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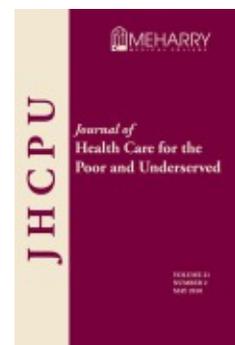
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Original paper

EFFECTS ON NAVAJO BIRTHRATE FROM LOSS OF THE INTRAUTERINE DEVICE

ROBERT L. WILLIAMS, MD, MPH

Abstract: The concerns of relatively powerless groups may not be adequately addressed by health-care decisions based on market forces and on considerations of the general population. Calculations of the number of Navajo women at risk of unintended pregnancy suggest that several hundred such pregnancies would have occurred as a result of the withdrawal of intrauterine devices from the United States' market. Analysis of birthrate data confirms this estimate: approximately four to five percent of Navajo births in 1988 may have been due to this market withdrawal. Available data are limited in their ability to assess impacts on small groups of health-policy decisions made for the population as a whole. A mechanism for surveilling such effects needs to be established to protect the interests of such groups, particularly when they have restricted alternatives.

Key words: Health services accessibility; Indians, North American; intrauterine devices; contraceptive devices, female

HEALTH-CARE DECISIONS based on considerations of the population as a whole and on market forces can adversely affect relatively powerless subgroups within the population. The withdrawal of the two most commonly used intrauterine devices (IUDs) in the United States in late 1985 and early 1986 for economic and medicolegal reasons exemplifies such effects. At the time, withdrawal of these products essentially eliminated a form of contraceptive preferred by some 11 percent of women using reversible methods.¹ Although one IUD remained on the market, its price and limited production restricted its availability.

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The impact of the withdrawal of these IUDs fell disproportionately on certain communities that had much higher rates of IUD utilization. For instance, 13.3 percent of blacks and 26.4 percent of Hispanics using reversible methods used the IUD.^{1,2} For Navajos, IUDs were the most commonly used form of reversible contraception prior to their withdrawal.³

For the great majority of Navajos who received care through the Indian Health Service (IHS) of the U.S. Public Health Service, the only IUDs available at the time were the Lippes Loop and the Copper-7, both of which were withdrawn in the face of declining sales and lawsuits alleging adverse consequences from their use. Since the Indian Health Service did not have the resources to offer the only remaining (and much more expensive) IUD on the market, the Progestasert, this meant IUDs were effectively removed as a contraceptive option for the Navajos. As with all forms of family planning, IUDs pose the potential for adverse effects.⁴ However, alternative forms of contraception were unacceptable for many of these women because of medical, social, economic, or cultural factors, including transportation problems and negative attitudes toward oral contraceptives.

Some health-care providers working with the Navajo who were familiar with the widespread use of the IUD before 1985 expected that the withdrawal of these IUDs would lead to an increase in the birthrate. This is an important question that has neither been addressed nationally nor among any of the minority groups with high IUD utilization rates before the market withdrawal. If this expectation was borne out, it would give evidence that market forces may at times not only fail to protect the interests of poor or underserved groups, but may result in undesired consequences. This paper presents data to test the hypothesis that withdrawal of the IUD was associated with an increase in the birthrate among Navajos beginning in 1987.

Methods

Specific data on the reproductive outcome of IUD-using or IUD-preferring Navajo women for the three years following the market withdrawal are unavailable. As a result, alternative approaches were used to test the hypothesis. Two lines of evidence were used to test the hypothesis: a projection of excess births based on women at risk, and an analysis of birthrate trends. Both lines of analysis combine data from several sources to produce a composite picture of likely effects.

Women at risk. In the 1980 census, 24.67 percent of Navajos were females age 15-44.⁵ Assuming this percentage persisted in 1986 (the year by which the IUD withdrawals were complete), 41,697 of the total Navajo population of 169,019 were females of reproductive age. There were 5,449 births to these women⁵, leaving 36,248 nonpregnant reproductive-age Navajo women. Rates of contraceptive use among the Navajo are not available, although of 12,492 visits to Navajo Area Indian Health Service facilities for family-planning

services in the year ending September 30, 1985, 43.9 percent were for IUDs.³ Nationally, 54.5 percent of women age 15-44 used contraception in 1982.¹ Calculations from national survey data show that of those discontinuing IUDs, an estimated 13 percent had unintended pregnancies in the following year.⁶ The above information was used to estimate the number of Navajos likely to have an unintended pregnancy.

Analysis of birthrate trends. Using results of the 1970, 1980, and 1990 U.S. censuses, the IHS has developed annual Navajo population estimates (Table 1). Data on total births to Navajo women are available through the National Center for Health Statistics (NCHS) and are based on birth certificates. These data are available through 1989.

Birthrate trends were analyzed using data from the annual population estimates and the NCHS birth totals. The hypothesis of an increase in birthrates occurring in association with the IUD withdrawal was tested by the use of a multiple regression model with crude birthrate as the dependent variable. Year was used as a predictor variable in the regression model to test for a trend in the birthrate. In addition, a dummy variable was created to test for an effect of IUD withdrawal.

Examination of birthrate data (Table 1) shows two apparent trends over the 25 years up to 1989. The first trend is a rapidly declining birthrate from initially very high rates, and is evident from 1965 through the mid-1970s. The second trend is a much more gradual decline beginning in the mid-1970s and extending through the time period under study. Because of the differing trends and because the event of interest took place during the latter period, analysis was restricted to the period beginning with 1976.

Since pregnancies resulting from unavailability of the IUD would take at least nine months to be reflected in birth data, the effects of the loss of the IUD were expected to first appear in the 1987 birth totals. In addition, because active users were not encouraged to immediately discontinue use, the pool of at-risk women would build only gradually as postpartum women, women requiring a change in a time-limited IUD, or women seeking to change from other, less acceptable forms of family planning were unable to obtain an IUD. Because of this, it was hypothesized that the full effects of the IUD withdrawals would not be seen until 1988, with intermediate impacts seen in 1987 birth totals.

On the basis of this hypothesized level of effects, two regression models were established to test for effects of the loss of IUD availability on the crude birthrate after 1986.⁷ The first assigned a value of zero to the dummy variable for years 1976-1986, an intermediate level (0.5) to the dummy for 1987, and a full level (1.0) to the dummy variable for 1988 and 1989. The second model took a more traditional approach to dummy variables, assigning a value of 1.0 to all three years (1987-1989) in which the effect was hypothesized to be noted, and a value of zero to the preceding years. The hypothesis was tested by a t-test of the regression coefficient of the dummy variable. Since the hypothesis specified a direction of effect, a one-sided t-test was used.

TABLE 1
BIRTH DATA FOR THE NAVAJO POPULATION, 1965-1989

YEAR	POPULATION*	BIRTHS**	CRUDE BIRTHRATE†
1965	88,714	4,912	55.4
1966	91,307	4,458	48.8
1967	93,976	4,624	49.2
1968	97,709	4,450	45.5
1969	100,567	4,226	42.0
1970	91,553	4,410	48.2
1971	96,476	4,611	47.8
1972	101,396	4,756	46.9
1973	106,317	4,211	39.6
1974	111,237	3,900	35.1
1975	116,161	3,417	29.4
1976	121,078	4,250	35.1
1977	126,000	4,250	33.7
1978	130,919	4,410	33.6
1979	138,531	4,564	32.9
1980	146,737	4,944	33.7
1981	150,450	4,881	32.4
1982	154,168	5,218	33.8
1983	157,880	5,306	33.6
1984	161,595	5,411	33.5
1985	165,306	5,529	33.4
1986	169,019	5,449	32.2
1987	172,730	5,887	33.5
1988	176,442	6,033	34.2
1989	180,152	6,117	34.0

* Population is based on 1970, 1980, 1990 U.S. censuses. Validity of population estimates prior to 1970 is uncertain.

** Births are based on National Center for Health Statistics data.

† Births per 1,000 population

Source: Reference 4

Results

Women at risk. If 50 percent of the 36,248 nonpregnant reproductive-age Navajo women were using contraception, 40 percent of them were using the

IUD, and 13 percent of these suffered an unintended pregnancy upon loss of the IUD, then 942 unintended pregnancies would have resulted. Using a more conservative estimate of one-fourth of the women using contraception and one-fourth using the IUD, 294 unintended pregnancies would have resulted in the first year after IUDs became unavailable.

Since not all of the IUD users or potential users would request one in the first calendar year after the market withdrawal, this first-year effect may have been spread over a few calendar years. Assuming an average IUD retention of three years, the corrected estimate in each of the first three calendar years of unintended births per calendar year would be approximately 100 to 300. This would be augmented by postpartum women desiring an IUD in whom the effect would be apparent in the first year.

Analysis of birthrate trends. Both models of the effects on birthrate of year and a dummy variable representing IUD withdrawal showed the two predictor variables to be statistically significant. For the model using an intermediate effect for 1987 (Table 2), the t-statistic for year was -2.36 ($p=.02$) and for the dummy representing the effect of IUD withdrawal, the t-statistic was 2.53 ($p=.01$). For the second model assigning one value for the dummy to all three years, the t-statistic for year was -2.07 ($p=.03$) and for the dummy was 2.16 ($p=.03$). Both models show that the birthrate declined until there was a statistically significant increase in the years 1987 to 1989. By deriving a linear equation of year on birthrate for the period before 1987, one can estimate that in the absence of the effects occurring in 1987 to 1989, the birthrate for 1988 would have been 32.8, implying an excess of 243 births during that year. This is consistent with the estimate derived from the analysis of women at risk. The concurrence of estimates from the two separate lines of analysis lends support to the hypothesis.

TABLE 2
RESULTS OF MULTIPLE REGRESSION MODEL OF YEAR AND A DUMMY VARIABLE REPRESENTING EFFECT OF IUD WITHDRAWAL ON CRUDE BIRTHRATE

VARIABLE	COEFFICIENT*	STD. ERROR*	t-TEST	p
Intercept	34.388	.434	79.21	<.001
Year number	-0.132	.056	-2.36	.02
Dummy	1.587	.627	2.53	.01

* $\times 10^{-3}$

Discussion

These analyses provide evidence to support the hypothesis that withdrawal of IUDs as a potential form of contraception was associated with an increase in the birthrate among Navajos. Two approaches were used to derive an estimate of the number of unintended births. First, an estimate of the probable number of births occurring to women at risk was made. This was based on numbers of women projected to be using the IUD in 1985 and on national rates of unintended pregnancy after discontinuing the IUD. Second, an examination of birthrate trends among the Navajo showed a statistically significant increase in birthrates. This increase reversed the baseline trend and corresponded to the period following the withdrawal of IUDs. The concurrence of estimates derived from each approach suggests that the estimated increases in birthrate did in fact occur in the aftermath of IUD withdrawal.

A causal link between the withdrawal of these IUDs and an increase in the birthrate among the Navajos cannot be fully supported in the absence of a comparison population; other unidentified factors may be responsible for the change in birthrate. However, the most likely interpretation is that the loss of the IUD resulted in several hundred unintended pregnancies—approximately four to five percent of all births among the Navajo. In a population with scarce financial resources and numerous sociocultural obstacles to alternative methods of family planning, including abortion, such an outcome would be expected.

It is important to recognize, though, that the ideal data for testing this hypothesis are unavailable. Thus there are potential flaws with some of the data that are available and that were used in these analyses. The women-at-risk analysis (as well as the birthrate-trend analysis) relied on census figures for the Navajo population. The validity of census data for poor and minority groups has been criticized.^{8,9} No specific data are available on prevalence of IUD usage among Navajos in 1985. As a substitute, number of visits for IUDs was used to estimate prevalence of usage, but this is only a rough estimate; some women may use an IUD for several years without a visit to a health-care facility, while others may have problems with the IUD and be seen several times. Finally, in the women-at-risk analysis, national survey data were used. It is unclear how validly national data represent the Navajo. To address both of these latter problems, sensitivity analyses used more conservative lower estimates of family-planning use and of IUD prevalence.

It is possible that the effect on the Navajo birthrate noted to coincide with the withdrawal of the IUDs may be due to some other, unmeasured variable. Examples of such variables might be changes in the economic circumstances among the Navajos, changes in the availability of alternative family-planning methods, and changes in the perceived desirability of having children. Neither of the first two occurred during the period under study, and while the last would be difficult to measure retrospectively, it was not noted at the time.

The concurrence of the estimates derived from two independent lines of analysis is what gives strength to the conclusions despite the potential flaws in the data. However, the fact that such data had to be used points to the present difficulty of monitoring the impacts of health-care changes among small population groups. Data based on larger groups or on the nation as a whole may not apply to smaller segments of the population. Since actions based on these data may overlook the needs of the smaller groups, it is important to assure that accurate data are available on these needs and on impacts of health-care decisions on smaller groups, particularly those with limited recourse. It is especially critical that as our nation considers moving to a health-care system relying heavily on market forces, that a system of health surveillance be in place that can assess the impacts of these forces on the poor and underserved.

Conclusion

In the years before the withdrawal of these IUDs, much discussion centered on adverse effects of IUDs and medicolegal impacts of these effects. There was less discussion of the role of IUDs in subgroups with high utilization rates, and in whom alternatives were less acceptable. This study supports the view that in one distinct population, the loss of the IUD as a contraceptive option caused major effects. The decision to withdraw IUDs from the market, based on manufacturers' economic considerations, led to social and economic consequences for women with limited alternative options. This suggests that reliance on market forces in the health-care system can lead to inequitable consequences. The nature of the process by which such decisions are made should ensure that the concerns of relatively powerless groups are included.

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The opinions expressed in this paper are those of the author and do not necessarily represent those of the Indian Health Service.

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