

Annotated Bibliography on Mifepristone Medical Abortion

APPROVED AND EVIDENCE-BASED REGIMENS UP TO 9 WEEKS (1ST TRIMESTER)

Shannon C, Weibe, E., Guilbert E, Dunn S, Sheldon WR, Winikoff B. Regimens of misoprostol with mifepristone for early medical abortion: A randomized trial. *British Journal of Obstetrics and Gynaecology* 2006; 113:621-628.

Nine hundred and fifty six women with gestations less than 56 days were randomized into a non-blinded trial in Canada. The women were given 200 mg mifepristone orally and then randomized into three groups: Group 1, 400 mcg oral misoprostol; group 2, 600 mcg oral misoprostol; and group 3, 800 mcg vaginal misoprostol. Misoprostol was self-administered at home 24-48 hrs following mifepristone and participants were instructed to take a second similar misoprostol dose at 24 hrs after the initial dose if bleeding was less than a normal menstrual period. Successful abortion without surgery was 94.1%, with no significant differences across the three groups (group 1, 94.7%, group 2, 93.4%, group 3, 94.3%; P=0.975). Adverse effects did not differ significantly across the three study groups. Pain increased significantly across the study and gestational age groups and was associated with lower acceptability.

Shannon, CS, Winikoff B, Hausknecht R, Schaff E, Blumenthal PD, Oyer D, Sankey, H, Wolff J, Goldberg R. Multicenter trial of a simplified medical abortion regimen. *Obstetrics and Gynecology* 2005; 105(2):345-351.

This study evaluated a simplified regimen of 200 mg of mifepristone followed 48 hours later by 400 mcg of oral misoprostol taken at home to terminate pregnancies up to 49 days duration. Complete abortions, defined as no need for surgical intervention or additional misoprostol by day 21, occurred in 91.5% of the 354 women included in the efficacy analysis. The most common side effects reported by patients were pain or cramps (93.2%) and nausea (66.6%), followed by weakness, headache, and dizziness. Overall acceptability of the regimen was high, with over 86% of women reporting that it was either very satisfactory or satisfactory.

Hajri, S., Blum J, Gueddana N, Saadi H, Maazoun L, Chélli H, Dabash H, Winikoff B. Expanding medical abortion in Tunisia: Women's experiences from a multi-site expansion study. *Contraception* 2004; 70:487-491.

Three hundred and twenty-one women with pregnancies up to eight weeks of gestation were enrolled in a study using a regimen of 200 mg mifepristone followed two days later by 400 mcg of oral misoprostol administered either in the clinic or at home as per the woman's choice. The overall success rate was 96% (95% CI, 95.1-96.3). Seventy-five percent of women chose to administer their misoprostol at home; there were no statistically significant differences between home and clinic users. Almost all women (95%) reported they were satisfied with the method.

Schaff EA, Fielding SL, Eisinger SH, Stadius LS, Fuller L. Low-dose mifepristone followed by vaginal misoprostol at 48 hours for abortion up to 63 days. *Contraception* 2000; 61:41-46.

This prospective trial compared the efficacy, side effects and acceptability of 200 mg mifepristone followed 48 hours later by 800 mcg of vaginal misoprostol among two groups: women with pregnancies \leq 56 days LMP and 57-63 days LMP. A second dose of misoprostol was administered if necessary. Of 1,137 women enrolled, complete abortions occurred in 97% of the \leq 56 days LMP group and 96% in the 57-63 days LMP group. Ninety-one percent of women in both groups found the method acceptable.

WHO Task Force on Post-ovulatory Methods of Fertility Regulation. **Comparison of two doses of mifepristone in combination with misoprostol for early medical abortion: A randomised trial.** British Journal of Obstetrics and Gynaecology 2000; 107:524-530.

This double-blinded, randomized controlled trial enrolled 1,589 pregnant women with menstrual delay of \leq 35 days. Women were randomly assigned to receive a single oral dose of mifepristone, either 200 mg or 600 mg, followed 48 hours later by 400 mcg oral misoprostol. Both doses of mifepristone had a comparable efficacy - the complete abortion rate with the lower dose of mifepristone was 89% and 88% with the higher dose. The likelihood of complete abortion was inversely related to gestational age; the efficacy for pregnancies >21 days menstrual delay decreased significantly ($P < 0.01$).

Spitz IM, Bardin CW, Benton L, Robbins A. **Early pregnancy termination with mifepristone and misoprostol in the United States.** New England Journal of Medicine 1998; 338:1241-1247.

Two thousand fifteen women with pregnancies of 63 days' duration or less were enrolled in a study using a regimen of 600 mg mifepristone followed by 400 mcg oral misoprostol two days later for pregnancy termination. The success rates at different gestational ages are as follows: \leq 49 days LMP (92%), 50-56 days (83%), 57-63 days (77%) ($P < 0.001$). Abdominal pain, nausea, vomiting, diarrhea, and vaginal bleeding also increased with advancing gestational age.

Ashok PW, Penney GC, Flett GM, Templeton A. **An effective regimen for early medical abortion: A report of 2000 cases.** Human Reproduction 1998; 13(10):2962-2965.

Two thousand women participated in a study to evaluate the efficacy of a regimen of 200 mg mifepristone followed 36-48 hours later by 800 mcg vaginal misoprostol for termination of pregnancies up to 63 days LMP. The complete abortion rate was 97.5%. Two percent aborted following mifepristone administration alone. The median induction-abortion interval was 4.15 hours among those observed.

Aubeny E, Peyron R, Turpin CL, Renault M, Targosz V, Silvestre L, Ulmann A. **Termination of early pregnancy (up to and after 63 days of amenorrhea) with mifepristone (RU 486) and increasing doses of misoprostol.** International Journal of Fertility and Menopause Studies 1995; 40(Suppl 2):85-91.

This study evaluated the efficacy of a medical abortion regimen for 1,108 women with pregnancies up to 63 days LMP. On Day 1 women received 600 mg mifepristone and on Day 3 an oral dose of 400 mcg misoprostol. If women did not expel products of conception within 3 hours, an additional dose of 200 mcg of misoprostol was given and they were monitored for 2 more hours. The overall success rate was 92.9%; efficacy decreased with advancing gestational age, especially beyond 56 days of amenorrhea.

Ulmann A, Silvestre L, Chemama L, Rezvani Y, Renault M, Aguilhaume CJ, et al. **Medical termination of early pregnancy with mifepristone (RU 486) followed by a prostaglandin analogue.** Acta Obstet Gynecol Scan 1992; 71: 278-283.

This study evaluated available data for 15,709 women seeking to terminate pregnancies with gestations of \leq 49 days LMP. Women took 600 mg mifepristone and returned 36-48 later received one of the two prostaglandin (PG) analogues if expulsion had not occurred: either 1 mg gemeprost vaginal pessary or .025 mg sulprostone i.m. injection. Complete abortion occurred for 95.3% of women, with no statistical difference regarding the nature and dose of PG used.

MIFEPRISTONE MEDICAL ABORTION REGIMENS FOR 9-12 WEEKS LMP (LATE 1ST TRIMESTER)

Hamoda H, Ashok PW, Flett GMM, Templeton A. **Medical abortion at 9-13 weeks' gestation: A review of 1076 cases.** *Contraception* 2005; 71(5):327-332.

This retrospective chart review of 1,076 cases of induced abortion for gestations 9-13 weeks evaluates a medical abortion regimen of 200 mg mifepristone followed 36-48 hours later by one or more doses of misoprostol. An initial dose of 800 mcg vaginal misoprostol or 400 mcg sublingual misoprostol was given; if products of conception were not passed, additional doses of 400 mcg vaginal or sublingual misoprostol were given at 3-hourly intervals as required, up to five doses. Overall, successful abortion without the need for surgical evacuation occurred in 95.8% of women; there was no significant difference in the rate of surgical evacuation for women who received misoprostol sublingually vs. vaginally. The mean number of misoprostol doses needed for complete abortion was 2.31.

Ashok PW, Kidd A, Flett GMM, Fitzmaurice A, Graham W, Templeton A. **A randomized comparison of medical abortion and surgical vacuum aspiration at 10-13 weeks gestation.** *Human Reproduction* 2002; 17(1):92-98.

This partially randomized, controlled trial recruited women with gestations between 10-13 weeks amenorrhea seeking to terminate their pregnancies. A total of 465 women were enrolled: 77 expressed a strong preference for either medical or surgical abortion and the remaining 368 were randomized to one of two treatments. Women in the medical group received 200 mg mifepristone followed 36-48 hours later by 800 mcg administered vaginally. If products of conception were not passed, two doses of 400 mcg misoprostol were given either orally or vaginally at 3 hour intervals (women with heavy bleeding were administered misoprostol orally). Surgical termination was performed by vacuum aspiration under general anesthesia, preceded 3 hours pre-operatively by 800 mcg misoprostol for cervical priming. The success rate was 94.6% for the medical abortion arm and 97.9% for the surgical arm. Side effects were higher in medical abortion group.

MIFEPRISTONE MEDICAL ABORTION REGIMENS FOR 2ND TRIMESTER TERMINATIONS

Ho PC, Blumenthal PD, Gemzell-Danielsson K, Gómez Ponce de León R, Mittal S, Tang OS. **Misoprostol for the termination of pregnancy with a live fetus at 13 to 26 weeks.** *International Journal of Gynecology and Obstetrics* 2007; 99:S178-S181.

This article recommends a misoprostol-alone regimen for termination of pregnancy based on reports in recent literature. For the gestational period between 13 and 22 weeks, a regimen of 400 mcg of vaginal misoprostol every 3 hours up to 5 doses appears effective, without excessive side effects or complications. There is inadequate data to recommend a regimen for the gestational period of 23 to 26 weeks, but a lower and less frequent dose is advised.

Kapp N, Borgatta L, Stubblefield P, Vragovic O, Moreno N. **Mifepristone in second-trimester medical abortion: A randomized controlled trial.** *Obstetrics and Gynecology* 2007; 110(6):1304-1310.

This randomized, placebo-controlled, double-blind trial of mifepristone in second-trimester induction termination using misoprostol after feticidal digoxin enrolled 64 women between 18 and 23 weeks of gestation. Thirty two of these women received 200 mg mifepristone while the other half received a placebo, and both groups underwent induction with buccal misoprostol the following day using an initial dose of 400 mcg followed by 200 mcg doses repeated every 6 h. In the group receiving mifepristone, median procedure time was a significantly shorter 10 hours (95% CI 8-12) versus 18 hours (95% CI 9-14) in the placebo group ($P < .01$). The mean dose of misoprostol required for completed abortion also differed

significantly by group: 925 ± 48 mcg in the mifepristone group compared with 1412 ± 101 mcg in the placebo group ($P < .01$). Side effects during induction were similar between groups.

Goh SE, Thong JT. **Induction of second trimester abortion (12-20 weeks) with mifepristone and misoprostol: A review of 386 consecutive cases.** *Contraception* 2006; 73:516-519.

This is a retrospective analysis of 386 women who underwent pregnancy termination between 12 and 24 weeks of gestation. Each woman received 200 mg mifepristone orally followed by vaginal misoprostol 800 mcg 36 to 48 h later. Three hours after the initial misoprostol administration, 400 mcg doses of vaginal misoprostol were administered every 3 h, to a maximum of four doses in 24 h. If abortion failed, 200 mg mifepristone was given again 3 h after the last misoprostol dose, followed by 12 h rest before vaginal misoprostol administration is repeated as per previous course of treatment. The results indicated that 97.9% and 99.5% of the women aborted within 24 and 36 h, respectively. The median induction-to-abortion interval was 6.7 h (range 1.4 - 73.8h), and nulliparous women took significantly longer time to abort, 6.0 h in multiparous women compared to 7.6 h in nulliparous women; $p < 0.0001$). Multiparous women were less likely to need analgesics for pain management, and to experience vomiting and diarrhea, than nulliparous women.

Ashok PW, Templeton A, Wagaarachchi PT, Flett GMM. **Midtrimester medical termination of pregnancy: A review of 1002 consecutive cases.** *Contraception* 2004; 69(1):51-58.

This study evaluates the efficacy and acceptability of women undergoing induced abortion for pregnancies between 13-21 weeks amenorrhea. Women took 200 mg of mifepristone followed 36-48 hours later by 800 mcg misoprostol administered vaginally. Three hours later, 400 mcg doses were administered orally at 3-hour intervals for a maximum of 4 doses. Of the 999 who completed treatment, 97.1% aborted successfully within 5 doses of misoprostol or 15 hours of the first administration; the mean induction-to-abortion interval was 6.25 hours (range, 0-67.5 h).

Tang OS, Thong KJ, Baird DT. **Second trimester medical abortion with mifepristone and gemeprost: A review of 956 cases.** *Contraception* 2001; 64:29-32.

Nine hundred and fifty-six women undergoing pregnancy termination with gestations between 12-24 weeks participated in a study using 200 mg mifepristone followed 36 hours later by 1mg gemeprost prostaglandin inserted vaginally every 6 hours for a maximum of 4 doses over 24 hours. Additional 1 mg doses of vaginal gemeprost were given over a 12 hour period (up to 5 doses) if abortion had not occurred within the first 24 hours. Overall, 96.4% and 98.8% of women aborted within 24 and 36 hours respectively. The median induction-to-abortion interval was 7.8 hours (range: 0.5-109.9 h).

Ho PC, Chan YF, Lau W. **Misoprostol is as effective as gemeprost in termination of second trimester pregnancy when combined with mifepristone: A randomized comparative trial.** *Contraception* 1996; 53:281-283.

This prospective randomized study compared the efficacy of misoprostol with gemeprost in combination with mifepristone for termination of second trimester pregnancies between 14 – 20 weeks gestation. All 50 participants received 200 mg mifepristone 36-48 hours prior to the administration of prostaglandins. Group 1 received 400 mcg oral misoprostol every 3 hours up to 5 doses; group 2 received 1 mg vaginal gemeprost every 6 hours up to 4 doses. 92% of women in Group 1 and 88% in Group 2 aborted within 24 hours. There was no significant difference in the median induction-abortion intervals (8.7 h in Group 1 and 10.8 h in Group 2 or the incidence of side effects).

PHARMACOLOGY

Meckstroth K, Whitaker A, Bertisch S, Goldberg A, Darney P. **Misoprostol administered by epithelial routes: Drug absorption and uterine response.** *Obstetrics & Gynecology* 2006; 108(3):582-590.

Forty women between 6 weeks and 12 6/7 weeks of gestation were randomized to receive one of four doses of 400 mcg misoprostol administered vaginally dry, vaginally saline-moistened, buccally or rectally. Prior to misoprostol administration, a pressure monitoring catheter was inserted to record uterine tone and activity. Uterine pressure was recorded for at least 15 min before misoprostol administration. After administration, uterine tone and activity was measured and calculated by personnel blinded to treatment group. Blood samples were taken at 15 and 30 min, then every 30 min during a five-hour period post misoprostol administration. Uterine tone and activity following buccal and vaginal routes were similar, though buccal resulted in lower serum concentrations of misoprostol. Rectal administration produced earlier serum level peaks but the lowest uterine tone and activity compared to the other three routes.

Tang OS, Schweer H, Seyberth HW, Lee SWH, Ho PC. **Pharmacokinetics of different routes of administration of misoprostol.** *Human Reproduction* 2002; 17(2):332-336.

The pharmacokinetic parameters of four different routes of administration of a single dose of 400 mcg misoprostol were studied. Forty women undergoing suction evacuation were randomized to receive one of four routes: sublingually, orally, vaginally with or without the addition of 3 drops of water. Venous blood samples were taken at various time intervals after misoprostol administration. The sublingual route achieved the highest serum peak concentration of misoprostol acid (574.8 +/- 250.7 pg/ml) and was significantly higher than those in the other groups [oral: 287.6 +/- 144.3 pg/ml ($P < 0.01$), vaginal: 125.2 +/- 53.8 pg/ml ($P < 0.001$), vaginal with water: 162.8 +/- 57.1 pg/ml ($P < 0.001$)]. The time to peak concentration was similar in both sublingual (26.0 +/- 11.5 min) and oral groups (27.5 +/- 14.8 min) and was significantly shorter than those in both vaginal groups.

ROUTE OF ADMINISTRATION OF MISOPROSTOL

Raghavan S, Comendant R, Digol I, Ungureanu S, Friptu V, Bracken H, Winikoff B. **Two-pill regimens of misoprostol after mifepristone medical abortion through 63 days' gestational age: A randomized controlled trial of sublingual and oral misoprostol.** *Contraception* 2009; 79:84-90.

Four hundred seventy-nine women with pregnancies through 63 days LMP were randomized to 400 mcg of misoprostol sublingually or orally 24 hours after 200 mg mifepristone. Efficacy was high for both groups, but the sublingual route was significantly more effective overall (98.7% sublingual, 94.0% oral, p value=.006, RR: 1.05, 95% CI=1.01-1.09). Further, all 30 women between 57 and 63 days' gestation in the sublingual group successfully aborted, whereas only 15 of the 18 women in this gestational age group in the oral arm did (p value=.04, RR: 1.20, 95% CI=0.98-1.48). Bleeding, pain and side effects were similar between arms, except for fever or chills which was significantly more common in the sublingual arm (28.1% vs. 18.4%, p value=.01, RR: 1.43, 95% CI=1.09-2.14). Acceptability and satisfaction levels were high in both groups, but significantly more women in the sublingual arm said they would switch routes if they needed another abortion (16.6% vs. 3.0%, p value<.000, RR:5.43, 95% CI=2.48-11.89).

Winikoff B, Dzuba IG, Creinin MD, Crowden WA, Goldberg AB, Gonzales J, Howe M, Moskowitz J, Prine L, Shannon CS. **Two distinct oral routes of misoprostol in mifepristone medical abortion: a randomized controlled trial.** *Obstetrics and Gynecology* 2008; 112 (6):1303-1310.

This randomized controlled trial involved 966 women with pregnancies through 63 days LMP. Women took 200 mg mifepristone followed by 800 mcg oral or buccal misoprostol 24-36 hours later. The overall

efficacy was significantly greater in the buccal arm (96.2% vs. 91.3%, $p=.003$) as was the efficacy in women with pregnancies of 57-63 days since LMP (94.8% buccal vs. 85.1% oral, $p=.015$, RR 0.90). Adverse effects were similar in both study arms, but fever/chills was reported 10% more often in the buccal group (41.4% vs. 33.3%, $p=.020$). Levels of satisfaction and acceptability were very high in both groups.

Gemzell-Danielsson K, Bygdeman M, Aronsson A. Studies on uterine contractility following mifepristone and various routes of misoprostol. *Contraception* 2006; 74(1):31-35.

The progesterone receptor inhibitor, mifepristone, increases uterine contractility and sensitizes the myometrium to prostaglandin. The maximum effect is achieved when prostaglandins are administered 36-48 hours after mifepristone. Misoprostol is the recommended prostaglandin analogue for use with mifepristone. Oral misoprostol leads to an increased uterine tonus without regular contractions while vaginal and sublingual administration lead to a longer-lasting effect on the myometrium and subsequent development of regular contractions.

Arvidsson C., Hellborg M., Gemzell-Danielsson K. Preference and acceptability of oral versus vaginal administration of misoprostol in medical abortion with mifepristone. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2005; 123:87-91.

A total of 97 women were randomized to oral misoprostol, $n=48$, or vaginal misoprostol, $n=49$. On day one of the study both groups received 600 mg of mifepristone. On day three, one group received 400 mcg of misoprostol orally and the other group received 800 mcg of misoprostol vaginally. Although oral administration seemed to be associated with a higher rate of gastrointestinal side effects, women in both groups preferred the oral administration (76% in the oral group, 48% in the vaginal group). The willingness to administer misoprostol at home was also higher among women in the oral group.

Middleton T, Schaff E, Fielding SL, Scahill M, Shannon C, Westheimer E, Wilkinson T, Winikoff B. Randomized trial of mifepristone and buccal or vaginal misoprostol for abortion through 56 days of last menstrual period. *Contraception* 2005; 72:328-332.

This randomized study involved 429 women with pregnancies through 56 days LMP to test two routes of misoprostol in combination with 200 mg mifepristone. One to two days after mifepristone administration, women were randomized to receive 800 mcg of misoprostol either buccally or vaginally. The efficacy rate was 95% in the buccal group and 93% in the vaginal group ($\chi^2=0.43$, $p=.51$). Nausea was the most commonly reported side effect. Participants in both groups were highly satisfied with the overall procedure and there were no differences in the satisfaction between the buccal (92%) and vaginal groups (95%) ($\chi^2=1.87$, $p=.17$).

WHO Research Group on Post-ovulatory Methods for Fertility Regulation. WHO multinational study of three misoprostol regimens after mifepristone for early medical abortion. *British Journal of Obstetrics and Gynaecology* 2003; 110:808-818.

A total of 2,219 women with pregnancies ≤ 63 days of amenorrhea participated in a double-blinded, randomized controlled trial comparing the efficacy of three different regimens of misoprostol following 200 mg mifepristone for pregnancy termination. Women were randomized to one of three treatment arms 36-48 hours after mifepristone administration: 1) oral/oral group (O/O) received 800 mcg misoprostol orally and placebo tablets vaginally, 2) vaginal/oral (V/O) and 3) vaginal-only (V) groups received 800 mcg of vaginal misoprostol and placebo tablets orally. Groups O/O and V/O continued with 400 mcg oral misoprostol twice daily for 7 days starting on Day 4 of the study, while group V-only took placebo tablets. The crude abortion rate was 92.3% in the O/O group, in the V-only group it was 93.5%, and 94.7% in the

V/O group. Women with gestations ≥ 57 days had a risk of failure almost three times higher in the O/O group and over two times higher in the V-only group.

Tang, OS, Xu J, Cheng L, Lee SWH, Ho PC. Pilot study on the use of sublingual misoprostol with mifepristone in termination of first trimester pregnancy up to 9 weeks gestation. Human Reproduction 2002; 17(7):1738-1740.

One hundred women seeking pregnancy termination up to 63 days LMP received 200 mg oral mifepristone followed 48 hours later by 800 mcg of sublingual misoprostol. The complete abortion rate was 94% (95% CI: 88-97%) and the median duration of vaginal bleeding was 15 days. The most common side effects were lower abdominal pain (89%), fever (79%), diarrhea (42%) and chills (38%).

TIMING OF MISOPROSTOL ADMINISTRATION FOLLOWING MIFEPRISTONE

von Hertzen H, Piaggio G, Wojdyla D, Marions L, My Huong NT, Tang OS, et al. Two mifepristone doses and two intervals of misoprostol administration for termination of early pregnancy: a randomized factorial controlled equivalence trial. British Journal of Obstetrics and Gynaecology 2009; 116 (3):381-389.

Two thousand one hundred and eight-one women with pregnancies through 63 days LMP were randomized to one of four dose-interval combinations (100mg or 200mg mifepristone dose, 24 or 48 hour mifepristone to misoprostol time interval), with oral administration for mifepristone and vaginal administration for misoprostol. Use of either mifepristone dose was found to result in equivalent efficacy: 92.0% and 93.2% success for the 100 mg and 200 mg groups, respectively (difference 1.2%, 95% CI: -1.0 to 3.5). Similarly, no difference in efficacy was found comparing the groups administering misoprostol at 24 compared to 48 hours: 93.5% and 91.7%, respectively (difference -1.9, 95% CI: -4.0 to 0.5). The average time from misoprostol administration to expulsion was comparable among the four groups, occurring approximately 4 hours later. More women in the 48-hour interval groups than in the 24-hour interval groups reported pregnancy-related symptoms between mifepristone and misoprostol administration, but after misoprostol administration side effect rates were similar among all arms.

Creinin MD, Schreiber CA, Bednarek P, Lintu H, Wagner MS, Meyn LA, Medical Abortion at the Same Time Study Trial Group. Mifepristone and misoprostol administered simultaneously versus 24 hours apart for abortion. Obstetrics and Gynecology 2007; 109(4):885-894.

One thousand, one hundred twenty-eight women with gestations up to 63 days' LMP ingested 200 mg mifepristone and were then randomized to self-administer misoprostol intravaginally immediately in the office (group 1) or 24 h later at home (group 2). Women who had not aborted at follow up evaluation one week after initial treatment were offered a second dose of misoprostol and returned for another evaluation approximately 1 week later. The complete abortion rate did not differ greatly among the two treatment groups (group 1, 95.1%, CI 93-96.8%; group 2, 96.9%, 95% CI 95.1-98.2%) (P=.003). Abortion rates did not differ significantly by gestational age. Side effects were similar among the two groups, although nausea, diarrhea, and warmth or chills were significantly more common in group 1.

Chen AY, Mottle-Santiago J, Vragovic O, Wasserman S, Borgatta L. Bleeding after medication-induced termination of pregnancy with two dosing schedules of mifepristone and misoprostol. Contraception 2006; 73:415-419.

One thousand eighty women with pregnancies up to 63 days of gestation were enrolled in a randomized trial of 200 mg oral mifepristone followed by 800 mcg vaginal misoprostol administered on one of two dosing schedules. Group 1 was randomized to a 6-to-8 h dosing schedule, and group 2 to a 24-h dosing schedule. Participants recorded daily bleeding in a diary over a period of 5 weeks. The total duration of

bleeding ranged from 1 to 54 days (median 7 days), and spotting ranged from 1 to 80 days (median 5-6 days) in both groups. Neither duration of bleeding nor duration of spotting were related to the interval between mifepristone and misoprostol. Increased gestational age was correlated with longer duration of bleeding ($p=0.007$) and spotting ($p<0.0001$), and nulliparity was associated with longer bleeding time ($p=0.003$).

Creinin MD, Fox MC, Teal S, Chen A, Schaff EA, Meyn LA. A randomized comparison of misoprostol 6 to 8 hours versus 24 hours after mifepristone for abortion. *Obstetrics and Gynecology* 2004; 103(5 Pt 1):851-859.

One thousand eighty women with pregnancies up to 63 days of gestation were enrolled in this randomized study to evaluate the equivalence between 200 mg mifepristone followed 6-8 hours later (Group 1) and 24 hours later (Group 2) by 800 mcg vaginal misoprostol for pregnancy termination. Participants who had not aborted 7 days after initial treatment were offered a second dose of misoprostol. Complete abortion rates for both groups were statistically equivalent: Group 1 success rate was 95.8% (95% CI: 93.7-97.3%) and Group 2 was 98.1% (95% CI: 96.6-99.1%). Group 1 had significantly fewer side effects as compared with the 24-hour dosing interval.

Creinin MD, Schwartz J, Pymar H, Fink W. Efficacy of mifepristone followed on the same day by misoprostol for early termination of pregnancy: Report of a randomized trial. *British Journal of Obstetrics and Gynaecology* 2001; 108(5):469-73.

This randomized trial enrolled 86 women with gestations up to 49 days comparing two regimens of misoprostol following 600 mg mifepristone administration. Women randomized to Group 1 took 400 mcg oral misoprostol 6-8 hours after mifepristone; Group 2 administered it 48 hours later. At 24 hours after receiving misoprostol 50% of women in Group 1 (95% CI: 35-65%) and 91% of women in Group 2 (95% I; 82-99%) had complete abortions. By two week follow up the success rates had risen to 95% in Group 1 and 98% in Group 2.

Schaff EA, Fielding SL, Westhoff C, Ellertson C, Eisinger SH, Stadalius, LS, Fuller L. Vaginal misoprostol administered 1, 2, or 3 days after mifepristone for early medical abortion: A randomized trial. *Journal of the American Medical Association* 2000; 284(15):1948-53.

This prospective randomized trial evaluated the outcomes of 2,255 pregnant women with gestation up to 56 days undergoing medical abortion using the following regimen: 200 mg mifepristone followed by 800 mcg vaginal misoprostol self-administered 1, 2 or 3 days later. A second dose of misoprostol was administered if the abortion was not complete at follow up 8 days after mifepristone. The complete abortion rates were 98% (95% CI: 97-99%) for misoprostol after 1 day, 98% (95% CI: 97-99%) for those using misoprostol after 2 days, and 96% (95% CI: 95-97%) among those using misoprostol after 3 days. Cramping and nausea were the most common side effects reported, similar across all groups and over 90% of women found the procedure to be acceptable.

HOME USE OF MISOPROSTOL

Bracken H, Gliozheni O, Kati K, Manoku N, Moisiu R, Shannon C, Tare V, Tasha I, Winikoff B. Mifepristone medical abortion in Albania: Results from a pilot clinical research study. *European Society of Contraception* 2006;11(1):38-46.

This prospective study evaluated the acceptability and feasibility of introducing a regimen of 200 mg mifepristone followed by 400 mcg or oral misoprostol taken at home or in the clinic to terminate pregnancies in 409 women with amenorrhea of 8 weeks. Nearly 97% of the women successfully terminated

their pregnancy using the simplified regimen. Almost all the women found the method either satisfactory (49.4%) or highly satisfactory (41.1%). Ninety percent of the women selected the home use protocol.

Clark WH, Hassoun D, Gemsell-Danielsson K, Fiala C, Winikoff B. Home use of two doses of misoprostol after mifepristone for medical abortion: A pilot study in Sweden and France. *European Journal of Contraception and Reproductive Health Care* 2005; 10(3):184-191.

One hundred and thirty women (100 in Sweden, 30 in France) presenting for first trimester abortion were administered 600 mg oral mifepristone in the clinic and sent home with two doses of misoprostol (400 mcg each), along with instructions to take the misoprostol at 24 h intervals. Women were asked to complete a daily symptom diary. The success rate was 98% and the satisfaction rate was also 98%. Most women experienced noticeable side effects after each dose (97% after first dose, 94% after second dose). All women adhered to the home-use regimen; participants took the misoprostol within 2 h of the prescribed time, and 98% reported no trouble with the regimen.

Faucher P, Baunot N, Madelenat P. The efficacy and acceptability of mifepristone medical abortion with home administration misoprostol provided by private providers linked with the hospital: A prospective study of 433 patients. *Gynécologie Obstétrique Fertilité* 2005; 33:220-227.

Four hundred thirty-three women seeking medical abortion up to 7 weeks LMP were administered 600 mg mifepristone orally at the clinic and received 400 mcg misoprostol to administer vaginally 48 hrs later at home. Efficacy was 93.8% (318/339). The family planning midwife received a phone call from 4.8% of the women after having taken mifepristone and 5.7% had an emergency consultation. Acceptability data for 25% of participants showed that 96% of those women found the abortion procedure to be acceptable.

Ngoc NTN, Nhan VQ, Blum J, Mai TTP, Durocher JM, Winikoff B. Is home-based administration of prostaglandin safe and feasible for medical abortion? Results from a multi-site study in Vietnam. *British Journal of Obstetrics and Gynaecology* 2004; 111:814-819.

A total of 1,601 women with pregnancies less than 56 days LMP were given 200 mg mifepristone and offered the choice of either home or clinic administration of 400 mcg oral misoprostol two days later. The complete abortion rate for 1,395 women was 89.2%. Over 90% of women reported they were satisfied with their experience. A large majority of women (88.9%) selected home administration as opposed to clinic use of misoprostol. The main reasons for choosing home administration were the perception that the method is "easier, simpler, faster", that it is more compatible with household/ professional duties, and that it offered more autonomy. Nearly ¾ of women choosing home administration took misoprostol in the presence of their partners, family or friends.

Harper C, Ellertson C, Winikoff B. Can American women use mifepristone-misoprostol pills safely with less medical supervision? *Contraception* 2002; 65(2):133-142.

The role of clinical supervision in the medical abortion process is examined using data collected during a large clinical trial of mifepristone-misoprostol abortion in the US that enrolled 2,121 women with gestations \leq 63 days LMP. Study participants received 600 mg mifepristone followed 48 hours later by 400 mcg oral misoprostol. Evidence suggests that most women can handle most steps of the medical abortion process by themselves, effectively and safely, especially the administration of the medications. Alternatives to the present protocol might allow greater control, comfort, and convenience at lower cost. Where clinician involvement might be useful, mid-level health care providers typically possess the skills necessary to offer the method safely, implying that physicians might be necessary only as complications arise.

Elul B, Hajri S, Ngoc NTN, Ellertson C, Ben Slama C, Pearlman E, Winikoff B. **Can women in less-developed countries use a simplified medical abortion regimen?** *Lancet* 2000; 357:1402-1405.

This prospective study enrolled 315 women from Vietnam and Tunisia with pregnancies ≤ 8 weeks LMP for pregnancy termination using the following regimen: 200 mg mifepristone followed by 400 mcg oral misoprostol 2 days later at home or in the clinic, as per women's preference. Success rates were high with 93% complete abortion in Vietnam and 91% in Tunisia. Approximately 88% of women chose home administration of misoprostol. Most women (~90%) in both countries were satisfied with their abortions, but efficacy and satisfaction rates were higher among those who took misoprostol at home.

Guengnant JP, Bangou J, Elul B, Ellertson C. **Mifepristone-misoprostol medical abortion: Home administration of misoprostol in Guadeloupe.** *Contraception* 1999; 60(3):167-172.

Ninety-two women with amenorrhea of ≤ 49 days presenting for pregnancy termination received 600 mg mifepristone under clinical supervision and were given 400 mcg oral misoprostol for home administration 2 days later. At the follow up visit 2 weeks later, 95.4% of women had complete abortions. Success rates and adverse events were comparable to rates found when both drugs are administered in the clinic.

Schaff EA, Stadalius LS, Eisinger SH, Franks P. **Vaginal misoprostol administered at home after mifepristone (RU 486) for abortion.** *Journal of Family Practice* 1997; 44(4):353-360.

A total of 166 women with gestations ≤ 8 weeks LMP seeking to terminate their pregnancies were enrolled in this prospective trial. Women received 600 mg mifepristone and subsequently self-administered 800 mcg vaginal misoprostol at home 2 days later. The majority of participants (98%) had a complete abortion using this regimen; only 6 women required a second dose of misoprostol at the 7-day follow up visit. Bleeding occurred on average 3.5 hours after taking misoprostol. Most participants (96%) agreed the procedure went well and 90% agreed that home administration of misoprostol was acceptable.

USE OF ULTRASOUND IN MEDICAL ABORTION

Clark W, Gold M, Grossman D, Winikoff B. **Can mifepristone medical abortion be simplified? A review of the evidence and questions for future research.** *Contraception* 2007; 75:245-250.

The article summarizes existing evidence for simplifying provision of medical abortion. The authors identified three ways of reducing medical visits by avoiding the routine use of ultrasound imaging. First, by substituting routine sonography with a combination of women's reports of their LMP and by clinicians' manual examination; second, by taking misoprostol at home; and third by replacing follow-up ultrasounds to confirm pregnancy termination with serial serum hCG measures. In addition, the authors suggest five potential simplifications that still await testing via research to replace sonography by: 1) use of self-dating of pregnancy and a contraindication checklist; 2) use of risk-factor inventory to detect ectopic pregnancies; 3) use of low-sensitivity pregnancy tests; 4) Use of patient education and home-administering low-sensitivity pregnancy tests to identify women who still need follow-up after a medical abortion; and 5) use of patient education to identify incomplete abortion that presents actual clinical problems.

Rossi B, Creinin MD, Meyn LA. **Ability of the clinician and patient to predict the outcome of mifepristone and misoprostol medical abortion.** *Contraception* 2004; 70:313-317.

This analysis evaluates the ability of both women and their clinicians to predict pregnancy expulsion after using mifepristone and misoprostol for medical abortion up to 63 days gestation. Women who participated in a randomized trial comparing misoprostol 6-8 hours vs. 23-25 hours after mifepristone attended a follow up visit approximately 7 days after mifepristone treatment and both women and clinicians were asked

whether they believed the gestational sac had been expelled. Vaginal ultrasound was subsequently performed to confirm and demonstrated expulsion in 915/938 (98.3%) women. When both clinician and patient felt that the gestational sac had passed (n=880 [94.5%, 95% CI: 92.9-95.9%]), expulsion was confirmed by sonography in 99.1% (95% CI: 98.2-99.6%) of cases.

Cowett AA, Cohen LS, Lichtenberg ES, Stika CS. Ultrasound evaluation of the endometrium after medical termination of pregnancy. *Obstetrics and Gynecology* 2004; 103(5 Pt 1):871-875.

A chart review of 525 women who had undergone mifepristone-misoprostol medical abortion was undertaken to determine ultrasound parameters associated with the need for clinical intervention after medical abortion. Endometrial thickness was measurable in 437/525 cases, with an observed mean of 4.10 +/- 1.80 mm (range 0.67-13.4 mm). Endometrial thickness was inversely proportional to the number of days after initiation of therapy when ultrasound was performed ($r = -0.22$; $P < .001$) and was thicker in the women who had failed than in those who had a successful medical abortion (6.15 +/- 1.95 mm [range 3.35-10.0 mm] versus 4.01 +/- 1.75 mm [range 0.67-13.4 mm], respectively; $P < .001$). However, the wide overlap in values nullified the clinical usefulness of this difference.

Grossman D, Ellertson C, Grimes DA, Walker D. Routine follow-up visits after first-trimester induced abortion. *Obstetrics and Gynecology* 2004; 103(4):738-745.

This paper reviews the evidence related to routine postabortion follow-up visits. Other than mifepristone medical abortion performed ≥ 50 days of gestation or later and methotrexate medical abortion, the authors found little evidence that mandatory follow up visits typically detect conditions that women themselves could not be taught to recognize. Further, the natural history of the most severe complications after abortion, infection and unrecognized ectopic pregnancy, have time courses inconsistent with the usual timing of the follow up visits. Given the costs associated with follow up visits, the authors conclude that rather than routine postabortion visits, that alternative methods be considered to monitor recovery after abortions.

Fiala C, Safar P, Bygdeman M, Gemzell-Danielsson K. Verifying the effectiveness of medical abortion: Ultrasound versus hCG testing. *European Journal of Obstetrics and Gynecology and Reproductive Biology* 2003; 109:190-195.

Two hundred and seventeen women with gestations ≤ 49 days amenorrhea seeking pregnancy termination with medical abortion were given ultrasound examinations and serum hCG tests before treatment and at follow up. Treatment was successful in 98.2% of women. At follow up their hCG dropped to a mean of 3% (SD 3) of initial levels and the endometrium measured a mean of 10 mm (SD 4). Using hCG was reliable in 98.5% of successful abortions. For ultrasound the corresponding figure was 89.8% for the cases with a confirmed intrauterine pregnancy before treatment but only 66% if all pregnancies were included. The authors conclude that measuring serum hCG before treatment and at follow up is more effective than ultrasound to confirm a successful medically induced abortion in early pregnancy.

Fielding SL, Schaff EA, Nam N. Clinicians' perception of sonogram indication for mifepristone abortion up to 63 days. *Contraception* 2002; 66:27-31.

The purpose of this prospective study with 1,016 women seeking medical abortion was to document how the accuracy of clinicians experienced with pelvic exams and dating pregnancies in assessing gestational age at the first visit compared with sonograms, and to identify the factors influencing whether they perceived that sonograms are desired or indicated at the first and follow up visits. Clinicians correctly dated gestational age as no more than 63 days in 87% of women and in only 1% of assessments did clinicians underestimate gestational age. In 29% of women with a persistent gestational sac, clinicians did not

indicate the need for sonography when it was likely indicated. Clinicians in the study felt confident in not using sonography in most cases. Monitoring hCG levels to identify any ectopic or continuing pregnancies can reduce the need for sonography in medical abortion service provision.

PAIN MANAGEMENT IN MIFEPRISTONE MEDICAL ABORTION

Hamoda H, Ashok PW, Flett GMM, Templeton A. Analgesia requirements and predictors of analgesia use for women undergoing medical abortion under 22 weeks of gestation. British Journal of Obstetrics and Gynaecology 2004; 111(9):996-1000.

This retrospective study of 4,343 women undergoing medical abortion for pregnancies \leq 22 weeks of gestation evaluated the analgesia requirements and predictors of its use. The study employed a regimen of 200 mg mifepristone followed 36-48 hours later by one of two misoprostol doses: either 800 mcg vaginal or 600 mcg sublingual; additional doses of misoprostol were given as required. Seventy-two percent of women required analgesia; of these, 97% used oral analgesia, 2.4% used opiates and .3% received diclofenac sodium rectally. There was no significant difference in analgesia use whether women used the vaginal or sublingual route of misoprostol administration. Analgesia requirement was significantly higher for younger women, higher gestations, and increased number of misoprostol doses. Women with previous live birth were significantly less likely to use analgesia.

Nonno LJ, Westhoff C, Fielding S, Schaff E. Timing of pain and bleeding after mifepristone induced abortion. Contraception 2000; 62:305-309.

This study evaluated cramping and bleeding onset patterns of 2,302 women who received 200 mg mifepristone, then self-administered 800 mcg vaginal misoprostol 24, 48 or 72 hours after mifepristone. Women documented their symptoms in a log following treatment up until follow up 3-8 days later. Across all groups, 11% experienced cramping and 21% experienced bleeding before misoprostol use. The longer women waited to administer misoprostol, the more likely they were to experience cramping and/or bleeding before misoprostol. In the 12 hours following misoprostol administration, cramping and bleeding patterns were similar in the three groups.

Westhoff C, Dasmahapatra R, Winikoff B, Clarke S, The Mifepristone Clinical Trials Group. Predictors of analgesia use during supervised medical abortion. Contraception 2000; 61(3): 225-229.

This analysis identifies predictors of narcotic analgesia use by women undergoing medical abortion with 600 mg mifepristone followed 2 days later by 400 mcg oral misoprostol. Participants received analgesics on request from clinical staff, typically acetaminophen with codeine. Of the 2,121 women in the study, 27% used narcotic analgesics. The main determinant was the study center; women treated at university hospitals were more likely to receive narcotic analgesics than those treated at Planned Parenthoods or free-standing clinics ($p < 0.001$). Relative risk of using narcotic analgesics increased with gestational age; the relative risk decreased in women with previous births as well as increasing age of the woman.

SAFETY

Fjerstad M, Trussell J, Sivin I, Lichtenberg ES, Cullins V. Rates of serious infection after changes in regimens for medical abortion. New England Journal of Medicine 2009; 361(2):145-151.

From 2001 through March 2006, Planned Parenthood clinics in the U.S. provided medical abortion principally using a regimen with vaginal misoprostol. In early 2006, Planned Parenthood changed the route of misoprostol administration to buccal and required either routine provision of antibiotics or universal screening and treatment for chlamydia; in July 2007, Planned Parenthood began requiring routine treatment with antibiotics for all medical abortions. Retrospective analysis assessed the rates of serious infection after

medical abortion for time periods corresponding to each change in practice. Rates of serious infection dropped significantly after the joint change to buccal misoprostol and to either (a) testing for sexually transmitted infection or (b) routine provision of antibiotics. The rate declined 73%, from 0.93 per 1000 abortions to 0.25 per 1000 (absolute reduction: 0.67 per 1000; 95% CI: 0.44 to 0.94; $p < 0.001$). The subsequent change to routine provision of antibiotics led to a further significant reduction in the rate of serious infection, to 0.06 per 1000 (ARR: 0.19 per 1000; 95% CI, 0.02 to 0.34; $p = 0.03$). NNT= 1,193. No conclusions could be drawn about mortality risks because the numbers were so few (1 death reported for 243,692 medical abortions).

Davey A. **Mifepristone and prostaglandin for termination of pregnancy: Contraindications for use, reasons and rationale.** *Contraception* 2006; 74:16-20.

The contraindications summarized on product labeling for mifepristone differ from country to country. Such differences may reflect the dynamic environment of emerging scientific evidence, local experience and guidelines, and local regulatory processes. There are relatively few absolute contraindications to licensed regimens of mifepristone and prostaglandin for early abortion. The differences in product labels of two mifepristone products are described as well as the reasons for the differences.

Winikoff B. **Clostridium sordellii infection in medical abortion.** *Clinical Infectious Diseases* 2006; 43:1447-1478.

This editorial touches on the recent occurrence of U.S. fatalities caused by the rare bacteria *Clostridium sordellii* in women who underwent mifepristone medical abortion. Six potential theories for understanding causality and for preventing the infection have been put forward. The author reviews the plausibility of each theory and concludes that while no definitive link has been made between medically-induced abortion and the fatalities, there is still much to learn about this complex and rare phenomenon.

Fischer M, Bhatnagar J, Guarner J, Reagan S, Hacker JK, Van Meter SH, Poukens V, Whiteman D, Iton A, Cheung M, Dassey DE, Shieh W Zaki SR. **Fatal toxic shock syndrome associated with *Clostridium sordellii* after medical abortion.** *New England Journal of Medicine* 2005; 353(22):2352-2360.

Clostridium sordellii is a gram-positive anaerobic bacillus that has been reported as a cause of infection in the female genital tract and fatal toxic shock syndrome. This report describes four deaths due to endometritis and toxic shock syndrome associated with *C. sordellii* that occurred within one week after medically induced abortions employing a regimen of 200 mg mifepristone followed by 800 mcg vaginal misoprostol. Clinical findings included tachycardia, hypotension, edema, hemoconcentration, profound leukocytosis, and absence of fever. These cases indicate the need for physician awareness of this syndrome and for further study of its association with medical abortion.

Henderson JT, Hwang AC, Harper CC, Steward FH. **Safety of mifepristone abortions in clinical use.** *Contraception* 2005; 72(3):175-178.

Data on 95,163 women who obtained medical abortions at the Planned Parenthood Federation of America in the United States was used to evaluate the safety of mifepristone abortion in routine clinical use. The regimen employed for pregnancies up to 63 days LMP was 200 mg mifepristone administered in the clinic followed by 800 mcg vaginal misoprostol self-administered at home 24-72 hours later, depending on gestational age. Overall, 2.2 per 1,000 women (95% CI: 1.9-2.5) experienced a complication, most commonly, heavy bleeding (1.3 per 1,000; 95% CI: 1.0-1.5). Few women experienced bleeding that required a transfusion (0.5 per 1,000; 95% CI: 0.4-0.7). Localized infections (endometritis or endomyometritis) requiring intravenous antibiotics occurred for 0.2 of 1,000 mifepristone abortion (95% CI: 0.1-0.3). Overall the safety of mifepristone for abortion is high; complications requiring hospital care are uncommon.

Honkanen H, Piaggio G, von Hertzen H, et al. WHO Task Force on Post-ovulatory Methods of Fertility Regulation. **WHO multinational study of three misoprostol regimens after mifepristone for early medical abortion. II: Side effects and women's perceptions.** British Journal of Obstetrics and Gynaecology 2004; 111:715-725.

A total of 2,219 women with pregnancies \leq 63 days of amenorrhea participated in a double-blinded, randomized controlled trial comparing the efficacy of three different regimens of misoprostol following 200 mg mifepristone for pregnancy termination. Women were randomized to one of three treatment arms 36-48 hours after mifepristone administration: 1) oral/oral group (O/O) received 800 mcg misoprostol orally and placebo tablets vaginally, 2) vaginal/oral (V/O) and 3) vaginal-only (V) groups received 800 mcg of vaginal misoprostol and placebo tablets orally. Groups O/O and V/O continued with 400 mcg oral misoprostol twice daily for 7 days starting on Day 4 of the study, while group V-only took placebo tablets.

Oral misoprostol is associated with higher frequency of nausea, vomiting and diarrhea than vaginal administration. Frequency of fever after misoprostol was similar between groups (5% of women at 2 hours with oral administration; up to 6% at 3 hours with vaginal administration). Lower abdominal pain was similar with the three regimens, peaking at 72% at 2 hours with oral administration and 73-75% with vaginal misoprostol. Continuation of misoprostol for one week increases the incidence of diarrhea by more than threefold, from 9% to 26-27%.

Shannon C, Brothers LP, Philip NM, Winikoff B. **Infection after medical abortion: A review of the literature.** Contraception 2004; 70(3):183-190.

This systematic review of data on infectious complications after medical abortion up to 26 weeks of gestation evaluated 64 studies published prior to 2003. The frequency of diagnosed and/or treated infection after medical abortion was very low (0.92%, N=46,421) and varied among regimens; this rate is lower than that reported after either surgical abortion procedures or childbirth. Infections were reported after treatment with a range of 0% to 6.11% among evaluated studies. The most common type of postabortal infection reported was endometritis (49%, 210/429), followed by undefined "genital tract infection" (37%, 159/429).

Hausknecht, R. **Mifepristone and misoprostol for early medical abortion: 18 months experience in the United States.** Contraception 2003; 67:463-465.

This review details adverse events reported to the US-based mifepristone distributor and the USFDA during the first 18 months since mifepristone was approved. One hundred thirty-nine events were reported out of approximately 80,000 women treated with mifepristone medical abortion. Of these, 13 women required blood transfusions, 10 were treated with antibiotics for infection and 6 had a generalized allergic reaction. Five ectopic pregnancies occurred, one resulting in death of the patient but was unrelated to the medical abortion procedure. Fifty women had an ongoing pregnancy, with 48 having suction curettage, leaving 2 ongoing pregnancies. Thirty-nine women had a suction curettage for heavy or prolonged vaginal bleeding.

ACCEPTABILITY FOR WOMEN AND PROVIDERS

Teal SB, Dempsey-Fanning A, Westhoff C. **Predictors of acceptability of medication abortion.** Contraception 2007; 75(3):224-229.

One thousand eighty women seeking pregnancy termination up to 63 days' gestation were enrolled in a multi-center, randomized trial comparing mifepristone followed by misoprostol 6-8 or 24 h later. Expectations of bleeding and pain were recorded and compared to responses following the procedure. The

randomized groups did not differ significantly in terms of expected versus experienced pain or bleeding. However, nulliparity and increasing gestational age were independently associated with experiencing more pain than expected, and gestational age was associated with more bleeding than expected. Although 89.7% of subjects would choose medication abortion again, only 58% rated the experience as positive. Significant predictors of not choosing medication abortion again were procedure failure and more pain and bleeding than expected.

Blum J, Hajri S, Chélli H, Ben Mansour F, Gueddana N, Winikoff B. **The medical abortion experiences of married and unmarried women in Tunis, Tunisia.** Contraception 2004; 69:63-69.

This study explores the social dimensions of abortion in Tunisia and offers evidence supporting the provision of medical abortion to special populations, such as young and unmarried women. Two hundred and twenty-two women (unmarried: n=101, married: n=121) with gestations of ≤ 56 days received 200 mg mifepristone followed by 400 mcg oral misoprostol 2 days later either at home or in the clinic, as per the woman's choice. The majority of both unmarried women (94.8%) and married women (94.1%) had successful abortions. A strong preference was demonstrated among both groups for home administration of misoprostol (unmarried 73.3%, married: 80.2%). The primary reasons women indicated for their preference include costly transportation to clinic (32.7%), greater confidentiality (26.3%), and ease of administration/convenience (12.8%). More than 90% of both groups were satisfied with the method.

Winikoff B, Ellertson C, Elul B, Sivin I. **Acceptability and feasibility of early pregnancy termination by mifepristone-misoprostol.** Archives of Family Medicine. 1998; 7:360-366.

This prospective study reports on the acceptability of medical abortion to women and providers in the United States. The study involved 2,121 women who had undergone medical abortion using 600 mg mifepristone followed 2 days later by 400 mcg oral misoprostol, for gestations up to 63 days. Nearly all women (95.7%) would recommend the procedure to others, 91.2% would choose it again, and 87.6% found it very or moderately satisfactory. Even among women for whom the method failed, 69.6% would try it again, 84.9% would recommend it to others, and 51.9% found it very or moderately satisfactory. The potential for avoiding a surgical procedure was reported as the method's best feature; the most commonly cited worst features were the uncertainty and fear of side effects. Most providers and women considered home use of misoprostol feasible and safe.

Winikoff B, Sivin I, Coyaji KJ, Cabezas E, Bilian X, Sujuan G, Ming-kun D, Krishna UR, Eschen A, Ellertson C. **The acceptability of medical abortion in China, Cuba and India.** International Family Planning Perspectives 1997; 23:73-78.

This comparative study of acceptability of medical and surgical abortion among women in three countries demonstrated a high level of satisfaction with medical abortion. The most common reasons cited for choosing medical abortion were the desire to avoid surgery and general anesthesia; for surgical abortion women cited speed, simplicity and effectiveness as the primary reasons for their choice. Side effects were more frequently reported by women who chose medical abortion, however the majority of women at all sites were either satisfied or highly satisfied with their experience regardless of method (medical 84-95%, surgical 94-100%).

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