Chapter

Emergency Contraception: Literature Review, Experience in a Greek Center and Greece Used Methods

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Abstract

The sexual liberation of women can now be taken for granted, and access to information is particularly easy, but even today there is still many lack of information about contraceptive methods. No method of contraception has a 100% guaranteed result as success depends on many factors such as faithful adherence to the instructions of family planning centers, age of the woman, the frequency of the sexual act, and of course the type of contraception. Emergency contraception refers to any method of contraception used after intercourse and before implantation. It differs from the medical termination of pregnancy, which has 75–89% effectiveness and copper IUDs. Contraception is used to stop the sperm from fertilizing the egg or to stop the fertilized egg from implantation in the uterus. All contraceptive methods require educational awareness and emergency contraception should not be used as normal contraceptive treatment. It does not fall into the sphere of moral dilemmas if it is taught correctly at the levels of primary and secondary education and in the family sphere. Undoubtedly, the organization of family planning centers for women of reproductive age as well as for teenagers is deemed necessary and should become a priority of every government.

Keywords: emergency contraception, methods, safety, effectiveness, medical contraceptives, cooper IUDs

1. Introduction

Despite the existence of highly effective contraceptive methods, many pregnancies occur unplanned and the majority of them are unwanted. These pregnancies put

women at increased risk of morbidity and mortality and are often artificially terminated without the necessary safety. The risk of conception after a free intercourse is about 25%, depending on the day of the menstrual cycle. Emergency contraception is the method that reduces the risk of pregnancy if administered after unprotected intercourse and before conception [1–3].

It is usually used when no contraceptive method is followed, mistakes were made in using a method or sex without consent, or rape without contraception. The conditions for spontaneous conception pregnancy include: fertile sperm in the fallopian tube, live spermatozoa up to 5 days, and eggs capable of fertilization in the uterus within 12–24 hours. Pregnancy begins when implantation is achieved. Fertile days are the 6 days preceding and including the day of ovulation [3–6]. One intercourse during this period has a 30% risk of conception, and a single unprotected intercourse in the cycle has a 25% chance of occurring on fertile days. On each day of the cycle, there is a theoretical possibility of conception and emergency contraception must be administered to each unprotected contact [1–6].

The purpose of this study is to publish the results of nine-year follow-up from the Family Planning Center of the Democritus University of Thrace and review international literature.

1.1 Contraception

Since the 1960s, the use of specific steroid oral contraceptive hormones has been shown to be effective in preventing unwanted pregnancy. Also, copper IUDs are highly effective as emergency contraception, while mifepristone is an antiprogestogen whose role in emergency contraception has been considered controversial [7].

Emergency contraception refers to an occasional method of contraception that prevents pregnancy after intercourse without or with inadequate contraceptive measures. Currently, available emergency contraception methods are the combined contraceptive pill containing ethinylestradiol and levonorgestrel (Yuzpe method), the progestogen pill, copper IUDs, and mifepristone or ulipristal acetate. The success rate of the Yuzpe method is 75%, while levonorgestrel administration prevents unwanted pregnancy in 85% of cases. As far as hormonal emergency contraception is concerned, there are no contraindications for its use, so it can be administered without hesitation. The use of a copper intrauterine coil for emergency contraception is very effective, with success rates greater than 99% [8–10].

Emergency contraception is applied and works before fertilization, so it is not an abortion. In the past and in limited cases, but even today for the same purpose, intrauterine devices are also used. Emergency contraception or the morning-after pill is the medicine that can be used after unprotected intercourse or where the contraceptive method has failed (e.g., the condom has broken) in order to prevent a possible pregnancy.

1.1.1 Indications for applying emergency contraception

Emergency contraception works by one of the following processes, depending on the stage of the cycle it is used:

By decreasing LH, it either delays or inhibits ovulation, preventing partial or total yellowing of the follicle depending on when EA (emergency contraception) is administered (**Table 1**).

It prevents the formation of the corpus luteum.

1	Missed/late doses of contraceptive pills
2	Failure to use a condom
3	Not using contraception or doubting its reliability
4	Intermittent intercourse method failure
5	After rape
6	Modes of action of emergency contraception

Table 1.
Indications for applying emergency contraception.

It causes histological or biochemical changes in the endometrium with the result that implantation is prevented.

Emergency contraception stops pregnancy before it starts. It is not an abortion, it is applied and works before the pregnancy test is positive. It is ineffective in established pregnancy, against which it has no potential for action and should not be taken [7–12].

2. Emergency contraception methods

2.1 Hormonal contraception

2.1.1 Estrogen

High doses of estrogen when administered within 72 hours of intercourse prevent pregnancy. This is an older method that is not used now.

2.1.1.1 Mechanism of action of estrogens

Alteration of the intrinsic motility of the fallopian tubes.

Inhibition of the function of the corpus luteum at the level of prostaglandins.

2.1.1.2 Endometrial changes

In the past, tablets containing a large amount of estrogen were mainly used. The method required taking two oral tablets (containing 50 μg of ethinylestradiol and 0.5 mg of norgestrel) as soon as possible after intercourse and another two tablets after 12 hours. However, nausea is a common symptom with these dosages. The total hormonal dose received in this way is less than the total dose received in a cycle with administrated oral dose (AOD), and only the absolute contraindications of AOD were usually taken into account [13–16].

2.1.1.3 Estrogen/progestogen combination

The combined contraceptive pill containing ethinylestradiol and levonorgestrel can be given for emergency contraception according to a protocol described as the Yuzpe method.

Dosage regimen: 100 μg ethinylestradiol +500 μg levonorgestrel (Yuzpe).

Taken 2 times within 12 hours and within 72 hours of contact. Pregnancy rate reduced to 2/3 (56–89%).

2.1.2 Progestogen-only preparations

2.1.2.1 Levonorgestrel

Levonorgestrel remains the first choice for patients as emergency contraception, 0 to 72 hours after unprotected intercourse.

In recent years, levonorgestrel 0.75 mg was released as an emergency contraceptive in two tablets and then in one tablet (Norlevo, Postinor, 1500 μg). This method has fewer side effects, mainly in terms of nausea and vomiting, than using contraceptive pills.

In the original packaging, the first tablet (as is generally the case in emergency contraception) was taken as early as possible after intercourse, with best effectiveness if taken within the first 12 hours. The first tablet should not be taken if the effectiveness of ulipristal acetate is greater than that of levonorgestrel [17–23].

The mechanism of action is largely unknown. However, levonorgestrel is thought to:

It suppresses ovulation, preventing fertilization.

It alters the endometrium, preventing implantation of the fertilized egg.

Dosage regimen: Levonorgestrel (LNG) 1.5 mg within the first 72 hours although there are data for action up to 120 hours. Failure has been estimated at 1.1–2% with the risk of an unwanted pregnancy being reduced to 60–93%.

Thus, it prevents a pregnancy, regardless of the phase of the cycle in which the woman is. However, if the process of implantation of the fertilized egg in the uterus has already begun, the preparation will have no effect; that is, it will not cause a miscarriage [13–16, 24–27].

2.2 Effectiveness

Levonorgestrel should be delivered as soon as feasible, ideally within 12 hours, following a sexual encounter during which measures were not followed or were unsuccessful, and no later than 72 hours (3 days) after the encounter in order to attain the method's optimum efficiency.

If taken within 24 hours of "suspected" intercourse, it is 95% effective at preventing an unwanted pregnancy.

If given within 24 to 48 hours, it is 85%, while if taken within 48 to 72 hours, it drops to 58%. Therefore, the sooner it is taken after suspected contact, the more effective it is. It can be used at any time during the cycle if contact occurs without protection.

In no case should emergency contraception replace regular methods of contraception. It should not be used on a permanent basis, but only in exceptional cases, as the repeated intake of the preparations can cause cycle disturbances due to the high hormonal load it causes.

2.3 Unwanted actions

The most common side effects that have been reported after its use are nausea in a percentage of 20%, as well as headaches or vomiting in smaller percentages. In addition, breast irritation, future ectopic pregnancy, thrombosis, and infertility may occur. In cases of vomiting less than two hours after taking the contraceptive dose, a repeat dose is recommended.

It has not been demonstrated, though, that this strategy improves contraception's efficacy. The likelihood that the vomiting was brought on by the pill's absorption is very high.

However, if vomiting prevents oral medication administration, the medication may be given vaginally.

Contraceptive tablets administered vaginally have not been proven to be successful, although it is known that the vaginal epithelium is a great receptor for steroid hormones used as contraceptives.

Atypical stomach pain, feeling exhaustion, headaches, dizziness, breast tenderness, blood spots, or vaginal bleeding are some more adverse effects [17, 28–30].

2.4 Contraindications

Other than pregnancy, using emergency contraception is not contraindicated.

Interactions with other medications.

When prescribing emergency contraception to women using rifampicin, griseofulvin, anticonvulsants, or barbiturates, many doctors choose twice the required dose. This tactic is based on observations of the pharmacokinetics of combined hormonal contraceptive pills, but there is no scientific evidence to justify its application in emergency contraception. It seems that increasing the dosage does not cause any particular side effects, apart from increasing the possibility of nausea and vomiting.

2.5 Frequency of use of hormonal emergency contraception

The use of hormonal emergency contraceptive pills should not replace the use of regular combined hormonal contraception. At the same time, pregnancy rates with the use of emergency contraception are higher compared to normal hormonal contraception. However, in cases where intercourse occurs a second time without precautions and in the same cycle the couple has already received hormonal emergency contraception once, they can use them again.

The woman should know that the use of hormonal emergency contraception does not protect her from unwanted pregnancy if she has unprotected intercourse later in the same menstrual cycle. In cycles where more than one intercourse has occurred the effectiveness of hormonal emergency contraception is affected by the time interval between taking the tablets and the first intercourse. The woman should know that if there is already a pregnancy, hormonal emergency contraception is not effective [17, 27–30].

2.6 Time of menstruation after taking the morning-after pill

Ulipristal (ellaOne, HRA Pharma) is an emergency oral contraceptive that has recently been launched on the UK market and has been licensed for use across Europe. ellaOne consists of one tablet containing 30 mg of ulipristal acetate (also known as CDB-2914 and VA2914). Ulipristal is a synthetic steroid, derived from 19-norprogesterone, and is a selective progesterone receptor modulator (SPRM), a class of tissue-selective compounds that act as complete agonists, antagonists, or partial agonists of the progesterone receptor.

Ulipristal acetate also exhibits high affinity for the glucocorticoid receptor and *in vivo* antiglucocorticoid effects have been observed in animals. However, no such effects have been observed in humans, even after repeated administration of a daily

dose of 10 mg. Ulipristal acetate has little affinity for androgen receptors and no affinity for human estrogen or corticosteroid receptors [17–21].

The first SPRM, mifepristone, is used in abortions and is also an effective emergency contraceptive. A Cochrane review concluded that mifepristone is more effective than progesterone emergency contraception up to 120 hours after intercourse; however, it has not been developed for this indication in the UK and is not licensed for use as emergency contraception in no European country. It has been said that ulipristal is a second-generation SPRM. Due to variations in their active metabolites, ulipristal has substantially less antiglucocorticoid action than mifepristone *in vivo*.

The important difference of ulipristal from emergency contraceptives based on levonorgestrel is that it maintains its effectiveness for 5 days after unprotected intercourse, while the safety and tolerability of the drug have been shown to be comparable to that of levonorgestrel [17–21].

2.7 Action mechanism

The main mechanism of action of ulipristal is thought to be the prevention or delay of ovulation. A single dose has been shown to suppress the development of the dominant follicle.

Ovulation can be prevented by ulipristal administration immediately before or, in certain situations, just after the peak of luteinizing hormone. Changes in the endometrium might also be important. Administration of ulipristal during the early luteal phase results in delayed endometrial maturation and changes in progesterone-dependent markers of implantation. If given in the mid-luteal phase it has been shown to cause premature endometrial bleeding in a dose-dependent manner.

It is possible that these changes in the endometrium inhibit implantation, making it less receptive to the trophoblast. However, it is not known whether ulipristal has a direct effect on the endometrium or whether the observed changes are a result of the effect on the ovaries.

Levonorgestrel works by blocking the LH surge but does not appear to interfere with follicular rupture when taken near ovulation when intercourse is most likely to result in conception.

In contrast, ulipristal has been shown to prevent ovulation even after the LH surge has begun. This may be the reason why ulipristal remains effective up to the 5th day after contact [21–23].

2.8 Current recommendations

Ulipristal acetate is recommended as a treatment option for patients presenting between 72 and 120 hours after unprotected intercourse or failure of contraceptive measures.

2.9 Contraindications

Ulipristal acetate is contraindicated in pregnancy as data on the health of the fetus after exposure to the substance is extremely limited. If pregnancy is suspected, a pregnancy test must be performed before taking the substance.

Administration of the substance is contraindicated in people who show hypersensitivity to it or to its excipients.

Special precautions and warnings during use.

Emergency contraception is an occasional method of contraception. Data on the safety and effectiveness of repeated administration of ulipristal acetate are limited and for this reason, it is not recommended to take the substance more than once during the menstrual cycle.

It is not advised to be used in females who have a history of severe asthma that was not successfully managed by oral glucocorticoids.

Patients with renal or hepatic impairment are not advised to take the medication due to the lack of particular research that would provide dosage recommendations. Patients with hereditary problems of lactose intolerance, Lapp lactase deficiency, or glucose-galactose malabsorption should not take the medicine due to its content of lactose monohydrate [17–23].

Clinical studies on the safety and effectiveness of the drug are limited to women over 18 years of age.

Ulipristal acetate is a lipophilic compound and theoretically, despite the lack of reliable data, it is excreted in breast milk. Consequently, breastfeeding is not recommended after taking the medicine and can be safely continued after 36 hours. After the administration of the drug, the onset of menstruation may be observed a few days earlier or later than expected. In 6% of women, menstruation was observed more than 7 days earlier than expected [17–23].

In approximately 20%, a delay in onset was observed for more than 7 days, while only in 5.1%, more than 20 days.

Ulipristal acetate may have a minor or moderate effect on the ability to drive or use machines: Mild-to-moderate dizziness is common after taking: ulipristal acetate, while drowsiness and blurred vision are uncommon, and impaired attention is rarely reported [17–23, 28–30].

2.10 Interactions with other medicinal substances

Cytochrome P450, more specifically CYP3A4, breaks down ulipristal acetate *in vitro*. There has not been any specific *in vivo* drug interaction research.

Ulipristal acetate plasma concentrations may be decreased by inducers of CYP3A4 (such as rifampicin, phenytoin, phenobarbital, carbamazepine, ritonavir, and lichen planus/hypertrophic) and this may reduce the drug's effectiveness.

Therefore, their concomitant administration is not recommended. Enzyme induction wears off gradually and effects on ulipristal acetate plasma concentrations may occur even if the woman has stopped taking enzyme inducers within the previous 2–3 weeks.

Strong inhibitors of CYP3A4 (e.g., ketoconazole, itraconazole, telithromycin, clarithromycin, and nefazodone) may increase exposure to ulipristal acetate.

The clinical relevance is not known. Concomitant administration of medicinal products that increase gastric pH (proton pump inhibitors, antacids, and H2 receptor antagonists) may decrease plasma concentrations of ulipristal acetate and reduce drug efficacy.

Due to its strong affinity for the progesterone receptor, ulipristal acetate may reduce the effectiveness of progestogen-only and combined hormonal contraceptives. It is also not advised to use ulipristal acetate in conjunction with emergency contraception that contains levonorgestrel.

The study's side effects are described below. The great majority of negative side effects were mild or moderate and went away on their own.

There were no significant adverse events recorded in the study, and no patients were removed because of bad effects [17–23].

The side effects listed below are classified by frequency of occurrence. Very common (1/10) Abdominal pain Menstrual disorders.

Common (=1/100, <1/10), The following infections have been reported: Mood disorders Headache nasopharyngitis, urinary tract infection, fungal infection, bacterial vaginitis, infectious conjunctivitis, pelvic inflammatory disease Nausea - vomiting - dyspepsia menorrhagia - uterine bleeding.

Ninety-eight percent of the women who took part in the study had their next period start on schedule or within seven days of that date, while 6.1% had their period start more than seven days earlier than expected and 19.2% had their period start more than seven days later than expected. In total, 5.1% of women had a delay of at least 20 days, and 0.5% had a delay of at least 60 days from the anticipated start of menstruation. The majority of women (79%), 16.0%, reported normal blood flow, and 5.0%, increased blood flow (=1/1.000, 1/100) [17–23].

Appetite disorders, Depression—anxiety symptoms—insomnia—sexual drive disorders—irritability, Sleepiness—tremors, Hot flashes, Diarrhea—constipation—dry mouth—flatulence, Mastodynia—genital pain—uterine spasm—premenstrual syndrome—genital itching—vaginal discharge.

Rare (=1/10,000, <1/1000).

Dehydration, Impaired attention—dysgeusia—lethargy, Facial sinus congestion—cough—epistaxis—dry pharynx, Gastroesophageal Reflux—glossitis—toothache, chest discomfort—inflammation—malaise—pyrexia—thirst—chills.

3. Experience in our Greece center

The effectiveness of a single dose of 30 mg of ulipristal acetate and 1.5 mg of levonorgestrel was assessed in 90 women aged 16 to 29 years and older who presented for emergency contraception, 24–120 hours (1–5 days) after unprotected intercourse, in prospective studies conducted at the Center for Family Planning, Democritus University of Thrace, Greece, from March 2014 in 60 women.

In addition, intrauterine copper coils were used in 40 women aged 19–24 years for emergency contraception. Women with a stable cycle of 24–35 (+/−5) days, without recent use of hormonal contraception, participated. The reasons for attending the family planning center were problems with the condom (70%, 105 women), forgotten the pill (12%, 18 women), and unprotected contact (18%, 27 women).

In the main efficacy analysis, the pregnancy rate was significantly lower than what would be expected in the absence of emergency contraception (0.9% vs. 6.8%). The data showed that both ulipristal acetate and levonorgestrel prevented 99% of expected pregnancies. One pregnancy was recorded in both the levonorgestrel group and the ulipristal acetate group, while no pregnancy and no side effects were observed in the endometrial group.

3.1 Clinical studies

According to literature data, the effectiveness of the drug was maintained over time and is presented as follows:

reported pregnancy rate of 0.3% when used 48–72 hours (on day 3) after intercourse, reported pregnancy rate of 0.9% if used 72–96 hours (on day 4) and reported pregnancy rate of 1.3% when taken during the 96–120 hour period (on day 5).

During the prospective study, 16 female participants (5.0%) experienced an adverse event, most commonly headache (19.5%), nausea (12.2%), or abdominal pain (6.7%). Cycle length increased by an average of 2.8 days, while menstrual length did not change.

Limited information is available based on literature data regarding the effects of ulipristal acetate on pregnancies that are preexisting or occur despite treatment. Consequently, the use of the drug in women who are already pregnant is contraindicated.

3.2 Dosage and method of administration

As soon as feasible, but no later than 120 hours following unprotected sexual activity or the failure of any used contraceptive measures, a tablet should be given orally.

Ulipristal can be taken at any point throughout the menstrual cycle, with or without food. A second tablet should be given if vomiting develops within three hours after the first one.

It is not recommended to use it more than once per cycle, as the safety and effectiveness of repeated exposure has not been established.

The possibility of pregnancy must always be excluded before administration.

Despite the fact that after taking ulipristal it is not contraindicated to continue the usual hormonal contraception, ulipristal may reduce the contraceptive effect of this method.

Therefore, after the use of emergency contraception and until the start of the next menstruation, it is recommended that sexual intercourse be carried out using a reliable method of mechanical contraception.

The effectiveness and safety of the preparation have been established in women over 18 years of age; therefore, its use in younger ages should be done with caution.

3.3 Allocation

Ulipristal acetate is highly bound (>98%) to plasma proteins, including albumin, alpha-1-acid glycoprotein, and high-density lipoprotein.

3.4 Metabolism/excretion

Ulipristal acetate is extensively metabolized to mono-demethylated, di-demethylated, and hydroxylated metabolites. The mono-demethylated metabolite is pharmacologically active. *In vitro* data indicate that this is mainly due to CYP3A4 and to a lesser extent to CYP1A2 and CYP2D6. The terminal half-life of ulipristal acetate in plasma after a single 30 mg dose is estimated to be 32.4 ± 6.3 hours, with a mean oral clearance (CL/F) of 76.8 ± 64.0 L/hour [17–23, 28–30].

3.5 Ulipristal acetate vs. levonorgestrel comparative study

A total of 150 women participated in a comparative study (prospective randomized) between levonorgestrel 90 women and ulipristal acetate 60.

The main subject of the study was the number of pregnancies after using each method and the side effects of the two methods. The doses used were: 1.5 mg of levonogestrel and 30 mg of ulipristal acetate (once).

The participants in the study were divided into two groups. In each group, one of the two compared methods of emergency contraception was used:

Group A: Levonogestrel use (n = 90).

Group B: Use of ulipristal acetate (n = 60).

The use of medicinal substances took place in the period between three to five days (72 to 120 hours) after contact, during which no contraceptive method was used or there was a failure of it.

Ten women who:

Follow-up either was not completed. Or with unknown follow-up.

The follow-up was done 5 to 7 days after the expected menstruation.

The most frequently reported side effect in both groups was headache: In group A, there were 17 events (18.9%), and in group B, 12 events (19.3%). From this comparative study, it follows that the action of ulipristal acetate is significantly superior to that of levonorgestrel, in the period of 3 to 5 days (72 to 120 hours).

From the mentioned comparative studies and meta-analyses, it becomes clear the superiority of ulipristal acetate in the prevention of pregnancies after failed or non-use of a contraceptive method, during intercourse, after 72 to 120 hours, while in our study the corresponding results ranged at the same levels.

According to the scientific organization Planned Parenthood Federation of America, if emergency contraception methods were widely implemented in the US, at least 1.7 million unwanted pregnancies and 800,000 abortions could have been avoided. A similar picture exists in our country, where the number of abortions is very close to that of births, while many Greek women have had the experience of an abortion.

This pill contains the same active substances that are included in ordinary contraceptive pills but in different amounts. Some of them have hormones, specifically estrogen and progestinoids, while others only have progestinoids.

It is worth noting that large comparative clinical studies carried out in countries such as Great Britain demonstrate that the "morning-after pills" containing only progestinoids are more effective [17–23, 28–30].

3.6 Mifepristone (RU486)

Mifepristone was approved in Greece in 2014 for the following indications:

Medical termination of a continuing intrauterine pregnancy (for use in amenorrhea for up to 63 days when used consecutively with a prostaglandin analog).

Cervical ripening and dilatation prior to surgical pregnancy termination in the first trimester.

Induction of labor in case of intrauterine death of the fetus (for patients in whom prostaglandin or oxytocin cannot be used).

There are indications that mifepristone at a dosage of 10 mg has great effectiveness as a method of emergency contraception. Mifepristone is a well-known antiprogesterone agent that, in combination with prostaglandins, terminates pregnancy [17–23, 28–30].

3.6.1 Dosage regimen

In total, 10 mg of mifepristone has the same efficacy (1.2% failure rate) as 50 mg or 600 mg of mifepristone if given within five days.

The potency of 10 mg (RU486) does not differ from the levonorgestrel (LNG) regimen.

3.7 Action mechanism

It inhibits the growth of the dominant follicle.

It antagonizes the positive feedback of estradiol, preventing the secretory peak of LH, and inhibiting ovulation.

In a percentage (9–18%), there is a delay in the appearance of the period beyond 5 days.

Mifepristone (RU 486) also seems to have good results in preventing pregnancy after intercourse. Mifepristone, which is a progesterone antagonist, is also used as an abortion drug. When administered at the beginning of pregnancy, it acts against implantation. In experimental animals, mifepristone appeared to cause an acceleration of the fallopian tube transport of the fetus and to have a deleterious effect on the development of the fetus and its retention in the uterus. The administration of mifepristone to be done later than 72 hours after contact.

The second tablet was taken between 12 hours at the earliest and 24 hours at the latest after the first tablet. With today's single-tablet packaging, the recommendation is to take it promptly and no later than the first 72 hours after contact. Since the first twelve hours after contact is considered the best time to start the method, it could be recommended to procure some package of this type of contraception in time to be present in "case of error." Advance care for procuring hormonal EC also arises from the fact that in some countries, hormonal EC is not readily available in many pharmacies [17–23, 28–30].

Ulipristal acetate is a SPRM with a primary antiprogesterone effect. However, in some countries, despite its wide availability, there did not seem to be sufficient: information on its use at a daily dose of 5 mg for 3 months, was also used successfully in reducing fibroid size) [19–23, 31–36].

3.8 Effectiveness

The effectiveness of the method is higher the earlier after sexual intercourse, which was done without protection, the hormones are administered. For the method containing ethinylestradiol, when taken within the first 72 hours, the probability of failure ranged from 7 to 26% [33].

Using the levonogestrel method within 2 hours of contact, the failure rate is 0.4%, and every 12 hours of delay increases the probability of failure by 50% [33]. It has been estimated that with the wider use of emergency contraception, almost half of all unplanned pregnancies and abortions could be avoided [33].

3.9 Intrauterine contraceptive devices

3.9.1 Endometrial copper coils

Emergency contraception can be achieved by inserting a copper coil into the endometrial cavity within 5 days of unprotected intercourse.

The glomeruli can be inserted within 5 to 7 days after unprotected intercourse and the chance of a pregnancy is reduced to over 99%. It is indicated as a method of emergency contraception in women who have passed 120 hours and in whom hormonal emergency contraception can no longer be used.

IUD mechanism of action

a. Aseptic inflammatory reaction of the endometrium that prevents implantation of the fertilized egg (creates a hostile environment for implantation, which occurs at least 5 days after fertilization)

b. It immobilizes the sperm or prevents the movement of the sperm in the fallopian tubes.

3.10 Effectiveness

The failure rates during the first year of use are 0.7% and overall in 1 to 2 years of use, the rates are 1.4% to 1.9%. Most women can be candidates for an IUD, including those with serious medical conditions, such as hypertension, morbid obesity, diabetes mellitus, stroke, myocardial infarction, and cancer [19–23, 31–36].

The only absolute contraindication to immediate IUD placement is active cervicotida, cervical or endometrial cancer, or a uterine cavity that is insufficiently sized (6 to 9 cm deep) to accommodate the device.

The copper IUD device works as a contraceptive method by immobilizing sperm. Women using this device should check the device tapes monthly to confirm that the device is in place. They should also know that their periods will be heavier and longer in duration.

3.11 Behavioral methods

Withdrawal or intermittent intercourse is the most effective method of behavior. The male intercourse position allows the man to remove his penis from the female reproductive system before ejaculating.

For women who have recently breastfed, lactational amenorrhea is also ineffective. When the woman exclusively breastfeeds and does not menstruate for the first six months after giving birth, failure rates are 2%. After six months it is wise to use another method.

The method of calculating fertile days involves a variety of techniques to calculate dangerous days. When these days are determined, couples can practice periodic abstinence or adopt some other method of either behavior or barrier at that time. The historical rhythm method has been replaced by other methods of natural family planning such as basic day counting methods, luteinizing hormone urine tests, and estrogen predictors of ovulation [36–40].

Emergency contraception (EC) is applied in cases of sexual intercourse on the "dangerous" days (i.e., a few days before and around ovulation). If, in order to avoid pregnancy, hormonal preparations (by mouth) are used, the method is also called behavioral methods post-coital hormonal contraception or "the morning-after pill".

The method is available without a medical prescription in some countries. However, many women choose not to use the method, even when it is readily available. It is the taking of –3 contraceptive pills in a short period of time in a large quantity to avoid a possible pregnancy. EC inhibits or delays ovulation. In the past, it has been suggested that it may also affect the receptivity of the endometrium [36–40].

However, this does not appear to be the case for levonorgestrel (LG) and ulipristal acetate (OG). LG and OG also do not affect embryo implantation Other potential contraceptive mechanisms, previously advocated, include effects on corpus luteum function, cervical mucus density, and sperm, egg, or embryo transport. Negative factors in method use appear to be women's lack of knowledge and confusion about how the method works and insufficient information provided to them by doctors.

4. Discussion

Sexual intercourse is a spontaneous, pleasurable, instinctive, and physiological act. It is often unpremeditated and in many instances unprotected. Methods that aim to control the timing of pregnancy have been in use since time immemorial. Ideally, they should not interfere with the spontaneity or pleasure of the sexual act but at the same time should operate when the need arises. Numerous contraceptive techniques ranging from the primitive to the highly sophisticated have tried to achieve this goal. As yet, none has been totally successful; systemic methods of contraception aim mainly at inhibiting ovulation and need to be taken for substantial periods of time regardless of the frequency of sexual activity of the woman concerned; methods linked to coitus, that is, barriers, by their nature need planning and premeditation [32–46].

First coital encounters are notorious for being unprotected through complete omission or inadequate use of contraception. The other contraceptive emergency where backup is essential is when method failure such as condom rupture, diaphragm displacement, or pill omission (especially around the pill-free week) occurs. The emergency postcoital consultation is a suitable opportunity to introduce and discuss with the woman the different contraceptive options available, allowing her to make an informed choice.

In Greece, morals have changed rapidly in the recent decades and the new generation, adopting modern trends, is determined to control their fertility. With this in mind, the goal should be to enlighten more individualized choices of the best contraceptive method and to fundamentally change public opinion against abortion. It seems that there are so many abortions in Greece because they are seen as an easy solution, like an analysis without medical and moral dimensions [38–46].

Another difficult area is the moral and ethical implications of postcoital contraception. A couple may accept a method that works pre-fertilization but may reject a post-fertilization form of therapy. It is desirable, therefore, to discuss the mode of action of these agents with the patient beforehand. There is a general consensus that postcoital agents are contraceptive (acting postovulation but preimplantation) rather than abortifacient, but this definition has not been tested in court.

Another anxiety on the part of the medical profession is that the existing postcoital drugs can be misused as a regular rather than an emergency method of fertility control. This is unlikely to be acceptable to the patient, as the total dose of hormones taken by a sexually active woman will be much higher than a conventional contraceptive pill. In addition, the efficacy of postcoital drugs is inferior to the conventional pill. Furthermore, side effects in the form of nausea and vomiting or menstrual irregularities would make regular use of these agents unacceptable to the majority of women [41–48].

Our country has a serious genetic deficit and fortunately, it has been perceived by Greek society as a consequence of avoiding misunderstandings that reduce the value of this institution.

The family planning center is not only about contraception and population policy but about eugenics and youth sex education. According to the WHO, unsafe abortion is a "solution" for many women, including teenagers, when they have an unwanted pregnancy and cannot access services [48–52].

Obstacles that prevent a "safe" abortion can include restrictive legislation, low availability of services, high costs, "stigma," dealing with health professionals and misinformation, manipulative counseling, medically unnecessary tests, and others that delay any necessary care. In our country, unwanted pregnancy leading to

abortion causes many problems for doctors, theologians, legislators, sociologists, and psychologists and problems that leave almost no person, of any social class, religion, or spirituality, untouched.

Family planning allows people to have the desired number of children and determine the spacing between pregnancies, practices that help individuals or couples avoid unwanted pregnancies, due to desired births, adjust the intervals between pregnancies, control the time of birth depending on the age of the parents, and determine the number of children in the family. Family planning allows people to make informed choices about their sexual and reproductive health [48–52]. Contraception enables the couple to decide voluntarily, responsibly, and consciously about the desired size of their family, because the size of the family should not be a matter of luck, but of choice of the couple. The use of contraceptive methods is necessary both in casual relationships and in long-term healthy relationships. In our country, the methods of contraception used are distinguished by natural methods, hormonal methods, intrauterine devices, and barrier methods.

The first full-fledged sexual encounter is crucial to women's sexual development, especially in adolescence. They have a sense of sexual fulfillment, but it also exposes them to risks if there is not adequate sex education. The most important risks may be unwanted pregnancy and accompanying problems that are often caused, such as psychological, fertility problems, interruption of the educational process, social isolation, the spread of sexually transmitted diseases (STDs), and the increasing use of alcohol and other substances related to sexual activity [48–52].

Other factors related to the early age of First Complete Sexual Contact are parents' education, parents' marital status (single or divorced parents), origin from Northern European countries, or other countries with more "open" social perceptions. These factors also influence the type of relationship (whether it was evening/casual or not), the age of the partner (whether same age or not), the type of contraception used for the first time, and the number of sexual partners.

Adolescents' knowledge and implementation of safe "sexual health" practices are influenced by factors other than individual factors such as age, gender, education, family, functional counseling-support structures, and the wider social environment.

In Greece, as a "conservative" society, the family does not easily discuss sex education issues with teenagers, and the primary health care structures that work on issues that concern young people are insufficient.

Nevertheless, it is encouraging that a large number of teenagers use prophylactic methods during sex, although their knowledge of contraception, STIs, and family planning lags behind young people from other European countries. The implementation of effective sex education programs requires the collection and evaluation of important information about the sexual life of adolescents, which will mainly be from the individual reports of the interested parties, to be anonymous, and the process that precedes the initiation of their sexual behavior.

This topic causes embarrassment to families, health professionals, government officials, civil servants, and young people themselves. Extensive efforts have been made to increase the use of contraceptive methods and, in particular, the condom, to prevent unwanted events, pregnancies, and sexually transmitted diseases. WHO classifies the "eligibility" of contraceptive methods into four categories according to their possible contraindications:

The 1st category includes the situations in which there is no restriction for the contraceptive method.

In category 2, the benefits of the contraceptive method generally outweigh the risks.

In category 3, the risks outweigh the benefits of the contraceptive method. In the 3rd category, clinical assessment and/or referral to a contraceptive specialist is required, since the method is usually not recommended except in cases where more appropriate methods are not available or they are not acceptable [40–48].

The 4th category includes the situations that involve an unacceptable health risk from the use of the contraceptive method.

The same classification is adopted by various countries and organizations (indicative: UK Medical Eligibility Criteria for Contraceptive Use [UKMEC] categories/ Faculty of Sexual & Reproductive Healthcare Clinical Guidance 2019) [40–48].

Based on the previous data, the classification of a method may vary depending on age, new pathological condition, etc. The ideal contraceptive method will prevent an unwanted pregnancy, but will also protect against sexually transmitted diseases, and have a low-risk rate high reliability, excellent tolerance predictable menstrual cycles, and additional benefits for skin hair well-being and quality of life. Emergency contraception in particular with the mechanism of action recapitulating which is the following the IUD works by preventing fertilization and implantation. This makes the IUD the most efficient postcoital contraceptive. This method seems to apply particularly to multiple coital exposures, where an IUD can be inserted with every chance of success up to 5 days after the calculated day of ovulation. Other instances where an IUD may be used are when estrogens are contraindicated, when treatment is delayed beyond 72 h, or for the multiparous patient who wishes to use the IUD as an ongoing method of contraception. It is less than ideal for the young nullipara, especially one with multiple sexual partners. In the latter case, IUD use may predispose to serious complications such as the development of pelvic inflammatory disease. The IUD may increase the risk of exacerbating quiescent PID or predispose to its development. Careful selection of patients helps reduce complications, thus encouraging the user to keep the IUD as an ongoing method of contraception. On the other hand, removal with the next menstruation may minimize the risk and be acceptable to an otherwise anxious patient [52–56].

According to our results, 90% of the women participating in our study would recommend it to their friends. There are certainly problems in assessing effectiveness, as the pregnancy rate in a cycle in the general population cannot be calculated because it is shaped by many factors.

Most work is done by showing the percentage of follicles that are canceled comparing treatment with placebo.

EC users with pills have a 5–12% risk of getting pregnant within the next year. Compared to levonorgestrel, ulipristal UPA reduces the chances of pregnancy by 75% [52–56]. Pregnancy 1.2–1.8%, probability 1.8% against 5.5% of the expected (in 941 women), Surpasses LNGEA. In cases of breastfeeding, if in partial breastfeeding there is a risk of conception from the 21st day after delivery, administration after breastfeeding is recommended, stopping breastfeeding for 8 hours of ulipristal acetate, and after taking it stop breastfeeding for 8 days. Ulipristal acetate is excreted in milk and levonogestrel has no effect [52–56].

IUD slightly has higher risk of uterine perforation during insertion (6/1000). After EA administration, the risk remains high immediately and in the future if continued without contraception.

The suitable time to discuss permanent contraception.

Sexual transmitted disease risk and appropriate laboratory testing.

Forensic examination in case of suspected rape and administration of EA and antibiotics and HIV. Rapid initiation of permanent contraception.

The availability of emergency contraception does not appear to affect the use of permanent contraception or increase risky sexual behaviors. Its availability does not appear statistically in the population to have reduced unintended pregnancies [52–57]. Women who are at risk for unwanted pregnancies frequently utilize no method or use emergency contraception late. Although it is a safe and reliable form of prevention, emergency contraception is less effective than permanent contraception. Teenage usage of EC is not medically contraindicated. The Food and Drug Administration (FDA) explained in its statement that it had approved the progestin-only method for nonprescription status that it could only be used by women 18 and older and that "Barr had not established that the projestin-only method could be used safely and effectively by young adolescents—girls 16 and younger—or EC without the professional supervision of a practitioner licensed by law to administer the drug [54–56].

The best method of effectiveness is IUD placement. The medicinal methods of EC have no contraindications and no significant side effects in all age groups. Its failure is related to the time of taking, body weight, and repeated contact without protection in the cycle. EC counseling should aim to initiate permanent contraception and protect against STIs.

It is undoubtedly necessary to organize family planning centers for teenagers and this should be a priority of every government.

The targeted intervention will provide teenagers with critical thinking, responsibility, and knowledge, with the aim of preventing unwanted pregnancy at the first sexual contact with the appropriate use of contraceptive methods, thereby reducing the risk of sexually transmitted diseases. The sexual behavior of young people is constantly changing, reflecting the times of the society in which they live and the level of education they possess. Family planning centers provide an effective sexual health service and especially help young women to have a healthy sex life without sacrificing contraceptive effectiveness.

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