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Studies in Family Planning, Vol. 32, No. 1 (Mar., 2001), 41-52.

Stable URL:
http://links.jstor.org/sici?sici=0039-3665%28200103%2932%3A1%3C41%3ATROCIC%3E2.0.CO%3B2-4

Studies in Family Planning is currently published by Population Council.

REPORTS

The Role of Changes in Contraceptive Use in the Decline of Induced Abortion in Turkey

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The induced abortion rate in Turkey declined from a peak of 4.5 abortions per 100 women in 1988 to 2.4 in 1998. This study examines the extent to which the decline in abortion in Turkey can be attributed to increased use of modern contraceptives. Trends in induced abortion rates and in contraceptive use are examined among Turkish women together with fertility preferences, changes in the contraceptive behavior associated with abortion, and changes in the propensity to abort unwanted pregnancies. The analysis includes a number of simulations that examine what abortion levels might be in different contraceptive-use scenarios. Results indicate that the decline in abortion is due to a decrease in the number of abortions associated with traditional method failure. This decrease is related to three factors: a shift from traditional method use to modern method use, a decline in the traditional method failure rate, and a decline in the proportion of pregnancies resulting from traditional method failures that are aborted. (STUDIES IN FAMILY PLANNING 2001; 32[1]: 41–52)

The relationship between contraceptive use and induced abortion is a long-debated and difficult one. The difficulty arises from the complex interaction of several interrelated factors that range from social, cultural, religious, and economic influences, from how ideal family size is determined, and from the demand for abortion and contraception, to a totally different set of variables related to the quality of family planning services. How the quality of services affects their use, contraceptive discontinuation, and contraceptive failure, as well as the use of abortion services are all factors that come into play in this relationship.

The abortion rate and ratio in Turkey are relatively high but have been declining during the last decade. Although overall contraceptive use has been stagnant over the same period, a gradual shift has occurred from use of traditional to modern contraceptive methods. The purpose of this study is to analyze the factors associated with the recent reduction in the induced abortion rate in Turkey, with particular emphasis on the role of increased use of modern contraceptives. National data are used for analysis, primarily those from the 1993 and 1998 Turkey Demographic and Health Surveys (TDHS), supported by earlier national data from the 1978, 1983, and 1988 Turkey Population and Health Surveys (TPHS). Potential contributions of other related factors, specifically changes in fertility preferences and in demand for family planning, changes in contraceptive discontinuation and contraceptive failure rates, and changes in the propensity to abort unwanted pregnancies are also examined.

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Background

The Sociodemographic and Family Planning Context

Turkey's current population of 65 million is projected to reach 88 million by the year 2025 (Population Reference Bureau 2000). The country is undergoing rapid urbanization, fueled by internal migration, with some cities growing at a rate of 4 percent per year (State Institute of Statistics 1997). Since the 1980s, Turkey has made great strides in liberalizing its economy; annual income

per capita is more than US$3,000, placing the country in the class of middle-income economies. Life expectancy still hovers around 68 years, however; like many other social development and health indicators, it is lagging behind that of comparable economies (OECD, 1999).

The Turkish family planning program, initiated in 1964, is one of the oldest in the developing world. In 1983, a liberal population law was passed, helping the program to diversify and expand. The new law legalized sterilization services and authorized nonphysicians to deliver family planning services. The 1983 law also legalized induced abortion up to ten weeks of pregnancy. The total fertility rate dropped from 4.3 children per woman of reproductive age in 1978 to 2.6 children in 1998. The most rapid decline occurred between 1983 and 1993, from 4.1 children to 2.7 children over the ten-year period (Hacettepe University Institute of Population Studies 1987 and 1989; Ministry of Health [Turkey] et al. 1994).

Unusually high reliance on traditional methods, particularly withdrawal, is a unique feature of the contraceptive-use pattern in Turkey. In 1978, the practice of withdrawal made up half of all contraceptive use. In spite of a gradual shift from traditional to modern methods, withdrawal is still the most commonly used contraceptive method. In 1998, 24 percent of all currently married couples practiced withdrawal, followed by the intrauterine device (IUD), at 20 percent (Hacettepe University Institute of Population Studies and Macro International 1999).

Even before its legalization in 1983, abortion was a common practice in Turkey. Particularly before the inception of the family planning program in 1964, the lack of modern contraceptives resulted in widespread use of induced abortion. Throughout the 1960s and 1970s, when the availability of family planning services remained limited, abortion rates increased steadily. In the 1970s, one-third of all women were estimated to have undergone at least one abortion.

Once the procedure was legalized in 1983, the abortion rate increased over a five-year period, and then began to decrease after 1988. At the same time, the prevalence of modern contraceptive use continued to rise, but prevalence of traditional method use began fall (Hacettepe University Institute of Population Studies 1987 and 1989; Ministry of Health [Turkey] et al. 1994).

Contraceptive Use and Induced Abortion

The relationship between trends in abortion and trends in contraceptive use has been analyzed for several other countries. In some eastern European countries, such as Hungary, increases in the availability of contraceptives in the mid-1960s led to immediate declines in abortion rates (Rolston and Eggert 1994). Trends in contraceptive use and abortion have been different in other countries, however. For example, in Korea, the abortion rate and contraceptive prevalence rate (CPR) rose simultaneously during the 1960s, as a result of increasing demand for smaller families. The abortion rate declined in the following decades, while contraceptive use among married women tripled from 24 percent to 77 percent. The abortion rate eventually stabilized, however, primarily because a large proportion of women relied on less effective traditional methods (Noble and Potts 1996).

Trends in the United States have been similar to those in Korea and Turkey. In the United States, the legalization of abortion in 1973 led first to a brief period of increase in the abortion rate and then to a gradual decline in the 1990s, accompanied by an increase in contraceptive use. This decline occurred as women shifted to using more effective contraceptive methods and to using them properly (Jones 1989).

A comprehensive study in three central Asian countries shows that increased use of family planning methods led to a corresponding decline in abortion rates in all three countries (Westoff et al. 1998). In Kazakhstan, the Kyrgyz Republic, and Uzbekistan, having an abortion was associated with age, number of living children, wanting no more children, and particularly with practicing contraception. The study also described a simulation analysis that the authors conducted to estimate future abortion rates by making different assumptions about contraceptive use, the propensity to abort, and contraceptive failure rates. The simulation analysis suggests that the abortion rate will be reduced by 25 to 30 percent over the next five years in these countries, based on plausible continued increases in contraceptive use and corresponding reductions in unmet need for contraception.

Another study on trends in abortion and in contraceptive use and fertility in Brazil, Colombia, and Mexico provides descriptive data on relationships among these trends over time (Singh and Sedgh 1997). It concludes that as a result of increasing demand for limiting fertility, abortion rates may continue to rise even while contraceptive use rises, but that ultimately they will stabilize and decline.

This brief review of the literature demonstrates that, although increases in contraceptive use ultimately lead to decreases in induced abortion rates, trends have been following different paths in individual country settings. Abortion rates and contraceptive practice often rise simultaneously because they are affected by the same un-

derlying social and demographic factors. Similarly, women who practice contraception are often those who are more likely than others to undergo abortions, again because of common causality. In these situations, increases in contraceptive use may reduce reliance on abortion by keeping abortion rates stable or by preventing an even more rapid increase in abortion rates.

Conceptual Framework

This study follows the conceptual framework summarized in Figure 1. Two main factors may have contributed to the decline in induced abortion rates in Turkey: a decrease in unintended pregnancies or a decline in the propensity to abort unintended pregnancies.

For fewer unintended pregnancies to occur, three possibilities are indicated: First, more couples might want to have children or couples might want to have more children. In either case, a decline would be seen in the proportion of couples who want to space or limit childbearing. Second, more couples could be practicing contraception. In this case, an increase in contraceptive prevalence rates would occur. Finally, couples might be practicing contraception more effectively, which would be reflected in declines in contraceptive failure rates. All of these variables might contribute to the decline in induced abortion rates. Therefore, this study examines the changes in all of these potential factors.

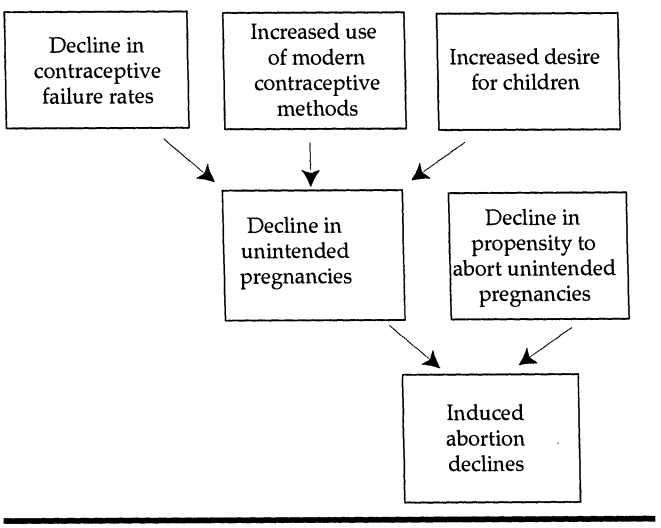
Data and Methods

The data come primarily from the 1993 and 1998 TDHS. The 1993 TDHS was conducted between August and October 1993. A nationally representative sample of 6,519 ever-married women aged 15–49 were interviewed. The 1998 TDHS was conducted between August and November 1998 and covered a nationally representative sample of 8,576 women aged 15–49 (including never-married women). Husbands of selected currently married women were also interviewed in half of the households.

In both surveys, data on induced abortion were collected in the reproduction section of the questionnaires, and five-year pregnancy histories were collected in the calendar section.[1] Basic data on knowledge, ever use, and current use of contraceptives were collected in the contraception section, and complete five-year contraceptive histories were collected in the calendar. This study also uses data on fertility preferences, on the wanted status of live births in the preceding five years, and on the women's background characteristics collected elsewhere in the questionnaires.

Data are also drawn from the 1978, 1983, and 1988 TPHS surveys in order to examine long-term trends wherever possible. All three surveys covered nationally representative samples of ever-married women younger than 50 and provide data on abortion and contraceptive use. The questions on abortion and contraceptive use were asked differently in these surveys than they were in the two DHS surveys, however. In particular, the data on abortion were collected by means of a complete pregnancy history, a method that provides more complete data than does the DHS calendar approach. The TPHS surveys did not collect the five-year contraceptive histories collected during the DHS surveys. Therefore, the analyses presented below that rely on the contraceptive-history data are restricted to the 1993 and 1998 surveys.

Figure 1 Factors affecting a decline in induced abortion

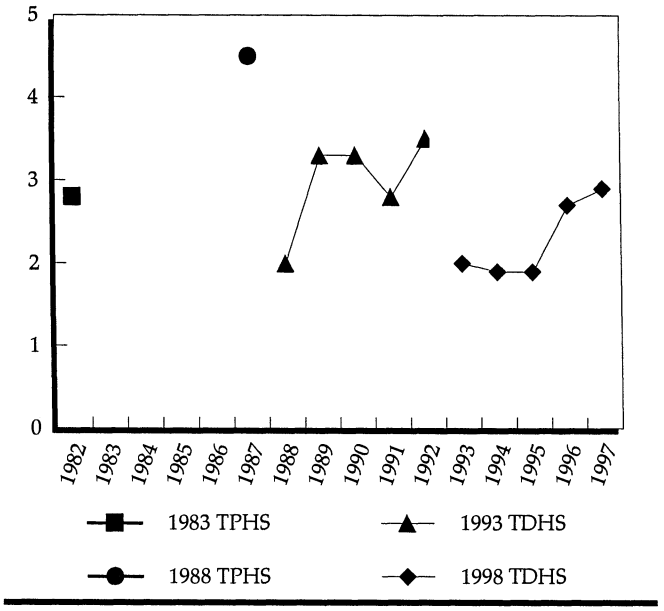


Data Quality

Good-quality data on induced abortion are notoriously difficult to gather. Induced abortions are typically underreported in many countries. Women may wish to conceal their having had one either because abortion is illegal or because of the social stigma associated with the procedure. Because abortion is legal and relatively acceptable in Turkey, the social and legal context is conducive to better-quality reporting. Nevertheless, underreporting of induced abortion remains a concern.

Figure 2 presents estimated annual abortion rates per 100 ever-married women aged 15–44 for 1982–97, by source. The most striking feature of this figure is the disjuncture between the series from each source. Typically, the latest figure for a given survey is much higher than the earliest figure from the next survey, even

Figure 2 Estimated annual abortion rates per 100 ever-married women aged 15–44, Turkey, 1982–97



Source: Data for 1983 and 1988 TPHS: Hacettepe University Institute of Population Studies (1989).

though the two figures are only a year apart. Moreover, the abortion rates from a given survey tend to increase closer to the survey date. These patterns suggest omission of abortions farther back in time or possibly misplacement of abortions in time to a date closer to the survey than they actually occurred. Given these patterns, most of the following analyses are based on the three-year period before each survey.[2] For some analyses, the three months immediately before the survey are excluded to allow for underreporting of first-trimester pregnancies and censoring of the outcome of recent pregnancies.[3]

Data concerning contraceptive use are generally much more reliable than are data on abortion. Reporting of traditional method use can be sensitive to the way questions are asked, but because virtually the same question format was employed in all the surveys used in this analysis, and because withdrawal is a widely recognized and used method in Turkey, the reporting of traditional method use should be reasonably good in these surveys. Several analyses of the quality of DHS calendar data on contraceptive use suggest that they are of reasonably good quality in terms of completeness and internal consistency (Goldman et al. 1989; Westoff et al. 1990; Curtis and Blanc 1997). The main problem identified by researchers lies in the reliability of reporting the main reason for contraceptive discontinuation (Curtis and Blanc 1997; Strickler et al. 1997). In addition, Strickler et al. (1997) found considerable unreliability in the reporting of individual women's contraceptive histories in Morocco, particularly for complex histories, although aggregate-level indicators were generally robust in terms of this unreliability.

A previous analysis of the quality of the 1993 TDHS calendar data on contraceptive use found some evidence of underreporting of condom use and of traditional method use other than withdrawal, but found no other serious data-quality problems (Enünlü and Doğan 1996). One area of concern, however, is that there is more information missing concerning reason for method discontinuation in the 1998 TDHS than in the 1993 TDHS. In the 1993 TDHS, 6 percent of completed episodes of contraceptive use in the calendar were lacking responses for reason for discontinuation (Ministry of Health [Turkey] et al. 1994). This figure increased to 13 percent in the 1998 TDHS (Hacettepe University Institute of Population Studies and Macro International 1999).

Results

Abortion Trends

Table 1 shows trends in the abortion ratio per 100 pregnancies and per 100 live births, and in the abortion rate per 100 ever-married women aged 15–49 for the period 1982–98. The abortion rate and ratio increased sharply between 1983 and 1988 following legalization of the procedure. Since 1988, the abortion rate and ratio have been declining steadily.

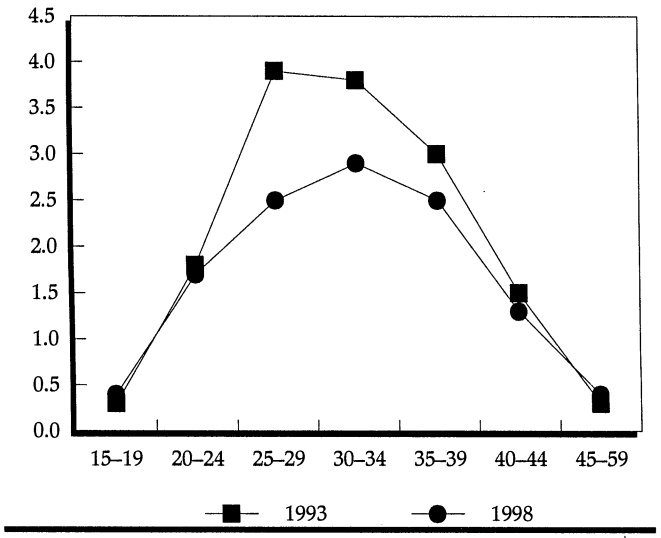
Figure 3 shows trends in age-specific abortion rates for 1993–98. The abortion rate has declined for all age groups except the youngest (15–19) and the oldest (45–49). The declines are most pronounced in the peak reproductive years, 25–39. Because the majority of unwanted pregnancies occur during these years, a decline in the abortion rates for women of these ages leads to a substantial drop in the total number of abortions. Be-

Table 1 Number of abortions per 100 pregnancies, per 100 ever-married women aged 15–49, and per 100 live births in the year before the survey, and standard errors, Turkey, 1982–98

Survey	Per 100 pregnancies	Standard error	Per 100 women	Standard error	Per 100 live births	Standard error
1983 TPHS[a]	12.1	(na)	2.8	(na)	15.4	(na)
1988 TPHS[a]	23.6	(na)	4.5	(na)	35.1	(na)
1993 TDHS	18.0	(1.3)	3.1	(0.2)	26.0	(2.3)
1998 TDHS	15.7	(1.4)	2.5	(0.2)	20.9	(2.3)

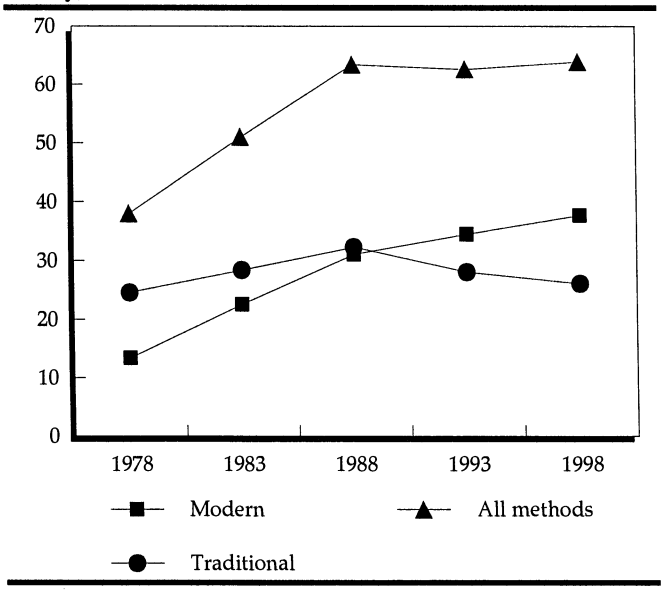
na = Not available. [a]Published figures.
Note: The abortion ratio is shown per 100 women or per 100 live births; the abortion rate is shown per 100 women aged 15–49.
Sources: Hacettepe University Institute of Population Studies (1987 and 1989).

Figure 3 Trends in age-specific abortion rates, Turkey, 1993 and 1998



Notes: Abortion rates are calculated for three years before each survey. The abortion rates refer to all women aged 15–49. Data for all women were not available for 1988.

Figure 4 Contraceptive prevalence among married women, Turkey, 1978–98



Source: Data for 1978–83: Hancioglu (1997).

tween 1993 and 1998, the total induced abortion rate, which represents the number of abortions a woman is expected to have during her lifetime, given current age-specific abortion rates, declined from 0.74 to 0.59.[4]

An analysis of trends in abortion rates between 1983 and 1998 by selected background characteristics revealed that the declines in abortion are most pronounced among women living in more developed areas (urban, west, central) and among more educated women (data not shown).

Trends in Contraceptive Use

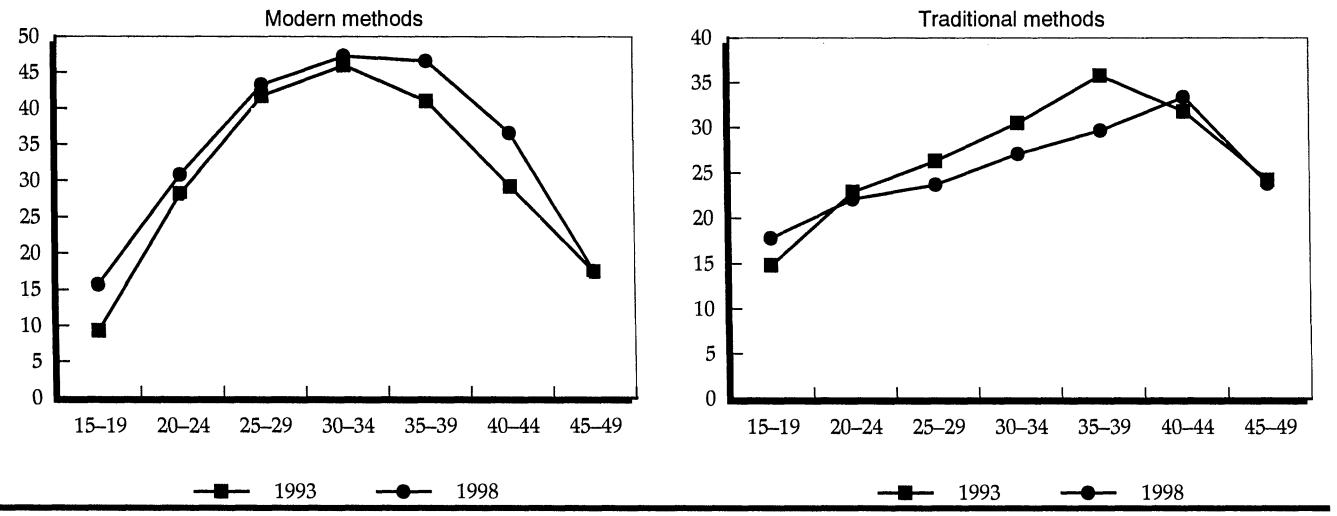
Figure 4 shows the proportion of currently married women aged 15–49 who reported that they were practicing contraception for the period 1978–98. Overall contraceptive use among married women increased sharply from 38 percent to 63 percent between 1978 and 1988. Since 1988, total contraceptive use has leveled off at around 63 percent. In the period of 1988–98, a substantial shift occurred away from traditional methods in favor of modern methods. Despite the decline in use of traditional methods, withdrawal remains the most commonly practiced means of contraception, relied upon by nearly one-fourth of all couples surveyed in 1998 (data not shown). Between 1988 and 1998, the use of intrauterine devices and sterilization increased steadily. Neither pill nor condom use changed much, however.

Figure 5 shows trends in contraceptive prevalence for modern and traditional methods among married women by age. Modern contraceptive use increased in all age groups between 1993 and 1998, with the most pronounced increases occurring among women aged 15–19 and 35–44. At the same time, traditional method use decreased for all age groups except for the youngest, with the most pronounced decreases among women aged 25–44. Overall contraceptive use increased only among those in the oldest (40–49) and youngest groups (15–19), and a slight (but statistically insignificant) decrease occurred in contraceptive use among women aged 25–39 (not shown). These findings suggest that the recent shift from use of traditional methods to modern methods seen in Figure 4 is most pronounced among women at the peak reproductive ages. The decline in abortions is also most pronounced among women in these same age groups, as shown in Figure 3. No substantial differences in the trend from traditional to modern methods are found by area of residence, region, or education (data not shown).

Fertility Preferences and Unmet Need for Contraception

Although trends in abortion in Turkey are clearly linked to trends in contraceptive use, the exact dynamic of this link is less clear. The first step in examining the link in more detail is to look at fertility preferences and demand for contraception. Changes in fertility preferences affect both the propensity to abort and contraceptive behavior. For example, shifts in attitudes toward more pronatalist fertility preferences could lead to declines in unmet need for contraception which, in turn, could lead

Figure 5 Contraceptive prevalence among married women, by method type, according to age, Turkey, 1993–98



to reductions in the demand for abortion if contraceptive use is maintained at previous levels.

Table 2 shows recent trends in preferences for spacing and limiting births among married women by age. Between 1993 and 1998, the proportion of married women who said they wanted no more children declined. Although this change was relatively small, it is statistically significant. In contrast, no change is seen in the proportion of married women reporting that they wanted to wait more than two years to have another child. No change in fertility preferences is found among the youngest married women aged 15–19, but among married women aged 20–34 a consistent decline is seen in the proportion who wanted no more children, accompanied by a small (and insignificant) increase in the proportion who wanted to wait at least two years until their next birth. Because both age at first marriage and age at first birth have been increasing in Turkey (Hacettepe University Institute of Population Studies and Macro International 1999), the recent declines in the proportion of younger women who want no more children may be associated with delays in marriage and childbearing that have resulted in a shift in the age at which women reach their ideal family size. Few women older than 35 want to space births. The proportion of these women wanting to stop childbearing decreased slightly between 1993 and 1998.

Total demand for contraception among married women remained at 76 percent from 1993 to 1998. In general, unmet need and demand for contraception did not change substantially in any subgroup between 1993 and 1998 (data not shown). This finding is consistent with the stable overall contraceptive prevalence rate and with the relatively small changes in fertility preferences discussed above. Therefore, little of the recent decline in abortion in Turkey is likely to be linked to declines in unmet need for contraception associated with changes in fertility preferences.

Table 2 Percentage of currently married women aged 15–49 who say they want no more children and who want to wait at least two years to have another child, by age group, according to data source, Turkey, 1988, 1993, and 1998

	Want no more children			Want to wait > 2 years		
Age group	TPHS 1988	TDHS 1993	TDHS 1998	TPHS 1988	TDHS 1993	TDHS 1999
15–19	14.7	15.1	15.1	na	50.2	47.3
20–24	39.9	34.6	32.3	na	40.3	41.3
25–29	65.3	64.9	56.8	na	18.0	19.7
30–34	83.8	83.6	77.8	na	4.6	5.4
35–39	85.8	89.7	87.8	na	1.6	0.4
40–44	76.7	89.2	86.7	na	0.3	0.2
45–49	47.6	79.7	75.4	na	0.0	0.1
Total	65.2	69.8	66.3	na	13.9	13.6

na = Not available.

Contraceptive Behavior Prior to Abortion

Contraceptive behavior prior to induced abortion is examined here in order to gain a more complete understanding of the dynamics of contraceptive use that result in abortion, and to determine whether these dynamics have changed recently.

Table 3 presents the percentage distribution of abortions in the three years before each survey by the most recent contraceptive behavior reported for the pregnancy interval preceding the abortion.[5] The majority of abortions are preceded by contraceptive use. In 1998, 46 percent of all recent abortions were preceded by a traditional contraceptive method failure or discontinuation.

Table 3 Percentage distribution of reported induced abortions in the three years prior to the survey, by most recent contraceptive behavior reported for the pregnancy interval preceding the abortion, Turkey 1993 and 1998

Contraceptive behavior	1993	1998
Modern method failure	16.0	15.2
Traditional method failure	46.2	36.1
Modern method discontinuation	15.2	16.8
Traditional method discontinuation	4.3	9.8
No method used	13.1	17.5
Uncertain	5.2	4.5
Total	100.0	100.0
Number of abortions	(567)	(426)

An additional 32 percent of abortions were preceded by the failure or discontinuation of a modern contraceptive.

A decline occurred in the proportion of abortions resulting from contraceptive failure. This decline is particularly notable for the proportion resulting from traditional method failures: 46 percent of all abortions reported in 1993 decreasing to 36 percent in 1998. The proportion of abortions resulting from modern method failures decreased slightly from 16 percent to 15 percent. Modern method failure remained relatively low because of the predominant use of the IUD. Little change occurred in the proportion of induced abortions resulting from modern method discontinuation, and a modest increase is found in the proportion resulting from traditional method discontinuation and from nonuse.

Figure 6 shows the abortion rate per 100 ever-married women for the three years prior to the survey, by contraceptive behavior prior to abortion.[6] The abortion rate associated with traditional method failure decreased between 1993 and 1998, while the abortion rate associated with traditional method discontinuation increased slightly. Abortion rates associated with other types of contraceptive behavior show little change, except for a small decline in the abortion rate associated with modern method failure. Apparently, most of the recent decline in the abortion rate is related to a decline in abortion preceded by traditional method failure. This decline could be due to: (1) the shift from traditional methods to more effective modern methods, because this shift will result in the exposure of fewer women to the risk of traditional method failure, which in turn will lead to fewer traditional method failures; (2) lower traditional method failure rates; or (3) fewer abortions of pregnancies resulting from traditional method failures.

Contraceptive Failure Rates

Table 4 shows trends in contraceptive failure rates between 1993 and 1998.[7] Between 1993 and 1998, both modern and traditional failure rates decreased. Although the decline in the traditional method failure rate is statistically significant, the decline in the modern method failure rate is not. Therefore, at least part of the decline in induced abortions is due to a decline in traditional method failure rates.[8]

Propensity to Abort Unwanted Pregnancies

Table 5 presents recent trends in the proportion of un-

Figure 6 Abortion rates for ever-married women for three years prior to survey, by contraceptive behavior prior to induced abortion, Turkey, 1993 and 1998

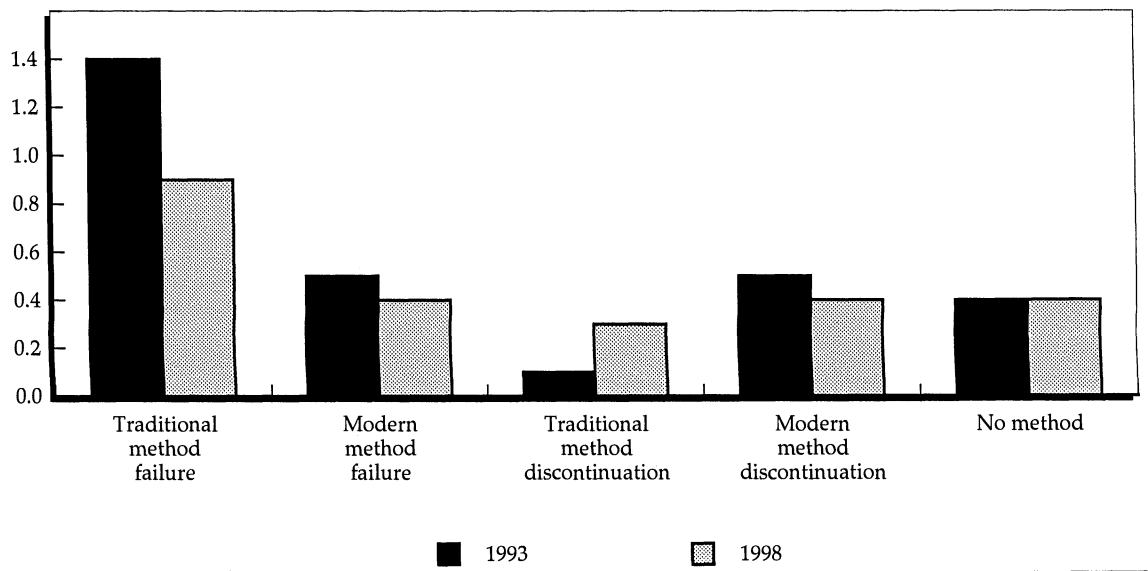


Table 4 Twelve-month net failure rates and standard errors for modern and traditional contraceptive methods, Turkey, 1993 and 1998

Method type/year	12-month failure rate	Standard error	Number of episodes
Modern methods			
1993	5.2	(0.9)	2,484
1998	4.2	(0.9)	2,303
Traditional methods			
1993	15.9	(0.9)	2,369
1998	11.8	(1.0)	2,171
All methods			
1993	10.4	(0.6)	3,939
1998	8.2	(0.6)	3,665

wanted or mistimed pregnancies that were aborted, by contraceptive behavior before the pregnancy.[9] Between 1993 and 1998, the propensity to abort unintended pregnancies declined for all categories of contraceptive behavior. The decline in the propensity to abort unwanted pregnancies does not seem to be stronger for those pregnancies that are the result of traditional method failures than for unwanted pregnancies resulting from contraceptive discontinuation, modern method failure, or nonuse.

Simulations

The analysis to this point suggests that the recent decline in the abortion rate is primarily associated with three main factors: the shift in use from traditional to modern contraceptive methods, the decline in the traditional method failure rate, and the decline in the propensity to abort pregnancies resulting from traditional method failures (which is the traditional-method-failure abortion ratio). The relative contribution of these factors to the decline in induced abortion between 1993 and 1998 is investigated here by means of a series of simple simulations.

Essentially, the simulations use a direct standardization approach. The observed distribution of ever-married women aged 15–49 by exposure status, the observed pregnancy/failure rate in each exposure group, and the observed proportion of pregnancies aborted in each exposure group are used to estimate an abortion rate among ever-married women for 1993 and 1998. The 1998 method mix, traditional method failure rates, and traditional method abortion ratios are then applied in turn to the 1993 data to estimate what the abortion rate would have been in 1998 if (1) only the contraceptive method mix had changed, (2) only the failure rates among traditional method users had changed, and (3) only the abortion ratios among traditional method users had changed. The effect of changing all of these factors is examined (see the Appendix for details).

Table 5 Percentage of unwanted or mistimed pregnancies in the three years prior to the survey that were aborted, by contraceptive behavior preceding the pregnancy, Turkey, 1993 and 1998

Contraceptive behavior	1993 Percent	1993 (N)	1998 Percent	1998 (N)
Modern method failure	48.6	(183)	38.1	(161)
Traditional method failure	45.8	(526)	35.2	(382)
Modern method discontinuation	64.5	(123)	57.8	(121)
Traditional method discontinuation	52.7	(41)	44.6	(83)
No method used	30.9	(276)	28.5	(244)
Total[a]	42.3	(1,240)	38.0	(1,029)

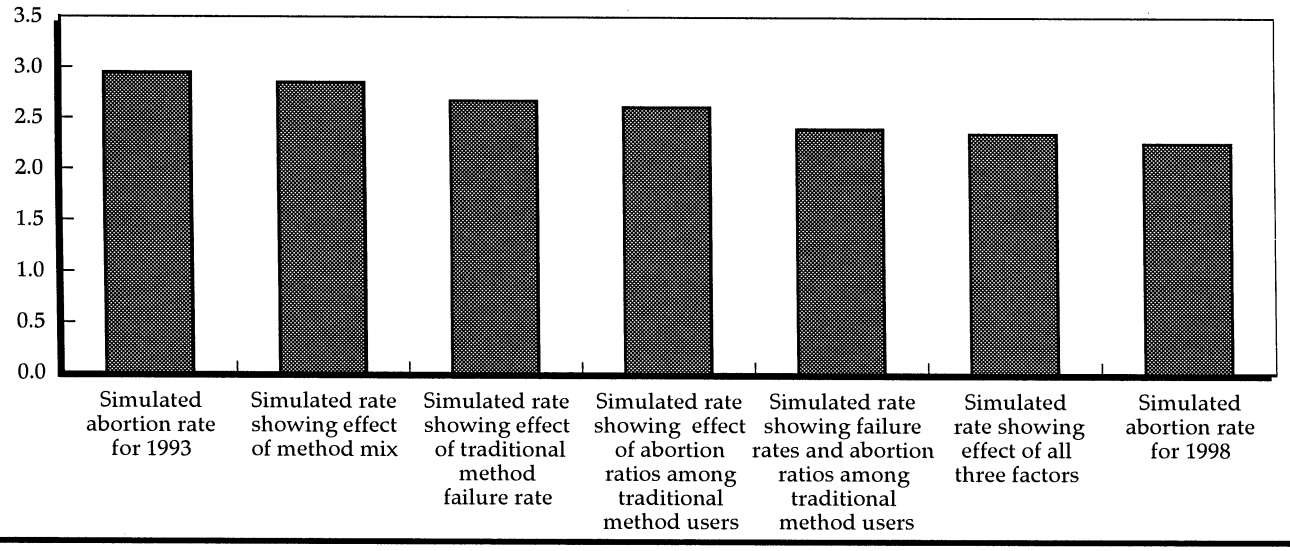
[a] Total includes a few pregnancies that were preceded by nonuse that extends back to the start of the calendar. Whether any contraceptive was used during the pregnancy interval prior to the start of the calendar is unknown, and therefore, whether the pregnancy followed a contraceptive discontinuation or a period of nonuse is uncertain.

Figure 7 summarizes the results of the simulations. The simulated abortion rate per 100 ever-married women in 1993 is 2.95, whereas the simulated abortion rate for 1998 is 2.26.[10] If only the method mix is changed from the 1993 mix to the 1998 mix, the simulated abortion rate declines from 2.95 to 2.85; this decline represents 14 percent of the total simulated change between the two years. If only the traditional method failure rate is changed from 1993 to 1998 levels, the simulated abortion rate declines from 2.95 to 2.67, representing 41 percent of the total simulated change. If only the abortion ratios among traditional method users are changed from 1993 to 1998 levels, the simulated abortion rate changes from 2.95 to 2.61, representing 49 percent of the total simulated change. If both the abortion ratios and the failure rates among traditional method users are changed from 1993 to 1998 levels, the simulated abortion rate declines from 2.95 to 2.40 (80 percent of the simulated change). Finally, if the method mix, failure rates among traditional method users, and abortion ratios among traditional method users are all changed from 1993 to 1998 levels, the abortion rate declines from 2.95 to 2.35. This decline represents 87 percent of the total simulated change between 1993 and 1998. The remainder of the decline can be attributed to a decline in the propensity to abort pregnancies resulting from other contraceptive behavior, to a slight increase in overall contraceptive use, and to a slight decline in pregnancies resulting from modern contraceptive failure.

Discussion and Conclusions

This study demonstrates that the recent decline in induced abortion in Turkey has been accompanied by an increase in the use of modern contraceptives and by a corresponding decrease in traditional method use, while overall contraceptive use has remained fairly stable. The

Figure 7 Simulated induced abortion rates among ever-married women, Turkey



shift from traditional to modern methods has been most pronounced among women in their peak reproductive years (25–39), the period when the decline in the abortion rate also has been most pronounced.

A detailed analysis reveals that the overall decline in the abortion rate is largely associated with a decline in abortions preceded by traditional method failure, which in turn is associated with three factors: a shift from traditional method use to modern method use, a significant decline in the traditional method failure rate, and a decline in the proportion of pregnancies resulting from traditional method failures that are aborted. A simulation analysis shows that the most important of these three factors is the decline in the propensity to abort pregnancies resulting from traditional method failures, followed closely by the decline in the traditional method failure rate. The shift in the method mix toward modern methods also has contributed to the decline, but to a lesser extent. These three factors taken together account for 87 percent of the decline in the abortion rate among ever-married women between 1993 and 1998.

The reasons for the decline in the traditional method failure rate and the decline in the propensity to abort pregnancies resulting from traditional method failures are not analyzed here. Use of traditional methods may have improved among all (or most) traditional method users. Another possible explanation is that the traditional method users who are most at risk of experiencing a failure are the ones who are most likely to switch to using modern methods (for example, younger women and those who have experienced a contraceptive failure). The decline in the propensity to abort pregnancies resulting from traditional method failures could be part of a general move away from induced abortion among contraceptive users, but could also be related to trends in contraceptive-method choice. For example, the women who are most likely to abort an unintended pregnancy could also be the ones who are most likely to switch from traditional to modern methods. Therefore, although the direct contribution of the increased use of modern contraceptive methods to the decline in abortion is modest according to the simulations, it may contribute indirectly to both the decline in the traditional method failure rate and to the decline in the propensity to abort pregnancies resulting from traditional method failures. A more detailed analysis of the dynamics of the shift from traditional to modern contraceptive use might illuminate this issue further, but is beyond the scope of this study.

Programmatic Implications

The results of the analysis conducted in Turkey add useful information to the broader literature on the relationship between contraceptive use and abortion. In many countries studied previously, such as those in eastern Europe and the former Soviet Republics, contraception has replaced abortion as contraceptive methods have become more widely available. In contrast, Latin American countries have undergone rapid increases in demand for fertility regulation, leading to simultaneous increases in both abortion and contraceptive use. The trend in Turkey represents another situation, where, after initial increases in both induced abortion and contraceptive use, both demand for contraception and overall practice of contraception remained fairly constant for

many years. Marked reductions in the number of abortions have been achieved in Turkey through improved contraceptive use rather than increased contraceptive use, however.

Throughout the 1990s, with the support of several international agencies, the Turkish national reproductive health program focused on improving clients' use of contraceptives by improving the training of providers, clients' knowledge, and the overall quality of services. The program has placed particular emphasis on the provision of family planning counseling and services to clients who have undergone abortions (Senlet et al. 2000). These efforts may be related to the improved use of family planning methods and the subsequent reduction in induced abortion. Programs providing high-quality family planning services improve clients' correct use of contraceptive methods, encourage continuity of method use, and promote informed choice of the most appropriate method for the client. Continued improvements in the quality of family planning services have the potential to improve method use and consequently to further reduce abortion rates in Turkey.

The findings presented here have important program implications for the delivery of family planning services in Turkey. This analysis demonstrates that shifts in the method mix toward more effective methods and more effective use of methods has considerable potential to reduce abortion levels, even in the absence of increased use. Given the relatively low level of unmet need for family planning (around 10 percent) and the relatively low abortion rate associated with nonuse of contraceptives (0.4), efforts to improve the existing practice of contraception rather than increase the overall use of contraceptives are likely to be most effective in reducing abortion. Traditional methods still account for 41 percent of all contraceptive use, and 46 percent of abortions are preceded either by traditional method failure or the discontinuation of a traditional method. Therefore, abortion could be reduced further through additional shifts toward more effective modern methods and through more effective use of traditional methods.

Appendix

Simulated Abortion Rates for 1993 and 1998

Table A1 shows the raw data on which the simulations presented in Figure 7 are based. Three exposure groups are defined: modern method users, traditional method users, and nonusers.[11] For each exposure group, the proportion of the population of ever-married women aged 15–49 in the exposure group is multiplied by the pregnancy rate (per woman) for that group and the proportion of pregnancies aborted to find the number of abortions per woman in that exposure group. These numbers are then summed across all exposure groups and multiplied by 100 to obtain the simulated abortion rate per 100 ever-married women for 1993 and 1998.

The pregnancy/failure rates are Pearl pregnancy rates among users of modern methods, users of traditional methods, and nonusers. For example, for modern method users, the number of modern method failures in the period 3–35 months before the survey is divided by the number of months of modern method use in the same period to obtain a monthly failure rate. The monthly failure rate is then multiplied by 1,200 to obtain the annual failure rate per 100 women.

The proportion of pregnancies aborted is the percentage of pregnancies that occurred in the period 3–35 months before the survey that were aborted for each exposure group. For modern method users, this proportion is the percentage of pregnancies resulting from modern method failures in the period that were aborted, and similarly for traditional method users. For nonusers, this proportion is the percentage of all pregnancies in the period that were not contraceptive failures that were aborted.

To estimate the effect of changes in the contraceptive method mix, changes in traditional method failure rates, and changes in the propensity to abort pregnancies resulting from traditional method failures, the simulated abortion rates are recalculated changing each of these factors from 1993 levels to 1998 levels in turn. When simulating the effect of changing the method mix, the overall level of contraceptive use is held at 1993 levels, but the distribution of use across modern and traditional methods is changed to that observed in 1998. The effect of the slight increase in overall contraceptive use between 1993 and 1998 is not included in these simulations. Table A2 summarizes the simulations.

Table A1 Percentage distribution of ever-married women aged 15–49, annual pregnancy rate, percentage of pregnancies aborted, and abortion rate, by exposure group, Turkey Demographic and Health Survey, 1993 and 1998

Exposure status	1993				1998			
	Percent women	Pregnancy rate	Percent aborted	Abortion rate	Percent women	Pregnancy rate	Percent aborted	Abortion rate
Modern method user	33.2	3.3	48.6	0.54	36.1	2.8	38.1	0.39
Traditional method user	27.0	11.7	45.9	1.45	25.0	9.5	35.2	0.84
Nonuser[a]	39.8	28.4	8.5	0.96	38.9	28.2	9.4	1.03
Total	100.0	—	—	2.95	100.0	—	—	2.26

— = Not applicable. [a]Includes pregnant women.

Table A2 Summary of simulations

Simulation	Description
Effect of changing method mix	1998 method mix, 1993 distribution of nonusers (that is, percent modern users = 35.5; percent traditional users = 24.6; percent of nonusers = 39.8; 1993 pregnancy rates and abortion ratios)
Effect of changing traditional method failure rate	1998 traditional method failure rate; 1993 distribution of women, modern method failure rate, pregnancy rate among nonusers, and abortion ratios
Effect of changing propensity to abort pregnancies resulting from traditional method failures	1998 abortion ratio for traditional method users; 1993 distribution of women, pregnancy/failure rates, and abortion ratios for modern method users and nonusers
Effect of changing propensity to abort pregnancies resulting from traditional method failures and traditional method failure rate	1998 abortion ratio for traditional method users and traditional method failure rate; 1993 distribution of modern method failure rate, pregnancy rate for nonusers, and abortion ratios for modern method users and nonusers
Effect of changing method mix, propensity to abort pregnancies resulting from traditional method failures, and traditional method failure rate	1998 method mix, abortion ratio for traditional method users, and traditional method failure rate; 1993 distribution of nonusers, modern method failure rate, pregnancy rate for nonusers, and abortion ratios for modern method users and nonusers

Notes

1 For further details of the DHS calendar, see Curtis and Blanc (1997).

2 Several of the tables were run for both three- and five-year analysis periods, and the general results were found to be robust to the choice of analysis period. In a few tables, a one- or five-year analysis period was used instead of a three-year period because doing so was more appropriate.

3 Most induced abortions in Turkey are performed in the first ten weeks of pregnancy, the period during which the procedure is legal. Therefore, if an induced abortion is the outcome, most pregnancies that occurred more than three months before the survey will have been aborted by the time of the survey.

4 The age-specific abortion rates and total abortion rate presented are for all women. Because neither of the DHS surveys collected data on abortion among never-married women, inflation factors are used to convert rates for ever-married women to rates for all women. These inflation factors assume that abortion among never-married women is negligible. Trends in abortion rates could be distorted if the completeness of abortion reporting were different for the different surveys. In particular, if reporting were less complete in the 1998 survey compared with the 1993 survey, the results could suggest a false decline in abortion. Therefore, the results of this analysis are sensitive to the assumption that the completeness of abortion reporting is comparable across the surveys. This assumption cannot be checked because no comparable data are available against which to compare the completeness of reporting in the different surveys.

5 Contraceptive behavior is defined for each pregnancy interval prior to an induced abortion based on the last contraceptive event recorded for that pregnancy interval in the calendar. For example, if a woman used no contraceptive during the pregnancy interval prior to the abortion, the abortion is classified as associated with nonuse, even if the woman had used a contraceptive in an earlier pregnancy interval. Similarly, if a woman used a modern method, switched to a traditional method, and then discontinued the traditional method during the pregnancy interval, the resulting abortion is classified as associated with a traditional method discontinuation. A contraceptive discontinuation is defined as a contraceptive failure if the woman reported that she became pregnant while using the method. For some abortions, the pregnancy preceding the abortion occurred before the start of the calendar. For these abortions, if there is no contraceptive use reported between the start of the calendar and the aborted pregnancy, contraceptive behavior is uncertain, because we do not know whether any contraceptive was used between the last pregnancy and the start of the calendar.

6 The behavior-specific abortion rates are calculated as $100^*A_x/E$, where A_x = number of abortions preceded by contraceptive behavior x in the three years before the survey and E = number of woman-years of exposure among ever-married women in the three years before the survey.

7 The failure rates are calculated using multiple decrement life-table methods and are based on episodes of contraceptive use obtained from the calendar. For the rate for all methods, an episode of contraceptive use is defined as a period of continuous use of any contraceptive method. For the failure rate for modern methods, an episode of use is defined as a period of continuous use of any modern method (including sterilization). For the failure rate for

traditional methods, an episode of use is defined as a period of continuous use of any traditional method.

8 Data quality could be another factor in the observed decline in traditional method failure rates. As mentioned in the section on data quality, an increase occurred between 1993 and 1998 in the proportion of discontinuations for which the reason for discontinuation was missing. If some of these missing reasons for discontinuation are, in fact, contraceptive failures, the traditional method failure rate will be underestimated (and the discontinuation rate for other reasons overestimated). Whereas this circumstance is likely to be true in some cases, the underestimate of the failure rate would not be sufficient to account for much of the decline in the failure rate.

9 Unwanted or mistimed pregnancies are defined in the health section of the DHS as all live births that were reported as wanted later or not wanted plus all induced abortions. The DHS did not collect information on the wanted status of spontaneous abortions and stillbirths, so these births are assumed to have been wanted. In addition, the reporting of the wanted status of live births is subject to postevent rationalization that increases with time since the birth (Westoff and Bankole 1998), so the number of unwanted or mistimed live births is likely to be underestimated.

10 The simulated abortion rates among ever-married women are slightly lower than the observed rates for the three years prior to the surveys in Table 1 (3.1 for 1993 and 2.4 for 1998). These small differences are the result of rounding errors and other minor differences in the way that the figures were calculated and are not statistically significant.

11 The authors experimented with a more detailed classification of exposure among nonusers, but found that the simpler definition required fewer assumptions in calculating the pregnancy and abortion ratios, which in turn resulted in simulated abortion rates that were close to those observed. In addition, the more complex definition of exposure was not necessary for the simulations chosen.

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Acknowledgments

Support for this research was provided by USAID through the MEASURE Evaluation Project.