



**Oral contraceptives- A description with insight into Adolescent use**

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**Abstract**

Despite the extensive use of oral contraceptive pill (OCP) for the past 50 years, present day analysis by the International Agency for Research on Cancer (IARC) has write down a threefold difference between developed and developing countries in using pills. The two types of OCP are combination oral contraceptives (COCs) that involves both estrogen and progesterone, and the progestin-only pills (POPs). The combined pills confers advantage that the contraceptive pill can be started at low dose of each hormone. Prevention of conception is attained by inhibiting ovulation, fertilization, and/or implantation of an egg. The ovulation is inhibited through the suppression of gonadotropin release. Follicular maturation is also impaired. Even if ovulation occurs sometimes, the changes that takes place secondary to chronic exposure to the progestin portion of OCs make both implantation and fertilization unlikely. It has also been urging that oral contraceptives can also provide additional benefits on bone mineral density, uterine

fibroids, toxic shock syndrome, and colorectal cancer. Most of the patients are heedless of these health benefits and medicinal uses of OCPs, and thus tend to exalt their risk. Combined Oral Contraceptive (COC) pills are the most popular hormonal contraceptives among adolescents, typical use failure rate is 9% and is usually secondary to non-adherence. Long-acting reversible contraception such as intrauterine contraception and implants has much higher contraceptive efficacy, are safe also for adolescents, and should be recommended.

**Keywords:** COC, POP, OCP, IARC.

**Introduction**

Control on fertility has, no dubiety, proved as one of the leading-edge discovery. Despite the extensive use of oral contraceptive pill (OCP) for the past 50 years, present day analysis by the International Agency for Research on Cancer (IARC) has write down a threefold difference between developed and developing countries in using pills [1]. The Envoid was the first hormonal contraceptive pill, which was warranted by the Federal

Drug Administration (FDA) back in May 1960 and constitutes mestranol and norethisterone as active ingredients. Over the past years, oral contraceptives have unfolded through progressive decrease in ethinyl estradiol (EE) content, with origination of  $17\beta$  estradiol, and many different progestin. The standard contraceptive regimen permit for 21 days of pill containing steroids and 7-day pill free period. [2]. The OCP is the most commonly used method of contraception. The two types of contraceptives pills used are either in combination oral contraceptives (COCs) that involves both estrogen and progesterone, and the progestin-only pills (POPs). The combined pills confers advantage that the contraceptive pill can be started at low dose of each hormone [3]. These are safe for most of the patients with failure rate of 7.2 to 9%. A pill containing hormonal estrogen can expand the likelihood of venous thromboembolism, thus patient with the probability of cardiovascular incident should circumvent use COCs [4]. Even though they are effective, initial COC formulations were linked with notable adverse effects and insufferable cardiovascular risk. Refinements in rightness and safety been achieved, without compromising in effectiveness, fundamentally via reductions in hormone dosage and the new progestin's development [5]. The goal of OCs is to subdue ovulation by exploiting episodes all-round the ovulatory cycle to fend off conception. The combined steroids constituents of OCs overpower the mid-cycle surge of luteinizing hormone (LH) and follicle-stimulating hormone (FSH). The overall effect is to decidualize the endometrial bed and subdue mitotic activity [6]. OCPs when added give complexity through the initiation of varying concentrations of circulating exogenous estrogen and progesterone, which may moderate physiological adaptations to exercise in a different manner to endogenous ovarian hormones [7].

Current options in oral contraception include the spectrum of products which enable clinicians to choose the most suitable formulation for the individual women [8]. There are over 90 different types of OCs on the market today, with combination OCs (those that contain both estrogen and progesterone components) as the most common formulation [9]. The evolution of both the type and dose of steroids in oral contraceptives has been complex. Amongst steroids the evolution of the progestin constituent remains commanded by a perturb for the metabolic effects of the 19-nortestosterone derivatives, whereas the estrogen component evolution has been more of a concern for safety, or perceived safety [10].

Combined pills are available in formulations as-monophasic, biphasic, or triphasic. Different modes of administration are also available for progestin-only pills. The mechanisms of action of OCPs vary in according to the respective type. Pills should be carefully added to the hormonal profile of the individual so that the side effects can be avoided. [11].

It is nearly impossible to collate the non- identical OC formulations since no truly comparative prospective studies have done yet, the number of individuals in existing trials has been small, and the methods of measuring the discrete hormones and overall evaluation criteria have differed [12].

The conventional, mono phasic, combination oral contraceptives (OCs) are by tradition administered daily for 21 days followed by a hormone-free interval of seven days. Misunderstanding and ignorance about continuous use of OCs has created concern because this regimen is new and different. [13]. OCPs are highly efficacious when taken accurately and are rapidly concerted with normal ovulation typically reinstated within 2-3 months after stop consuming the pills. OCPs have a well-

accepted safety profile in healthy, non-smoking, normotensive women [14].

Progestogen-only contraceptives can be used in women for whom CCPs are contraindicated (World Health Organization [WHO] Medical Eligibility Criteria [MEC] for contraceptive use, Category 4) or where the use of COC is not advisable (WHO MEC, Category 3) [15]. Generally the starting dose of estrogen must be 30 to 35 mcg in combined pills, however, if breakthrough bleeding or amenorrhea is experienced higher doses can be given [16].

### **Mechanism of action of oral contraceptives**

Hormonal contraception provides successful, enduring, and changeable prevention of pregnancy. Prevention of conception is attained by inhibiting ovulation, fertilization, and/or implantation of an egg [17]. The combination of steroid hormones in OCPs acts both centrally and peripherally and affects the normal reproductive function. The ovulation is inhibited through the suppression of gonadotropin release. Follicular maturation is also impaired. Even if ovulation occurs sometimes, the changes that take place secondary to chronic exposure to the progestin portion of OCs make both implantation and fertilization unlikely [18]. In the case of CCPs and progestin-only pills, the major mechanisms are inhibition of ovulation and change in the cervical mucus that inhibits the penetration of sperm.

The single hormonal progestin means, particularly the low-dose progestin-only products and emergency contraception pills, that have effects on the endometrium thus, theoretically, could affect the implantation [19]. The major (OCPs) involves the inhibition of luteinizing hormone surge and ovulation, which is mainly caused by estrogen [20].

### **Guiding pill prescription**

Some guiding principles that can be considered when prescribing pill and choosing right formulation for an individual are: [21].

- The lowest possible dose of estrogen and progestogen should be used.
- Good cycle control and efficacious contraception must be achieved.
- Tolerated potential must be high
- Best possible safety profile must be there.
- Is must be affordable.
- Also offers additional non-contraceptive benefits if needed.

### **Benefits**

The health advantages are innumerable and exceed the risks of their use. It has also been urged that oral contraceptives can also provide additional benefits on bone mineral density, uterine fibroids, toxic shock syndrome, and colorectal cancer. Most of the patients are heedless of these health benefits and medicinal uses of OCPs, and thus tend to exalt their risk. [22].

### **Suspension symptoms**

Alterations in hormone levels that occur throughout the menstrual cycle are proven to be related with notable physiological outcomes. In specific points, the let fall in estrogen levels previous to the cyclic period is related with bloating, mood alterations, headache, nausea, and cramps. It is now proven that the consumption of OCPs decline both the incidence and severity of suspension symptoms [22].

### **Menstrual irregularity**

The key considerations are consistency, constancy, heaviness and duration of flow. COCs can be used to bring down menstrual flow, in addition to providing conception, consistencies of the cycle and decreasing of dysmenorrhea [23].

## **Premenstrual syndrome and premenstrual dysphoric disorder**

Premenstrual dysphoric disorder (PMDD) comprised of emotional and physical manifestations and functional defacement which lies on the severe end of the collection of premenstrual symptoms. Serotonin reuptake inhibitors are designed as the first-line treatment consideration with second-line treatment options include oral contraceptives containing drospirenone, other ovulation suppression methods, calcium, and cognitive-behavioral therapy [24].

## **Acne and hirsutism**

Hirsutism, defined as excessive growth of terminal hair in women in a male-like pattern [25]. Acne is the most common and prevalent skin disorder among young girls. As there is no uniform approach for the management of acne is present, combined oral contraceptives (COCs), containing both estrogen and a progestin, are routinely prescribed for women [26].

## **Polycystic ovary syndrome**

Polycystic ovary syndrome (PCOS), also known as the Stein-Leventhal syndrome, is currently the leading cause of menstrual complications in women. Therapeutic options for women with the problem of infertility in PCOS are gonadotropins, used to induce ovulation [27]. Long-term benefits include reduced rates of endometrial, ovarian, and colorectal cancer [28].

## **Adverse effects with oral contraceptives**

### **• Headache**

Combined oral contraceptives increase the risk of stroke in women who have migraines with aura, and should not be used in these patients. A systematic review found that 10 percent of women have new-onset headache with the use of combined oral contraceptives. Headaches are more common during the first cycle of combined oral contraceptives and in women who are older than 35 years [29].

### **• Breakthrough bleeding**

physiologic effects of OCs on the endometrium, OC-related parameters, including dose, formulation, and regimen, patient behavior, including compliance, using concomitant medications, and smoking, and benign or malignancy pathology [30].

### **• Venous Thromboembolism**

From their incorporation in the 1960s, an increased threat or possibility of VTE has also been accompanying with COCs: a 3-fold to 6-fold risk of venous thrombosis is disclosed in epidemiological studies. The possibility of VTE hinge on many conditions: the full length of COC use, body mass index (BMI), the category of pill, the age of individuals, the existence of either inherited or acquired thrombophilia, or subjection to the additional risk factor [31].

### **• Thrombotic events and stroke**

The utter risks of thrombotic stroke and myocardial infarction associated with the use of hormonal contraception were low, the risk was related by a factor of 0.9 to 1.7 with OCPs that incorporate ethinyl estradiol at a dose of 20 µg and with ethinyl estradiol at a dose of 30 to 40 µg by factor of 1.3 to 2.3, with comparably less differences in risk according to type of progestin [32].

### **• Cancer**

The association between OCPs usage and breast cancer risk has been highly studied, even now the make-up and patterns of OCPs use have advanced considerably over time and more up to minute formulations have received relatively little investigations [33]. For breast cancer, these risks may be even higher for women at increased risk in relation to family history of cancer or genetic mutation carrier status (e.g., BRCA1/2); however, outcomes from studies are undetermined [34].

### Use of oral contraceptives among the youth

Adolescents, defined by the World Health Organization (WHO) as individuals between the ages of 10-19 years, represent almost one-fifth of the world's population. Contraception is an highly important pillar for the avoidance of unwanted pregnancy in adolescents. Combined Oral Contraceptive (COC) pills are the most popular hormonal contraceptives among adolescents, typical use failure rate is 9% and is usually secondary to non-adherence [35]. Oral contraceptives are the most boorish method of contraception pre-owned by adolescents, 44% of sexually active young women aged between 15 and 19 years wield them. The typical failure rate for the pill in adults is about 5%; in adolescents it is 10% to 15% at 1 year of use 26, 27 or higher, mainly due to inconsistent use. About fifty percent of all teenagers who start taking oral contraceptives stop within 1 year [36]. Counselling is the central part of providing contraception for adolescents, Long-acting reversible contraception such as intrauterine contraception and implants have much higher contraceptive efficacy, are safe also for adolescents, and should be recommended [37]. With the widespread use however, some cases of depression has come into light, a large cohort study conducted in Danish adolescents and young women demonstrated that the use of oral contraceptives was positively associated with diagnosis of depression. The same group also reported that the use of hormonal contraception was positively associated with suicide attempt and suicide, which was particularly observed in adolescent women who experienced the highest relative risk [38].

The relationship between contraceptive agents and mood is unclear, however, a safeguarding effect of the integrate pill, and the inimical effect of progestin only agents in consideration to mood disorders [39].

### Current scenario

Considering population of countries like India with over 1.25 billion is set to take out China. This population statistics is more than the combined population of USA, Brazil, Bangladesh, Pakistan, Indonesia and Japan. Evidence shows that diversification of the contraceptive method in low and middle remuneration countries has a confident relationship with contraceptive use [40]. Only Africa is expected prompt to experience prompt extension in growth from 2020 to 2030, Asia is contemplate to escapade slow moving growth, the count of modern method users can expect to reach 27.1 million in 2030, and the small measure of adolescent women the need for modern contraception then be met can rise to 79% [41].

From the establishment, the number of epidemiologic studies, oral contraceptives deliver the round about 90% curtailment in risk of ectopic conception. The most expected mechanism considered is by the clampdown of ovulation, an effect that undeniably prevents every types of pregnancy and that too should be presented with low-dose oral contraceptives as well [42]. Oral contraceptives are also effective in decreasing the menstrual bleed flow in very short time span and may also ward off the building up of of uterine fibroids. With the natural hormone progesterone extend epidermal growth factor, that stimulates fibroid growth, it also inhibits insulin-like growth factor-1, that be permitted to inhibit growth. Progestogens also cause down-regulation of both the estrogen and progesterone receptors in fibroids [43]

### Management of common adverse effects with combined contraceptive pill

Condition	Management strategies based on practice
Nausea	Reduce estrogen dose



	Exclude pregnancy
Breast tenderness	Reduce estrogen and/or progestin dose. Change progestogen
Bloating and Fluid retention	Change to progestogen with mild diuretic effect (i.e., drospirenone) or reduce estrogen dose
Headache	Reduce estrogen dose and/or change progestogen
Dysmenorrhea	Extended pill regimen to reduce the frequency of bleeding
Decreased libido	No evidence supports a benefit of one type of oral contraceptive pill over another
Breakthrough bleeding	If taking an ethinyl estradiol 20 microgram pill, increase estrogen dose to a maximum of 35 microgram. Change progestogen if already taking an ethinylloestradiol 30–35 microgram pill.

Table 1: Stewart Mary, Black Kirsten. Choosing a combined oral contraceptive pill. *Australian prescriber*. 2015; Feb 38(1):6-11

Polycystic ovary syndrome (PCOS) is now days had become a common endocrine disorder of all the women belonging to the reproductive age and combined oral contraceptives (OCs) are mainly considered as the first-line treatment. The cardio metabolic outcomes of OCs raise some concerns about their long-term use in PCOS, but presented data suggest that the benefits outweigh the risks. More studies are needed to make some clarification for the safety of long-term use of OCs in PCOS [44]. There is not all any evidence that any combined or progesterone-only hormonal pill is inherently better at preventing ovulation, conception, or implantation [45]. Oral contraceptives are mainly prescribed for the duration of 4 weeks at a time, with each 4-week packet

containing 4 to 7 days of hormone-free pills. If birth control pills are taken perfectly (100% of the time), the chance of pregnancy is 0.1%. However, in the real world, accounting for missed days of use, the chance of pregnancy is about 8% per year [46].

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