

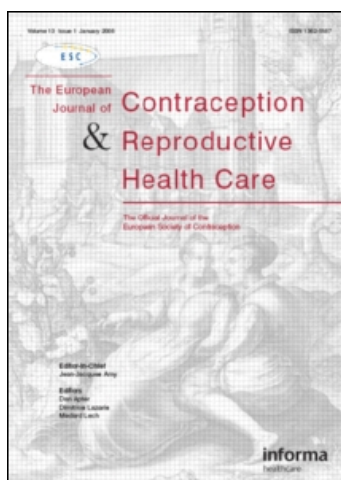
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Impact of post-abortion family planning services on contraceptive use and abortion rate among young women in China: a cluster randomised trial

Jin Liang Zhu^{*}, Wei-Hong Zhang[†], Yimin Cheng[‡], Juncai Xu[§], Xiao Xu⁺, Diana Gibson[^], Henrik Støvring[¶], Patricia Claeys[†] and Marleen Temmerman[†]

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ABSTRACT

Objectives To compare two post-abortion family planning (FP) service packages on contraceptive use and repeat abortion rate among young women in three cities in China.

Methods In this cluster-randomized trial, one FP service package included provision of limited information and referral to existing FP services, and the other, more comprehensive, package consisted – in addition to the above simple package – of individual counselling, free provision of contraceptive materials, and involvement of the male partner. Eight matched pairs of hospitals were certified by centralized randomization. Women undergoing abortion were followed up for six months, and data were collected in two rounds, before and after the intervention.

Results We followed a total of 2336 women younger than 25 years (555 before and 555 after the simple intervention package; 634 before and 592 after the comprehensive intervention package). Both packages increased use of any contraceptive method, but the comprehensive approach also increased use of more effective methods. Odds ratios for consistent and correct use of condoms were 2.32 (95% confidence interval 1.55–3.46) and 2.78 (1.81–4.26), respectively, compared with the simple package. The rates of unwanted pregnancies and repeat abortions were somewhat reduced for both packages, with no significant statistical difference between them.

Conclusion Couples who received the comprehensive post-abortion FP service appear to use more effective contraceptive methods and show better compliance.

KEY WORDS Induced abortion; Repeat abortion; Family planning services; Cluster randomized trial

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INTRODUCTION

An estimated ten million abortions are induced annually in China, two-thirds as a result of contraceptive failure and one-third due to non-use of contraception^{1,2}. About one-third of all abortions are repeat abortions². The one-child family policy implies that induced abortion is often the only option for failure of contraception and for unplanned pregnancies. Nearly all pregnancies among unmarried women will result in an induced abortion³.

Family planning (FP) services in China are provided through the national network of FP clinics, which are almost independent of the health care system¹. The integration of FP services within abortion clinics is a new concept. Contraceptive counselling reduces the number of repeat abortions^{4,5}, without suppressing all of these⁶. Few randomized trials have evaluated the impact of this counselling on contraceptive use among abortion-seeking women⁶⁻⁸, and none was conducted in developing countries. The interventions have to be adapted to the Chinese socio-cultural context and the rapid economic development, as well as the huge migration from rural areas to cities⁹.

We conducted a cluster randomized trial to evaluate two ways of introducing post-abortion FP services into hospitals in urban areas in China.

METHODS

Study design

An overview of the cluster randomized trial is shown in Figure 1. In the trial, the hospital was the unit of randomization. Selected public hospitals within each city were matched in pairs and then randomized into the two intervention packages. One package (A) included provision of limited information and referral to existing FP services whereas the other package (B) included face-to-face counselling, free provision of contraceptive materials, and male involvement, in addition to package A. Women seeking abortion at the hospitals were interviewed twice, at the time of the abortion and six months later. Data were collected in two rounds, before randomization and after implementation of the intervention, thus enabling us to evaluate each package by using each hospital as its own control.

Study cities and hospitals

The trial was carried out in Beijing, Shanghai, and Zhengzhou. In each city, eight abortion clinics (department of gynaecology in hospital) were included and matched in pairs. The matching criteria included characteristics of abortion clinics (total number of abortions in the previous year, staff availability for counselling and group education, and ability to provide FP materials) and characteristics of women seeking abortion (age, education, marital status, previous use of contraceptive methods, and history of induced abortion). Since no substantial differences in women's characteristics were seen among hospitals, we matched the hospitals in pairs on the characteristics of abortion clinics, mainly the volume of abortions in 2005.

A total of 24 hospitals were matched in pairs and randomly assigned to either one of the two intervention packages. Randomization was done by coin tossing by a neutral person who was not involved in the study at one research centre. However, five hospitals did not follow the protocol of randomization, thus rendering four pairs of hospitals ineligible for data analysis. Consequently, we had eight pairs of hospitals available for data analysis (two pairs from Beijing, four pairs from Shanghai, and two pairs from Zhengzhou).

Intervention packages and implementation

To develop post-abortion FP service packages that are adapted culturally and socio-economically to the specific needs of Chinese women, existing national and international literature was reviewed during the first phase of the trial, and a situation analysis (qualitative research) was carried out. Two intervention packages were then developed: an *essential package* (A) and a *comprehensive package* (B).

Package A consisted of: (i) training of abortion service providers and provision of service guidelines, according to a standard training schedule (one day) and training module, (ii) provision of information for women (group education), and (iii) referral of women to existing FP services. *Package B* consisted of: (i) training of abortion service providers and provision of service guidelines, according to a standard training schedule (two days) and training module, (ii) group education, (iii) individual counselling of women

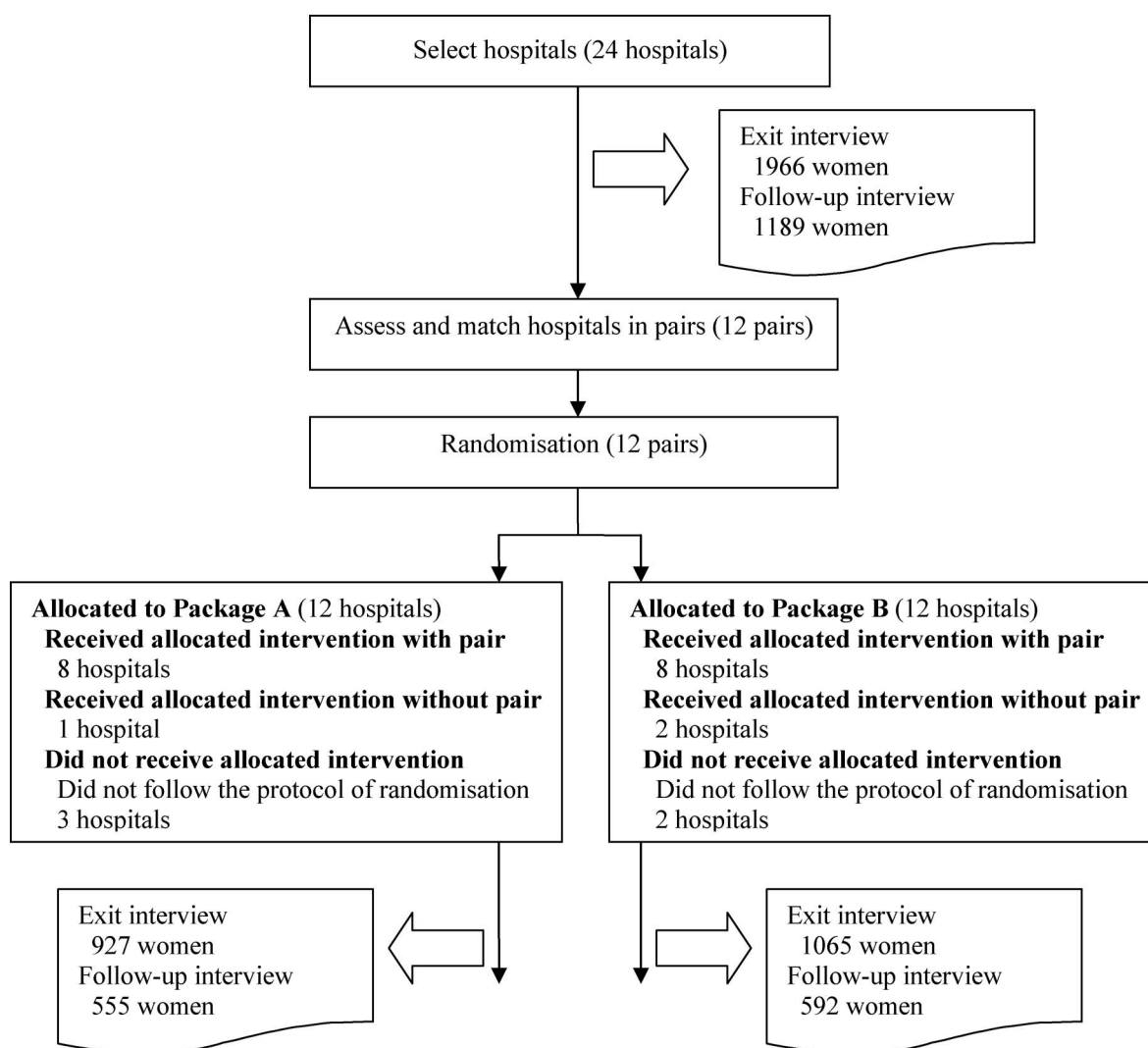


Figure 1 Trial profile with data collection among abortion-seeking women

(including information about contraceptive methods and recommendation of the most suitable methods), (iv) free provision of contraceptive materials (including condoms, oral contraceptives [OCs], intrauterine devices [IUDs], implants), (v) male involvement (involving male partner in group education and individual counselling), and (vi) referral of women to existing FP services.

Most women are accompanied by their partner when seeking abortion. However, Chinese men know very little about contraception. Condoms are most commonly used; women have little or no influence on their use. In the comprehensive package (B), the male partners were, therefore, involved in the group education and, whenever possible, in the counselling.

The interventions took place in the hospitals from May to November 2006. Due to the fact that most gynaecologists have a busy schedule, only a limited number of them were trained to provide FP services. The intervention was supervised and monitored by the research team in each city.

Data collection

Before hospital matching, all women who visited the hospitals for abortion were registered during a period of about two months. Women, who were less than 25 years old and in the first trimester of pregnancy, were submitted to an exit interview (mostly

self-administrated) that gathered information about their socio-demographic features, contraceptive use during the three months before the abortion, contraception knowledge, reproductive history, and the FP services they received at the hospital. Almost all eligible women participated in the exit interview during the period of about two months. At the follow-up interview six months later, they were asked (mostly over the telephone) about contraceptive use and abortion during the six-month follow-up period. The main reason for dropout at follow-up was that participants provided invalid telephone numbers at the exit interview. When the intervention activities were implemented in each hospital, data were collected once more (registration, exit interview and follow-up interview). Structured questionnaires were used to collect these data, and the research team in each city supervised and monitored the data collection. The interviews were not blinded to interviewers regarding intervention package that the women had received.

Endpoints

We included the following primary indicators (information collected in the follow-up questionnaire).

- (1) Use of contraceptives (use of any contraceptive method, including condoms, natural methods [periodic abstinence or withdrawal], IUD, OCs, emergency oral contraceptives, sterilization, injections, implants, diaphragms, spermicide, etc) among sexually active women during the 6-month follow-up period.
- (2) Use of more effective contraceptives (use of condoms, OCs, IUD, and implants) among sexually active women.
- (3) Consistent use, correct use, and both consistent and correct use of condoms among condom users.
- (4) Regular intake of the OCs among OC users.
- (5) Pregnancies among all women.
- (6) Repeat induced abortions during the follow-up period plus unwanted ongoing pregnancies which were most likely to end in induced abortions among all women.
- (7) Repeat induced abortions during the follow-up period among all women.

We defined the last three indicators so that if a woman had more than one event, we counted her only once,

since very few women had more than one pregnancy during the six-month follow-up period.

We also looked at the following secondary indicators (information collected in the exit questionnaire).

- (1) Knowledge of contraception among all women: we assigned a total score to the answers to 13 questions on contraception knowledge, with a correct answer scoring 1 and a wrong answer or an answer 'don't know' scoring 0.
- (2) Post-abortion FP services received at the time of abortion and satisfaction regarding abortion and FP services among all women.

Data analysis

We used conditional logistic regression accounting for hospital matching to calculate odds ratios (ORs) with 95% confidence intervals (CIs) for all the primary indicators. We used linear regression to calculate differences in the knowledge of contraception, and robust variance estimates were used to account for clustering at hospital level^{10,11}. By restricting the analysis to hospitals randomized to intervention package A and comparing the women who wanted an abortion before the intervention with the women who sought abortion after the intervention at these hospitals, we estimated the effect of package A; similarly, by restricting the analysis to hospitals randomized to intervention package B, we estimated the effect of package B. By including an interaction term between intervention packages and a variable indicating before or after intervention in an analysis of the entire dataset, we estimated the relative effect of package B taking into account the effect of package A and any baseline difference between hospitals.

Potential confounders included all variables shown in Table 1, but we adjusted only for variables showing significant difference between packages (i.e., women's birth place, education and occupational status, and men's occupational status) in the final adjusted models. For outcomes on contraception use, we also adjusted in the models for the history of use of the same contraception as recorded at baseline.

Sample size calculation

We used simulations to estimate the needed sample size. The exit interview before randomization

Table 1 Characteristics of study population, according to intervention and package

| | <i>Hospitals allocated to Package A</i> | | <i>Hospitals allocated to Package B</i> | |
|----------------------------|--|---|--|---|
| | <i>Before intervention</i> (<i>n</i> = 555) % | <i>After intervention</i> (<i>n</i> = 555) % | <i>Before intervention</i> (<i>n</i> = 634) % | <i>After intervention</i> (<i>n</i> = 592) % |
| <i>Women</i> | | | | |
| Birth place | | | | |
| Urban city | 33.5 | 39.1 | 44.6 | 46.3 |
| Rural town | 25.0 | 23.6 | 24.3 | 20.4 |
| Rural village | 41.3 | 37.1 | 30.8 | 33.3 |
| Age (years) | | | | |
| 15–20 | 22.5 | 26.3 | 22.6 | 26.0 |
| 21–24 | 77.5 | 73.7 | 77.4 | 74.0 |
| Education | | | | |
| Secondary school or lower | 24.7 | 21.4 | 20.2 | 19.9 |
| High school | 37.7 | 33.2 | 37.4 | 29.7 |
| College or higher | 37.7 | 45.4 | 42.4 | 50.2 |
| Employment | | | | |
| Unemployed | 15.5 | 13.3 | 11.0 | 16.7 |
| Employed | 74.6 | 75.0 | 78.7 | 69.4 |
| Students | 9.9 | 11.7 | 10.1 | 13.9 |
| Marital status | | | | |
| Single | 36.9 | 35.5 | 37.2 | 34.1 |
| Cohabitant | 36.9 | 35.3 | 36.1 | 33.8 |
| Married | 26.1 | 29.2 | 26.7 | 32.1 |
| Ever given birth to a baby | | | | |
| No | 91.4 | 93.3 | 92.7 | 90.4 |
| Yes | 8.6 | 6.7 | 7.3 | 9.6 |
| Previous Induced abortion | | | | |
| 0 | 64.1 | 64.9 | 62.3 | 62.7 |
| 1 | 25.2 | 26.1 | 28.5 | 28.2 |
| 2+ | 10.6 | 9.0 | 9.1 | 9.1 |
| <i>Men</i> | | | | |
| Age (years) | | | | |
| 16–20 | 8.6 | 11.5 | 10.3 | 12.8 |
| 21–24 | 46.7 | 47.6 | 46.7 | 44.9 |
| 25–34 | 42.0 | 39.1 | 40.7 | 40.2 |
| 35+ | 2.3 | 1.8 | 1.6 | 2.0 |
| Education | | | | |
| Secondary school or lower | 15.9 | 13.3 | 12.6 | 12.2 |
| High school | 35.0 | 33.0 | 34.4 | 31.4 |
| College or higher | 48.8 | 53.7 | 53.0 | 56.4 |
| Employment | | | | |
| Unemployed | 2.7 | 3.6 | 1.7 | 3.0 |
| Employed | 91.2 | 87.7 | 91.2 | 86.3 |
| Students | 5.9 | 8.6 | 7.1 | 10.6 |

Percentages may not add to 100% due to missing data for the corresponding variables.

indicated that 64% women had an induced abortion due to non-use of contraception. We thus assumed that 45% patients with the essential intervention would use contraceptives, whereas 55% patients with the comprehensive intervention would use contraceptives; i.e., a 10% difference in contraceptive use between the two packages. Furthermore, the follow-up rate after six months was expected to be about 60%. For a range of settings, 10,000 random datasets were generated for each setting after which each dataset was analysed by logistic regression. The percentage of datasets leading to a statistically significant result was then the estimated power of that setting.

For scenarios with varying rates of contraceptive use (spread of 0%, 5%, or 10%) and varying numbers of women (40–70) at each hospital, we found that including 60 women or more had a power exceeding 80% when the effect size (difference in use of contraceptives) was above 10%. The results showed very little sensitivity to varying rates between hospitals. We thus needed $60 \times 24 = 1440$ patients in total. If we further inflated the sample size by 25% considering incomplete follow-up, we needed to recruit 1800 young patients for the exit interview, 900 in Package A and 900 in Package B. We would then have $1800 \times 60\% = 1080$ patients interviewed at follow-up, 540 in Package A and 540 in Package B.

Ethical considerations

The study was approved by the ethical committee of the University Hospital of Ghent. Written informed consent was obtained from all women who were interviewed.

RESULTS

A total of 2336 women younger than 25 years of age (Package A: 555 before and 555 after the intervention; Package B: 634 before and 592 after the intervention) were followed up after six months; they represented 59.0% of those who had been interviewed at the time of the abortion with no substantial differences in follow-up rate between intervention packages and between before and after interventions. There were no significant differences in the characteristics of couples before and after the intervention, and between intervention packages, except for the women’s birth place, education and occupational status, and men’s occupational status (Table 1).

During the follow-up period, 2077 women (88.9%) had sexual intercourse. Both packages increased the use of any contraceptive method, and the consistent and correct use of condoms, with a stronger effect for Package B. Package B also increased the use of more effective methods (Table 2 and Table 3).

After intervention, the rates of unwanted pregnancy and induced abortion were slightly reduced for both packages (Table 4). For Package A, adjusted ORs for unwanted pregnancy and induced abortion were 0.66 (95% CI 0.37–1.18) and 0.57 (95% CI 0.30–1.07), respectively. For Package B, the corresponding estimates were 0.61 (95% CI 0.24–1.53) and 0.69 (95% CI 0.26–1.84), respectively. For Package B vs Package A, the estimates were 0.84 (95% CI 0.29–2.39) and 1.01 (95% CI 0.33–3.13), respectively.

The mean scores of contraception knowledge before and after intervention of Package A were 7.1 (standard deviation [SD] 2.9) and 7.3 (SD 3.1), respectively. For

Table 2 Use of contraceptive methods among sexually active women, according to intervention and package

| | <i>Hospitals allocated to Package A</i> | | | | <i>Hospitals allocated to Package B</i> | | | |
|---|---|----------|---------------------------|----------|---|----------|---------------------------|----------|
| | <i>Before intervention</i> | | <i>After intervention</i> | | <i>Before intervention</i> | | <i>After intervention</i> | |
| | <i>n/N</i> | <i>%</i> | <i>n/N</i> | <i>%</i> | <i>n/N</i> | <i>%</i> | <i>n/N</i> | <i>%</i> |
| Use of any contraceptive method | 469/500 | 93.8 | 495/507 | 97.6 | 555/576 | 96.4 | 486/494 | 98.4 |
| Use of effective contraceptive methods | 436/500 | 87.2 | 453/507 | 89.3 | 518/576 | 89.9 | 475/494 | 96.2 |
| Consistent use of condoms | 132/400 | 33.0 | 169/426 | 39.7 | 178/480 | 37.1 | 279/449 | 62.1 |
| Correct use of condoms | 164/399 | 41.1 | 213/427 | 49.9 | 179/480 | 37.3 | 302/449 | 67.3 |
| Consistent and correct use of condoms | 68/399 | 17.0 | 91/426 | 21.4 | 50/480 | 10.4 | 187/449 | 41.6 |
| Regular intake of the oral contraceptives | 39/47 | 83.0 | 30/48 | 62.5 | 53/59 | 89.8 | 27/35 | 77.1 |

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Table 3 Odds ratios of use of contraceptive methods for comparisons between before and after intervention and comparison between intervention packages

| | Package A | | | | Package B | | | | Package B vs Package A | | | |
|--|-----------|----------|------|------|-----------|----------|------|-------|------------------------|----------|------|------|
| | Crude | Adjusted | 95% | CI | Crude | Adjusted | 95% | CI | Crude | Adjusted | 95% | CI |
| | OR | OR | OR | CI | OR | OR | OR | CI | OR | OR | OR | CI |
| Use of any contraceptive method* | 2.62 | 2.45 | 1.22 | 4.95 | 2.50 | 2.55 | 1.00 | 6.46 | 0.82 | 0.81 | 0.27 | 2.40 |
| Use of effective contraceptive methods** | 1.36 | 1.19 | 0.79 | 1.81 | 2.78 | 2.35 | 1.33 | 4.17 | 2.13 | 2.03 | 1.04 | 3.98 |
| Consistent use of condoms† | 1.42 | 1.37 | 1.01 | 1.85 | 2.93 | 2.75 | 2.05 | 3.68 | 2.33 | 2.32 | 1.55 | 3.46 |
| Correct use of condoms† | 1.54 | 1.53 | 1.13 | 2.06 | 8.67 | 8.38 | 5.64 | 12.46 | 2.81 | 2.78 | 1.81 | 4.26 |
| Consistent and correct use of condoms† | 1.40 | 1.36 | 0.93 | 1.97 | 8.43 | 8.01 | 5.46 | 11.77 | 5.71 | 5.68 | 3.39 | 9.53 |
| Regular intake of the oral contraceptives‡ | 0.96 | 1.33 | 0.29 | 6.16 | 0.49 | 0.64 | 0.10 | 4.13 | 0.19 | 0.19 | 0.03 | 1.38 |

*Adjusted for women's birth place, education, occupational status, and history of contraceptive use, and men's occupational status.

**Adjusted for women's birth place, education, occupational status, and history of effective contraceptive use, and men's occupational status.

†Adjusted for women's birth place, education, occupational status, and history of condom use, and men's occupational status.

‡Adjusted for women's birth place, education, occupational status, and history of pill use, and men's occupational status.

Package B, the mean scores were 6.9 (SD 3.0) and 7.6 (SD 3.4), respectively. The linear regression models did not reveal any significant differences in the score between before and after intervention of either package, as well as between packages.

Almost all women who sought abortion at hospitals where intervention Package B was implemented reported having received the intended intervention activities, except for referral to other existing FP services and male involvement. They also reported more satisfaction with the medical staff's attitude and service, while no significant change was seen for women who sought abortion at hospitals where Package A was implemented (data not shown).

DISCUSSION

Our results suggest that an *essential package* consisting of group education and referral to existing FP services increased the use of any contraception, the consistent and correct use of condoms. A *comprehensive package* including in addition individual counselling, free provision of contraceptives, and limited male involvement had a stronger effect on the couples' contraceptive use after abortion, in particular the consistent and correct use of condoms.

The trial originally consisted of 24 hospitals (12 pairs), but only eight pairs of hospitals strictly followed the centralized randomization and could thus be included in the analyses. We did, however, obtain a sample size similar to the one calculated. The dropout rate was high (41%) but close to those of the trials in Iceland and the UK^{6,7}.

The accuracy of self-reported data on sensitive issues such as sex and use of contraception can be questioned, but substantial bias between the two arms seems unlikely, as indicated by the before intervention comparison of the two arms. China is a large country, and thus we used a strategy of matching hospitals within each city to minimize the difference in characteristics of hospitals and abortion-seeking women. Before intervention, the rates of pregnancies, unwanted pregnancies, and induced abortions during the six-month follow-up period among women seeking abortion at hospitals allocated to Package B were already lower than those of hospitals allocated to Package A. We believe this must be due to chance since these data were collected before the randomization.

Table 4 Pregnancies, unwanted pregnancies and induced abortions during the six month follow-up period among all women,* according to intervention and package

| | <i>Hospitals allocated to Package A</i> | | | | <i>Hospitals allocated to Package B</i> | | | |
|--------------------|---|----------|------------------------------------|----------|---|----------|------------------------------------|----------|
| | <i>Before intervention (N= 555)</i> | | <i>After intervention (N= 555)</i> | | <i>Before intervention (N= 634)</i> | | <i>After intervention (N= 592)</i> | |
| | <i>n</i> | <i>%</i> | <i>n</i> | <i>%</i> | <i>n</i> | <i>%</i> | <i>n</i> | <i>%</i> |
| Pregnancy | 46 | 8.3 | 41 | 7.4 | 27 | 4.3 | 16 | 2.7 |
| Unwanted pregnancy | 30 | 5.4 | 23 | 4.1 | 14 | 2.2 | 8 | 1.4 |
| Induced abortion | 26 | 4.7 | 18 | 3.2 | 12 | 1.9 | 7 | 1.2 |

*If a woman had more than one event, we counted only once.

Some variation arose in the intervention implementation. Shanghai had already had some integration of FP within abortion services at hospitals, while Beijing and Zhengzhou had little or no integrated FP at hospitals when the trial started. The gynaecologists' high workload is a major constraint to the provision of quality individual counselling. Men are usually not allowed to access the departments of gynaecology in China. In some hospitals, male partners were eventually allowed into the counselling room, and thus the couples got counselling together, while in other hospitals, male partners were just given some information material.

An increase in contraceptive prevalence is associated with a reduction in the number of abortions, and post-abortion FP intervention, including FP counselling and free provision of contraceptives, has been shown to decrease the rates of unwanted pregnancies and abortions^{5,12-14}. However, randomized trials have produced a mixed picture⁶⁻⁸. The Icelandic trial failed to demonstrate an effect of intensive pre-abortion counselling on contraceptive use during a follow-up of four to six months⁷. The UK trial reported that women receiving specialist contraceptive counselling and enhanced provisions most likely left the hospital with a long-acting contraceptive method. After 16 weeks, a significant difference was only seen in the use of contraceptive implants by the women in the intervention group. After two years, no difference was seen in abortion rate⁶. In both trials^{6,7}, controls received routine contraceptive counselling. The Italian trial concluded that patient-centred contraceptive counselling had a favourable effect on knowledge, attitudes and use of effective contraception in women. The counselling was intensive and lasted 30

minutes. However, the sample size was very small (20 women in the intervention arm and 21 in the control arm) with a follow-up period of only three months⁸. Our results showed that neither packages changed contraception knowledge. Individual counselling and provision of contraceptives could thus be the most important aspects of the comprehensive package that may have led to the strong impact on the couples' use of more effective contraceptive methods. The long-term effect on abortion rates needs, however, to be further investigated.

The current national FP programme in China exclusively targets married couples and rarely reaches migrants and unmarried people. The post-abortion care setting is an important and probably the only opportunity for offering FP counselling and services to migrants and unmarried couples. The need for effective contraceptive use after an induced abortion is immediate, since ovulation may occur as soon as two weeks after a first-trimester abortion¹⁵.

This trial suggests that a comprehensive approach in FP services may lead to an increase in the use of more effective contraceptive methods and user compliance among abortion-seeking couples. They may be more ready to use effective methods after having been counselled face-to-face and having received free contraceptive materials.

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