Contraception at the time of abortion: high-risk time or high-risk women?

Nathalie Bajos¹,4, Agathe Lamarche-Vadel¹, Fabien Gilbert¹, Michèle Ferrand², COCON Group¹ and Caroline Moreau¹,3

¹INSERM INED U569, Hôpital de Bicêtre, Kremlin Bicêtre, ²CNRS, Paris, France and ³Office of Population Research, Princeton University, Princeton, NJ, USA

4To whom correspondence should be addressed at: INSERM INED U569, Hôpital de Bicêtre, 82 rue du Général Leclerc, 94276 Kremlin Bicêtre, France. E-mail: bajos@vjf.inserm.fr

The COCON Group also includes: Jean Bouyer, PhD, Beatrice Ducot, MD, Danielle Hassoun, MD, Helene Goulard, M, Nadine Job-Spira, MD, Monique Kaminski, PhD, Nathalie Lelong, M, Henri Leridon, PhD, Nicolas Razafindratsima, M, Clementine Rossier, PhD and Josiane Warszawski, MD, PhD.

BACKGROUND: Despite the widespread use of highly effective contraception in France, the incidence of abortion is high. A retrospective population-based cohort study was designed to analyse women’s contraceptive history.

METHOD: We compared the contraceptive use of 163 women, whose last pregnancy ended in abortion, 6 months before, at the time of, 1 month and 6 months after the event with that of 1787 women who had never had an abortion.

RESULTS: A total of 46% of women who experienced an abortion used a highly effective form of contraception 6 months before the event (versus 76% among women who had never had an abortion, \( P < 0.001 \)). This proportion dropped to 33% at the time of the abortion and increased to 71%, 1 month after. In addition, 50% of women who had an abortion had changed their contraceptive method in the 6 months before the event (compared with 16% in the 6 months before the interview in women who had not had an abortion, \( P < 0.001 \)). Women with socially deprived backgrounds were less likely to use a highly effective contraception after an abortion.

CONCLUSIONS: Abortion is a good opportunity for intervention, but especially so for socially disadvantaged women. It is essential to draw the attention of prescribers and women to the higher risk of contraceptive failure at the start of use of a method.

Key words: abortion/contraception/contraceptive failure/unwanted pregnancy

Introduction

Contraception is highly medicalized in France, where 60% of women use the pill and 22% the intrauterine device (IUD) (Bajos et al., 2004). The use of these highly effective contraceptive methods is one of the highest in the world (Leridon and Toulemon, 2002). In the same time, unintended pregnancies remain frequent: with one in three pregnancies reported to be unplanned and 62% ending in abortion (Bajos et al., 2004). In total, more than 200 000 abortions are carried out each year, resulting in an annual incidence rate of 14 per 1000, which is high for Western Europe (Vilain, 2004).

This apparent paradox raises questions about the circumstances in which abortions occur, and suggests several non-mutually exclusive hypotheses. Women undergoing abortions may manage their everyday contraceptive practices less well than other women, as suggested in several studies (Bajos et al., 2002; Jones et al., 2002; Larson et al., 2002). Indeed, many pregnancies ending in abortion are the result of women forgetting to take the pill or having difficulty with negotiating the use of a condom. Finally, these women may be more likely to choose non-highly effective contraceptive methods, with higher theoretical failure rates than highly effective contraceptive methods (Trussell, 2004). In this article, we will explore this last hypothesis. Several studies have shown that women who have abortions often use non-highly effective contraceptive methods (Price et al., 1997; Jones et al., 2002). However, their contraceptive profile has not been compared to that of women with similar socio-demographic characteristics who have not undergone an abortion. Furthermore, most of these studies focus exclusively on the contraceptive situation at the time of the abortion. Only two studies have more broadly described the contraceptive practices of women before and after an abortion (Bianch-Demicheli et al., 2003; Jones et al., 2002). However, they have not used a longitudinal approach that allows detailed analysis of the factors associated with contraceptive paths around the time of abortion. From a public health point of view, it is important to determine whether the contraceptive practices of women undergoing an abortion are persistent, reflecting possible problems of access to health care, or are temporary, reflecting a change in their personal circumstances.
In this article, we analyse the contraceptive profile of women undergoing abortions, compare it to that of women who have not had an abortion, and we investigate whether the specific characteristics of the contraceptive profile of these women are transient or persistent.

Materials and methods

We report here an analysis of data collected during a retrospective, population-based, cohort study dealing with contraceptive practices throughout life and the circumstances surrounding contraceptive failure and abortion in France. The methodology of this study has been described in detail elsewhere (Bajos et al., 2003). Here, we present only the main methodological issues.

Sampling design

A representative sample of households including at least one eligible French-speaking woman between the ages of 18 and 44 years was selected at random from the telephone directory, which was first stratified by region. One eligible woman per household was randomly selected. The response rate was 75%. All women who had had an abortion in the last 5 years, or whose last pregnancy was unplanned were selected ($n = 1034$) and a fraction of the other women were selected at random as controls (sampling proportion = 19%; $n = 1829$). A pregnancy was defined as unplanned if the woman reported she did not want to get pregnant at all or if she wanted to get pregnant later. The initial survey included 2863 women who were interviewed once per year for 5 years, from 2000 to 2004, inclusive. To reduce the mean length of the questionnaire, three women out of five were randomly selected ($n = 1689$) to answer the set of questions on lifetime contraceptive biography in the 2000 interview. The sample was weighted to take into account sampling design as well as reflect the social demographic composition (age, marital status, professional activity, level of education) of the French population in the 1999 census. The total numbers reported in the tables are gross values, i.e. the number of women actually interviewed. The percentages are weighted percentages taking the sampling design into account.

Population

Of the 2863 women interviewed, two groups were selected.

(i) The ‘abortion group’: among the 689 out of 2863 women who reported having an abortion at some time in their life, we selected those women for whom the abortion corresponded to the last pregnancy (349 women); the questionnaire was designed to obtain a detailed description of the woman’s situation at the time of the last completed pregnancy. To limit recall bias, we further selected only those women whose last abortion occurred in the 5 years before the interview (297 women). Finally, we retained only those women who responded to the detailed questions on their lifetime contraceptive biography: 163 women reporting a recent abortion. Despite the reduction in size, this sample of women having experienced a recent abortion was likely to remain representative of last pregnancies ending in abortion, because the procedures for selecting the women were not linked to the subject studied.

(ii) The second group, ‘women potentially at risk for an unintended pregnancy’, was defined as never having had an abortion, being sexually active non-sterile, and not pregnant or trying to get pregnant at the time of the survey. For this group ($n = 1787$), we did not need to select women who answered questions on their detailed lifetime contraceptive biography because we only used the information on their contraceptive practices at the time of the survey.

Analysis

We first compared the contraceptive practices of women of the abortion group 6 months before the event with that of women potentially at risk for an unintended pregnancy. This last population was standardized for age, number of children and whether or not they were living in a couple.

Among the women who had a recent abortion, we compared their contraceptive practices 6 months before and at the time of abortion. We then compared their contraceptive practices at the time of abortion with their practices 1 month after. Finally, we compared the contraceptive practices 1 month after the abortion with that of women potentially at risk for an unintended pregnancy who reported no such event.

We completed this cross-sectional analysis by a longitudinal analysis, exploring the individual contraceptive paths of women around the time of the abortion. These contraceptive paths were described using the first three available time points (6 months before, at the time of and 1 month after the abortion). Contraceptive practices 1 month and 6 months after the abortion were identical for 94% of the women. Therefore, the contraceptive situation 6 months after the abortion was excluded from the analysis of contraceptive paths. A small number of women ($n = 14$) were using no contraception 6 months before the abortion because they were pregnant ($n = 9$), or had not experienced their first sexual intercourse ($n = 5$). These women were not included in the longitudinal analysis of contraceptive paths. The contraceptive situation at each of the three time points in the path was characterized with a binary variable: \(H\) = highly effective contraception (pill, IUD, implant, sterilization) versus \(O\) = other contraceptive situations (condom, withdrawal, rhythm and none). A path ‘HOH’ thus indicates that the woman using a highly effective method 6 months before the abortion, was not doing so at the time of the abortion and returned to the use of highly effective contraception 1 month after the abortion. We compared the socio-demographic characteristics and medical follow-up of the women at the time of abortion, according to the type of contraceptive paths followed.

Finally, we investigated the factors associated with the use of highly effective contraception after the abortion.

Variables with \(P\) values below 0.25 in univariate analysis were included in the multivariate logistic regression models. The analysis was conducted using Stata software version 7 SE (StataCorp, 2002). The study received the approval of the Commission Nationale de l’Informatique et des Libertés (CNIL).

Results

Contraceptive profile before, at the time of and after abortion

Six months before the event, women who went on to have an abortion were significantly less likely to be using the pill (36 versus 63%, \(P < 0.001\)), and significantly more likely to be using condoms (21 versus 9%, \(P < 0.001\)) and natural methods (9 versus 2%, \(P < 0.001\)), compared with women who never had an abortion (Table I).

At the time of the abortion, women were less likely to be using the pill (23 versus 36%, 6 months before the abortion, \(P < 0.001\)) and more likely to be using no contraception (25 versus 14%, \(P < 0.001\)) or a natural method (19 versus 9%, \(P < 0.001\)). Interestingly, the results show that 50% of the women who had an abortion changed their contraceptive practice during the 6 months before the abortion (which includes changes from a non-highly effective method to another non-highly effective method), whereas only 16% of the women who had never had an abortion changed their contraceptive practice in the 6 months before the
Among women who had an abortion, the changes led to the use of less effective methods in 67% of cases. The abortion itself had a major impact on women’s contraceptive practices. One month after the abortion, the use of highly effective contraception was greater than before the event (6 months before or at the time of the abortion). These changes remained stable in the 6 months following the abortion (and even in the year following the event, data not shown). When comparing the detailed contraceptive patterns of use at the time of and 1 month after the abortion, results show an increase in the proportion of women using the pill, from 23% at the time of abortion to 55% 1 month after (P < 0.001). In the same time, the proportion of women using no contraception decreased from 25 to 12% (P < 0.001), the proportion using condoms decreased from 23 to 11% (P < 0.001) and the proportion using local or natural methods decreased from 19 to 5% (P < 0.001).

The distribution of contraceptive methods 1 month after the abortion was statistically similar to that of the population of women who had never experienced an abortion (P = 0.2), but the frequency of pill use remained slightly lower (Table I). We found no statistical difference in the proportion of women having an abortion in the 4 years of follow-up (2001–2004) between the two groups (3.5% in the abortion sample versus 1.6% in the population of women who had never experienced abortion, P = 0.14).

### Table I. Contraceptive profile of women 6 months before, just before, just after (1 month) and 6 months after an abortion, and of women who had never had an abortion

<table>
<thead>
<tr>
<th>Contraception</th>
<th>6 months before the abortion</th>
<th>Just before the abortion</th>
<th>Just after the abortion</th>
<th>6 months after the abortion</th>
<th>Population of women who had not had an abortion (n = 1787)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant or had never had sex 6 months before the abortion</td>
<td>9.9</td>
<td>13.7</td>
<td>11.9</td>
<td>11.8</td>
<td>10.5</td>
</tr>
<tr>
<td>None</td>
<td>36.1</td>
<td>23.2</td>
<td>54.8</td>
<td>52.7</td>
<td>63.1</td>
</tr>
<tr>
<td>Pill</td>
<td>9.7</td>
<td>9.4</td>
<td>12.4</td>
<td>15.2</td>
<td>12.7</td>
</tr>
<tr>
<td>IUD</td>
<td>20.5</td>
<td>23.0</td>
<td>11.1</td>
<td>10.6</td>
<td>9.4</td>
</tr>
<tr>
<td>Condoms</td>
<td>9.4</td>
<td>18.8</td>
<td>5.1</td>
<td>3.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Local and natural methods&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.7</td>
<td>0.4</td>
<td>0.6</td>
<td>1.2</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<sup>a</sup>Non-pregnant, non-sterile women not seeking to become pregnant and having sexual intercourse, population standardized for age, number of children and living in a couple.

<sup>b</sup>Fertility awareness, spermicides, and withdrawal.

### Table II. Social and reproductive characteristics of women who had an abortion according to their contraceptive path<sup>a</sup>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>OOO (n = 27)</th>
<th>OOH (n = 40)</th>
<th>HOH (n = 26)</th>
<th>HHH (n = 40)</th>
<th>Total (n = 133)</th>
<th>P&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age at abortion (years)</td>
<td>29.5</td>
<td>26.1</td>
<td>27.2</td>
<td>30.3</td>
<td>28.3</td>
<td>0.04</td>
</tr>
<tr>
<td>Mean number of children at the time of the abortion</td>
<td>1.1</td>
<td>0.8</td>
<td>1.2</td>
<td>1.7</td>
<td>1.2</td>
<td>0.03</td>
</tr>
<tr>
<td>Living in a couple at the time of the abortion (%)</td>
<td>46.1</td>
<td>32.2</td>
<td>51.6</td>
<td>61.5</td>
<td>47.5</td>
<td>0.18</td>
</tr>
<tr>
<td>Duration of relationship with the partner &gt;1 year (%)</td>
<td>71.7</td>
<td>42.8</td>
<td>48.1</td>
<td>70.8</td>
<td>58.4</td>
<td>0.13</td>
</tr>
<tr>
<td>Stable relationship (%)</td>
<td>30.2</td>
<td>35.3</td>
<td>40</td>
<td>65.8</td>
<td>44.4</td>
<td>0.05</td>
</tr>
<tr>
<td>Unemployed at the time of the abortion (%)</td>
<td>23.7</td>
<td>11.1</td>
<td>22.6</td>
<td>51</td>
<td>14.0</td>
<td>0.32</td>
</tr>
<tr>
<td>Financial problems at the time of the abortion (%)</td>
<td>19.5</td>
<td>18.8</td>
<td>34.1</td>
<td>21.4</td>
<td>22.4</td>
<td>0.69</td>
</tr>
<tr>
<td>Educational level below completion of high school (%)</td>
<td>66.8</td>
<td>46.9</td>
<td>36</td>
<td>50.7</td>
<td>50.5</td>
<td>0.33</td>
</tr>
<tr>
<td>Not French/not born in France (%)</td>
<td>19.5</td>
<td>5.5</td>
<td>16</td>
<td>18.8</td>
<td>14.4</td>
<td>0.51</td>
</tr>
<tr>
<td>No private health insurance (%)</td>
<td>44.9</td>
<td>9.7</td>
<td>6.5</td>
<td>10</td>
<td>16.9</td>
<td>0.004</td>
</tr>
<tr>
<td>History of unplanned pregnancy (%)</td>
<td>42.7</td>
<td>35.4</td>
<td>31.4</td>
<td>38.6</td>
<td>37.2</td>
<td>0.92</td>
</tr>
<tr>
<td>History of abortion (%)</td>
<td>31.4</td>
<td>30.7</td>
<td>31</td>
<td>22.8</td>
<td>28.5</td>
<td>0.91</td>
</tr>
<tr>
<td>Pre-abortion consultation (%)</td>
<td>61.0</td>
<td>83.7</td>
<td>83.9</td>
<td>73.2</td>
<td>75.8</td>
<td>0.27</td>
</tr>
<tr>
<td>Post-abortion consultation (%)</td>
<td>55.6</td>
<td>88.4</td>
<td>85.5</td>
<td>97.4</td>
<td>83.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<sup>a</sup>Refer to text for path descriptions.

<sup>b</sup>Chi-square test.
Conversely, the 26.3% of women who used highly effective methods (H) continuously (HHH) were less likely than other women to be unemployed (Table II). They were also more likely to state that they were in a stable relationship (i.e. not one that had just begun or was in the process of breaking up). Finally, we found that the women of these two groups with stable contraceptive paths (OOO and HHH) were more likely to be in long-term relationships (more than 1 year).

Women who had switched from highly effective to other contraceptive methods before the abortion, and went back to highly effective methods after the abortion (HOH; 15.2%) were more likely to be unemployed and in financial situations they considered to be very difficult at the time of the abortion.

Reasons to change from highly effective to less effective methods were not explored in the contraceptive biography collected in 2000. This information was provided in the follow-up questionnaires performed each year between 2001 and 2004. Among the general population, these reasons were: medical advice (29.7%), side effects (28.0%), break-up of the relationship (26.0%), women were tired of their method (22.2%) and women did not have a new prescription (7.4%) (women could give several reasons).

Finally, 26.2% of women used a non-highly effective method 6 months before and at the time of the abortion, and then switched to highly effective methods after the event (OOH).

By nationality, there was no apparent difference between these four main contraceptive paths. Similarly, having had a previous abortion or an unplanned pregnancy was not linked to the type of contraceptive paths.

The other four possible paths were distributed as follows: 2.8% OHO, 1.6% OHH, 5.2% HOO and 4.4% HHO.

### Discussion

This study is the first to analyse in detail the contraceptive paths of women undergoing an abortion, over a 1-year period around the time of abortion (6 months before to 6 months after the abortion). We considered possible bias because of the underreporting of abortions observed in all studies of the general population (Rossier, 2003). This underreporting was estimated to be 40% in the COCON survey (Moreau et al., 2004).

However, if not reporting an abortion is linked to the contraceptive situation of the woman, then we might expect women using traditional methods to be less likely to report having had an abortion in a survey carried out by a medical research institute than women who have followed medical recommendations to use a more effective method. If such a bias exists, we would expect it to lead to underestimating the use of non-highly effective contraception in women who have undergone an abortion when compared to the general population. This would not affect our proposed interpretation.

Another limitation of our data is that information is not provided about the sexual activity of the women after an abortion. Consequently, we do not know whether the 12% of women using no contraception 6 months after the abortion were exposed to the risk of an unplanned pregnancy. This is important because the proportion of women who are not sexually active after an abortion may not be negligible, and indeed was reported to be 10% in a Swiss prospective study (Bianchi-Demicheli et al., 2003).

In this study, the contraceptive profile of women undergoing abortion appeared to be under-medicalized at the time of the procedure. Several studies in the US (Henshaw and Kost, 1996; Jones et al., 2002) and in Western Europe (Ingelhammar...
Women undergoing abortions often use no contraception at the time of the pregnancy which ended in abortion. Many use condoms or natural methods and conversely, very few use the pill. However, these earlier studies do not compare this contraceptive profile with that of other women. Only the study by Jones et al. (2002) compared the contraceptive patterns of use of women, undergoing abortion with that of other women exposed to the risk of unplanned pregnancy. The conclusions of this comparison were similar to those of the previously cited studies.

There are two possible explanations for these observations: women undergoing abortions have a specific contraceptive profile linked to a socio-demographic or sexual activity profile different from that of the general population; and/or these women have a specific relation to contraception, regardless of their socio-demographic and sexual characteristics. When comparing the contraceptive profile of the women in our survey who had an abortion with that of a standardized population of women who had not undergone an abortion, there is clear evidence of the under-medicalization of contraception in the women who had an abortion. This result suggests that these women have a particular relation to contraception, possibly reflecting difficulty accessing the health care system. However, the specificity of the contraceptive profile at the time of the abortion appeared in many cases to be transitory in the woman’s contraceptive path. Indeed, many of these women who had experienced an abortion were using highly effective methods (pill, IUD) 6 months before the abortion, although not as frequently as the general population. These findings, therefore, reflect not only high-risk contraceptive profiles but also windows of vulnerability in a contraceptive path that is medicalized at other times. It must be emphasized that the contraceptive regime at the time of abortion was relatively new (i.e. they had been using it for less than 6 months) for 50% of these women. Several studies have shown that errors in contraceptive practices are more frequent at the start of use (Peterson et al., 1998), leading to higher contraceptive failure rates in the first year of use (Ranjit et al., 2001; Trussell, 2004).

Our findings show that the time of the abortion provided an opportunity for many women to remedicalize contraceptive practices. Thus, the level of medicalization after an abortion reaches that of the women who have not had an abortion. The more contacts the women had with the health professionals at the time of the abortion, the more likely they were to use highly effective methods after the abortion. For these women, it is therefore more appropriate to talk about risky situations rather than risky women. Furthermore, the use of highly effective methods 6 months before the abortion was found to be more predictive of post-abortion highly effective contraceptive use than was the use of highly effective methods at the time of the pregnancy leading to the abortion. Bianchi-Demicheli et al. (2003) also found that Swiss women switched from non-highly effective contraception just before an abortion to highly effective methods after the event. Garg et al. (2001) reported similar findings for the UK.

The longitudinal analysis of contraceptive paths was used to refine these concepts of profiles and high-risk situations. The results indicate that four types of contraceptive paths accounted for 86% of the women who had an abortion. These contraceptive paths appear to be linked to the socio-demographic characteristics as well as to the type of relationship with the partner. Women using non-highly effective contraception methods before the abortion (6 months before and at the time of the abortion) had a lower educational level, and were less likely to have private health insurance. They also appeared to be at some social distance from the health care system (fewer pre- and post-abortion consultations). These characteristics were found to be associated with a lower likelihood to use highly effective methods after an abortion. These results may reflect long-term difficulty with access to medically prescribed contraception, and also suggest that it may be harder for some socially disadvantaged women who find themselves at a greater social distance from the health system to modify their contraceptive paths.

The recent change in the contraceptive situation for women who switched from highly effective contraception to other methods at the time of the abortion seems to be associated with recent changes in their social lives. They were more likely to be in difficult material conditions, in a recent relationship or single. This change also partly results from a decision to stop using the previous contraceptive method due to perceived secondary effects, as also shown in several studies (Milsom et al., 1991; Price et al., 1997; Rosenberg and Waugh, 1998). Thus, an American prospective study showed that 19% of women who stopped taking the pill during the first 6 months of use did not immediately switch to another contraceptive method (Rosenberg and Waugh, 1998). The authors of this study estimate that 20% of the 3.5 million unplanned pregnancies that occur each year could be attributed to inconsistent use or early discontinuation of the pill (Rosenberg et al., 1995).

The women undergoing abortions therefore present contraceptive specificities reflecting, in some cases, a contraceptive profile associated with a ‘high risk’ of abortion, and in others, a period of risk in an otherwise medicalized contraceptive path. Abortion is thus clearly a vulnerable time for all women, and a good opportunity for intervention, but especially so for the less well off, who may have less contact normally with health professionals, and also for those undergoing personal changes in their lives. Preventive strategies beyond simple information are certainly required to reach women from socially deprived backgrounds. For those who find themselves temporarily at high risk, it appears essential to draw the attention of prescribers and users to the need to use another contraceptive method in case they stop the pill, and to the higher risk of contraceptive failure at the start of use of a new method. We also recommend making the practice of prescribing contraception more flexible taking into account the social and emotional conditions that may lead to contraceptive failures (Bajos et al., 2002).

The use of a highly effective contraceptive method such as the pill or the IUD is not necessarily the most appropriate solution for all women (ANAES, 2004), but it is important that the women who wish to use these methods, whose efficiency is higher than that of other methods such as condoms, can do so regardless of socio-economic status. Women must also be informed of the inherent difficulties with the use of oral contraception, particularly during the initial phase.
Acknowledgements
This study was carried out with the financial support of the French Institute of Health and Medical Research (INSERM) and the National Institute of Demography (INED). Funding for data collection was provided by grants from Wyeth Lederle. The authors thank Melanie Adams for her help in editing the article. We also thank all the women who answered our questionnaire.

References
StataCorp (2002) Stata Statistical Software: release 7.0. Stata Corporation, College Station, TX.
Submitted on January 13, 2006; resubmitted on April 1, 2006; accepted on June 5, 2006