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MISTIMED AND UNWANTED CHILDBEARING IN THE COURSE
OF FERTILITY TRANSITION*

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A. BACKGROUND

Mistimed and unwanted childbearing are indicators of imperfect control over the reproductive processes. They mirror the extent of unmet need for effective contraception either to delay pregnancies and space births (mistimed fertility) or to stop childbearing (unwanted fertility). The levels of these indicators vary across countries in ways that are often difficult to explain because they do not correlate with contraceptive prevalence or fertility levels. For example, why would the level of mistimed and unwanted fertility be low in Niger where total fertility rate (TFR) is 7.2 and only 5% of women aged 15-49 use modern contraception, but high in Peru where 50% of the women use modern contraception and fertility level is less that half of that in Niger? One approach that has been adopted to investigate such variations is to focus on the determinants. Among the important determinants of mistimed and unwanted fertility are: maternal age, number of living children, preceding birth intervals and measures of economic status. However, while studies of determinants give us an understanding of factors that are important in explaining individual-level variations within a population, they do little to advance our understanding of the variation across countries or cultures.

One of the promising explanations for the apparently counterintuitive patterns of mistimed and unwanted fertility across human populations is the linkage to the stages of the fertility transition. This line of research, although it emerged in the last few years, has led to some interesting findings. The delay in making the conceptual link between overall fertility levels and the prevalence of mistimed and unwanted childbearing is partly due to the fact that initial research efforts to understand the patterns and determinants of mistimed and unwanted childbearing focused on low fertility settings of the West. Of course, in those early days, pertinent data for investigating this issue were not available in developing countries. However, with the availability of the World Fertility Surveys data in the 1970s and 1980s, researchers began to explore the possibility of investigating the pattern of unwanted childbearing in developing regions. Among the earliest systematic investigation of such topics in developing regions was a study by Westoff (1981) in which the general patterns of unwanted fertility in six countries were described. This was followed by the work of Blanc (1982), which focused on Latin America. The data situation improved considerably under the Demographic and Health Surveys (DHS) project. Available evidence now shows that a large proportion of pregnancies resulting in births in developing countries is neither planned nor wanted. According to a recent estimate from the United Nations Population Fund (1997), about 43% (75 million) of the 175 million pregnancies that occur annually are unwanted. Studies also show that the levels of mistimed childbearing seem higher than levels of unwanted childbearing.

1. Unwanted childbearing and fertility transition

In 1989, Westoff et al. (1989) hypothesized that unwanted childbearing patterns in developing countries has some relationship with the overall patterns and trends in total fertility rates. Similarly, Bongaarts and Lighbourne (1990) suggest that an association exists between aggregate levels of unwanted fertility and the stage where a country is along the course of fertility transition. However, these hypotheses attracted no major attention in the literature until towards the end of the 1990s when Bongaarts (1997) further explored the issue. Bongaarts demonstrated that over time, a transition occurs in the proportion of unwanted births observed in a population and that transition in unwanted fertility seems related to fertility levels.

The connection between total fertility and unwanted (excess) fertility, according to Bongaarts, is as follows: in a natural fertility setting, total fertility will be the sum of wanted and unwanted fertility, i.e., $F_t = WF_t + UF_t$, where F_t is total fertility at time t, WF_t is wanted fertility and UF_t is unwanted fertility at time t. In such a setting, married women continue to have children until they reach their desired family size. Thereafter, they may be having unwanted children in the absence of fertility control. If contraception

is introduced to such a population, and the contraception is 100% effective, then, the actual unwanted fertility is equal to the product of the proportion of married women who are not using contraceptives after completing their desired family size. Thus, according to Bongaarts, unwanted fertility is zero when no women want to stop childbearing. It peaks in the middle of the fertility transition when about a half of women who wanted no more children use effective contraception and again drops to zero when all women who want no more births use effective contraception. This is how it is assumed that a connection exists between observed levels of unwanted fertility and total fertility levels or fertility transition.

2. Mistimed childbearing and fertility transition

One of the limitations of the Bongaarts' model is the inability to separate mistimed fertility from wanted fertility despite its importance as a component of fertility change and contraceptive use in developing countries. The position taken in the current paper is that the prevalence of mistimed childbearing also changes over the course of fertility transition. The premise of this assumption is as follows: First, since unwanted fertility (UF_t) changes over the course of fertility decline, and since total fertility (F_t) is the sum of wanted (WF_t) and unwanted fertility (UF_t), then wanted fertility changes over the course of fertility decline. However, wanted fertility (WF_t) is composed of rightly timed fertility (RF_t) and mistimed fertility (MF_t) i.e., $WF_t = RF_t + MF_t$. Therefore, $F_t = RF_t + MF_t + UF_t$. It is argued here that mistimed fertility will change in the same way that unwanted fertility changes. This is because in a pre-transitional or natural fertility setting, although fertility is high and apparently no conscious attempt is made to limit the number of births, there are strong traditional norms to control the context, timing, and spacing of births. Adherence to such social controls and norms is usually widespread thereby limiting the incidence of mistimed pregnancies and births. Various studies have found that birth spacing is usually not a major problem in high fertility regimes. However, as modernization sets in, often accompanied by the introduction of modern contraception and increased schooling, adherence to the traditional norms and taboos – the means through which traditional societies regulated birth spacing and timing – weakens.

Consequently, the proportion of individuals and couples violating the traditional birth spacing norms without substituting with the use of effective modern methods would increase. Since desired family size is usually large, the risk of having a mistimed birth is therefore higher than in a low fertility setting. Hence, the prevalence of mistimed pregnancies and births would increase – often leading to higher fertility rates among some segment of the society. As more and more people adopt effective contraception, and as desired family size gets smaller, the prevalence of timing failure will decrease – provided there is limited number of user failure. The risk of user failure is high when a large proportion of contraceptive users are using temporary, user-dependent methods for delaying the onset of childbearing or for achieving long intervals between births.

3. Investigating the fertility transition linkage

Although Bongaarts has argued convincingly that a separate low-high-low transition exists in the level of unwanted childbearing and that such transition is related to fertility transition, the nature of his data did not allow for a test across fertility levels. Similarly, a pathway through which mistimed fertility levels could be connected to the course of fertility transition is presented in the preceding paragraphs. Nevertheless, it is necessary to test with empirical data to see if such a relationship actually exists. This is the next task to be undertaken in this paper.

Ideally, to investigate what happens to mistimed and unwanted fertility in a population as it moves from a high to a low fertility regime, it is necessary to follow that population through in time. This is neither feasible nor efficient for our purposes. An alternative is to use a hypothetical approach in an attempt to capture the experience of populations at various stages of their demographic transition. The

assumption in this case is that the levels of mistimed and unwanted fertility observed in countries with various levels of fertility approximate the experience of a given country as it journeys through various stages of fertility transition. If the analysis is limited to high-fertility countries alone, understanding the relationship that exists between mistimed and unwanted childbearing and declines in fertility regimes will be difficult. To show the relationship between TMFR or TUFR and TFR across a wide spectrum of fertility regimes, it is necessary to include countries with lower levels of fertility. Therefore, the countries included in this paper span a broad range of fertility levels.

In consonance with the practice in recent literature (Adetunji, 1998a; Tsui et al., 1997; Brown and Eisenberg, 1995; Forrest and Singh, 1990), in this paper, a child is defined as mistimed if the mother became pregnant at a time when she would have preferred to delay the pregnancy until a later time. A child is defined as unwanted if he or she was a product of a pregnancy that occurred when the mother wanted to have no more children. The use of the terms unwanted and mistimed childbearing, therefore, refers only to the time of conception and do not reflect the perception of the child at the time of birth or later in life.

B. DATA AND METHODS

1. Data

The paper is based on an analysis of Demographic and Health Surveys (DHS) data from 11 countries from Africa, Asia, Latin America and Eastern Europe. Initially, 14 countries that had participated at least twice in the DHS program were randomly selected from a list of countries representing various fertility scenarios that was supplied by the United Nations Population Division. These countries were selected to represent high-fertility settings (Chad and Niger), countries with declining fertility levels in Africa (Mali, Benin, Togo, Ghana and Kenya), Asia (Bangladesh, Indonesia and Kazakhstan) and Latin America (Brazil, Colombia and Peru) and Near East (Jordan and Yemen). However, because of non-availability of data, three countries (Brazil, Jordan and Yemen) had to be dropped from the list – leaving 11 countries for the paper. Of these 11 countries, the first DHS data set available in 4 countries does not contain the necessary variable for the analysis of trends.

For all the countries in the study, data on mistimed and unwanted childbearing were obtained from women who had given birth to a baby in the three to five years preceding the survey date and from those women who were pregnant at the time of survey. For our purposes here, only data for women who had given a birth in the preceding 36 months were of interest. The wording of their question was: "At the time you became pregnant with (NAME), did you want to become pregnant then, did you want to wait until later, or did you want no more children at all?" The women's responses were the basis for classifying the pregnancies as wanted then, wanted later (mistimed) or wanted no more children (unwanted). Wanted and rightly timed pregnancies were those that occurred at the time that the respondent wanted them; mistimed pregnancies were those that occurred sooner than the respondents desired (conceptually, these would be wanted), and unwanted pregnancies were those that respondents had when they wanted no more children.

2. Methods

From responses to this question, age specific fertility rates are calculated as follows:

$$ASFR[a,t] = b[a,t]/e[a,t]$$

where a = five year age groups 15-19 to 45-49, b[a,t] = births to women in age group **a** during the period t, and e [a,t] = woman-years of exposure among women in age group **a** during the period t (see Arnold and Blanc, 1990:2). In this paper, **t** refers to 36 months (three years) before the date of survey and each woman is assumed to contribute three years of exposure in her current age group. The same formula was used to derive the age-specific mistimed fertility (ASMF) and age-specific unwanted fertility (ASUF). From the age-specific rates, total mistimed fertility (TMF) and total unwanted fertility (TUF) were obtained. All of these rates were based on births in the 36 months before the date of interview especially because of the observation that more recent births tend to be more accurately reported by mothers than those in more distant past (Bankole and Westoff, 1998).

To get a sense of how the level of mistimed and unwanted fertility changes in the course of fertility transition, two approaches were adopted. First, we checked whether TMF and TUF rates differ according to the overall TFR in each country. We expected that both mistimed and unwanted fertility levels would be low in high fertility settings, high in countries undergoing fertility reduction, and low again in low fertility countries. Secondly, we undertook an analysis of the age pattern of mistimed and unwanted fertility to see if their interaction varies over the course of fertility transition. The results are shown using graphs. Specifically, we were interested in the age at which both lines intersect under various fertility scenarios.

The calculation of unwanted fertility in this paper differs in one important respect from the calculation used in some previous studies (Bankole and Westoff, 1995; Bongaarts, 1997). In those studies, wanted fertility was based on the difference between stated ideal and current family sizes. A woman whose number of children exceeds the ideal number that she reports is counted as having unwanted births. That is an indirect approach and it does not allow for an analysis of mistimed fertility. In the current paper, a woman had to indicate that the child in question was actually unwanted at the time of conception. A comparison of the total wanted fertility obtained from both approaches has been made in an earlier study (Adetunji, 1998a) and it shows no major differences in most countries. This notwithstanding, a direct comparison of the results of this paper with those using the indirect approach should be done with caution.

A quick word on possible sources of biases in the data before going on to present the results. First, because these data were collected retrospectively, there is the possibility of *post facto* rationalization. This may happen if, because of other considerations or events after the conception, a pregnancy is reported as rightly timed or wanted even though that was not the feeling when the pregnancy was first noticed. For example, an unmarried teenager who became pregnant might at first react negatively but later change her mind if her partner felt differently and planned to marry her. How often this happens is difficult to say. However, previous studies have shown that the farther the event is in the past, the more likely it is to be rationalized (Bankole and Westoff, 1998). To minimize the effects of post facto rationalization, then, the cases analyzed in this paper were restricted only to births in the 36 months (three years) preceding the date of interview.

Another possible source of bias in the data is the lack of information on the opinions of male partners. A man's opinions are still dominant in decisions about fertility in Africa. However, studies that examine how much the opinions of husbands or the child's father weigh on how a woman evaluates the wantedness of her pregnancy are rare. It may often be the case that a woman's expressed intention is not similar to that of her husband. A woman may express the view that she does not want to have another child, but her husband may or may not agree with her. In many cases, both husband and wife do not discuss such issues.

C. RESULTS

1. Levels and trends

Current fertility (TFR) among the countries in this study ranged from a high of 7.2 children per woman in Niger Republic to a low of 2.5 in Kazakhstan.   In the high fertility countries (TFR above 6+), which are all in sub-Saharan Africa (Table 1) – mistimed total fertility rates tend to be low. For example, in Niger and Chad, by the time a woman reaches the end of her reproductive life span, she would have mistimed the pregnancy of less than a child (0.7 and 0.6 respectively). About 10% of the TFR in Niger was mistimed, and 9% in Chad. A similar low mistimed fertility is observed in countries with a TFR below 4. However, in countries with a TFR between 4 and 5, mistimed fertility is much higher (see Figure 1).

The risk of having unwanted fertility is low in countries with a TFR above 6 and TFR below 3 and high among those with a TFR in-between this range. For example, in Niger and Chad, by the time a woman reaches the end of her reproductive life span, her chance of having an unwanted birth is virtually nil because unwanted TFR, as a percentage of overall TFR is 1.4%. Similarly, in Kazakhstan, unwanted TFR is only 0.17 or 6.8% of overall TFR. However, unwanted TFR is 14% of the TFR in Kenya, and 39% in Peru. Colombia seems to have elevated MTF and UTF than those with comparable TFR (see Figure 2 and Table 1).

Overall, if the highest and the distribution of mistimed and unwanted fertility rates across countries with highest and lowest TFR in the table 1 are considered, the finding suggests that both mistimed and unwanted fertility rates are low at the upper and lower extremities of TFR and are higher somewhat in-between. Thus, an apparent transition apparently occurs in mistimed and unwanted fertility rates over the course of fertility transition. This is the same conclusion that was reached using predominantly African countries in an analysis (Adetunji, 1998b). They also support the conclusions of Bongaarts (1997) in regard to unwanted (excess) fertility: that is, the level of unwanted fertility observed in a population tends to vary according to where a population is along the course of the fertility transition. It is low during a high fertility regime, it increases when fertility begins to decline, and it is again low when the population reaches a low fertility level. Although Bongaarts could not show this because of the nature of his data and his approach to measuring unwanted fertility, his logic is quite convincing.

Trends in TFR, MTF and UTF were examined in the seven countries with trends data. Overall, TFR increased in only one country (Niger), remained the same in only one country (Peru), while it decreased in most (five) of the countries. The highest decline was in Kazakhstan (0.5 of a child). However, unwanted fertility rates seem to have increased in four of the seven countries – mostly in countries with a TFR below 4. MTF decreased in most countries with trends data.

2. Age patterns

Age is a very important variable when discussing fertility levels and patterns. Because of the calculation of age specific fertility rates and age specific mistimed and unwanted fertility rates, it was possible to compare the age pattern of mistimed and unwanted childbearing. The result of that comparison, particularly the intersection, led to some interesting observations (Figures 3-13). First, the schedule of mistimed fertility differs from that of unwanted fertility in each country – in general, mistimed ASFR in countries with intermediate or high TFR peaks by age 20-24. Unwanted ASFR peaks towards the tail end of the reproductive life span. Secondly, in virtually all countries, an intersection occurs between the mistimed ASFR and unwanted ASFR line graphs. The points at which the

intersections between the graphs occur vary across all countries. Second, further examination suggests that the age at intersection – which represents the age at which mistimed fertility is replaced in prominence by unwanted fertility – falls into three separate categories (I refer to them as types A, B and C).

Type A patterns are those countries where the intersection occurred at the upper end of reproductive age span. The two countries in this category are Niger and Chad. Their intersection (or lack of it) occurs at ages 40 and above. Interestingly, these are also the two countries in the high-fertility (or pre-transitional fertility) category. Type B countries are those where the intersection (or crossover) occurs between ages 25-29 and 35-39: Mali, Togo, Benin, Kenya, Colombia, Bangladesh and Indonesia. The last group (Type C) where the intersection occurs before age 25 has just two countries – Kazakhstan and Peru. The case of Peru seems to be an aberration because its TFR does not seem to be in synch with this level of mistimed and unwanted fertility. However, if one looks at the unwanted TFR (Table 1), Peru has 1.4, suggesting that if its women had succeeded in implementing their desires, its TFR should have been 2.1. Thus, if Peruvian women were able to implement their fertility preference, the country would have reached replacement-level fertility.

D. DISCUSSION

In this paper, the relationship between total mistimed fertility rates (MTF), unwanted fertility and overall fertility pattern has been investigated. Rather than follow the same population through over time, a synthetic or hypothetical approach was adopted: the pattern observed in a cross-section of countries at various stages of the fertility transition is assumed to approximate the experience of a hypothetical country in its course of its fertility transition. The observed association between TFR and mistimed and unwanted fertility rates seems to be in the expected direction. The levels are low when TFR is high, but they increase as fertility levels decrease. The levels dropped to low levels when fertility reaches low levels. This is the pattern we expected. They tend to confirm the conclusions reached by Bongaarts (1997) for unwanted (or excess) fertility. They also tend to support the conclusions of an initial study focusing on sub-Saharan Africa (Adetunji, 1998b).

Thus, the fact that a consistent conclusion is arrived at from different analytical approaches, using different data sets from different countries, lends credence to the arguments and hypothesis put forward in this paper. Nevertheless, in interpreting this result, it is still necessary to bear in mind that more work is still needed on this topic. The number of countries represented here is small and the association in question is observed at aggregate levels. Mistimed and unwanted childbearing are individual reactions to pregnancies.

We would like to reiterate that the best way to establish the changes in mistimed and unwanted fertility levels over the course of fertility transition is to observe the level in a population when it experiences high, medium, and low fertility. Pertinent data that are necessary to do such analyses are not yet available. While awaiting further data for this investigation, the evidence seems reliable enough to warrant some discussion.

What do these findings suggest, in relation to the prospect for fertility decline in high fertility settings? First, as fertility levels (TFR) begin to decline, we should expect to see a rise in the proportion of mistimed pregnancies, which is a reflection of what would happen to unmet contraceptive need for spacing. At this stage, the most popular contraceptive methods are likely to be effective but temporary methods. Secondly, we expect the level of unwanted fertility to increase, reflecting a downward trends in fertility preference. Until the high levels of mistimed gives way to high levels of unwanted births,

prospects for a lasting reduction in TFR are small. Similarly, unless appreciable progress is made in reducing unwanted births, fertility reduction will progress very slowly.

One of the points that came out from this study is about the intersection between age specific mistimed and unwanted fertility rates. These intersection points represent the ages at which mistimed childbearing is exceeded or are supplanted by unwanted fertility. From the viewpoint of family planning programs, the age at which ASMFR intersects with ASUFR is the appropriate age when emphasis should be shifting from temporary methods to more permanent methods of contraception. Prior to that age, the predominant methods of choice among women at risk of pregnancy are reversible methods. A recommended objective of family planning programs in developing countries is to minimize the proportion of women experiencing mistimed and unwanted pregnancies that result in a birth. One way to do this is to reach women and men with relevant information as well as contraceptive methods when needed. The objective is to minimize the time lag between when a woman needs an effective contraceptive method and the time she begins to use one. Until this happens, a sizeable number of mistimed and excess births will continue to occur in many developing countries, thereby delaying the completion of the fertility transition.

E. CONCLUSION

The results presented in this paper suggest that the level of mistimed and unwanted fertility depends on where a country is in the course of fertility transition. The levels are high in countries that have begun the transition and have intermediate levels of fertility (e.g. a TFR of 3.5 – 5). One possible reason for the high level of mistimed childbearing is a time lag between the breakdown of traditional norms and widespread acceptance of effective contraception. Increased modernization, as evidenced by increased female education and rural-urban migration, tends to herald the breakdown of the traditional norms that supported or regulated birth intervals (prolonged breastfeeding, postpartum abstinence, sleeping arrangement for husbands and wives, plural wives). Adoption of effective method of contraception that could have helped couples to achieve desired birth intervals might still not be immediate. Consequently, couples may discover that they are having shorter birth intervals than desired. Thus, a large proportion of potential users of modern contraceptive methods would exist that are not using these methods. When couples use contraception, since their problems now is mainly how to prevent mistimed births, they would be more interested in temporary, reversible methods than a permanent method. Similarly, a high level of unwanted fertility suggests that fertility preference is well below fertility behavior. The implication is that there are high levels of unmet need for stopping.

In conclusion, as countries move from high to low fertility regimes, the levels of mistimed and unwanted fertility levels are likely to increase first unless concerted efforts are made to curb them. Meanwhile, more studies are needed on this issue. Particularly, it would be interesting to see whether unmet needs for spacing and for stopping undergo a similar transition as a country moves from high to low fertility regimes. Countries where a large proportion of their births is unwanted could achieve very low TFR by eliminating or minimizing the occurrence of unwanted births. Conversely, when the level of unwanted fertility is low and the overall fertility is high, it is likely that as fertility declines, both mistimed and unwanted fertility will rise before both UTF and TFR reach a new equilibrium at low levels. This has implications for family planning programs and the method mix that is appropriate for countries at various stages in the transition.

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TABLE 1. TOTAL FERTILITY RATES AND THE LEVELS OF MISTIMED TOTAL
FERTILITY AND UNWANTED TOTAL FERTILITY IN SELECTED COUNTRIES

Country (year of survey)	Total fertility rate	Total mistimed fertility rate	Total unwanted fertility rate
Niger (1998)	7.20	0.72	0.10
Chad (1996/97)	6.37	0.57	0.09
Mali (1995/96)	6.71	1.15	0.33
Benin (1996)	5.96	1.07	0.45
Togo (1998)	5.20	1.57	0.57
Kenya (1998)	4.70	1.61	0.67
Peru (1996)	3.54	0.75	1.38
Bangladesh (1996/97)	3.27	0.63	0.48
Indonesia (1997)	2.78	0.24	0.27
Colombia (2000)	2.61	0.74	0.66
Kazakhstan (1995)	2.49	0.20	0.17

Source: Demographic and Health Surveys data

TABLE II   Trends in the total fertility, mistimed fertility and unwanted fertility rates in selected countries.

	TFR		MTFR		UTFR		Change in:		
	Period 1	Period 2	Period 1	Period 2	Period 1	Period 2	TFR	MTFR	UTFR
Niger	6.99	7.20	0.85	0.72	0.18	0.10	+0.21	-0.13	-0.18
Chad (1996/97)	--	6.37	--	0.57	--	0.09	--	--	--
Mali (1995/96)	--	6.71	--	1.15	--	0.33	--	--	--
Benin (1996)	--	5.96	--	1.07	--	0.45	--	--	--
Togo (1998)	--	5.20	--	1.57	--	0.57	--	--	--
Kenya (1993, 1998)	5.40	4.70	1.73	1.61	1.24	0.67	-0.7	-0.12	-0.57
Peru (1991/92, 1996)	3.54	3.54	0.81	0.75	1.33	1.38	0.00	-0.06	+0.05
Bangladesh (1993-94, 1996/97)	3.44	3.27	0.61	0.63	0.56	0.48	-0.17	+0.02	-0.08
Indonesia (1991, 1997)	3.02	2.78	0.49	0.24	0.25	0.27	-0.24	-0.25	+0.02
Colombia (1990, 2000)	2.82	2.61	0.46	0.74	0.64	0.66	-0.21	+0.28	+0.02
Kazakhstan (1995)	2.49	2.01	0.20	0.19	0.17	0.20	-0.48	-0.01	+0.03

Source: Demographic and Health Surveys data

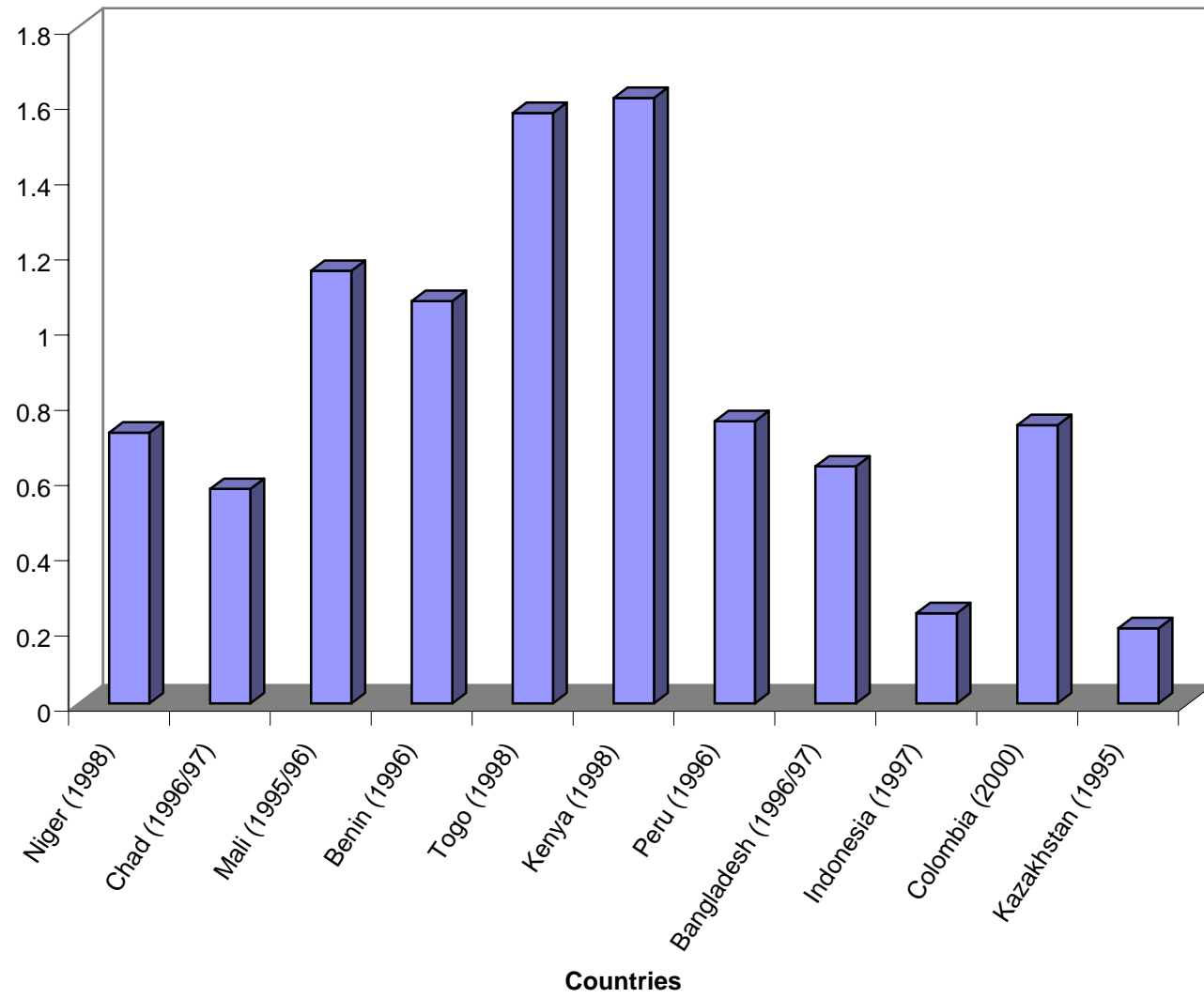**Figure I   Mistimed Total Fertility Rates in High and Low Fertility Countries**

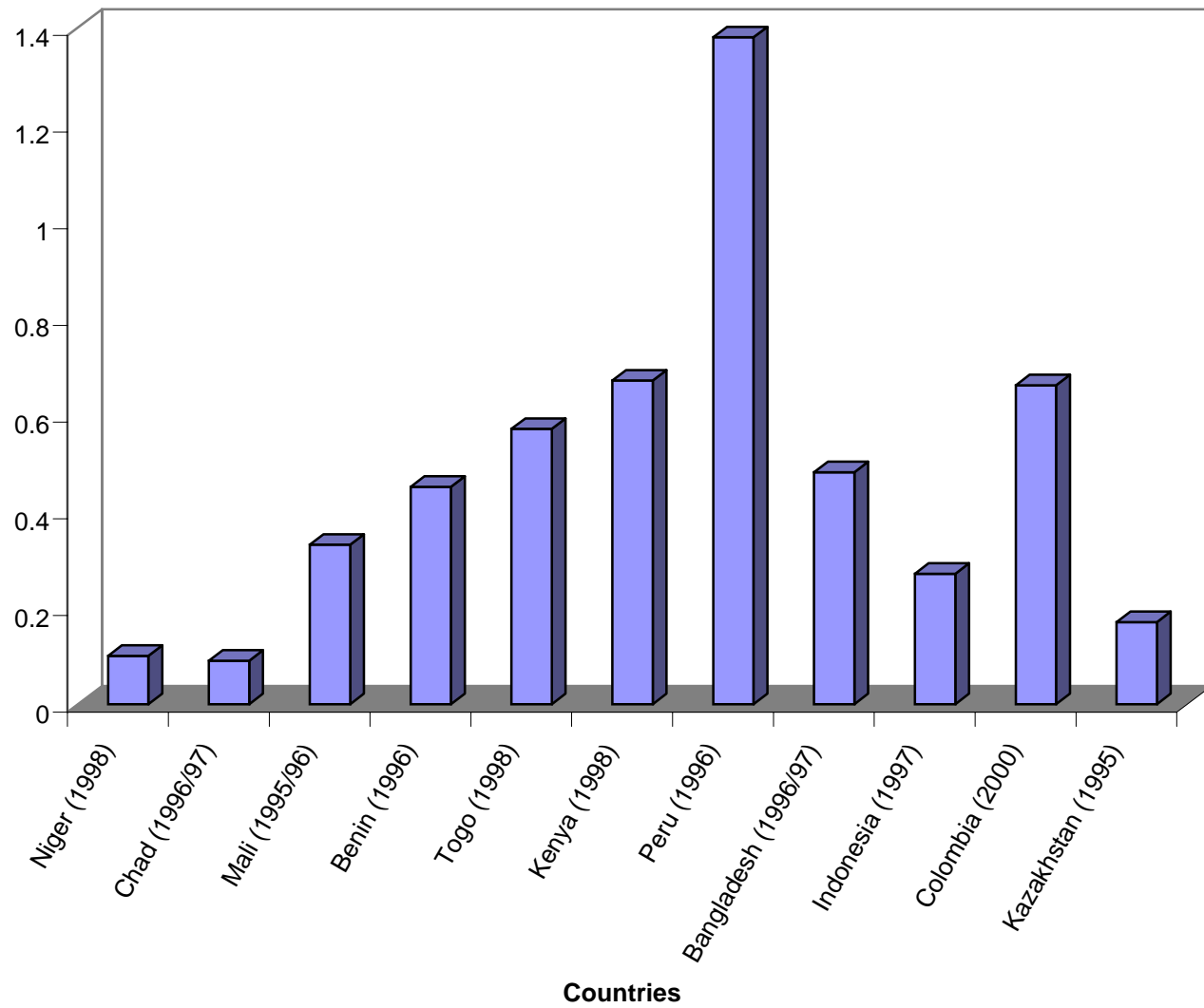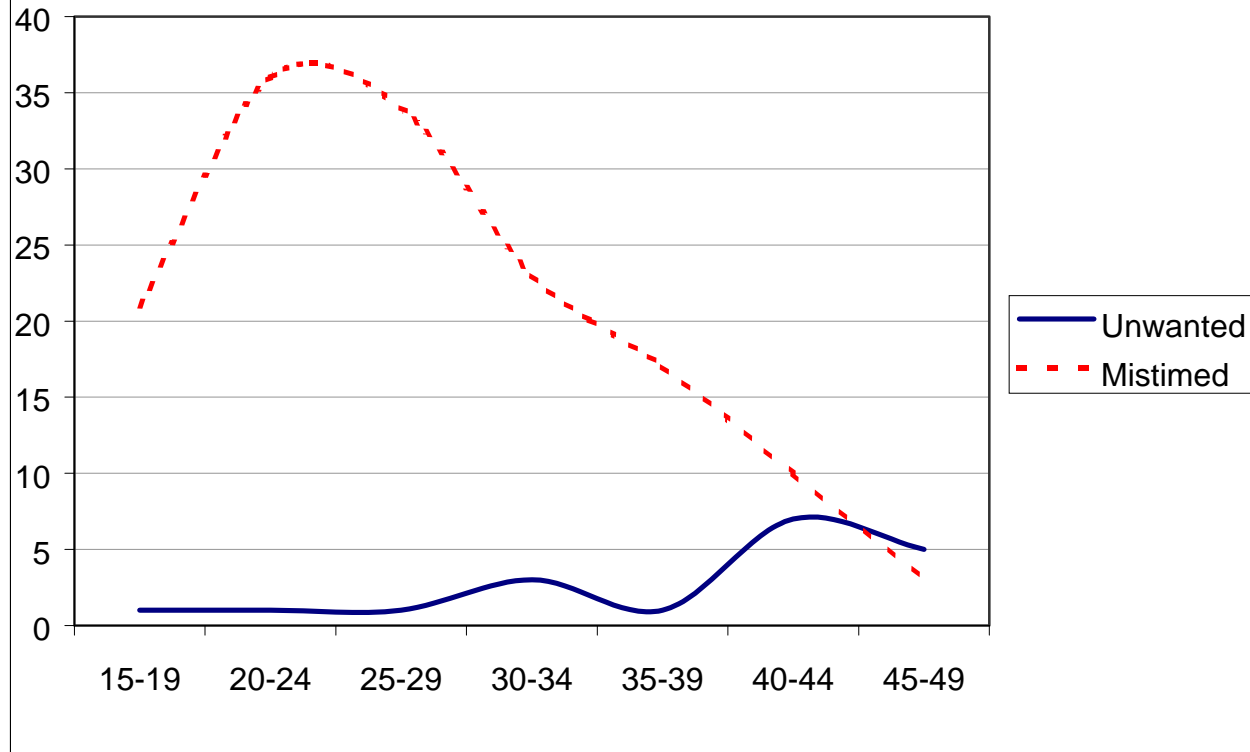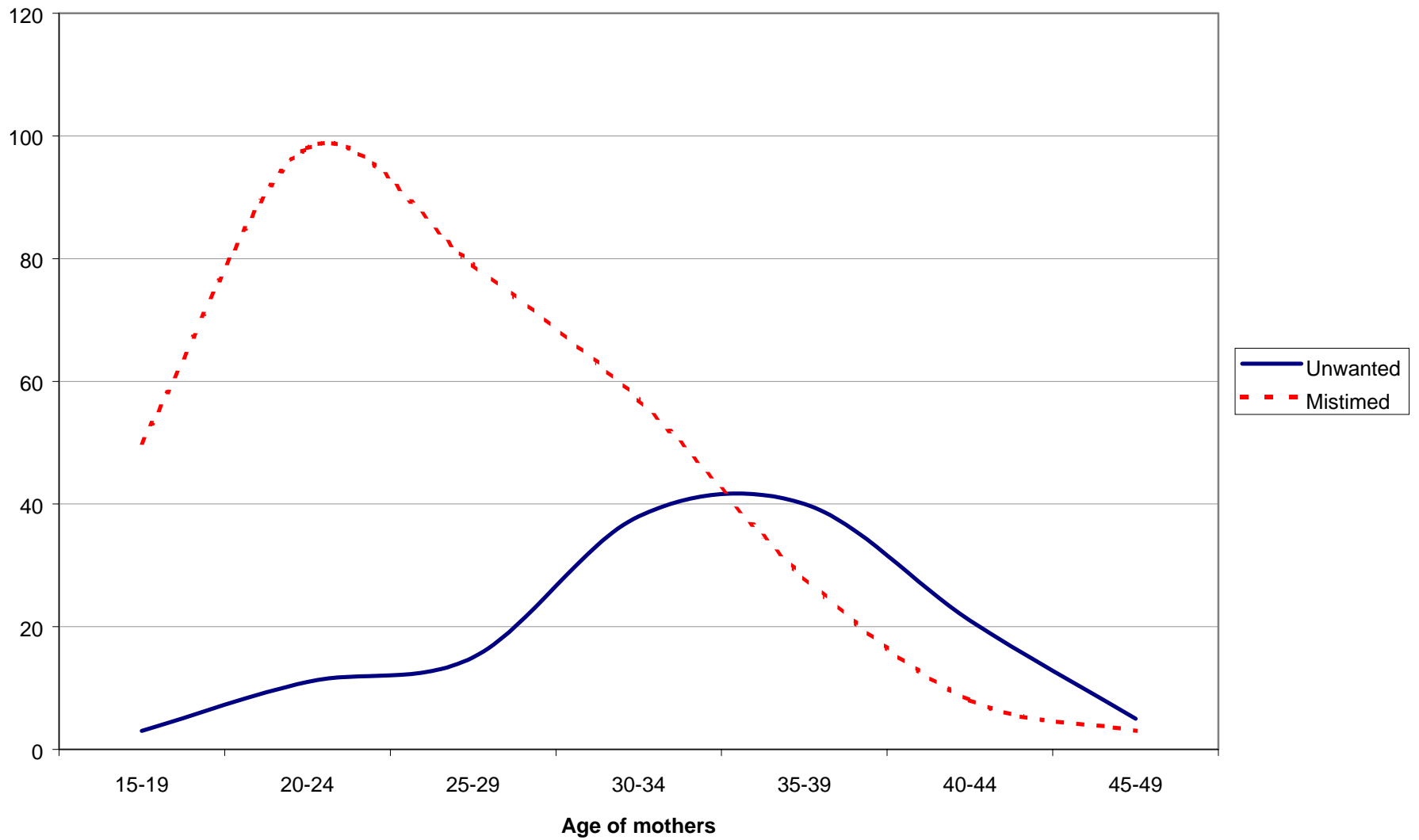**Figure II   Unwanted Total Fertility Rates in High and Low Fertility Countries**

Type A   Age-specific Mistimed and Unwanted Fertility, Niger, 1998

Type B   Age-specific Mistimed and Unwanted Fertility, Kenya 1998

Type C   Age-specific Mistimed and Unwanted Fertility, Kazakhstan 1999