Intrauterine Device Contraception in Nulliparous Women

A Master’s project submitted in partial fulfillment of the requirements for the degree of

MASTERS OF NURSING

By

Erinn A. Case

WASHINGTON STATE UNIVERSITY – MOUNT VERNON, WA

College of Nursing

Graduation Date: May 2012
To the Faculty of Washington State University:

The members of the Committee appointed to examine the master’s project of ERINN ALEXANDRA CASE find it satisfactory and recommend that it be accepted.

[Signatures]

Chair

[Signature]

[Signature]
ACKNOWLEDGEMENTS

I would like to thank the following individuals for their continuous encouragement and support throughout my education.

To my wonderful circle of friends for giving me the much needed down time when I just could not turn the page of another textbook.

To my parents, Edward and Jacque, for always believing I could become anything I wanted and for never allowing me to settle for second best.

Finally, to my husband, Paul, the love of my life and the man that makes me want to become a better person every day.

I thank everyone who has touched my life throughout these difficult and very rewarding two years.
Intrauterine Device Contraception in Nulliparous Women

Abstract

By Erinn Alexandra Case, RN
Washington State University
May 2011

Chair: Lorna Schumann

Submitting to Contraception: an international reproduction health journal.

“Approximately half of the six million annual pregnancies (in the United States) are unintended and almost half of these are ended in abortion, for 1.3 million abortions in 2000” [22 (p. 1417)]. This statistic provides proof that the U.S. female population requires better forms of contraception and further contraceptive education. The key to preventative health care is education and therefore full education on all contraceptive methods needs to begin now. The intrauterine device (IUD) and the intrauterine system (IUS) are safe and effective long-term forms of contraception that are underutilized in the United States (U.S.) [10]. The rate of IUD/IUS use in the U.S. is low, in comparison to other developed countries, at approximately three percent [4]. The exact rate of IUD use in nulliparous women is not known, but it is thought to be much less than the rate of use in the U.S. female population as a whole.

Underutilization of the IUD stems from multiple misconceptions held by both the medical provider and the general U.S. female population. Brockmeyer, et al. [3] states,
"The fear about problems with intrauterine contraception in nullipare often lies with clinicians." (p. 253). There have been multiple studies conducted to ascertain the usefulness and safety of the IUD in the nulliparous population. These studies have found the IUD to be a reliable, safe, and cost-effective contraceptive device well suited for nulliparous women. The IUD should be considered a first-line contraceptive choice in low risk women regardless of age and parity [10].

This paper reviews the current literature regarding IUD use in the nulliparous population and dispels myths. Three primary misconceptions will be covered: increased pain with IUD use, increased risk of pelvic inflammatory disease (PID), and the increased likelihood of IUD expulsion in comparison with the parous population.

Key Words: Nulliparous, Intrauterine device (IUD), IUD complications, Pelvic Inflammatory Disease, Pain, Expulsion.
# Table of Contents

Abstract ........................................................................................................................................ iv

Intrauterine Device Contraception in Nulliparous Women ......................................................... 1

Theoretical Framework .................................................................................................................. 4

Literature Review .......................................................................................................................... 6

Methods ......................................................................................................................................... 6

Pain ................................................................................................................................................ 6

Pelvic Inflammatory Disease ......................................................................................................... 8

Expulsion ........................................................................................................................................ 9

Discussion ..................................................................................................................................... 10

Significance or Implications for Nursing/Nurse Practitioner Practice ....................................... 11

Summary ......................................................................................................................................... 13

Table 1 ........................................................................................................................................... 15

References ...................................................................................................................................... 16
Intrauterine Device Contraception in Nulliparous Women

An intrauterine device (IUD) is a T-shaped apparatus inserted into and left in the uterus to prevent conception [12]. Many women in the U.S. are unfamiliar with IUDs, and they do not know of their benefits and possible contraindications [22]. IUDs are a form of birth control with long duration of use, little to no need for assessment or intervention, and subsequently low cost. In fact, IUDs have been found to be greater than 99% effective in preventing pregnancy during the first year of use in comparison to combined oral contraceptives [6, 23]. Oral contraceptives, on the other hand, have an effectiveness rate of 92%, as commonly used [8]. The World Health Organization found IUDs to be as effective as tubal ligation [8]. Therefore, IUDs have an advantage over the birth control pill (BCP) and can be considered as an acceptable form of contraception for all parities.

The most common form of contraception in the U.S. is currently the BCP [15]. BCPs have been found to have harmful side effects most predominantly venous thrombosis [24]. Van Hylckama Vlieg et al. [24], conducted a population based case-control study of 3,284 patients including 1,524 patient’s taking BCPs at the time of their venous thrombosis and 1,760 patients not taking BCPs at the time of their venous thrombosis. Patients taking BCPs were both younger and without any major comorbidities when experiencing their venous thrombosis [24]. Patients not taking BCPs were older and most had a significant comorbidity when experiencing their venous thrombosis [24]. Van Hylckama Vlieg et al. [24] found, “... currently available oral contraceptives were associated with a fivefold increased risk of venous thrombosis. This result confirms the results of previous studies reporting a two-fold to six-fold increased
risk of deep venous thrombosis associated with oral contraceptive use” (p. 6). The IUD can be a welcome alternative for patients worried about the harmful side effects of BCPs. 

There are two FDA-approved IUDs available on the market in the U.S. today: the levonorgestrel-releasing intrauterine system (LNG IUS) referred to by its trade name, the Mirena, and the copper T380 referred to by its trade name, Paragard [10]. The difference between the two is primarily the material from which they are made. The Mirena is plastic and contains the levonorgestrel hormone-releasing system; the Paragard is a copper IUD with no hormones incorporated [10]. Both employ a similar mechanism of action by slowing the migration of sperm and thus preventing zygote formation, with the Mirena having the addition of hormones [10]. The Mirena contains levonorgestrel, a synthetic progestogen, which creates the contraceptive benefit of thickening the cervix and decreasing or even stopping menstruation [11].

The IUD has presented an ethical issue of whether or not both forms, the Mirena and the Paragard, prevent fertilization or implantation. This is something every patient should consider prior to deciding on any contraceptive method. Neither form of IUD is completely understood [18]. Peterson and Curtis [18] stated, “Multiple mechanisms of action contribute to the effectiveness of all IUDs; the precise contribution of each mechanism is unclear, and the extent to which prevention of implantation plays a role is controversial” (p. 2171). Stanford and Mikolajczyk [21] conducted a meta-analysis on the mechanisms of action for both the copper containing Paragard and the levonorgestrel containing Mirena. These researchers found both the Paragard and the Mirena have multiple mechanisms of action including: increased cervical mucus production causing decreased spermatic motility, increasing rates of phagocytic activity on both the
spermatozoa and the ova while in the endometrium and fallopian tubes, as well as decreased ova development [21]. Both the Paragard and the Mirena’s primary mode of action according to multiple studies is the interference of fertilization rather than interference during implantation [21]. The general female population in the U.S. seeking contraception must be aware of their specific ethical concerns and once information has been given to the patient about all products she should then be able to make a more educated decision.

Currently, the use of IUDs in nulliparous women is thought to be low because of misconceptions commonly associated with the IUD in this population [11]. Some of these misconceptions include IUD contraception failure, painful insertions, health care provider biases and the increased risk of pelvic inflammatory disease (PID) [11]. Greater awareness and education about the efficacy of IUDs and their potential for success in the nulliparous women is needed for both the general public and health care providers. All health care providers should be informed of the new guidelines set forth by the World Health Organization [8] for IUDs in nulliparous women. These guidelines state IUDs fall under category two (see Table 1) for the need of clinical judgment from a provider prior to use [8]. The World Health Organization [8] states category two is, “A condition where the advantages of using the method generally outweigh the theoretical or proven risks” (p.11).

Statement of the Purpose

The nulliparous population and many providers hold multiple misconceptions related to IUD use, including increased pain with IUD use, increased risk for pelvic inflammatory disease, and increased risk of expulsion in comparison to the parous
population. These misconceptions lead to a low utilization of IUDs in this population, when it should be a positive and often preferable alternative to other forms of contraception. The purpose of this paper is to examine the evidence for the effectiveness and safety of IUD use as a form of birth control and contraception among nulliparous women of all ages living in the U.S.

Theoretical Framework

Misconceptions related to IUD use in the nulliparous population can be attributed to many different beliefs held by the general U.S. female population and by health care providers alike. To provide a better explanation and framework for addressing these misconceptions, two theories were chosen from the behavioral sciences: the Health Belief Model written by Irwin M. Rosenstock in 1974, and the Theory of Planned Behavior written by Daniel Montano and Danuta Kasprzyk in 2002 [14, 19]. These two theories will be utilized to better understand the evidence base effectiveness of the IUD so patients and providers can make informed decisions about their use.

The Health Belief Model is a social psychology theory used to predict health behaviors [12]. Everyone has a level of wellbeing they want to remain at in life, and when something begins to threaten that wellbeing, the individual has to make decisions that will prevent that threat. The Health Belief Model depicts an individual's perceived susceptibility, severity, benefits, barriers and cues from the threat to influence the decisions that the individual makes [19]. Nulliparous women interested in preventing pregnancy are presented with a multitude of contraception options that come with just as many risk factors or "threats" as they do benefits. Each nulliparous woman can weigh the health benefits and risks, and arrive at the best option for her life. The problem lies in
both: the minimal amount of research regarding IUDs in this population, as well as the minimal amount of information and education presented to this population by their provider. Many nulliparous women are aware of only risk factors or threats of the IUD, and they are not aware of the many benefits. For this reason women are not able to make an educated decision about their options. By using the Health Belief Model a better understanding of why the nulliparous population are currently not using IUDs can be made. Lack of proper education related to IUD benefits is cited as primary [19].

The Theory of Planned Behavior is also from the behavioral sciences, and it too is used to gauge an individual’s readiness to perform a given behavior [12]. This theory therefore is utilized to explain the reasoning for health care providers to either encourage or discourage the placement of IUDs in the nulliparous population. There are three motivating factors behind decision-making: attitude toward the decision, social norms, and perceived control over the decision [14]. When a health care provider has outdated or inappropriate information concerning new practices, they are placing themselves and the patient at a disadvantage. Some outdated social attitudes and norms consist of inflated failure rates of the IUD, adverse effects on subsequent fertility after IUD use, and inappropriateness of IUD use in the nulliparous population as a whole [2]. Many health care providers continue to deny nulliparous women IUD placement because of these old attitudes and social norms, therefore inhibiting the patient’s control over her own decision-making.
Literature Review

Methods

Multiple scholarly databases, including CINAHL, PubMed, Cochrane Library, and Google Scholar were searched for articles published from 2002 to 2010. Nulliparous, Intrauterine Device (IUD), IUD complications, Pelvic Inflammatory Disease (PID), Pain, and Expulsion, as well as many combinations of these key words made up the list of terms utilized. Thirteen articles were subsequently chosen from the list of 25 relevant resources brought forward from this search. After the concept review was completed, three main topics were identified as misconceptions and possible reasons for decreased use of IUDs in the nulliparous population. The three misconceptions are increased pain with IUD use, increased risk for pelvic inflammatory disease, and increased risk of expulsion in comparison to the parous population. Many of the articles covered all three misconceptions, simultaneously.

Pain

The nulliparous woman typically has a small and narrow cervix, which may make the placement and use of an IUD painful. Saav et al. [20], hypothesized that this pain during IUD insertion could be decreased or eliminated with the use of cervical dilating agents, such as misoprostol. Eighty nulliparous women were randomly assigned to either the misoprostol group or the control group that received no cervical dilation [20]. Patients were excluded from the trial if they presented with a positive pregnancy test [20]. Both the nulliparous patient’s pain score and the medical provider’s difficulty of insertion were recorded and then compared. The nulliparous patient’s pain was evaluated using a Visual Analog Scale (VAS) ranging from 1-10 [20]. The median VAS score of the misoprostol
group was 7.0 and the median VAS score of the control group was 6.5, with both groups describing very similar pain experiences [20]. Both the control group and the misoprostol group also reported similar low rates of pain one month after IUD insertion. However, there was a significant difference in medical provider’s difficulty of insertion ratings. The medical provider’s difficulty of insertion was classified as either easy or intermediate to difficult [20]. Medical providers found 18 patients in the control group to be intermediate to difficult and 22 patients as easy. Medical providers found only 10 patients in the misoprostol group to be intermediate to difficult insertions and 29 patients were found to be easy [20].

The IUDs were tolerated well in both the misoprostol group and the control group. When interviewed at one-month post IUD insertion, the majority of women stated they would go through the insertion process again if needed [20]. Overall there was no reduction of pain experienced by the misoprostol patients, even though the medical providers felt decreased cervical resistance [20]. Therefore, cervical resistance and diameter is not necessarily related to the pain experienced from IUD insertion and use. The misconception of a narrow or small cervical diameter leading to increased pain with insertion should not be considered a reason to restrict IUD placement in the nulliparous population [20].

Brockmeyer et al. [3] conducted a study on nulliparous women and their experience of IUD insertion, satisfaction, and continuation over their first year of use. One hundred and seventeen nulliparous women were recruited for this study, and 60% described their IUD insertion pain as similar to the pain of a regular period or minor cramping [3]. Fourteen percent reported having severe abdominal pain, and the rest of the
women (15%) experiencing very little to no pain [3]. Despite feeling some pain, most of the study’s participants were very positive about their experience. This satisfaction carried on throughout the following year. When participants were reevaluated at 12 months, 67% stated they were very satisfied with their IUD [3].

Health care providers and nulliparous patients seeking reliable contraception should not exclude IUDs based on the misconception of increased pain. Pain is experienced across the continuum from nulliparous to parous IUD users. It is illogical to predict one patient’s pain experience from another’s, or to base treatment on this misinformed prediction. Patients are aware procedures are can painful, but many times patient benefits outweigh potential discomfort: [3] “…clinicians should not assume that pain is always associated with lack of satisfaction” (p. 253).

**Pelvic Inflammatory Disease**

Pelvic Inflammatory Disease (PID) is particularly worrisome to young nulliparous women, because of the risk for infertility. PID, or an infection of a female’s reproductive organs including the uterus, is commonly caused by sexually transmitted infections (STI) such as chlamydia and gonorrhea [26]. Younger nulliparous females are typically considered to have higher-risk sexual behavior and therefore an increased risk for the STIs that can cause PID [9]. PID rates have been found to be low for both parous and nulliparous IUD users, as well as for women not even using IUDs for contraception [11].

Suhonen et al. [23] conducted a randomized control study of 200 nulliparous women receiving IUDs or oral contraceptives (OC) for a period of one year. The safety of the IUD was compared to OCs including the risk for PID. No case of PID was reported in either the IUD group or the OC group [23]. These researchers also introduced the idea
that OC have been known to mask the symptoms of PID, thereby allowing for delayed
diagnosis and advanced infection [23]. IUDs, specifically the Mirena, have been
associated with lower incidence of PID related to its mechanism of action [17].

A meta-analysis conducted by Prager and Darney [17] on nulliparous women
revealed more information about the protective effects related to the Mirena. The Mirena,
as stated previously, is an intrauterine system containing a hormone called levonorgestrel,
a synthetic progestin. Progestin causes thickening of cervical mucus and decreased
menstrual bleeding [17]. Both of these effects decrease the likelihood of PID. Cervical
thickening prevents the ease of transmission of infection up through the cervix, and
decreased menstrual bleeding lowers the rate of menstrual wicking up into the uterus

It is a misconception to relate high-risk sexual behavior with nulliparity and
subsequent PID. Any woman, whether she is nulliparous or parous, has an increased risk
for PID, if her IUD is inserted while she has a STI: [17] “...age and nulliparity are
surrogates for cervical infection at the time of IUD insertion and not independent risk
factors” (p. S13).

**Expulsion**

IUD expulsion in the nulliparous population is wrongly believed to be greater in
comparison to the parous population. Medical providers and the general female
population many times believe a smaller uterus leads to IUD expulsion at higher rates,
but this has been found to be false [25]. Not only are the rates of IUD expulsion similar in
both the nulliparous and parous populations, but also the use of the Mirena IUD tends to
inhibit uterine peristalsis and thus expulsion [25].
Between zero and 4.2% of all women may expel their IUD within the first year of use [17]. A randomized, single-blinded study on 1,170 Mexican nulliparous women was conducted by Otero-Flores et al. [16]. The study was a comparison of three different IUDs used in Mexico and their separate outcomes on the nulliparous population [16]. These researchers found the expulsion rate of IUDs in nulliparous women to be on average 2.3% [16]. In comparison to 4.2% or less in the parous population, showing no difference or increase in the likelihood a nulliparous woman will experience expulsion [16].

An interim analysis conducted by Wildermeersch et al. [25] on 143 parous women and 92 nulliparous women found the expulsion rate to be equal for both groups. Each group had one expulsion experienced prior to a follow-up exam at one-year post-IUD insertion [25]. It seems as though the skill and experience of the provider inserting the IUD has more to do with retention than the parity of the patient. The researchers found the two expelled IUDs were placed by providers who rarely insert IUDs in either the parous or nulliparous population [25]. The nulliparous patient can be an increasingly difficult placement in comparison to the parous patient simply because of the decreased cervical os and uterus size [25]. Therefore, it is imperative for the medical provider to take extra caution while placing an IUD in this population to limit risk of expulsion [25].

Discussion

The IUD has had a tumultuous history with many setbacks and misleading studies. Nulliparity was at one time considered to be a contraindication for IUD use due to the fear of subsequent pelvic inflammatory disease, perforation and infertility. The Dalkon Shield was a popular intrauterine device placed in many U.S. women in the 1970s
The Dalkon Shield was correlated with an increased rate of pelvic inflammatory disease resulting in subsequent infertility and even death, and in 1980, physicians were advised to remove the Dalkon Shield from asymptomatic women to avoid infection [5]. The Dalkon Shield is no longer in use anywhere in the world; however, it created a strong opposition to the use of the IUD in any population of women. The fear generated by this product has continued through to present day [10]. However, IUDs have many positive attributes that should place it at the top of the list when considering contraceptive options. The IUD should be presented to the general U.S. female population including the nulliparous along with all other forms of contraception.

IUD satisfaction and continuation rates have been found to be high in the nulliparous population. There are many ways to evaluate the acceptance and satisfaction of a contraceptive product, and one is the continuation rate [23]. In the study by Suhonen et al. [23], 200 nulliparous women receiving IUDs or oral contraceptives (OC) were assessed one year after the study began for the participants’ satisfaction rates. Eighty-eight percent of the IUD users were happy with their contraceptive device and wanted to continue its use after having it for one year [23]. Only 68% of oral contraceptive users wanted to continue their use of the medication at one year [23]. In this particular study young nulliparous women found the IUD to be particularly advantageous, because of its benefit of long-term contraception without the need for daily medication adherence [23]. The IUD is extremely convenient and effective for this population.

**Significance or Implications for Nursing/Nurse Practitioner Practice**

Health care providers including nurse practitioners form the first line of education for patients seeking contraception. The duty of the nurse practitioner or provider is to
properly inform the patient of all her options, including the benefits and possible risks of each method. This is where providers have fallen short in the past and continue to do so [2]. With the new World Health Organization’s recommendations concerning IUDs in the nulliparous population, as well as the strong recommendation from the American College of Obstetrics and Gynecology, providers should be encouraged by the fact that IUDs have been approved in the nulliparous population [1, 8]. By utilizing the Health Belief Model misconceptions and concerns by the patient about an IUD can now be addressed and extinguished. No longer do the misconceptions about IUD use in this population need to be seen as a contraindication to use in this population. The IUD is a beneficial alternative to other more common forms of contraception.

Health care providers including nurse practitioners need to start talking about IUD use as a first line contraceptive method. In their cross-sectional survey of 252 nulliparous women age 14-27, Fleming et al. [9] found the strongest indication for IUD interest from a patient was previous discussion with and education from their provider. Providers should introduce IUDs as a possible option to nulliparous women as a standard of education about contraceptive methods.

Health care providers must also remain current with new evidence-based information regarding contraception. Black et al. [2] conducted a cross-sectional survey of 701 health care providers to assess their knowledge related to IUD’s risks, benefits, and uses. These researchers found a direct correlation between the time since a provider had graduated from medical or nursing school and the knowledge they correctly possess related to IUD use in the nulliparous population: [2] “…the time since graduation was apparent, with more recent graduates having more up-to-date knowledge about most
aspects of both the Cu-IUD and LNG-IUS” (p. 186). Three motivating factors behind
decision making from the Theory of Planned Behavior include: attitude toward a
decision, social norms, and perceived control over the decision [14]. Health care providers
must remain current so their decision making process is not affected by obsolete
information. When a health care provider has out of date information and
misconceptions about IUD use in the nulliparous population, they are inhibiting their
ability to properly inform and treat their patients.

Summary

Health care providers and the U.S. female population as a whole are under-
informed about IUDs and their many benefits. This lack of information has led to
misconceptions related to IUD use. The U.S. and its health care providers need to change
the popular perspective on IUD use among the nulliparous population and become
educated about the facts; the IUD is a highly effective, inexpensive, convenient and safe
method of contraception for all women, including nulliparous women [22].

The body of contraceptive research is constantly growing and evolving. Further research on the topic of IUD placement in nulliparous women is very much needed. There seems to be a lack of comparison studies between the parous population and the nulliparous population of women using IUDs for contraception in the U.S. There are multiple studies dedicated to IUD use and its safety in both parity populations separately, but only a few comparing the two against each other. More research needs to be conducted on the nulliparous population in regards to length of IUD use and possible complications post IUD removal. There should also be further research performed on nulliparous women following yearly increments after the IUD has been inserted. Little to
no information can be found on the nulliparous women’s satisfaction with the IUD more
than a year after insertion.

IUDs have many advantages over most other forms of contraception for
nulliparous women. The IUD has been found to be the most effective form of
contraception with a failure rate of only 1% [8]. Nulliparous women using IUDs have
higher acceptance and continuation rates, than those using oral contraceptives [3].
Misconceptions related to IUD safety have now been better addressed and hopefully are
ready to be dispelled by both patient and provider alike.
<table>
<thead>
<tr>
<th>Number</th>
<th>Absolute and Relative Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Method can be used without restriction</td>
</tr>
<tr>
<td>2</td>
<td>Advantages generally outweigh theoretical or proven risks</td>
</tr>
<tr>
<td>3</td>
<td>Method not usually recommended unless other, more appropriate methods are not available or not acceptable</td>
</tr>
<tr>
<td>4</td>
<td>Method not to be used</td>
</tr>
</tbody>
</table>

(Department or Reproductive Health, World Health Organization, 2009)
References


World health Organization:


