

Unintended pregnancy and use of emergency contraception among a large cohort of women attending for antenatal care or abortion in Scotland

Fatim Lakha, Anna Glasier

Summary

Lancet 2006; 368: 1782–87

See Comment page 1747

University of Edinburgh School of Clinical Science and Community Health, Edinburgh, UK (F Lakha MBChB, Prof A Glasier DSc); University of London School of Hygiene and Tropical Medicine, Department of Public Health and Policy, London, UK (A Glasier); and NHS Lothian, Edinburgh, UK (A Glasier)

Correspondence to:

Prof Anna Glasier, NHS Lothian Family Planning Service, 18 Dean Terrace, Edinburgh EH4 1NL, UK
Anna.Glasier@lpct.scot.nhs.uk

Background Unintended pregnancy is common. Although many unintended pregnancies end in induced abortion, up to a third of those proceeding to birth might be unplanned. Some of these pregnancies could be prevented by emergency contraception. We have sought to establish how many pregnancies ending in either childbirth or abortion are unintended, and what proportion of women use emergency contraception to try to prevent pregnancy.

Methods 2908 women who attended an Edinburgh hospital for antenatal care and 907 attending for abortion fully completed a self-administered questionnaire including a validated measure of pregnancy intention and questions about emergency contraceptive use.

Findings 814 (89.7%) of 907 pregnancies among women requesting abortion were unintended compared with only 250 (8.6%) among 2908 women who planned to continue pregnancy. However, only 1909 (65.6%) of continuing pregnancies were intended. The rest of the women were ambivalent about pregnancy intention. In women who continued with their pregnancies intendedness was related to age, with unintended pregnancy most probable in young women ($p < 0.0001$). Emergency contraception was used by 113 (11.8%) of women who requested abortion but only 40 (1%) of those planning to continue pregnancy. In those whose pregnancy was continuing, the proportions reporting use of emergency contraception were higher in young women than in older women and in those who reported that their pregnancies were unintended than in those who meant to become pregnant (both $p < 0.0001$).

Interpretation Unintended pregnancy is common, even among women planning to continue pregnancy. However, EC use is low even among women with no intention of conceiving, and is thus unlikely to reduce unintended pregnancy rates. Rather, we need to find ways to improve the use of regular contraception.

Introduction:

Unintended pregnancy is common. In the UK, almost 200 000 pregnancies are terminated every year.^{1,2} Additionally, a substantial number of births result from unintended conception. In a questionnaire survey of 2000 mothers who were randomly selected from birth registrations in 1989 and interviewed 6 months after childbirth, almost a third of pregnancies (31.3%) were "unplanned".³ A simple measure of pregnancy intention was devised and validated by Barrett and colleagues⁴ in 2004 (table 1); however, there have been no estimates of pregnancy intendedness in women in the UK since 1989.

Up to a quarter of pregnancies that end in induced abortion in the UK arise from unprotected sexual intercourse; most of the rest are the result of inconsistent or incorrect use of contraceptives (eg, missed pills) or accidental damage of barrier contraceptives (eg, a burst condom).^{5,6} Emergency contraception can prevent pregnancy if used within 72 hours of unprotected sex.^{7,8} The only marketed product in the UK (oral levonorgestrel 1.5 mg) is thought to prevent over 80% of pregnancies depending on how soon after intercourse it is used.⁷ Trussell and colleagues⁹ estimated that if every woman in the USA used emergency contraception every time it was needed, 1.7 million unintended pregnancies, over half of which end in abortion, could be prevented every year.

Although knowledge of emergency contraception in the UK is high, use is rather low. In 2003–04, 6% of women aged 16–49 years had used emergency contraception within the previous year although more than 94% of women knew about it.¹⁰ One small study showed that about 11% of women presenting for abortion in the UK in 2000 had used emergency contraception to try to prevent the pregnancy,⁵ but there are no data on the use of emergency contraception among women who continued with their pregnancies.

In 2005, we undertook a questionnaire survey designed to quantify pregnancy intention and use of emergency contraception among women who presented over the course of 8 months to a large teaching hospital in Edinburgh, UK, for antenatal care, or to attend the pregnancy support centre (women who have a history or high likelihood of miscarriage), or for termination of pregnancy.

Methods

From July 5, 2004, until Feb 28, 2005, all women booking for antenatal care or abortion in the New Royal Infirmary of Edinburgh, were invited to complete a self-administered questionnaire asking about pregnancy intention and use of emergency contraception. We excluded women whose fetus was shown to have died, by ultrasonography, and

those who were unable to read or write English well enough to understand or complete the questionnaire. Women who were judged by the nursing staff to be distressed about the clinical consultation were not offered the questionnaire. This judgment applied mainly to women presenting at the abortion clinic.

Before seeking ethics approval for the study, we asked 207 women to read and comment on a draft information sheet and questionnaire. The final questionnaire consisted of 15 questions about age, pregnancy gestation, contraceptive use (including emergency contraception) in the month of conception, and pregnancy intention. Intendedness was measured by using Barrett and colleagues' instrument (table 1).⁴ For the intendedness score, the answer to each of the six questions was scored from 0 to 2, so the total scores ranged from 0 (least intended) to 12 (most intended). Although Barrett and colleagues emphasised that there were no obvious cutoff points on the range of scores obtained, they suggested that three score groups were identifiable: 10–12 (planned), 4–9 (ambivalent), and 0–3 (unplanned).⁴ These three groups were used for the purposes of analysis and discussion. Ethics approval for the survey was obtained from the local research ethics committee.

On the basis of an estimated proportion of emergency contraceptive use of at least 10%⁵ among women presenting for abortion and our estimate of 2% for women continuing their pregnancies, a sample size of 1000 women undergoing abortion and 4500 booking for antenatal care was needed to ensure that the upper confidence limit for proportion of emergency contraceptive use was only 50% higher than the lower limit. The study was powered to 90% and the confidence intervals set to 95%. Quality control checks were done on 5% of all data entries. Data were analysed by use of Excel (2003) and SPSS (version 12).

Groups were compared by χ^2 tests for binary data, Mann-Whitney tests for intendedness scores, and two-sample *t* tests for age and gestation. Ages in different intendedness groups were compared by one-way ANOVA.

Results

5686 pregnant women attended the hospital during the study period, 5630 of whom were eligible to participate (figure 1). Less than 1% of women were judged to be too distressed to be offered a questionnaire. 1285 (78%) of 1645 women attending for abortion were given the questionnaire and it was returned by 1006 (78%). 2905 (93%) of women attending the antenatal clinic and 810 (92%) of those attending pregnancy support centre were given the questionnaire; of those women, 2496 (86%) and 643 (79%), returned the questionnaire, respectively (figure 1). Women attending for abortion were younger than those planning to continue their pregnancies and women seeking abortion or attending the pregnancy support clinic attended hospital at an earlier gestation than those women attending an antenatal clinic (table 2).

Question	Answer	Score
Q1. At the time of conception	Always used contraception	0
	Inconsistent use	1
	Not using contraception	2
Q2. In terms of becoming a mother	Wrong time	0
	OK but not quite right	1
	Right time	2
Q3. Just before conception	Did not intend to become pregnant	0
	Changing intentions	1
	Intended to get pregnant	2
Q4. Just before conception	Did not want a baby	0
	Mixed feelings about having a baby	1
	Wanted a baby	2
Q5. Before conception	Had never discussed children	0
	Discussed but no firm agreement	1
	Agreed pregnancy with partner	2
Q6. Before conception	No actions	0
	Health preparations (1 action*)	1
	Health preparations (≥ 2 actions*)	2

Health preparations included: taking folic acid supplements; stopping or reduction of smoking; stopping or reduction of drinking alcohol; healthy eating; seeking medical advice before conception.

Table 1: Pregnancy intendedness instrument⁴

3815 women answered all six questions in the intendedness measure, 2908 of them continuing their pregnancy and 907 who requested abortion. 814 (89.7%) of women who requested abortion had a total score of 3 or less, which suggests that their pregnancies were unintended (table 2). Only two women who wanted an abortion scored 10 or more (intended) and 91 (10.0%) were ambivalent about the intendedness of the pregnancy

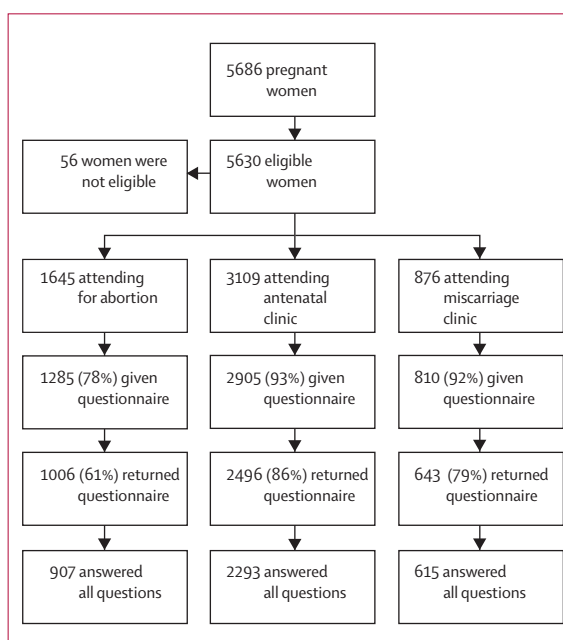


Figure 1: Study profile

	Seeking abortion	Continuing pregnancy			*	†
		Miscarriage clinic	Antenatal clinic	Total		
Age (years)						
Mean (SD)	25.0 (6.7)	30.3 (6.2)	29.6 (5.8)	29.7 (5.9)	<0.0001	0.002
Range	10-45	14-44	15-44	14-44		
Gestation (days)						
Mean (SD)	56 (19)	58 (15)	92 (17)	87 (21)	<0.0001	<0.0001
Range	7-181	16-129	44-270	16-270		
Total intendedness score, n (%)						
10-12 (intended)	2 (0.2%)	402 (65.4%)	1507 (65.7%)	1909 (65.6%)	<0.0001	0.42
4-9 (ambivalent)	91 (10.0%)	140 (22.8%)	609 (26.6%)	749 (25.8%)		
0-3 (unintended)	814 (89.7%)	73 (11.9%)	177 (7.7%)	250 (8.6%)		
EC used in conception cycle						
Yes	113 (11.8%)	17 (2.7%)	23 (1.0%)	40 (1.4%)	<0.0001	0.002
No	844 (88.2%)	603 (97.3%)	2308 (99.0%)	2911 (98.6%)		
EC after all episodes of unprotected sex ‡	74 (65%)	7 (41%)	13 (56%)	20 (50%)	0.12	0.42

EC=emergency contraception. *Seeking abortion versus total continuing with their pregnancy. †Attending miscarriage clinic versus those attending the antenatal clinic. ‡Percentage is of those answering "Yes" to use of emergency contraception in conception cycle.

Table 2: Characteristics of women, use of emergency contraception, and intendedness score

(score 4-9), (figure 2). Of the women who planned to continue their pregnancies, 250 (8.6%) scored less than 3 (unintended), 1909 (65.6%) scored 10 or more (intended) and 749 (25.8%) had some ambivalence about their intention to conceive (score 4-9) (table 2, figure 2). Intendedness was associated with age in women who chose to continue with their pregnancies; women who had intended to become pregnant were significantly older than those who were ambivalent or had unintended pregnancy. There was no significant association between age and intendedness in women presenting for abortions (table 3). 113 (11.8%) women presenting for abortion used emergency contraception to try to prevent pregnancy whereas only 40 (1.4%) of those continuing with their pregnancies had done so (table 2). Of the women who used emergency contraception, 74 (65%) of those attending for abortion and 20 (50%) of those continuing with their pregnancy said they had used it after every episode of unprotected intercourse during the menstrual cycle in which they got pregnant. Women who used emergency contraception were significantly more likely to score low rather than high on the intendedness scale, both in the abortion group and in those continuing their pregnancies (table 4). In women continuing with their pregnancies, young age was significantly associated with emergency contraception use ($p < 0.0001$). Age was not related to emergency contraception use in women seeking abortion, but in this group, women who presented before 39 days of gestation were significantly more likely to have used emergency contraception than those presenting later.

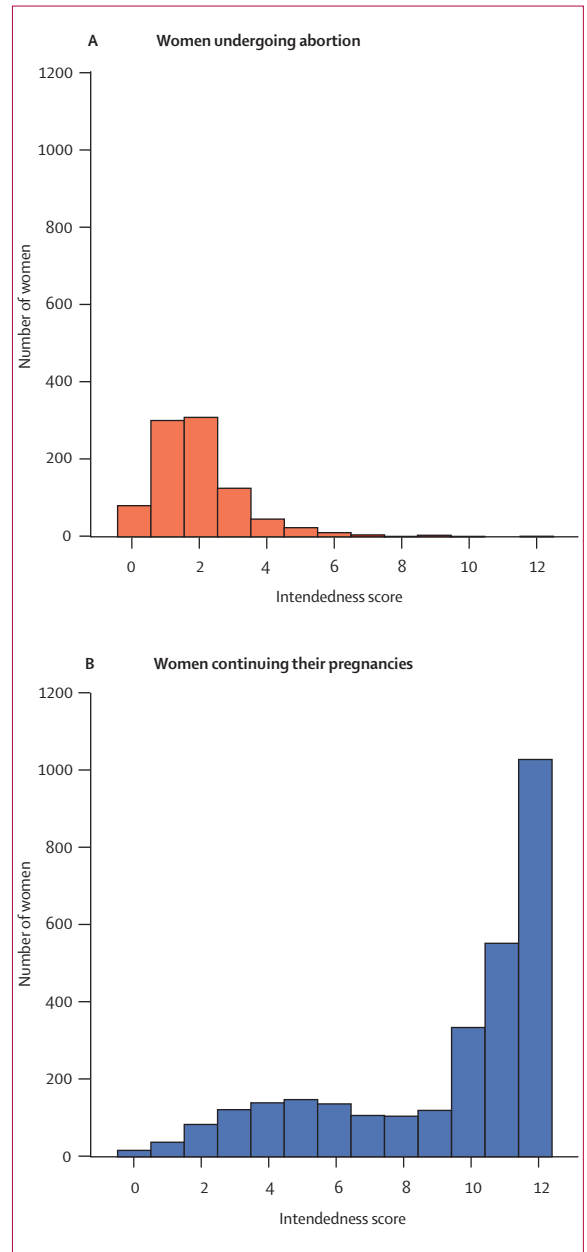


Figure 2: Spread of intendedness scores for women undergoing induced abortion and for all women continuing their pregnancies (including those seen in the miscarriage clinic). 0=least intended pregnancies, 12=most intended.

Discussion

In Edinburgh in 2005, only two-thirds of pregnancies destined to end in childbirth were clearly intended, one in ten was unintended, and around a quarter of women were somewhat ambivalent about their intention to become pregnant. When Barrett and colleagues developed their instrument, they took care to describe the differences in the meaning of the words “planned and unplanned”, “intended and unintended”, and “wanted and unwanted”.⁴ In 1989, Fleissig³ used the

	Mean age (years)			
	Seeking abortion	Miscarriage clinic	Antenatal clinic	Continuing pregnancy total
Intended	31.0	31.9	31.0	31.2
Ambivalent	24.9	28.3	27.3	27.5
Unintended	24.8	25.8	25.6	25.7
p	0.28	<0.0001	<0.0001	<0.0001

p values are from one-way ANOVA.

Table 3: Association between mean age (years) and intendedness

	Seeking abortion	Continuing pregnancy		
		Miscarriage clinic	Antenatal clinic	Total
Age (years)				
0–19	19 (9.3%)	1 (3.7%)	6 (3.6%)	7 (3.6%)
20–24	35 (11.1%)	8 (7.8%)	7 (2.3%)	15 (3.7%)
25–29	34 (17.4%)	2 (1.6%)	5 (0.9%)	7 (1.0%)
30–34	10 (8.8%)	4 (2.1%)	2 (0.2%)	6 (0.6%)
≥35	11 (10.4%)	2 (1.2%)	3 (0.7%)	5 (0.8%)
p*	0.64	0.011	0.0001	<0.0001
Gestation (days)				
0–39	21 (22.8%)	2 (5.0%)	0	2 (5.0%)
40–79	74 (10.6%)	9 (2.5%)	2 (0.9%)	11 (1.8%)
80–119	6 (8.7%)	1 (2.5%)	17 (1.0%)	18 (1.0%)
≥120	2 (14.3%)	0	3 (3.8%)	3 (3.8%)
p*	0.015	0.48	0.13	0.19
Intendedness				
Intended	0	6 (1.6%)	1 (0.1%)	7 (0.4%)
Ambivalent	4 (4.7%)	7 (5.0%)	14 (2.4%)	21 (2.9%)
Unintended	96 (12.3%)	3 (4.1%)	6 (3.5%)	9 (3.7%)
p*	0.031	0.054	<0.0001	<0.0001

Percentages are the proportion of women in that age, gestational stage, or intendedness group who used emergency contraception. Information is not available for all participants. * χ^2 test for trend.

Table 4: Trends in maternal age, gestational stage, and pregnancy intendedness among women using emergency contraception

word “unplanned” and the questionnaire was completed by women 6 months post partum. Despite the difference in timing of the survey, and differences in wording of the questionnaires, the proportion of pregnancies that are “planned” or “intended” has not changed since Fleissig’s study. This finding is perhaps surprising given the demographic changes (falling birth rates, later age of first childbirth)¹¹, changes in sexual behaviour,¹² and the increase in contraceptive choice in the past 25 years.¹³

The relation between age and intendedness among women continuing their pregnancies is unsurprising. The findings that over 90% of pregnancies ending in abortion were unintended and that only 10% of women requesting abortion were ambivalent about their pregnancies is consistent with the findings of a smaller study of 300 women in Edinburgh undergoing abortion,

in which a similar proportion claimed to have used emergency contraception.⁶ In that study a modified version of the intendedness measure was used in a face-to-face interview rather than in a self-administered questionnaire. Despite the methodological differences, both studies show that most women who requested abortion had no intention to conceive.

One in ten women undergoing abortion and a quarter of women continuing with their pregnancies seemed to have some ambivalence about pregnancy intention. Since the number of women who were ineligible for the study or deemed to be too distressed to be given the questionnaire was small we do not believe that inclusion of these women would have altered the findings.

The observation of a relation between intendedness and emergency contraception use adds weight to the validity of Barrett and colleagues’ scoring system. The results also suggest that, women who are ambivalent about their pregnancies are more likely to continue than to have them terminated. The association between use of emergency contraception and earlier gestational stage at presentation among women requesting abortion is probably related to heightened awareness of the risk of pregnancy since they recognised that they were at risk of pregnancy before missing a menstrual period. Use of emergency contraception was related to age only for women who were continuing with their pregnancy, perhaps because younger women are more ambivalent about avoiding pregnancy than older women.

The availability and use of emergency contraception varies around the world. Although use of a combination of oral contraceptive pills as a substitute for emergency contraception has always been possible, in many countries a dedicated product has only recently become available. Generally, use does not start to increase until such a product becomes available (eg, in Nigeria and the USA in 1998, in France in 1999, and in India in 2002). In much of sub-Saharan Africa, the former Soviet Union, and the Middle East, a dedicated product is not available. In a 2001 survey of 880 female undergraduates in Nigeria, of whom 34% had had an abortion in the past, 58% knew about emergency contraception, but only 2% had ever used it.¹⁴ In a group of 623 women who sought contraception or abortion in India—where an estimated 5–6 million abortions occur each year, most of them illegal—only 6% knew about emergency contraception and none had ever used it.¹⁵ In more developed countries, knowledge of emergency contraception is greater and more women use it. Among women undergoing abortion, the proportion who said they had used emergency contraception to try to prevent the pregnancy was 1.3% in the USA in 2000,¹⁶ 2.9% in Sweden in 2000,¹⁷ and 9.2% in France in 2002.¹⁸ Use of emergency contraception has increased in the UK since it was first licensed in 1984. In a questionnaire study of women presenting for abortion in Dundee in 1984, 1% of women had tried to prevent the pregnancy with emergency contraception.¹⁹ When the study was repeated

in 1996, 7% of women had used emergency contraception.²⁰ Nevertheless, emergency contraception is unlikely to prevent many pregnancies if, as in our survey of women who became pregnant, only one in ten women who definitely did not want to become pregnant use it in cycles when they have put themselves at risk of pregnancy, and not much more than half of those use it with every act of unprotected intercourse. The availability of emergency contraception over the counter in UK pharmacies does not seem to have resulted in increased use.²¹

Other studies have shown that failure to recognise the need to use emergency contraception is common. In a questionnaire study of 1365 women who had induced abortions in France, 90% had heard of emergency contraception but only a third had ever used it and only 9% had used it in the cycle in which they became pregnant.¹⁸ 38% of the women were aware that they had put themselves at risk of pregnancy in the cycle in which they conceived—most of these were either not using contraception or were relying on condoms or withdrawal. Nine out of ten of them knew about emergency contraception but only one in four of them used it. More than half the women did not realise that they were at risk of pregnancy, and only 2.8% used emergency contraception. Lack of knowledge of how and when to use emergency contraception, difficulties with getting hold of it, and reservations about using it are all commonly cited barriers to its use.²² However, without these barriers, most women who have become pregnant and could have used emergency contraception to prevent an unwanted pregnancy failed to do so. Several studies, from various settings, in which women were given a supply of emergency contraception in advance of need have shown that three out of four women who put themselves at risk of pregnancy, even when they had a supply at home, did not use emergency contraception because they did not recognise—or did not acknowledge—the risk.^{23–25}

Although 98% of women who wish to avoid pregnancy use contraception in the UK,¹⁰ abortion rates continue to rise.¹² Unintended pregnancies that end in childbirth, unless they occur in teenagers, are of less concern to policymakers than those that end in abortion, but they do affect the lives of the women involved. Understanding of sexual behaviour and patterns of contraceptive use is crucial for development of interventions to reduce unintended pregnancy. This survey needs to be repeated in other settings, and if the findings are similar elsewhere, a strategy will need to be developed to improve contraceptive use. We need to find ways to raise awareness of the real risks of pregnancy associated with lack of use of contraception or with incorrect or inconsistent use. Emergency contraception is unlikely to make a substantial difference to pregnancy rates. Condoms and oral contraceptive pills are the most commonly used reversible methods of contraception in the UK and both rely on

consistent use for their effectiveness. Condom use is commonly inconsistent, and compliance with oral contraception is not easy. In one US study, 47% of women reported missing one or more pills per cycle and 22% reported missing two or more.²⁶ In a study that used electronic diaries to record compliance, 63% of women missed one or more pills in the first cycle of use, and 74% did so in the second cycle.²⁷ We need to encourage women who clearly want to avoid pregnancy and are taking risks to use long-acting contraceptive methods (implants and intrauterine devices) that do not depend on compliance for their effectiveness.²⁸

Contributors

A Glasier was the main investigator, conceived the study, and wrote the report. F Lakha assisted with the design of the questionnaire, piloted it, and coordinated the data collection, data entry, and analysis, and assisted with writing of the report.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgments

This study was supported by the Contraceptive Development Network, which is funded by the UK Medical Research Council and the UK Department for International Development (research grant number G 9523250). We thank Ann Kerr, all the midwives, clerical staff, and radiographers at the Simpson Centre for Reproductive Health who assisted with distributing the questionnaires; Susan Morrow and Heather Murphy at the Contraceptive Development Network in Edinburgh for monitoring the study, and Rob Elton for statistical advice.

References

- 1 http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsStatistics/PublicationsStatisticsArticle/fs/en?CONTENT_ID=4116461&chk=6T9UTA (accessed June 1, 2006).
- 2 http://www.isdscotland.org/isd/new2.jsp?pContentID=3915&p_applic=CCC&p_service=Content.show& (accessed June 1, 2006).
- 3 Fleissig A. Unintended pregnancies and the use of contraception: changes from 1984–1989. *BMJ* 1991; **302**: 147.
- 4 Barrett G, Smith SC, Wellings K. Conceptualisation, development and evaluation of a measure of unplanned pregnancy. *J Epidemiol Community Health* 2004; **58**: 426–33.
- 5 Garg M, Singh M, Mansour D. Peri-abortion contraceptive care: can we reduce the incidence of repeat abortions? *J Fam Plann Reprod Health Care* 2001; **27**: 77–80.
- 6 Schünmann C, Glasier A. Measuring pregnancy intention and its relationship with contraceptive use amongst women undergoing therapeutic abortion. *Contraception* 2006; **73**: 520–24.
- 7 Task Force on Postovulatory Methods of Fertility Regulation. Randomised controlled trial of levonorgestrel versus the Yuzpe regimen of combined oral contraceptives for emergency contraception. *Lancet* 1998; **352**: 428–33.
- 8 Von Hertzen H, Piaggio G, Ding J, et al. Low dose mifepristone and two regimens of levonorgestrel for emergency contraception: a WHO multicentre randomised trial. *Lancet* 2002; **60**: 1803–10.
- 9 Trussell J, Stewart F, Guest F, Hatcher RA. Emergency contraceptive pills: a simple proposal to reduce unintended pregnancies. *Fam Plann Perspect* 1992; **24**: 269–73.
- 10 Dawe F, Rainford L. Contraception and sexual health 2003. A report on research using the ONS Omnibus Survey produced by the Office for National Statistics on behalf of the Department of Health, London: Office for National Statistics, 2004.
- 11 Smallwood S. The converse of contraception: fertility trends in England and Wales. In: Glasier A, Wellings K, Critchley H, eds. *Contraception and contraceptive use*. Royal College of Obstetricians and Gynaecologists, 2005: 6–11.
- 12 Wellings K, Nanchahal K, Macdowall W, et al. Sexual behaviour in Britain: early heterosexual experience. *Lancet* 2001; **358**: 1843–50.
- 13 Baird DT, Glasier AF. Science, medicine and the future. *Contraception*. *BMJ* 1999; **319**: 969–72.

- 14 Aziken ME, Okonta PI, Anda ABA. Knowledge and perception of emergency contraception among female Nigerian undergraduates. *Int Fam Plan Perspect* 2003; **29**: 84–87.
- 15 Arora N, Mittal S. Emergency contraception and prevention of induced abortion in India. *J Fam Plann Reprod Health Care* 2005; **31**: 294–96.
- 16 Jones RK, Darroch JE, Henshaw SK. Contraceptive use among US women having abortions in 2000–2001. *Perspect Sex Reprod Health* 2002; **34**: 294–30.
- 17 Aneblom G, Larsson M, Od lind V, Tyden T. Knowledge, use and attitudes towards emergency contraceptive pills among Swedish women presenting for induced abortion. *Br J Obstet Gynaecol* 2002; **109**: 155–60.
- 18 Moreau C, Bouyer J, Goulard H, Bajos N. The remaining barriers to the use of emergency contraception: perception of pregnancy risk by women undergoing induced abortions. *Contraception* 2005; **71**: 202–07.
- 19 Johnston T, Howie P. Potential use of postcoital contraception to prevent unwanted pregnancy. *BMJ* 1985; **290**: 1040–41.
- 20 Gordon AF, Owen P. Emergency contraception: change in knowledge of women attending for termination of pregnancy from 1984 to 1996. *Br J Fam Plann* 1999; **24**: 121–22.
- 21 Marston C, Meltzer H, Majeed A. Impact on contraceptive practice of making emergency hormonal contraception available over the counter in Great Britain: repeated cross sectional surveys. *BMJ* 2005; **331**: 271–75.
- 22 Free C, Raymond ML, Ogden J. Young women's accounts of factors influencing their use and non-use of emergency contraception: in-depth interview study. *BMJ* 2002; **325**: 1393–97.
- 23 Glasier AF, Fairhurst K, Wyke S, et al. Advanced provision of emergency contraception does not reduce abortion rates. *Contraception* 2004; **69**: 361–66.
- 24 Lo SST, Fan SY, Ho PC, Glasier A. Effect of advanced provision of emergency contraception on women's contraceptive behaviour: a randomized controlled trial. *Hum Reprod* 2004; **19**: 2404–10.
- 25 Hu X, Cheng L, Hua X, Glasier A. Advanced provision of emergency contraception to postnatal women in China makes no difference to abortion rates: a randomized controlled trial. *Contraception* 2005; **72**: 111–16.
- 26 Rosenberg A, Waugh MS. Causes and consequences of oral contraceptive non-compliance. *Am J Obstet Gynecol* 1999; **180**: 276–79.
- 27 Potter L, Oakley D, de Leon-Wong E, Canaman R. Measuring compliance among oral contraceptive users. *Fam Plann Perspect* 1996; **28**: 154–158.
- 28 National Institute for Health and Clinical Excellence. Long-acting reversible contraception. <http://www.nice.org.uk/page.aspx?o=cg03> Onicguideline (accessed Sept 6, 2006).