

PAPERS AND ORIGINALS

Fertility after stopping different methods of contraception

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Summary and conclusions

Data on the return of fertility after discontinuing various methods of contraception were collected from among the women taking part in the Oxford-Family Planning Association contraceptive study. Return of fertility was measured as the time taken to give birth to a child.

The fertility of both nulligravid and parous women who stopped taking oral contraceptives was initially impaired in comparison with that of women who stopped using other methods of contraception. But the effect of oral contraceptives on fertility had become negligible by 42 months after cessation of contraception in nulligravidae and by 30 months in multiparae. Impairment seemed to be independent of the length of use of oral contraceptives. Data relating to IUD users were sparse, but the figures that were available were reassuring.

These results suggest that, although women may have temporary impairment of fertility after discontinuing oral contraception, they are unlikely to become permanently sterile through taking the pill.

Introduction

In 1976 we reported some preliminary data from the Oxford-Family Planning Association contraceptive study, which suggested that fertility is impaired among women who stop using oral contraceptives.¹ We report here a more detailed assessment of this problem, based on a much larger body of information.

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Subjects and methods

The Oxford-Family Planning Association contraceptive study began at two clinics in 1968. Seventeen clinics are now taking part, and over 17 000 women are under observation. At the time of recruitment all these women were married white British subjects, aged 25-39 years, who volunteered to take part in the project. Fifty-six per cent were using oral contraceptives, 25% were using a diaphragm, and 19% were using an intrauterine device (IUD).

During follow-up each woman is questioned at return visits to the clinic and, among other items, data are collected about (a) changes in contraceptive methods and the reasons for the changes, and (b) pregnancies and their outcome. Women who default are sent a postal questionnaire and if this is not returned are telephoned or visited in their homes to collect the necessary information. In this way follow-up has been maintained with a yearly lapse rate of only about 0.3% as a result of withdrawal of co-operation or loss of contact. The study methods (including details of the data collection forms) were described in detail in an earlier report.¹

From the above it will clearly be possible to identify participants who discontinue birth control to plan a pregnancy and to determine what subsequently happens to them. Data concerning the last menstrual period are not routinely collected in the study, so rather than analysing return of fertility in terms of cumulative conception rates, we calculated cumulative "outcome" rates instead. We took a live birth or a stillbirth as the relevant outcome in the analyses presented here, but none of our conclusions would have changed if we had also taken account of miscarriages, terminations of pregnancy, and ectopic pregnancies. All cumulative outcome rates (and their standard errors) were calculated by routine life-table techniques.² Each analysis shown in the tables was discontinued when only 10 or fewer women remained undelivered and still under observation.

To try to maximise comparability between the women discontinuing different methods of contraception we excluded all those known to have suffered from ovarian or uterine tumours, pelvic inflammatory disease, or amenorrhoea or oligomenorrhoea before admission to the study. Nulliparous women with a history of miscarriage or termination of pregnancy were also excluded.

Results

Table I summarises the findings for nulligravid women. The overall data for each method provide strong evidence of impaired fertility in women who discontinued oral contraceptives compared with those who discontinued other methods of birth control. The magnitude of the impairment, however, diminished steadily with time and seemed to be negligible 42 months after stopping contraception.

The remaining data shown in table I suggest, firstly, that the impairment of fertility associated with oral contraception was independent of how long the preparations had been used and, secondly, that no "carry-over" effect was apparent in women discontinuing non-systemic methods of contraception (principally the condom) who had previously used the pill.

The results for parous women (table II) were closely similar to those for nulligravid women. The differences between the rates for women discontinuing oral contraceptives and those for women discontinuing other methods of birth control, however, were negligible just 30 months after cessation of contraception. The data relating to IUD users were sparse, but the figures that were available were reassuring.

The figure contrasts the differences between nulligravid and parous women and between women stopping oral contraceptives and those stopping other methods of birth control.

We also examined the relation between fertility and (a) age, (b) smoking habits, and (c) obesity. As expected, we found that fertility decreased with age, but it is clear from tables I and II that an age effect did not explain the impairment of fertility that we observed in women discontinuing the pill. We also found some suggestion that fertility might be reduced in women smoking 15 or more cigarettes a day, but the effect was too small to influence our main results.

Almost all our data on oral contraceptives related to preparations containing 50 µg oestrogen. We could not therefore investigate the relation between return of fertility and the oestrogen content of oral contraceptives.

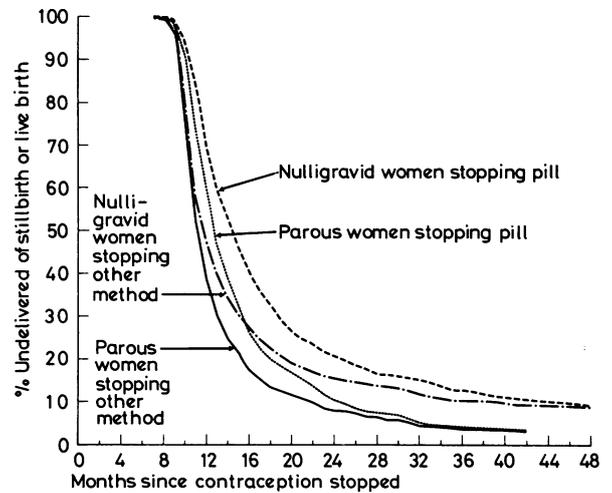
Discussion

Our data indicate that, on average, both nulligravid and parous women suffer temporary impairment of fertility after stopping oral contraceptives. While the numbers are still too small to permit a final evaluation, however, it seems unlikely that any appreciable number of women could experience permanent sterility as a result of using the pill.

We were a little surprised to find no evidence of a carry-over effect of oral contraceptive use in those women stopping non-systemic methods of contraception who had used the pill during the previous three months. Only a few women came into this category, however, and the mean period of use of the other method was two months. Most of these women would, of course, have deliberately substituted the alternative method of birth

control after discontinuing the pill to give the menstrual cycle a chance to become re-established before trying to become pregnant.

We are unaware of any other study of the return of fertility after discontinuing different methods of birth control that has been both adequately controlled and analysed by life-table methods. Our conclusions, however, seem to agree with the



Fertility after stopping different methods of contraception in order to conceive.

generally held view that discontinuing the pill is succeeded by temporary impairment of fertility, which is independent of duration of use, and that there is no impairment of fertility after removal of an IUD, at least after short- to medium-term use.³

All the participants in our investigation were at least 25 years old at the time of recruitment and few had started to use the pill before the age of 20 years. It would be wrong, therefore, to assume that our findings necessarily apply to women who start taking oral contraceptives while still in their teens.

TABLE I—Fertility of nulligravid women after they stopped using different methods of contraception in order to conceive. Results are percentages (±SE) of women remaining undelivered of stillbirth or live birth at intervals after stopping contraception. Numbers of women remaining undelivered and under observation are shown in parentheses

Details of use	No of women	Mean age (years)	% Of women remaining undelivered at various intervals after discontinuing contraception:					
			12 months	18 months	24 months	30 months	36 months	42 months
<i>Women who stopped taking oral contraceptives</i>								
Used for <12 months ..	115	28.5	70.2 ± 4.3 (71)	35.2 ± 4.4 (33)	27.2 ± 4.3 (20)	24.5 ± 4.2 (17)	— (8)	— (5)
Used for 12-23 months ..	292	28.0	67.8 ± 2.6 (180)	35.1 ± 2.8 (88)	21.1 ± 2.4 (46)	17.9 ± 2.4 (39)	14.5 ± 2.2 (28)	12.2 ± 2.1 (21)
Used for 24-47 months ..	486	27.8	69.6 ± 2.0 (311)	28.7 ± 2.0 (121)	18.1 ± 1.8 (73)	13.0 ± 1.6 (45)	11.2 ± 1.5 (34)	8.9 ± 1.4 (21)
Used for ≥48 months ..	281	28.6	73.6 ± 2.6 (175)	37.0 ± 3.0 (76)	23.2 ± 2.8 (37)	16.5 ± 2.6 (22)	11.8 ± 2.5 (15)	11.0 ± 2.4 (10)
Total	1174	28.1	70.1 ± 1.3 (737)	32.8 ± 1.4 (318)	20.8 ± 1.2 (176)	16.1 ± 1.2 (123)	12.8 ± 1.1 (85)	10.7 ± 1.1 (57)*
<i>Women who stopped using diaphragm</i>								
Pill never used	303	28.9	46.8 ± 2.6 (129)	23.2 ± 2.4 (61)	16.2 ± 2.1 (40)	14.5 ± 2.0 (31)	11.1 ± 1.9 (19)	9.7 ± 1.9 (13)
Pill used within last 3 months ..	18	29.0	— (7)	— (4)	— (3)	— (0)	— (4)	— (3)
Pill used >3 months before ..	73	28.8	44.8 ± 5.3 (30)	23.5 ± 4.8 (15)	18.2 ± 4.5 (10)	— (6)	— (4)	— (3)
Total	394	28.9	46.4 ± 2.3 (166)	23.4 ± 2.1 (80)	16.7 ± 1.9 (53)	13.7 ± 1.8 (37)	10.6 ± 1.7 (23)	9.5 ± 1.6 (16)
<i>Women who stopped using IUD</i>								
All users	8	31.5	— (2)	— (1)	— (0)	— (0)	— (0)	— (0)
<i>Women who stopped using any other method of contraception</i>								
Pill never used	13	29.0	— (5)	— (3)	— (1)	— (0)	— (0)	— (4)
Pill used within last 3 months ..	154	28.1	46.2 ± 3.8 (60)	20.0 ± 3.2 (24)	9.5 ± 2.5 (10)	— (7)	— (6)	— (4)
Pill used >3 months before ..	210	28.7	51.4 ± 3.2 (94)	22.8 ± 2.9 (38)	17.9 ± 2.7 (27)	17.2 ± 2.7 (18)	— (8)	— (7)
Total	377	28.5	48.9 ± 2.4 (159)	21.7 ± 2.1 (65)	14.1 ± 1.9 (38)	12.8 ± 1.8 (25)	10.3 ± 1.8 (14)	9.5 ± 1.8 (11)
Total stopping non-systemic contraception	779	28.7	47.6 ± 1.7 (327)	22.6 ± 1.5 (146)	15.5 ± 1.3 (91)	13.2 ± 1.3 (62)	10.4 ± 1.2 (37)	9.4 ± 1.2 (27)†

*At 48 months: 9.4 ± 1.0 (34). †At 48 months: 9.0 ± 1.0 (23).

TABLE II—Fertility of parous women after they stopped using different methods of contraception in order to conceive. Results are percentages (\pm SE) of women remaining undelivered of stillbirth or live birth at intervals after stopping contraception. Numbers of women remaining undelivered and under observation are shown in parentheses

Details of use	No of women	Mean age (years)	% Of women remaining undelivered at various intervals after discontinuing contraception:					
			12 months	18 months	24 months	30 months	36 months	42 months
<i>Women who stopped taking oral contraceptives</i>								
Used for <12 months ..	404	29.7	53.3 \pm 2.4 (171)	17.9 \pm 2.0 (46)	10.9 \pm 1.8 (22)	7.2 \pm 1.6 (12)	— (4)	— (4)
Used for 12-23 months ..	382	29.3	65.6 \pm 2.5 (199)	22.2 \pm 2.2 (56)	11.2 \pm 1.8 (24)	7.2 \pm 1.6 (11)	— (6)	— (3)
Used for 24-47 months ..	193	29.7	63.5 \pm 3.6 (97)	22.9 \pm 3.2 (32)	11.1 \pm 2.5 (14)	7.9 \pm 2.2 (10)	— (7)	— (3)
Used for \geq 48 months ..	81	31.7	57.8 \pm 5.3 (42)	14.7 \pm 3.7 (10)	— (2)	— (1)	— (0)	— (0)
Total	1060	29.7	59.9 \pm 1.5 (509)	20.0 \pm 1.3 (144)	10.4 \pm 1.1 (62)	6.9 \pm 0.9 (34)	4.3 \pm 0.8 (17)	3.5 \pm 0.8 (10)
<i>Women who stopped using diaphragm</i>								
Pill never used	567	30.2	36.0 \pm 1.8 (178)	12.1 \pm 1.3 (54)	7.6 \pm 1.2 (30)	5.5 \pm 1.0 (21)	3.4 \pm 0.8 (12)	— (8)
Pill used within last 3 months ..	22	30.7	— (2)	— (0)	— (1)	— (0)	— (0)	— (0)
Pill used >3 months before ..	72	30.7	34.0 \pm 5.2 (18)	— (6)	— (1)	— (0)	— (0)	— (0)
Total	661	30.2	35.2 \pm 1.7 (198)	11.8 \pm 1.2 (60)	7.1 \pm 1.1 (31)	5.2 \pm 1.0 (21)	3.2 \pm 0.8 (12)	— (8)
<i>Women who stopped using IUD</i>								
Pill never used	181	30.5	45.0 \pm 3.6 (64)	14.9 \pm 2.7 (19)	— (9)	— (6)	— (1)	— (1)
Pill used within last 3 months ..	2	30.4	— (0)	— (0)	— (1)	— (0)	— (0)	— (0)
Pill used >3 months before ..	75	29.9	60.0 \pm 6.4 (29)	— (8)	— (1)	— (0)	— (0)	— (0)
Total	258	30.3	48.5 \pm 3.2 (93)	17.0 \pm 2.5 (27)	8.5 \pm 2.1 (10)	— (6)	— (1)	— (1)
<i>Women who stopped using any other method of contraception</i>								
Pill never used	78	31.2	37.5 \pm 5.0 (24)	— (9)	— (5)	— (3)	— (3)	— (2)
Pill used within last 3 months ..	82	29.4	35.4 \pm 5.1 (21)	— (6)	— (3)	— (3)	— (2)	— (1)
Pill used >3 months before ..	264	30.3	39.2 \pm 2.9 (76)	14.3 \pm 2.4 (20)	— (9)	— (3)	— (2)	— (2)
Total	424	30.3	38.2 \pm 2.3 (121)	14.6 \pm 1.9 (35)	9.6 \pm 1.7 (17)	— (9)	— (7)	— (5)
Total stopping non-systemic contraception	1343	30.3	38.5 \pm 1.2 (412)	13.5 \pm 1.0 (122)	8.1 \pm 0.8 (58)	5.8 \pm 0.8 (36)	3.8 \pm 0.7 (20)	3.4 \pm 0.6 (14)

Some authors have suggested that return of fertility after stopping the pill is particularly likely to be impaired in those with a history of scanty or irregular periods.³ To increase comparability between the contraceptive groups we excluded women known to have such a history from all the analyses reported here. Unfortunately there were too few of them to justify separate examination.

The design of our study does not permit us to disentangle the effects of treatment of infertility from the reasonably favourable "natural history" of the disorder. Nevertheless, of the 108 women remaining undelivered and still under observation 42 months after discontinuation of contraception, 60 had been referred to hospital for a consultant opinion. Our information about the findings in these 60 women (many of whom were investigated only as outpatients) is incomplete. Nevertheless, we are aware of only seven in whom a gross structural abnormality that would definitely prevent conception—for example, infantile uterus or bilateral tubal occlusion from genital tuberculosis—was found, while another five are known to have had husbands with azoospermia or severe oligospermia.

Finally, information on the pattern of menstruation is not routinely collected in our investigation, so we are unable to determine the extent to which "post-pill infertility" reflects "post-pill amenorrhoea."

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