the older cohorts (ie 35 +) experience birth intervals of between 38 and 43 months. The residential pattern ranges from 41 months among the city dwellers to 40 and 38 months among the urban and rural women respectively.

However, estimates based on all closed intervals show that the younger cohorts have a relatively longer inter-birth interval than the oldest cohort by two months (34 as against 32 months). The new estimates indicate that the previous estimates of the average live birth interval of the oldest cohort were heavily influenced by the preponderance of open intervals. The relatively low proportions of intervals closed by the cohort during the past six years is indicative of the fact that some, if not the majority, of these intervals will never be closed. However, the patterns revealed by the new estimates do not differ significantly from those noted above: age, level of education and type of residence all affect birth intervals to some extent. The average inter-birth intervals vary from 38 months among women with secondary and tertiary education to 34 months among those with no schooling whilst the women with primary and middle education experience about 32.5 months of inter-birth intervals. The new estimates, as noted above, show that the younger cohorts have longer inter-birth intervals with those women living in large urban conurbations still exhibiting the longest intervals, followed by the rural and urban women with average durations of 34 and 32 months respectively.

Both post-partum amenorrhoea and post-partum abstinence are important determinants of durations of the post-partum non-susceptible period of Ghanaian women. Whilst the former is heavily dependent on the frequency and intensity of breastfeeding which is relatively long in Ghana, the latter tends to lead to a period of non-susceptibility being longer than the post-partum anovulatory period. The estimated mean duration of post-partum amenorrhoea is about 13.5 months with the younger cohorts experiencing shorter duration than the older women by two months. The average estimated duration of post-partum abstinence is 10.5 months and there is a general increase in the average duration of abstinence with increasing age, the mean durations ranging from 9.5 months to 12 months from the younger generations to the oldest cohort.

The overall non-susceptible and non-exposed period of post-partum is longer than the duration of post-partum amenorrhoea by between two and three months, indicating that amenorrhoea and abstinence contribute about 12–14 months to the average birth interval beyond the minimum possible average period of post-partum non-susceptibility. The greater proportion of this is most likely to be added by breastfeeding-related amenorrhoea.

The estimated average duration of breastfeeding is about 18 months with the oldest cohort (ie 35–49) breastfeeding, on average, for two months longer than the younger cohorts. Full breastfeeding lasts, on average, for about 5.5 months. However, no child receives supplementary food at less than three months of age and one-quarter of the children are not given any additional food before the age of six months.

Among the ethnic groups, the Ga and the Mole-Dagbani have the shortest and the longest durations of post-partum amenorrhoea (ie 9 and 16 months) with the latter also experiencing the longest post-partum abstinence of 23 months as compared with seven months among the Akan including the Akuapem. The Ewe lie between the two groups with an estimated mean duration of 11.5 months. The ethnic groups may be divided into four broad categories (1) the Mole-Dagbani – experiencing the highest mean durations of post-partum variables, followed by (2) the Ewe with high to medium durations; (3) the Akan with relatively moderate mean durations and (4) the Ga and Fante with the lowest mean durations.

The rural women experience the highest mean durations in respect of all the five post-partum variables followed by the urban women: the women resident in the cities exhibit the lowest mean durations. As regards the educational groups there is an inverse relationship between mean durations of the post-partum variables and an increase in the number of years spent in school. For instance, the non-susceptible and non-exposed period among the women with no formal education is four and seven months longer than that among the primary and middle, on one hand, and secondary and tertiary groups, on the other hand.

The average durations of breastfeeding range from 21 months among the 'No schooling' group to 18, 16 and 12 months among the primary, middle and the secondary and over subgroups respectively.

The relatively long exposure interval noted among the urban residents and formally educated women stems from their use of contraception and perhaps from relatively high foetal losses. This pattern is reflected in the fertility levels exhibited by these women and their rural uneducated counterparts. A more detailed analysis of this phenomenon is given in chapter 5, where the Bongaarts model is employed.

6.3 AGE AT LAST BIRTH AND ITS PROXIMATE DETERMINANTS

Widowhood, divorce and separation as well as terminal abstinence have very little impact on stopping patterns of fertility. Sterilization is scarcely used as a stopping method. Menopause or secondary sterility appear to be the major proximate determinants of age at last birth and, therefore, exercise a major impact on stopping patterns. The proportion with any stopping attribute, mainly menopause or secondary sterility, shows that 7 out of 10 women aged 45–49 are unable to bear any more children and that acquisition of a stopping attribute gathers momentum at age 40, rising rapidly from 40 per cent to 81 per cent by age 49.

Similar patterns are noted among the subgroups with the Mole-Dagbani and Ewe exhibiting the lowest and the highest proportions acquiring a stopping attribute among the oldest cohort (ie 45–49) respectively. All the information we have assembled together in this study indicates quite clearly that between 6 and 7 out of every 10 women acquire a stopping attribute between 45 and 49 years and that the average age of acquiring any stopping attribute lies in the neighbourhood of 43 years.

6.4 OVERALL FERTILITY LEVELS AND THE CONTRIBUTION OF THE MAJOR PROXIMATE DETERMINANTS

The city and, to some extent, urban residents with relatively high formal education experience longer inter-birth intervals than other women because they have longer exposure intervals largely as a result of comparatively high foetal losses and fairly effective use of contraception (including perhaps induced abortion). Furthermore, these women are undergoing a process of the shortening of the durations of post-partum variables as noted in chapter 3 on Birth-spacing patterns. The mechanisms they employ in holding their fertility levels in check are contraception and delayed marriage, particularly among those with secondary and tertiary education and resident in cities and urban areas. Thus, the shortening of the durations of post-partum variables, effective use of contraception and delayed marriage appear to be associated with modernizing processes such as education and urbanization.

On the other hand, the relatively low level of fertility noted among the Mole-Dagbani is achieved through long durations of post-partum variables and non-use of effective contraception. The Akan (ie the Asante and Fante) achieve high levels of fertility with a combination of relatively short durations of post-partum variables with little use of effective contraception and comparatively high proportions married.

The Ewe are more or less sandwiched between these two with relatively effective use of contraception, but with lower proportions married and longer durations of post-partum variables compared with the Akan. The pattern depicted by the Ga is influenced by the fact that the majority of them live in the capital city where they are exposed to modernizing processes. Thus, the shortening of the post-partum variables among them is counteracted, to a large extent, by contraception and delayed marriage.

The high fertility levels prevailing among the rural women is attributable to high proportions married and little use of contraception which outweigh their long durations for the post-partum variables. They constitute more than 60 per cent of the female population in Ghana and they are both less equipped and motivated to reduce their fertility levels than are urban women.

However, there is a need to undertake a detailed multivariate analysis of the considerable diversity within the subgroups with respect to all the variables, and particularly the post-partum variables. Determination of the extent to which socio-economic characteristics are systematically associated with longer or shorter durations of breastfeeding and abstinence, ages at marriage and at first birth, and characteristics relating to stopping patterns will undoubtedly throw much more light on the structural relationships that link socio-economic and other variables to fertility directly through their impact on the post-partum variables.

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Appendix A – Detailed Tables: Starting Patterns of Family Formation

Table A1 Estimated median age at menarche, first marriage and first born by current age of mother and ethnicity

Current age of mother	Ethnic group					
	Twi	Fante	Mole-Dagbani	Ewe	Ga–Adangbe	Other
A Median age at menarche						
15–24	15.5	15.4	15.5	15.6	15.2	15.3
25–34	15.5	15.5	15.3	15.7	15.4	15.3
35–40	15.4	15.5	15.6	15.8	15.6	15.3
15–49	15.5	15.5	15.4	15.7	15.4	15.3
B Median age at first marriage						
15–24	18.6	18.0	17.7	18.9	19.2	17.7
25–34	18.2	18.5	17.0	18.9	18.9	18.0
35–49	17.8	18.5	17.7	18.7	18.6	17.9
15–49	18.3	18.4	17.4	18.9	18.9	17.8
C Median age at first live birth						
15–24	19.4	18.9	19.2	19.7	19.8	19.1
25–34	19.6	20.1	19.7	20.2	20.4	20.2
35–49	19.3	20.1	21.5	20.0	20.0	20.4
15–49	19.5	19.7	19.9	20.0	20.0	19.8
D Median first birth interval						
15–24	15.0	13.9	18.4	12.9	12.9	18.0
25–34	15.5	14.4	20.0	13.4	16.5	18.2
35–49	15.1	14.9	20.9	13.8	17.6	19.8
15–49	15.2	14.4	21.5	13.4	15.8	18.3

Table A2 Estimated median age at first live birth by current age, residence and level of education

Current age	Residence					
	Large urban	N	Urban	N	Rural	N
15–24	20.9	481	19.8	442	19.0	1668
25–34	20.9	337	19.6	313	19.6	1163
35–49	20.4	242	20.0	264	19.9	1215
15–49	20.8	1060	19.8	1019	19.5	4046

Current age	Level of education							
	No schooling	N	Primary	N	Middle	N	Secondary +	N
15–24	18.7	769	18.6	305	19.7	1349	24.5	166
25–34	19.3	989	20.0	203	20.0	495	24.4	126
35–49	20.0	1394	19.6	141	19.7	152	25.3	34
15–49	19.4	3152	19.2	649	19.8	1996	24.5	326

Table A3 Estimated duration of first birth interval between marriage and first birth by current age of mother (months)

Current age	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{99}	Average trimean	Inter-quartile range(s)	$B_{0.5}$ [a]	Q [b]	N
15–19	8.3	11.1	16.3	25.1	42.6	17.3	14.0	1.9	95.8	424
20–24	5.2	8.5	15.0	22.4	42.8	17.2	13.9	7.5	94.8	1032
25–29	4.4	9.8	16.2	25.0	48.8	15.2	15.2	7.4	92.7	981
30–34	0.1	9.2	16.2	28.1	61.0	16.8	18.9	9.9	88.7	795
35–39	–	9.6	16.6	28.0	60.8	17.4	18.4	11.2	89.2	697
40–44	–	8.8	15.7	31.5	73.5	17.7	22.7	10.1	85.5	576
45–49	1.2	9.4	16.0	36.5	84.7	17.9	27.1	9.4	86.5	438
15–49	3.6	9.6	16.0	27.7	55.3	17.1	18.7	8.3	90.4	4943

[a] $B_{0.5}$ – Cumulative proportion of births occurring in the negative interval (ie pre-marital births).
[b] Q – Quintum (or B_{60}) cumulative proportion of births occurring within five years after marriage.

Table A4 Estimated duration of first birth interval by current age of mother and residence (months)

Current age of mother and residence	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average trimean	$B_{0.5}$ [a]	B_9 [b]	Q [c]	N
15–24										
Large urban	6.7	9.8	15.3	27.8	43.4	17.1	5.2	23.7	92.9	231
Urban	7.4	10.3	15.0	24.6	42.5	16.2	5.8	19.8	96.1	226
Rural	6.2	9.9	15.2	22.4	42.7	15.7	6.0	23.3	95.1	999
25–34										
Large urban	5.2	10.5	18.3	27.9	55.3	18.8	5.9	19.8	90.2	325
Urban	4.2	9.3	15.1	22.5	48.6	15.5	7.2	25.6	94.4	305
Rural	0.9	9.4	15.7	25.5	61.9	15.8	9.7	25.4	90.2	1146
35–49										
Large urban	0.5	8.9	17.1	27.8	55.0	17.7	14.6	23.3	90.8	240
Urban	0.5	8.3	15.3	22.4	55.4	15.3	11.1	29.8	90.1	262
Rural	1.4	9.4	17.0	34.4	73.3	19.5	9.4	25.4	86.0	1209
15–49										
Large urban	3.4	10.0	17.4	27.8	54.8	18.2	8.3	22.8	90.9	796
Urban	4.3	9.4	15.1	22.5	48.7	15.5	8.1	25.4	92.9	793
Rural	3.5	9.6	15.9	28.0	60.7	17.4	8.5	24.6	89.7	3354

[a] $B_{0.5}$ – Cumulative proportion of births occurring in the negative interval.
[b] Q – Quintum or B_{60}.
[c] B_9 – Cumulative proportion of births occurring within nine months of marriage.

Table A5 Estimated duration of first birth interval by current age of mother and level of education (months)

Current age of mother and education	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average trimean	$B_{0.5}$[a]	B_9[b]	Q[c]	N
15–24										
No schooling	7.5	10.5	17.1	25.0	48.8	18.2	4.4	19.6	93.4	586
Primary	6.7	10.4	15.1	22.1	34.0	15.7	6.3	21.5	96.3	191
Middle	4.4	9.2	13.6	19.3	36.6	13.9	7.2	27.1	96.3	637
Secondary +	10.4	14.6	24.9	43.0	–	28.4	2.4	7.6	85.1	42
25–34										
No schooling	0.5	9.8	17.1	28.4	60.9	18.1	9.7	23.6	89.1	980
Primary	4.2	9.0	14.0	22.4	48.9	14.9	6.5	28.2	92.8	200
Middle	3.6	9.3	14.4	19.5	37.1	14.4	8.2	25.8	94.2	487
Secondary +	6.4	10.7	18.0	31.2	60.9	19.5	3.7	18.7	88.8	109
35–49										
No schooling	1.0	9.4	17.3	34.1	73.3	19.5	9.7	25.3	85.8	1389
Primary	–	9.1	15.1	22.3	37.0	15.4	11.5	27.3	95.7	139
Middle	–	8.4	14.0	19.4	43.3	14.0	13.4	30.0	91.7	149
Secondary +	–	–	13.5	24.7	43.3	–	20.6	41.2	97.2	34
15–49										
No schooling	3.0	9.8	17.2	31.0	61.6	18.8	8.6	23.6	88.0	2955
Primary	4.5	9.4	15.0	22.3	37.4	15.4	7.7	25.5	94.7	530
Middle	3.7	9.2	14.0	19.4	43.2	14.0	8.3	26.8	94.5	1273
Secondary +	5.6	10.6	17.9	31.3	55.2	19.4	6.5	20.6	90.8	185

[a] $B_{0.5}$ – Cumulative proportion of births occurring in the negative interval.
[b] B_9 – Births occurring within nine months of marriage.
[c] Q – Quintum.

Table A6 Estimated duration of first birth interval by current age of mother and ethnicity

Current age of mother	Quantiles	Ethnic group: Twi	Fante	Mole-Dagbani	Ewe	Ga-Adangbe	Other
15–24	T_{10}	6.0	5.0	8.1	6.8	2.4	7.1
	T_{25}	10.4	9.1	11.0	9.1	8.7	10.4
	T_{50}	15.0	13.9	18.4	12.9	12.5	18.0
	T_{75}	21.6	22.1	33.6	21.6	19.4	31.0
	T_{90}	37.0	43.0	49.1	34.2	46.2	48.7
	Trimean	15.5	14.8	20.4	14.1	13.3	14.6
25–34	T_{10}	3.9	.5	4.0	4.6	.5	4.6
	T_{25}	9.8	8.4	10.2	8.8	10.2	11.0
	T_{50}	15.5	14.4	20.0	13.4	16.5	18.2
	T_{75}	22.0	25.5	48.6	19.4	25.3	34.1
	T_{90}	36.9	54.9	73.2	33.9	48.8	73.5
	Trimean	15.7	15.7	24.7	13.8	17.1	20.4
35–49	T_{10}	.8	.7	1.6	.5	4.7	–
	T_{25}	9.5	8.4	10.5	8.9	8.6	9.4
	T_{50}	15.1	14.9	29.9	13.8	17.6	19.8
	T_{75}	22.5	24.9	72.5	24.9	24.7	37.3
	T_{90}	43.4	60.6	120.5	60.7	43.3	–
	Trimean	15.5	15.8	35.7	15.4	17.1	21.6
15–49	T_{10}	3.8	1.7	6.6	3.5	2.7	2.9
	T_{25}	9.9	8.6	10.5	9.0	9.0	10.3
	T_{50}	15.2	14.4	21.5	13.4	15.8	18.3
	T_{75}	21.5	24.9	49.2	21.9	24.8	36.5
	T_{90}	42.5	49.5	96.7	43.3	43.3	73.2
	Trimean	16.7	15.6	25.6	14.4	16.4	20.9

Appendix B – Detailed Tables: Birth-Spacing Patterns

Table B1 Live birth interval length by current age of mother and residence (all intervals started in six years preceding the survey) (months)

Current age of mother and residence	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average trimean	Per cent closed	Q[a]	N
Large urban									
15–24	21.4	28.9	36.5	54.8	–	39.2	82.1	82.1	235
25–34	20.7	26.7	36.4	49.5	–	37.3	87.5	82.0	481
35–49	23.3	28.6	48.6	–	–	–	61.7	61.7	239
15–49	21.2	27.2	38.5	60.5	–	41.2	77.7	74.9	955
Urban									
15–24	20.9	26.7	35.2	46.8	–	35.9	85.9	85.9	271
25–34	19.1	25.2	34.8	52.0	–	36.7	81.1	77.8	455
35–49	20.9	29.0	40.5	–	–	–	65.2	65.2	269
15–49	20.6	26.6	36.2	60.7	–	39.9	76.5	74.5	995
Rural									
15–24	21.0	26.7	35.6	46.4	–	36.1	89.0	80.3	1261
25–34	19.4	25.2	34.9	46.0	66.7	35.3	93.5	87.7	1938
35–49	20.7	26.8	40.9	–	–	–	70.0	68.4	1300
15–49	19.6	25.5	36.6	52.3	–	37.8	85.1	79.3	4499

[a]Q (quintum) – Cumulative proportion closed by the fifth year.

Table B2 Live birth interval length by current age of mother and level of education (all intervals started in six years preceding the survey) (months)

Current age and education	Quantiles T_{10}	T_{25}	T_{50}	T_{75}	T_{90}	Average trimean	Per cent closed	Q	N
No schooling									
15–24	21.3	26.9	37.4	51.7	–	38.4	81.2	81.2	676
25–34	19.5	25.3	34.9	46.2	66.7	35.3	87.0	87.0	1648
35–49	20.7	27.1	40.9	–	–	–	66.7	66.7	1498
15–49	20.7	26.6	37.4	55.3	–	39.2	77.2	77.2	3822
Primary									
15–24	19.1	24.8	33.6	46.4	67.2	34.6	92.1	84.2	264
25–34	18.8	24.8	32.7	46.0	–	34.1	89.2	84.4	338
35–49	22.6	26.5	42.0	–	–	–	66.6	66.6	149
15–49	19.3	24.9	33.8	51.7	–	36.1	85.0	79.9	751
Middle									
15–24	21.1	27.0	35.3	46.0	–	35.9	88.8	81.4	795
25–34	20.6	26.8	37.3	48.9	–	37.6	86.0	82.5	747
35–49	21.2	26.8	44.1	–	–	–	63.1	63.1	137
15–49	20.8	26.9	36.5	49.1	–	37.3	84.2	80.2	1679
Secondary +									
15–24	26.9	33.1	–	–	–	–	–	40.3	32
25–34	19.5	26.7	34.1	57.6	67.4	38.1	90.8	81.6	141
35–49	29.4	40.0	–	–	–	–	–	28.1	24
15–49	21.2	28.5	40.3	67.2	–	44.1	79.3	65.4	197

Table B3 Live birth interval length by current age of mother and ethnicity (all intervals started in six years preceding the survey) (months)

Current age of mother and ethnic group	Quantiles					Average trimean	Per cent closed	Q	N
	T_{10}	T_{25}	T_{50}	T_{75}	T_{90}				
Twi									
15–24	21.0	26.7	35.5	46.3	–	36.0	84.2	81.5	766
25–34	19.3	25.0	33.8	45.9	64.1	34.6	90.5	84.6	1022
35–49	21.3	27.3	43.9	–	–	–	64.8	62.8	634
15–49	20.8	25.5	36.1	54.6	–	38.1	81.8	77.0	2482
Fante									
15–24	20.8	25.3	35.9	40.3	52.4	34.4	91.0	91.0	88
25–34	18.6	22.9	31.3	40.1	–	31.4	88.8	88.8	98
35–49	17.2	25.4	39.9	–	–	–	68.3	68.3	65
15–49	18.8	24.7	34.9	48.9	–	35.9	82.9	82.9	251
Mole-Dagbani									
15–24	24.7	30.6	40.2	46.5	–	39.4	79.5	79.5	206
25–34	21.6	29.4	40.3	51.9	–	40.4	89.9	84.9	417
35–49	22.6	33.2	48.5	–	–	–	72.7	67.4	298
15–49	23.1	30.7	42.5	55.5	–	42.8	82.9	77.9	921
Ewe									
15–24	21.1	26.6	33.7	54.7	–	37.2	84.4	84.4	199
25–34	21.3	27.0	37.6	51.8	–	38.4	86.1	82.0	332
35–49	20.6	26.9	38.4	–	–	–	74.1	68.8	238
15–49	21.1	26.8	37.2	54.9	–	39.0	81.9	77.7	769
Ga-Adangbe									
15–24	24.8	29.1	36.3	49.4	–	37.8	75.9	75.9	106
25–34	16.8	24.6	32.7	46.0	–	34.0	100.0	87.3	217
35–49	18.9	22.8	33.1	55.0	–	36.0	76.9	76.9	139
15–49	18.9	25.2	34.2	51.7	70.2	36.3	93.8	93.8	462
Other									
15–24	20.2	22.9	30.0	40.3	52.3	30.8	91.5	91.5	48
25–34	18.5	23.3	36.5	46.4	–	35.7	84.0	84.0	80
35–49	19.4	24.6	35.4	–	–	–	73.9	73.9	75
15–49	19.0	21.4	35.2	49.1	–	35.2	80.2	80.2	203

Appendix C – Detailed Tables: Patterns of Stopping Family Formation

Table C1 Recorded age at last live birth and estimated age at final birth for the cohort aged 45–49

Age (X)	Recorded percentage with most recent birth at age (X)	Estimated percentage with last (final) birth at age (X) fully adjusted
15	.2	.2
16	.2	.2
17	.7	.7
18	1.1	1.1
19	.5	.5
20	.7	.6
21	.7	.7
22	1.1	1.0
23	.5	.4
24	.2	.2
25	.9	.8
26	1.1	1.0
27	3.2	3.0
28	1.4	1.3
29	1.1	1.1
30	1.4	1.2
31	2.5	2.4
32	1.8	1.7
33	3.0	2.8
34	3.0	2.7
35	3.2	2.9
36	4.6	4.2
37	6.2	5.7
38	5.9	5.5
39	5.7	5.4
40	8.4	7.8
41	5.5	5.0
42	7.3	6.7
43	7.8	7.1
44	7.5	6.8
45	6.4	7.1
46	3.2	4.4
47	1.8	3.9
48	.7	1.9
49	.5	2.1
Mean age	37.7 years	38.8 years

Table C2 Recorded age at last live birth and estimated age at final birth for single-year cohorts

		Per cent within given age group who reported age at last birth as											
Current age	N	15	16	17	18	19	20	21	22	23	24	25	26
45	149	.7 (.6)	.0	.7 (.6)	.7 (.6)	.0 (.0)	1.3 (1.1)	.0 (.0)	2.0 (1.7)	.7 (.6)	.7 (.6)	2.0 (1.7)	1.3 (1.1)
46	85	.0 (.0)	.0 (.0)	1.2 (1.1)	.0 (.0)	.0 (.0)	.0 (.0)	.0 (.0)	1.2 (1.1)	.0 (.0)	.0 (.0)	.0 (.0)	1.2 (1.1)
47	44	.0 (.0)	.0 (.0)	.0 (.0)	2.3 (2.2)	2.3 (2.2)	.0 (.0)	.0 (.0)	2.3 (2.2)	.0 (.0)	.0 (.0)	.0 (.0)	2.3 (2.2)
48	86	.0 (.0)	.0 (.0)	.0 (.0)	2.3 (2.3)	1.2 (1.2)	1.2 (1.2)	2.3 (2.3)	.0 (.0)	.0 (.0)	.0 (.0)	1.2 (1.2)	.0 (.0)
49	74	.0 (.0)	1.4 (1.4)	1.4 (1.4)	1.4 (1.4)	.0 (.0)	.0 (.0)	1.4 (1.4)	.0 (.0)	1.4 (1.4)	.0 (.0)	.0 (.0)	1.4 (1.4)
45–49	438	.2 (.2)	.2 (.2)	.7 (.7)	1.1 (1.1)	.5 (.5)	.7 (.6)	.7 (.7)	1.1 (1.0)	.5 (.4)	.2 (.2)	.9 (.8)	1.1 (1.0)

Current age	N	27	28	29	30	31	32	33	34	35	36	37	38
45	149	2.0 (1.7)	.7 (.6)	1.3 (1.1)	2.7 (2.3)	.7 (.6)	2.7 (2.3)	1.3 (1.1)	2.7 (2.3)	2.0 (3.4)	4.0 (3.4)	6.0 (5.1)	6.0 (5.1)
46	85	5.9 (5.4)	1.2 (1.1)	.0 (.0)	.0 (.0)	4.7 (4.3)	2.4 (2.2)	4.7 (4.3)	4.7 (4.3)	3.5 (3.2)	8.2 (7.5)	4.7 (4.3)	5.9 (5.4)
47	44	4.5 (4.3)	2.3 (2.2)	.0 (.0)	2.3 (2.2)	2.3 (2.2)	.0 (.0)	9.1 (8.7)	4.5 (4.3)	4.5 (4.3)	.0 (.0)	4.5 (4.3)	2.3 (2.2)
48	86	2.3 (2.3)	2.3 (2.3)	2.3 (2.3)	.0 (.0)	.5 (3.4)	1.2 (1.2)	3.5 (3.4)	2.3 (2.3)	.0 (.0)	3.5 (3.4)	3.5 (3.4)	9.3 (9.2)
49	74	2.7 (2.7)	1.4 (1.4)	1.4 (1.4)	1.4 (1.4)	2.7 (2.7)	1.4 (1.4)	.0 (.0)	1.4 (1.4)	4.1 (4.1)	5.4 (5.4)	12.2 (12.1)	4.1 (4.1)
45–49	438	3.2 (3.0)	1.4 (1.3)	1.1 (1.1)	1.4 (1.2)	2.5 (2.4)	1.8 (1.7)	3.0 (2.8)	3.0 (2.7)	3.2 (2.9)	4.6 (4.2)	6.2 (5.7)	5.9 (5.5)

Current age	N	39	40	41	42	43	44	45	46	47	48	49
45	149	.0 (3.4)	7.4 (6.3)	7.4 (6.3)	8.7 (7.4)	8.7 (7.4)	10.7 (9.1)	7.4 (9.9)	1.3 (4.4)	.0 (3.9)	.0 (1.9)	.0 (2.1)
46	85	5.9 (5.4)	8.2 (7.5)	5.9 (5.4)	9.4 (8.6)	8.2 (7.5)	7.1 (6.5)	3.5 (3.2)	2.4 (3.3)	.0 (3.9)	.0 (1.9)	.0 (2.1)
47	44	2.3 (2.2)	15.9 (15.3)	2.3 (2.2)	2.3 (2.2)	9.1 (8.7)	9.1 (8.7)	9.1 (8.7)	4.5 (4.3)	.0 (.0)	.0 (1.9)	.0 (2.1)
48	86	9.3 (9.2)	7.0 (6.9)	4.7 (4.6)	9.3 (9.2)	7.0 (6.9)	3.5 (3.4)	5.8 (5.7)	4.7 (4.6)	4.7 (4.6)	1.2 (1.9)	1.2 (2.1)
49	74	6.8 (6.8)	8.1 (8.0)	4.1 (4.1)	2.7 (2.7)	5.4 (5.4)	5.4 (5.4)	6.8 (6.8)	5.4 (5.4)	5.4 (5.4)	2.7 (1.9)	1.4 (2.1)
45–49	438	5.7 (5.4)	8.4 (7.8)	5.5 (5.0)	7.3 (6.7)	7.8 (7.1)	7.5 (6.8)	6.4 (7.1)	3.2 (4.4)	1.8 (3.9)	.7 (1.9)	.5 (2.1)

NOTE: Figures in parenthesis are estimated.

Table C3 Per cent using contraception by current age and education

	Education							
	No schooling		Primary		Middle		Secondary +	
Current age	Modern	Traditional	Modern	Traditional	Modern	Traditional	Modern	Traditional
15–19	.0	3.8	2.1	2.1	5.2	1.5	.0	.0
20–24	.6	2.5	4.3	3.5	8.0	2.9	21.6	8.1
25–29	1.4	2.1	9.1	7.1	15.4	3.3	22.2	6.9
30–34	3.3	5.3	3.9	7.8	12.7	6.7	34.3	8.6
35–39	2.0	5.3	3.5	1.8	11.9	6.0	40.0	10.0
40–44	1.2	5.0	9.3	4.7	.0	3.0	21.4	7.1
45–49	1.3	2.9	.0	.0	3.8	.0	33.3	.0

Table C4 Per cent using contraception by current age and ethnicity

	Ethnic group									
	Twi		Mole-Dagbani		Ewe		Ga-Adangbe		Other	
Current age	Modern	Traditional	Modern	Traditional	Modern	Traditional	Modern	Traditional	Modern	Traditional
15–19	3.7	1.5	1.5	2.9	.0	2.9	5.0	10.0	.0	.0
20–24	7.1	2.1	.8	1.6	6.5	6.5	10.5	7.0	4.2	4.2
25–29	11.6	4.9	2.8	.0	7.0	7.0	12.0	4.0	8.7	4.3
30–34	8.2	5.9	1.7	.0	7.5	15.1	7.5	15.1	.0	9.5
35–39	4.7	5.1	.0	.0	4.7	9.3	3.9	9.8	4.0	.0
40–44	2.1	2.6	.0	.0	4.8	9.7	12.1	24.2	.0	.0
45–49	3.6	3.6	.0	3.2	.0	2.7	3.8	3.8	.0	.0

Table C5 Per cent using contraception by current age and residence

	Residence					
	Rural		Urban		Large urban	
Current age	Modern	Traditional	Modern	Traditional	Modern	Traditional
15–19	2.3	3.4	1.9	1.9	2.0	.0
20–24	3.7	2.7	9.9	3.3	6.5	3.9
25–29	4.5	2.8	9.3	5.6	20.8	3.4
30–34	3.7	6.0	8.3	5.0	15.6	7.0
35–39	2.6	6.2	5.1	3.0	7.8	2.9
40–44	2.0	5.1	1.4	5.6	6.0	3.0
45–49	1.8	1.4	—	9.8	2.5	2.5

Table C6 Per cent exhibiting a characteristic presumed to reflect menopause or secondary sterility, by age and ethnic group

Characteristic and ethnicity	Current age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Menopause							
Twi	.0	.0	.0	.4	2.8	8.3	27.0
Mole-Dagbani	.0	.0	.0	.8	1.9	10.2	29.0
Ewe	.0	.0	.0	.0	3.5	11.3	24.3
Ga-Adangbe	.0	.0	.0	.0	5.9	.0	23.1
Other	.0	.0	.0	.0	2.9	6.7	22.9
Menses stopped ⩾ 6 months							
Twi	.0	.0	.0	.0	1.8	6.1	23.7
Mole-Dagbani	.0	.0	.0	1.5	6.2	16.4	25.9
Ewe	.0	.0	.0	.0	6.0	13.5	23.8
Ga-Adangbe	.0	.0	.0	.0	.0	.0	12.5
Other	.0	.0	.8	.0	.0	10.5	44.4
Reported infecund							
Twi	.0	.8	1.7	3.9	17.7	27.1	49.6
Mole-Dagbani	.0	.0	.7	2.5	4.8	18.4	37.1
Ewe	.0	.9	1.7	4.3	12.8	25.8	45.9
Ga-Adangbe	.0	3.5	.0	3.8	7.8	6.1	46.2
Other	.0	.0	.0	.0	8.0	35.3	87.5
No birth in last 5 years							
Twi	.0	5.3	8.8	12.4	19.8	35.7	51.0
Mole-Dagbani	.0	8.2	5.8	17.6	15.0	10.7	19.4
Ewe	.0	.0	2.0	6.7	22.9	40.7	41.2
Ga-Adangbe	.0	.0	.0	14.8	34.4	13.3	60.0
Other	.0	.0	.0	14.3	31.6	33.3	.0
Has menopause or second sterility							
Twi	.0	1.5	5.2	9.7	26.4	40.7	59.9
Mole-Dagbani	.0	3.4	4.8	14.8	17.3	26.4	47.7
Ewe	.0	.7	2.4	7.1	25.0	42.9	63.8
Ga-Adangbe	.0	2.3	.0	10.3	25.0	10.8	58.1
Other	.0	.0	.0	8.0	32.0	50.0	80.0

Table C7 Per cent exhibiting a characteristic presumed to reflect menopause or secondary sterility, by age and education

Characteristic and education	Current age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Menopause							
No schooling	.0	.0	.0	.2	2.8	10.7	27.6
Primary	.0	.0	.0	.0	.0	9.3	21.4
Middle	.0	.0	.0	.7	4.5	6.1	30.8
Secondary +	.0	.0	.0	.0	.0	.0	33.3
Menses stopped ⩾ 6 months							
No schooling	.0	.0	.0	.7	2.9	11.0	25.1
Primary	.0	.0	.0	.0	2.1	5.0	22.2
Middle	.0	.0	.0	.0	1.4	3.2	21.4
Secondary +	.0	.0	.0	.0	.0	.0	.0
Reported infecund							
No schooling	.0	.6	1.8	2.5	11.7	26.3	46.3
Primary	.0	2.6	1.0	6.5	17.5	18.6	42.9
Middle	.0	.5	1.3	5.2	13.4	18.2	46.2
Secondary +	.0	.0	1.4	.0	.0	28.6	33.3
No births in last 5 years							
No schooling	.0	2.9	5.8	12.9	18.2	30.7	42.7
Primary	.0	7.5	10.3	11.4	28.1	25.0	50.0
Middle	.0	4.0	5.7	9.8	26.3	31.8	58.3
Secondary +	–	20.0	14.3	7.7	80.0	40.0	100.0
Has menopause or secondary sterility							
No schooling	.0	1.5	5.4	10.2	22.0	39.5	59.5
Primary	.0	4.0	4.3	11.6	29.0	28.0	40.9
Middle	.0	.9	3.2	8.3	22.4	33.3	67.9
Secondary +	.0	1.1	3.4	2.6	33.3	37.5	33.3

Table C8 Per cent with at least one of the four characteristics by current age and education (ever-married women)

Current age	Education			
	No schooling	Primary	Middle	Secondary +
15–19	–	–	–	–
20–24	1.6	5.9	2.1	2.4
25–29	6.1	7.0	3.9	4.1
30–34	11.4	14.0	12.3	5.6
35–39	25.4	36.8	31.7	50.0
40–44	45.4	36.0	35.9	37.5
45–49	65.8	61.9	71.4	83.3

Table C9 Per cent with at least one of the four characteristics by age and ethnicity (ever-married women)

	Ethnic group				
Current age	Twi	Mole-Dagbani	Ewe	Ga-Adangbe	Other
15–19	.0	.0	.0	.0	.0
20–24	1.8	3.8	3.4	4.5	.0
25–29	6.4	4.8	2.5	1.2	.0
30–34	11.5	17.5	8.2	12.1	12.0
35–39	33.1	20.4	29.2	32.8	32.0
40–44	45.4	30.0	48.6	13.8	55.0
45–49	64.8	52.2	68.0	67.7	90.0
Mean age	40.5	43.6	42.3	42.7	

Table C10 Percentage distribution of combined effects of stopping attributes[a] by current age and residence

Current age	All areas	Rural	Urban	Large urban
15–19	.0	.0	.0	.0
20–24	2.3	2.3	2.7	1.7
25–29	5.2	4.5	8.0	4.8
30–34	11.4	11.3	13.2	10.3
35–39	27.5	25.6	28.7	(35.0)[b]
40–44	43.6	44.1	45.7	(38.4)[b]
45–49	66.2	66.3	67.9	64.0
$\bar{X}$	42.5	42.7	41.7	42.3

[a]Menopause or secondary sterility, definitive widowhood/divorce/separation, terminal abstinence and sterilization.
[b]Number of women with attribute (S) is relatively small. Figures must, therefore, be interpreted with caution.