Pain from copper intrauterine device insertion: Randomized trial of prophylactic ibuprofen

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Objectives: This study was undertaken to determine whether 400 mg of prophylactic ibuprofen can alleviate pain from insertion of an intrauterine device (IUD) and to measure level of pain with improved techniques.

Study design: We conducted a randomized, double-blind, placebo-controlled trial of 2019 first-time IUD users: 1008 women received placebo and 1011 women received 400 mg of ibuprofen. Participants took the single tablet at least 45 minutes before IUD insertion. Immediately after insertion, participants recorded level of pain by using a 10-cm visual analog scale, with the value of 10 meaning “worst imaginable pain.”

Results: Median level of pain was 1.0 for both ibuprofen and placebo participants; rank test statistics confirmed no difference. Some subgroups of women experienced higher pain (eg, nulliparous women), but ibuprofen still had no important impact on level of pain.

Conclusion: Even among first-time users, pain from IUD insertion is generally low. Prophylactic ibuprofen as used in this protocol does not reduce IUD insertion pain.

The intrauterine device (IUD) is used by approximately 145 million women worldwide1 and is the most common form of reversible contraception. The insertion procedure, experienced by about 40 million women each year, can cause pain and discomfort in several ways: use of the tenaculum to grasp the cervix and straighten the uterus for proper insertion, transcervical actions (including measuring uterine depth, inserting the IUD insertion tube, and removing the tube), and placement of the device in the uterus.2 Though IUD use is apparently on the rise in the United States, yet less than 2% of US women of reproductive age3 use it, the method is more widely used in many European countries: United Kingdom (5%), Switzerland (6%), Germany (6%), Austria (9%), Finland (18%) and France (21%).4

New research confirming safety,5-7 recent changes in the Food and Drug Administration–approved prescribing information8 (dropping a recommendation that only parous women use an IUD), and Food and Drug Administration approval of a new levonorgestrel system in year 2000 may broaden US access to this form of birth control.

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Pain from the IUD insertion procedure (or fear of it) may limit the appeal of this contraceptive method, yet today’s clinicians have no facts to share with potential acceptors because the existing information is outdated, inaccessible, not applicable, or somewhat meaningless. For example, in large contraceptive efficacy trials, pain at insertion (using a 4-point categorical scale) was not recorded from the patients’ perspective, but instead was recorded from the clinicians’ subjective assessment of that experienced by the patient; some level of pain was registered in 13% to 24% of insertions.9,10 The scales and manner in which pain information was collected in a Brazilian study are unknown, though 9% experienced severe pain from the IUD insertion procedure.11 In 1, small, well-done study of 58 IUD insertions, researchers used a scale ranging from 0 (no pain) to 10, but the devices used in that study are unavailable today and the results are not applicable.12 From a different study of only 23 insertions, investigators reported that 4 patients described the process as painful, 16 as uncomfortable, and 3 as painless.13 Some research has shown that nulliparity, nonlactation, and lengthier time since last pregnancy are associated with more insertion pain11,14,15 but because the aforementioned shortcomings are common to these studies as well, the findings and ways to prevent pain deserve additional study.

To prevent or alleviate pain at insertion, both oral analgesics and cervical anesthetics have been recommended by some16 though neither medication have undergone rigorous testing to measure effectiveness. A recent American College of Obstetricians and Gynecologists publication17 on the IUD notes that “many clinicians use ibuprofen or nonsteroidal anti-inflammatory drugs for pain control on insertion, but there are limited data of their efficacy.” A randomized trial of 50 participants comparing 300 mg of naproxen to placebo found that when taken 1.5 hours before IUD insertion, pain at insertion (using a 5-point scale) was equivalent in the 2 groups; however, use of paracervical blocks may have prevented detecting an impact on pain at insertion.18 Jensen et al19 conducted a trial of 55 participants and showed that 600 mg of ibuprofen taken at least 1 hour before IUD insertion did not alleviate insertion pain, compared with placebo; median level of pain (on a scale of 0-10) was 3.0. A publication from the Royal College of Obstetricians and Gynaecologists20 states that “Pain relief prior to, and during, IUD insertion should be discussed with women and administered appropriately” though “there is a lack of randomized controlled trials investigating the use of oral analgesia.” Pain relief has been demonstrated with the use of anesthetic gel; in 1 trial of 102 IUD insertions, researchers found that 2% lidocaine gel when applied to the intracervix significantly lowered pain.21

Because ibuprofen has been shown to reduce IUD-induced side effects, including pain,22,23 its prophylactic use may alleviate insertion pain; however, existing clinical research provides little guidance on the topic. Only a large trial may be able to determine whether particular subgroups of women (who are likely to experience pain) respond differently to ibuprofen. This article reports on a randomized controlled trial that addresses previous weaknesses in attempts to prevent and simply measure pain from IUD insertion.

**Materials and methods**

We conducted a randomized trial of first-time IUD users to test the possible benefit of prophylactic use of ibuprofen; the main study outcome (early removal caused by bleeding and pain) and more detail on the methodology have been reported previously.24 We chose first-time IUD users to ensure fair capture/reporting of novel experiences. Briefly, eligible women were aged 18 to 49 years,
Table II  Level of pain at insertion: median (n), mean (95% CI), by background characteristics and treatment

<table>
<thead>
<tr>
<th>Background characteristics</th>
<th>Total</th>
<th>Placebo (N = 1008)</th>
<th>Ibuprofen (N = 1010)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (n)</td>
<td>Mean (95% CI)</td>
<td>Placebo (N = 1008)</td>
</tr>
<tr>
<td><strong>Age (y)</strong> *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤19</td>
<td>0.7 (327)</td>
<td>1.5 (1.3-1.7)</td>
<td>1.6 (1.3-1.9)</td>
</tr>
<tr>
<td>20-24</td>
<td>1.0 (794)</td>
<td>1.8 (1.7-2.0)</td>
<td>1.9 (1.6-2.1)</td>
</tr>
<tr>
<td>25-29</td>
<td>1.2 (464)</td>
<td>2.1 (1.9-2.3)</td>
<td>2.2 (1.9-2.5)</td>
</tr>
<tr>
<td>≥30+</td>
<td>1.2 (433)</td>
<td>2.2 (2.0-2.5)</td>
<td>2.3 (2.0-2.6)</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nulliparous</td>
<td>2.0 (102)</td>
<td>2.7 (2.2-3.2)</td>
<td>2.8 (2.0-3.5)</td>
</tr>
<tr>
<td>Parous</td>
<td>1.0 (1916)</td>
<td>1.9 (1.8-2.0)</td>
<td>2.0 (1.8-2.1)</td>
</tr>
<tr>
<td><strong>Days since start of last menstrual period</strong> *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;6</td>
<td>1.0 (1928)</td>
<td>1.9 (1.8-2.0)</td>
<td>2.0 (1.9-2.2)</td>
</tr>
<tr>
<td>6-10</td>
<td>0.2 (33)</td>
<td>1.0 (0.4-1.7)</td>
<td>0.9 (0.0-1.8)</td>
</tr>
<tr>
<td>≥11</td>
<td>0.9 (57)</td>
<td>1.8 (1.2-2.4)</td>
<td>1.5 (0.8-2.1)</td>
</tr>
<tr>
<td><strong>Time since last pregnancy ended among previously pregnant women (mo)</strong> *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>0.3 (133)</td>
<td>1.0 (0.7-1.3)</td>
<td>1.1 (0.6-1.6)</td>
</tr>
<tr>
<td>3-6</td>
<td>0.6 (200)</td>
<td>1.6 (1.3-1.9)</td>
<td>1.6 (1.4-1.8)</td>
</tr>
<tr>
<td>&gt;6</td>
<td>1.2 (1625)</td>
<td>2.0 (1.9-2.1)</td>
<td>2.1 (1.9-2.4)</td>
</tr>
<tr>
<td><strong>Currently breastfeeding</strong> *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.8 (538)</td>
<td>1.6 (1.4-1.7)</td>
<td>1.6 (1.3-1.8)</td>
</tr>
<tr>
<td>No</td>
<td>1.1 (1480)</td>
<td>2.0 (1.9-2.1)</td>
<td>2.1 (1.9-2.3)</td>
</tr>
</tbody>
</table>

* P < .05 using nonparametric Kruskal-Wallis test.
\* P < .05 using nonparametric Wilcoxon rank test.

literate, had menstruated in the last 6 weeks, had never used an IUD, were more than 6 weeks postpartum if recently pregnant, and had no medical contraindications to IUDs or ibuprofen. Participants were recruited at 42 Ministry of Health facilities and 1 private clinic (Instituto Chileno de Medicina Reproductiva, ICMER) in Santiago, Chile. The ethics committees of Family Health International (FHI), the Chilean Ministry of Health, and ICMER approved the protocol and data collection. Research staff obtained written consent from all participants before enrollment. We complied fully with CONSORT guidelines for the conduct and reporting of this trial.25

On the day of enrollment, participants were randomly assigned either ibuprofen or placebo tablets (identical in appearance); participants took 1 tablet immediately. Clinicians waited at least 45 minutes before inserting the copper IUD (Cu-T380A) and completed other enrollment/preparation tasks in the interim. Participants, clinicians, and the research team were blinded to the true identity of the tablets.

At enrollment, clinicians recorded basic sociodemographic, obstetric, and menstrual histories as reported by participants. After IUD insertion, the clinicians taught participants how to record level of pain by using the visual analog scale; we used a 10-cm horizontal line with the left hash mark denoting “no pain” and the right hash mark denoting “worst pain imaginable.” Participants wrote an “X” on the line to characterize their pain; study clinicians measured the distance from the left hash mark to the “X” and recorded the measurement in centimeters (to 1 decimal place). In pain research, visual analog scales that use a line to represent the continuum of “no pain” to “worst pain imaginable” are thought to be superior to other techniques.26

This study was designed to investigate the possible effect of ibuprofen on IUD continuation rates; thus, the power calculations performed for that purpose are not applicable here. For the present analysis on level of pain at insertion, we discovered that the data were not normally distributed. In light of this, our statistical tests and comparisons use the rank distributions; the Wilcoxon and Kruskal-Wallis nonparametric tests were used to evaluate and report differences. However, because of the large study size and familiarity that most readers have with parametric measures, we also computed means (and 95% CIs) and used them in some graphics27 to highlight statistically significant nonparametric differences (nonparametric graphics do not convey these differences). We examined a priori participant characteristics associated with higher insertion pain to confirm earlier reports and examined new factors as well. In addition, we did subgroup analyses to determine whether ibuprofen might provide some benefit. To better isolate the possible impact of ibuprofen, we used multivariable regression techniques to assess numerous factors simultaneously. SAS version 9.0 for Windows was used for all statistical analyses (SAS Institute Inc, Cary, NC).
Results

Recruitment began in June 2002 and ended in August 2003. The details of recruitment and randomization (including a standardized flowchart diagram) have been reported previously. A total of 2019 participants were enrolled; 1011 were assigned to ibuprofen and 1008 to placebo. All participants took the first tablet as instructed before IUD insertion. One ibuprofen participant did not have information on level of pain; thus, we analyzed data on 2018 participants in total.

Overall, level of pain for the study population was low (Figure 1). Forty-eight percent reported a pain score of less than 1.0, and 15% experienced pain in the range of 1.0 to 1.9. On other extreme, 11% reported a score of 5.0 or higher and 4.4% reported a score of 7.0 or higher.

Mean level of pain was 2.0 for placebo and 1.8 for ibuprofen; this difference was not significant (Table I). The median level of pain for both groups was 1.0 and the distribution of pain levels was similar; level of pain was equivalent in the 2 groups by using nonparametric rank tests.

Age, parity, time since start of last menses, lactation status, and time since last pregnancy ended were associated with level of pain at insertion (Table II). Older women experienced higher pain than younger women. Nulliparous women and nonlactating women experienced significantly higher pain than parous and lactating women, respectively. Those whose last pregnancy ended within 3 months experienced significantly less pain than women whose last pregnancy ended at least 6 months ago. Within each subgroup, levels of pain did not differ significantly between placebo and ibuprofen participants. Thus, ignoring the placebo/ibuprofen breakdown and combining all data to improve precision on the estimates of mean level of pain, the primary subgroup differences are shown graphically (Figure 2).

Multivariable regression analyses confirmed these results (data not shown). Namely, prophylactic ibuprofen did not alter level of pain even after controlling for numerous sociodemographic factors simultaneously.

Figure 2  Level of pain from IUD insertion showing significant differences between user groups based on the mean and 95% confidence interval (represented by the dot and extending arrows, respectively) from an overall scale of 0 to 10.
Also in the regression analyses, statistically significant increases in pain ($P$ value <.05) were associated with the following factors: increasing age, lower parity, lengthier time since last pregnancy, and nonlactation.

**Comment**

We measured IUD insertion pain in more than 2000 first-time users; with a 10-point visual analog scale, we found that the mean and median levels were 1.9 and 1.0, respectively. Prophylactic ibuprofen did not affect level of pain. In subgroup analyses of participants with known high likelihood of experiencing more discomfort, ibuprofen did not alleviate pain either.

The primary conclusion from this trial is that the insertion procedure is not painful to the vast majority of women who are having an IUD inserted for the first time in their lives. Thus, given this finding, it is not surprising that prophylactic use of a test medication failed to alleviate already low pain. We also failed to identify a benefit of ibuprofen for subgroups in which higher pain was anticipated. Only 7 participants received paracervical block before insertion; this cannot explain lack of ibuprofen benefit.

Fear of pain is often a barrier to seeking elective or even recommended medical procedures. The results of our study provide useful information to women who may be fearful of the IUD insertion procedure. Though the mean and median levels of pain from our study describe the experiences of 2018 women, individual tolerance, anatomic differences, genetics, subjective perceptions, as well as provider skills in inserting an IUD, may influence the level of pain that any 1 person experiences. We conducted our study in public facilities in Santiago, Chile; thus our study population is analogous to women seeking family planning services in Title X-supported clinics in the United States.

We tested the minimal effective dosage (400 mg) at a reasonable time before insertion (at least 45 minutes); in most settings, a patient can be counseled, prepared, and receive an IUD within 45 minutes. We did not collect information on the time since last meal, which could affect absorption. A higher dose (such as 800 mg) would have increased the chances of ibuprofen-related side effects and perhaps jeopardized participant compliance with our primary study aim: to improve IUD continuation rates with repeated doses of ibuprofen taken during menses for 6 months. A higher preinsertion dose may not have produced different results; in a study on colposcopy, 800 mg of prophylactic ibuprofen had no impact on reducing pain.28

Although early IUD removal rates vary slightly depending on which day of the menstrual cycle the IUD is inserted,29 little has been done to study how level of pain at insertion varies by day of the cycle. In our study, 94% of participants had the IUD inserted within 5 days of the start of their last menstrual period; within that group, level of insertion pain did not vary by day. Outside of that period, we had too few cases to correlate levels of pain to different phases of the menstrual cycle that might alter pain (eg, endometrial build-up, increases in amount and consistency of cervical mucus that occur near ovulation).

Clinicians should continue to provide or suggest analgesics such as ibuprofen for treating postinsertion related discomfort that may occur. There is no evidence, however, that prophylactic use of any analgesic is necessary.

**Acknowledgments**

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