

Oral Contraceptives and Hypertension Risk: Implications for Cardiovascular Health and Clinical Management

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Oral contraceptives (OCs), commonly utilized for contraception, exert considerable influence on cardiovascular health, especially in the regulation of blood pressure. This review examines the correlation between oral contraceptives, particularly those comprising estrogen and progestin, and their effect on blood pressure. Studies indicate that combination hormonal contraceptives, especially those with high-dose estrogen, raise both systolic and diastolic blood pressure, with risks amplifying according to extended usage, elevated BMI, age, and pre-existing hypertension. Conversely, progestin-only pills (POPs) have negligible effects on blood pressure, rendering them a safer option for women with cardiovascular risk. The fundamental mechanisms encompass estrogen-induced stimulation of the renin-angiotensin-aldosterone system (RAAS) and salt retention, whereas progestin influences mineralocorticoid receptors, resulting in fluid retention and vascular alterations. Meta-analyses demonstrate modest yet significant elevations in blood pressure among oral contraceptive users. Clinicians must meticulously evaluate patient profiles, monitor blood pressure, and contemplate personalized contraceptive options to mitigate cardiovascular risks. Additional randomized controlled trials (RCTs) and longitudinal studies are necessary to improve our comprehension of the effects of oral contraceptives on blood pressure in various populations, highlighting the significance of individualized contraceptive counseling.

Keywords: Blood pressure regulation; Cardiovascular risk; Estrogen; Hypertension; Individualized contraceptive counseling; Oral contraceptives; Progestin.

One of the most popular and successful ways to avoid unwanted pregnancies is through the use of oral contraceptives (OCs), also referred to as birth control tablets. Since their launch in the 1960's, OCs have revolutionised reproductive health by offering safe and effective birth control and empowering people to make informed reproductive decisions.¹ Developments in gender roles, public health outcomes, and society dynamics have all been profoundly impacted by

the creation and use of these drugs. Combination hormonal contraceptives (CHCs) and progestin-only pills (POPs) are the two primary categories of oral contraceptives.²

The contraceptive action involves blocking the pituitary gland from releasing luteinizing hormone (LH) and follicle stimulating hormone (FSH), modifying cervical mucus to limit sperm migration, and changing tubal ciliary cells to hinder ovum transport.³ Progesterone

inhibits follicle growth and ovulation, which helps prevent pregnancy. It functions by inhibiting the hypothalamus's production of hormones, which lowers levels of LH and FSH and delays follicle maturation.⁴ Furthermore, oestrogen slows the anterior pituitary's negative feedback loop, which in turn prevents follicular growth and decreases FSH release. Progesterone also modifies cervical mucus and the endometrium to decrease the likelihood of implantation, which keeps sperm from entering the cervix and upper reproductive canal.⁵ Progestin and oestrogen in combination hormonal contraceptive affect cervical mucus, suppress ovulation, and alter the endometrial lining, reducing the risk of pregnancy. As the name implies, progestin alone is the only ingredient in these pills. For people who are contraindicated for oestrogen use or who cannot take it, these pills are especially helpful.

The effectiveness of oral contraceptives has been well-established; a failure rate of roughly 7% is yielded by average use, and less than 1% is produced with perfect use. This high degree of efficacy is attained by blocking ovulation and making the environment unfavourable for sperm and implantation.⁶ For many, OCs are the favoured option due to their great efficacy and ease of daily administration. OCs are widely used because they provide a number of non-contraceptive advantages in addition to contraception. These advantages include regulating the menstrual cycle, reducing cramps, treating endometriosis and polycystic ovarian syndrome, and improving acne. To further increase its appeal, using OCs has been linked to a lower risk of endometrial and ovarian malignancies.⁷ The use of oral contraceptives is not without its drawbacks, despite their benefits. Nausea, weight gain, mood swings, and an elevated risk of thromboembolic events are possible adverse effects, especially in smokers and people with specific medical problems.

OCs must be carefully considered based on health profiles and lifestyle factors and monitored by healthcare professional to ensure safety and efficacy.⁸ The introduction of newer formulations and advancements in oral contraceptive technology continue to improve user experience and safety. Contemporary research focuses on reducing side effects, enhancing effectiveness, and expanding the range of therapeutic benefits. The changing

landscape of reproductive health and rights emphasises the need for comprehensive education and OCs access to help people make educated decisions that meet their personal and health needs.

Evaluating the overall safety and effectiveness of OCs requires an understanding of the cardiovascular consequences, especially those pertaining to blood pressure.⁹ Extensive research is necessary to fully understand the potential effects of OCs, especially those that include progestin and oestrogen, on cardiovascular health. There is evidence that these hormonal agents interact with a number of physiological mechanisms involved in blood pressure regulation. Oestrogen in combination hormonal contraceptives causes fluid retention and changes the renin-angiotensin-aldosterone pathway, which raises blood pressure. Furthermore, oestrogen may affect vascular tone and endothelial function, which may alter systemic vascular resistance and arterial stiffness. Although its effects are often less evident than those of oestrogen, progestin, the other primary hormone in combined OCs, can also affect blood pressure. Fluid balance and vascular tone can be affected by progestin's interaction with mineralocorticoid receptors, which in turn affects blood pressure.¹⁰

The risk factors associated with the use of OCs vary depending on whether they influence the venous or arterial components of the cardiovascular system. Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is the main category of venous events. Ischemic or haemorrhagic stroke and myocardial infarction (MI), on the other hand, are examples of arterial events.¹¹ According to study, there may be a difference in the relative influence of common cardiovascular disease risk factors such as obesity, diabetes, hypertension, and smoking on the two kinds of occurrences. According to major WHO studies, smoking, hypertension, and diabetes increase arterial events including MI and stroke but not venous events. However, a risk factor for venous as well as arterial incidents is obesity.¹²

The objective of the meta-analysis is to compile information from multiple trials in order to measure the total impact of OCs on blood pressure. Combining the findings of several research projects, the meta-analysis examines how OCs, particularly combination hormonal contraceptive

(CHCs) and progestin-only pills (POPs), affects blood pressure.¹³ To ascertain the average effect size, spot potential variances among various populations, and assess the consistency of findings, statistical analysis of the data is required. This kind of analysis offers a more comprehensive view of the effects in various study settings and aids in determining the level of risk connected with OC usage.

This study focusses on how OCs affect blood pressure, is essential in combining information from different studies to offer a thorough evaluation of these effects. The findings can spot patterns and disparities in blood pressure changes linked to OC usage by methodically examining and evaluating data from several research projects. This analysis sheds light on whether OCs cause clinically significant increases in blood pressure and, if so, what circumstances or demographics are most affected. All of these goals work together to give a thorough assessment of how OCs impact blood pressure, educating medical professionals and directing clinical judgements to improve patient safety and maximise contraceptive treatment.

MATERIALS AND METHODS

A thorough and methodical search strategy was utilized to assess the correlation between blood pressure, cardiovascular risk, and the usage of oral contraceptives. To guarantee the incorporation of all pertinent studies, many databases were examined, each providing a distinct and valuable assemblage of biological literature. PubMed was employed for its comprehensive collection of clinical research papers, systematic reviews, and meta-analyses concerning oral contraceptives and cardiovascular health. Embase, recognized for its emphasis on pharmacological research and extensive indexing of European and global journals, was incorporated to guarantee a wide range of pertinent publications. The Cochrane Library was also searched for high-quality systematic reviews and clinical trials that offer robust data about the effects of oral contraceptives on blood pressure and cardiovascular risk.

Rigorous inclusion and exclusion criteria were implemented to uphold the relevance and quality of the studies included. The inclusion

criteria comprised randomized controlled trials (RCTs), cohort studies, case-control studies, and systematic reviews or meta-analyses, as these methodologies yield substantial evidence. The target demographic comprised women utilizing oral contraceptives, irrespective of age or health condition, with an emphasis on research that documented blood pressure readings and cardiovascular risk. Outcome measures needed to encompass the impact of oral contraceptives on blood pressure and related cardiovascular diseases, including hypertension and other cardiovascular events. To guarantee that the study incorporated the most recent evidence and therapeutic practices, only articles published in the past 20 years were considered. Moreover, the research was restricted to those published in English to ensure clarity and accessibility of information.

Studies were omitted if they did not pertain to primary research or systematic reviews. This encompassed editorials, opinion articles, and conference abstracts, as these sources lack unique scientific data. Research concentrating solely on non-human subjects or failing to directly evaluate the effects of oral contraceptives on blood pressure and cardiovascular risk was likewise eliminated. Furthermore, studies that did not provide explicit data on blood pressure or cardiovascular outcomes, or in which oral contraceptive use was not a principal variable of inquiry, were excluded. The study sought to provide a thorough and evidence-based assessment of the impact of oral contraceptives on blood pressure and cardiovascular health using a stringent selection procedure.

Overview of Included Studies

A significant study that tracked women taking OCs for ten years to evaluate blood pressure variations and cardiovascular events was carried out in the United States ($n = 13,000$).¹⁴ Long-term OCs users of a different cohort research conducted in Europe ($n = 17,032$) showed a rather larger increase in blood pressure than non-users.¹⁵ A cross-sectional study conducted in South Asia ($n = 1,500$) also revealed geographical differences; women who used OCs for more than two years had notably higher systolic and diastolic blood pressure than their non-using peers.¹⁶

Different formulations resulting from the hormone mix and OCP route of delivery affect

hormone balance, menstruation, and individual appropriateness differently. Continuous cycle pills, extended cycle pills, progestin-only pills (POPs), and combined oral contraceptive pills (COCs) are four main groups into which all OCs fall. Every category offers special advantages and particular applications (**Fig.1**).

Combined Oral Contraceptive Pills (COCs)

Most often given OCs are COCs, which mix oestrogen with progestin. Monophasic and multiphasic COCs are the two primary forms they fall into. Following a 7-day pill-free interval, monophasic COCs offer a continuous hormone dosage throughout the 21-day cycle, therefore inducing a withdrawal bleed.¹⁷ This easy schedule guarantees constant hormone exposure. In contrast, multiphasic COCs mimic normal fluctuations to reduce mood swings and bloating. Notwithstanding these changes, a study written in the *Journal of Hypertension* claims that the cardiovascular hazards are nevertheless comparable to those of monophasic pills. Particularly in women over 35 or those inclined to hypertension, both monophasic and multiphasic COCs have been demonstrated to increase blood pressure. Advise regular blood pressure monitoring even if recent low-dose COCs (with oestrogen levels less than 50 mcg) have greatly lower this risk.¹⁸

Progestin-Only Pills (POPs)

POPs, also known as mini-pills, are oestrogen-free and provide a steady daily dose of progestin. They are suitable for women with coagulation issues, migraines, hypertension, or nursing mothers. POPs weaken the uterine lining and thickening cervical mucus thereby inhibiting fertilisation. POPs unlike COCs lack a pill-free period, so they usually cause regular menstruation not unlike COCs. Studies have revealed that POPs are linked with a reduced cardiovascular risk than COCs. Since POPs lack oestrogen, which is known to affect blood pressure and raise thromboembolic risk.¹⁹

Continuous-Cycle and Extended-Cycle Pills

Continuous-cycle and Extended-cycle pills are options for women who want to minimize the frequency of menstrual cycles. Extended-cycle tablets are taken for 12 straight weeks, then a 7-day break yields just four periods annually.²⁰ Women who have severe premenstrual syndrome (PMS), significant monthly bleeding, or period-

related migraines will find this schedule helpful. Extended-cycle tablets clearly lower menstruation symptoms and have the same contraceptive efficacy as conventional 21-day regimens, according a review in the *Contraception Journal*.

Continuous-cycle tablets erase menstruation when used daily for a year. Women who prefer convenience or have medical issues like endometriosis where menstruation worsens symptoms are using this alternative more. Though long-term data is still being gathered, studies show that consistent use is safe and does not negatively affect cardiovascular health.²¹

Health Considerations and Choice of Pills

OCs choice usually relies on personal lifestyle preferences, health issues, and goals for menstruation control. Although COCs are usually effective, especially in older women or those who smoke, they may raise blood clot and hypertension risk. POPs provide a safer substitute for those having cardiovascular risk factors. Concurrent with this, continuous- and extended-cycle tablets offer more choices for controlling menstruation and improving general convenience as shown in Table 1.²²

Oral contraceptive effects on blood pressure

The use of OCs has been linked to an increased risk of hypertension, particularly with long-term use. Numerous studies suggest that the hormonal components of OCs, specifically estrogen and progestin, can modulate blood pressure through various physiological pathways.²³ One prominent study, the Tabari Cohort, reported that women who had used OCs had a 23% higher risk of hypertension compared to those who had never used them (adjusted odds ratio 1.23). Additionally, prolonged use significantly increases the risk. Women who used OCs for more than 120 months had a 47% higher chance of developing hypertension compared to non-users.²⁴

Mechanisms of Blood Pressure Elevation

OCs affect hypertension by means of several physiological processes that finally raise blood pressure. The renin-angiotensin-aldosterone system (RAAS) is one of the main processes as it is so important for control of blood pressure and fluid balance (**Fig.2**)²⁵. Activating RAAS causes sodium and water retention, which helps to explain higher blood volume and hence higher blood pressure. Key hormonal components of OCs, oestrogen and

progesterone, also have major effects on blood pressure control. Oestrogen has been linked to the RAAS pathway activation and fluid retention, therefore aggravating hypertension. Furthermore, interacting with the mineralocorticoid receptor, progesterone could cause salt retention and raised blood pressure. These hormonal influences help to explain a general change in cardiovascular performance.²⁶ OCs also affect arterial stiffness, which is another way they impact hypertension. Reduced flexibility of blood arteries resulting from increased arterial stiffness makes it more difficult for the circulatory system to adjust for changes in blood pressure. This change in vascular tone causes reduced vasodilation, which also helps to explain variances in blood pressure. Inappropriate dilating of blood arteries can lead to persistent hypertension, hence raising the risk of cardiovascular problems.²⁷

OCPs affect hypertension generally in a complex manner with hormonal effects on fluid retention, vascular stiffness, and changed blood pressure control.²⁸ Particularly in those prone to hypertension, evaluating the cardiovascular risks linked with OCP usage depends on an awareness of these processes. By means of appropriate blood pressure monitoring and evaluation, women taking OCPs can help to reduce possible hypertension

effects and guarantee safer contraceptive choices for at-risk groups.

RESULTS

Blood Pressure Elevation Due to Oral Contraceptives

The utilisation of OCs results in a statistically significant elevation in blood pressure relative to non-users. The increase in systolic blood pressure (2-4 mmHg) and diastolic blood pressure (1-3 mmHg) is mostly ascribed to estrogen-induced stimulation of the RAAS, which facilitates sodium retention and fluid overload (Table 2). This indicates that even slight elevations in blood pressure among oral contraceptive users may elevate the long-term risk of hypertension, especially in vulnerable individuals (Fig.3).^{29,30}

Hypertension Risk Based on Duration of OC Use

Prolonged usage of OCs is associated with an escalating risk of hypertension. Studies indicate a 15% increase in risk for users under 5 years and up to 47% increased risk in users exceeding 10 years (Table 3). This substantiates the notion that extended exposure to synthetic oestrogen and progestin may provoke vascular alterations and

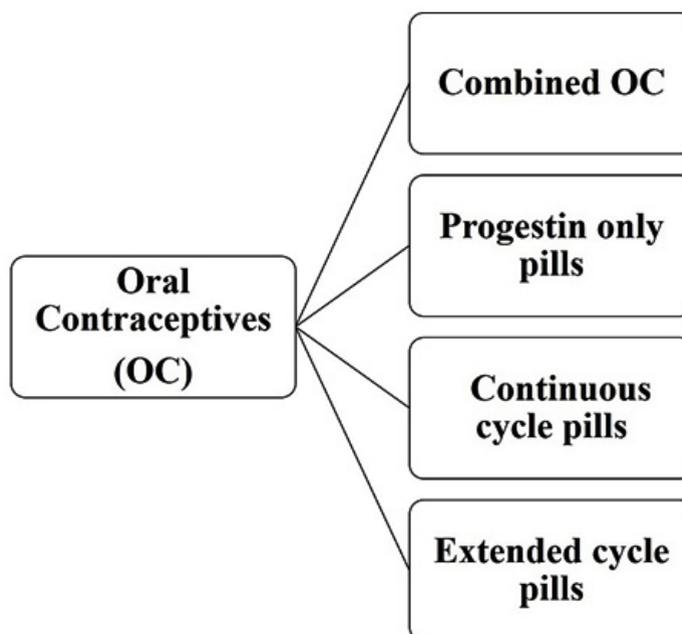


Fig.1. Classification of Oral Contraceptives

Table 1. Comparison of Oral Contraceptive Pill Types

Type of Pill	Hormones	Cycle Length	Menstruation/Impact	Target Population
Monophasic COCs	Estrogen + Progestin	21 days on, 7 days off	Regular withdrawal bleed	General users
Multiphasic COCs	Varying Estrogen + Progestin	21 days on, 7 days off	Regular withdrawal bleed	Users seeking fewer side effects
Progestin-Only Pills (POPs)	Progestin only	Daily, no breaks	Irregular or no menstruation	Breastfeeding, cardiovascular risk
Extended-Cycle Pills	Estrogen + Progestin	12 weeks on, 7 days off	Fewer periods (4/year)	Heavy menstruation, migraines
Continuous-Cycle Pills	Estrogen + Progestin	Daily, no breaks	No menstruation	Endometriosis, convenience

elevate blood pressure, highlighting the necessity for routine blood pressure monitoring in long-term users (Fig.4).^{31,32}

OC Formulation and Blood Pressure Variability

Higher-dose estrogen-containing OCs are significantly correlated with increased blood pressure, but progestin-only pills exhibit negligible effects on blood pressure. This indicates that for women susceptible to hypertension, low-dose OCs or progestin-only formulations may represent a safer option (Table 4).^{22,33}

Age, BMI, and Lifestyle Factors in OC-Induced Hypertension

Older women and individuals with elevated BMI have a more pronounced increase in blood pressure due to diminished arterial flexibility and the buildup of oestrogen in adipose tissue (Table 5). Smoking intensifies hypertension and cardiovascular risk, rendering OCs use especially alarming in these populations.^{22,34,35}

Meta-Analysis of BP Trends in OC Users

Older women show higher blood pressure rises than younger women, which supports age-specific contraceptive prescriptions. Meta-analysis studies repeatedly linked long-term OC usage to rises in both systolic and diastolic blood pressure (Table 6 & Fig.5).³⁶⁻³⁷

Clinical Recommendations Based on Results

Hypertensive women should steer clear of combination estrogen-progestin OCs and think about non-hormonal or progestin-only contraception. Early hypertension can be detected by regular blood pressure monitoring; if BP rises above 10 mmHg, cessation should be taken under consideration.³⁸⁻⁴²

DISCUSSION

Healthcare providers must weigh the risks and advantages of OCs, especially for women with high blood pressure or a higher risk of cardiovascular disease. The link between OCs and blood pressure is well established, showing that particular formulations might cause raised blood pressure in sensitive persons with the possible mechanism as described in figure 6.⁴³ To reduce possible risk, physicians should undertake complete health evaluations for each patient, taking into account age, body mass index (BMI), smoking status, and pre-existing medical disorders⁴⁴. This

allows them to identify women who may be at a higher risk for unfavourable cardiovascular events associated with OC usage. For patients with

hypertension or other cardiovascular risk factors, progestin-only pills or non-hormonal solutions may be safer and more appropriate.⁴⁵

Table 2. Blood Pressure Elevation Due to Oral Contraceptives^{29,30}

Parameter	Effect in OC Users	Effect in Non-Users	Statistical Significance
Systolic BP (SBP)	↑! 2-4 mmHg	No significant change	p < 0.05
Diastolic BP (DBP)	↑! 1-3 mmHg	No significant change	p < 0.05

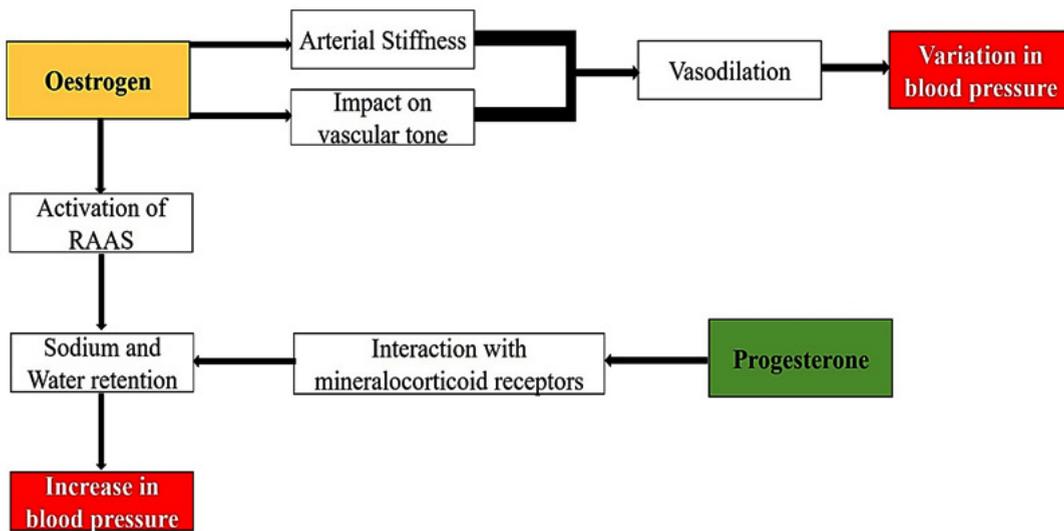


Fig. 2. Mechanisms of Blood Pressure Elevation

Blood Pressure Elevation Due to Oral Contraceptives

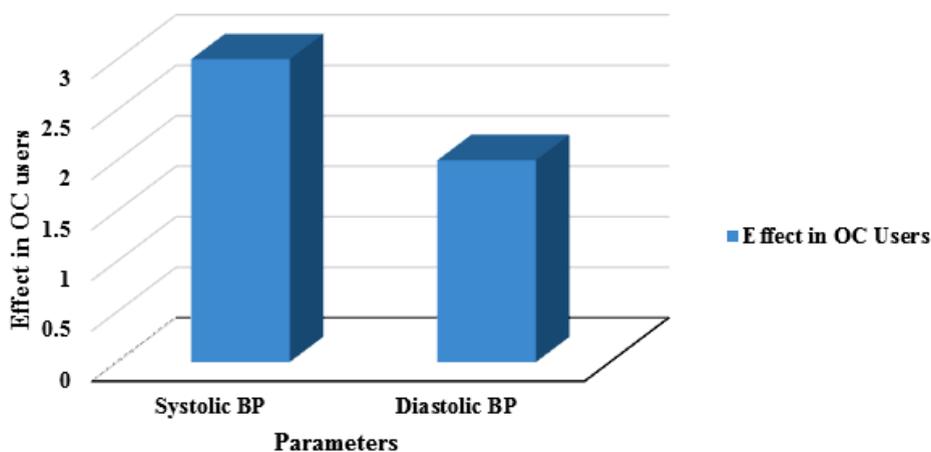


Fig. 3. Elevation in blood pressure due to OC

In addition to careful prescription, frequent blood pressure monitoring is necessary for women using OCs, particularly those who are at increased risk of hypertension. A study reported by Cameron *et al.* 2023 showed elevated blood pressure after continuous use of OCs. Out of 68297 participants (aged 25-42 years) from United states, reported increased SBP and DBP

by 0.7 mmHg (95% CI, 0.4–1 mmHg) and 0.4 mmHg (95% CI, 0.4–0.6mmHg) respectively where age, existing CVD, smoking and family history were the additional contributing factors. Furthermore; 4 years’ follow-up showed the more risk of hypertension (1.2 times more) in post OCs user. Moreover; similar risk was reported by the survey performed in England, Germany,

Table 3. Hypertension Risk Based on Duration of OC Use^{31,32}

Duration of OC Use	Relative Risk (RR) of Hypertension	Odds Ratio (OR)	95% Confidence Interval (CI)
< 5 years	1.15	1.12	(1.05 - 1.21)
5 - 10 years	1.30	1.25	(1.15 - 1.38)
> 10 years	1.47	1.40	(1.27 - 1.55)

Table 4. OC Formulation and Blood Pressure Variability^{22,33}

OC Type	Systolic BP Increase	Diastolic BP Increase	Recommendation
High-Dose Combined Pills (≥50 ig estrogen)	+4 mmHg	+2 mmHg	Avoid in hypertensive women
Low-Dose Combined Pills (<50 ig estrogen)	+2 mmHg	+1 mmHg	Consider safer, but monitor BP
Progestin-Only Pills (POPs)	Minimal change	Minimal change	Preferred for hypertensive women
Extended/Continuous-Cycle Pills	Gradual BP increase over time	Gradual BP increase over time	Monitor BP in long-term users

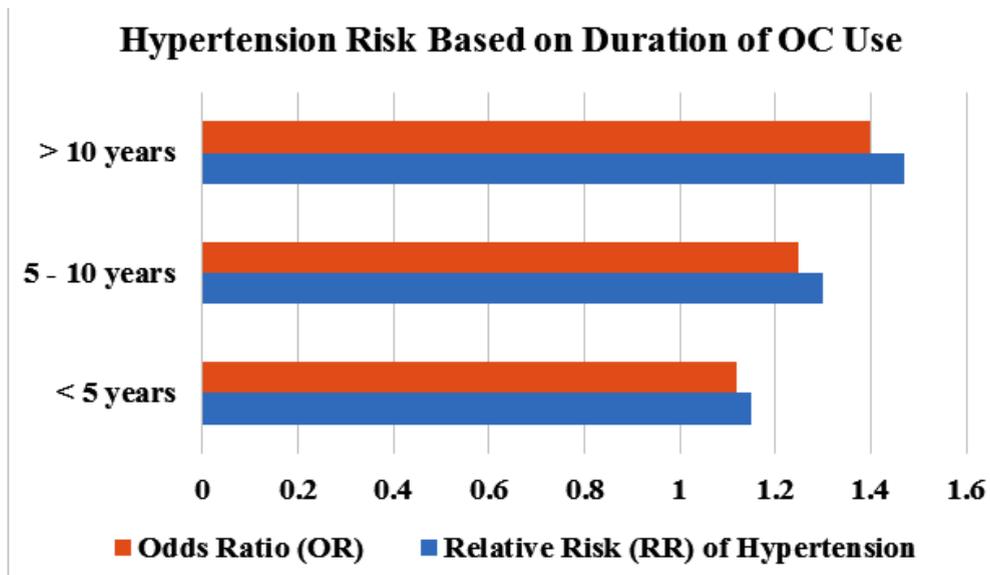


Fig. 4. Hypertension Risk Based on Duration of OC Use

and Korea. The SBP and DBP for the users of OCs was found to be higher by 2.6 to 5.8 mmHg and 1.8 to 3.6 mmHg than non-users. Available evidences clearly reflect the risk of increased hypertension among the OCs users in comparison to non-users.²² Henceforth; healthcare professions may recommend regular blood pressure checks, especially in the first several months of OCs use, when side effects may be more obvious and after two years of treatment.⁴⁶ The American College of Obstetricians and Gynaecologists (ACOG) recommends that healthcare providers measure blood pressure at least once a year for women taking combined hormonal contraceptives;²² however, more frequent monitoring may be required for

patients with elevated baseline blood pressure or other cardiovascular risk factors.⁴⁷ Patient should also be educated to detect hypertension symptoms and encouraged to report any severe health changes immediately. This proactive blood pressure monitoring technique identifies potential issues early, allowing for risk reduction.

The necessity of tailored contraceptive alternatives and medicine is critical in improving the health outcomes of women who use OCs. Because each woman's health profile is unique, the efficacy and safety of OCs might differ depending on individual characteristics like as age, weight, and overall health.^{8,9} Personalised contraceptive counselling allows healthcare

Table 5. Age, BMI, and Lifestyle Factors in OC-Induced Hypertension^{22,34,35}

Risk Factor	Effect on BP	Increased Risk
Age > 45 years	Increased BP due to reduced vascular elasticity	3.5 mmHg higher SBP vs. younger users
BMI > 30	Higher estrogen levels, RAAS activation	35% increased risk of hypertension
Smoking	Vasoconstriction, increased clot risk	4-5x increased thromboembolic risk

Table 6. Meta-Analysis of BP Trends in OC Users³⁶⁻³⁷

Study Population	Systolic BP Change (mmHg)	Diastolic BP Change (mmHg)
Women aged 35-45 years	+3.5 mmHg	+2.0 mmHg
Women aged <35 years	+1.5 mmHg	+1.0 mmHg

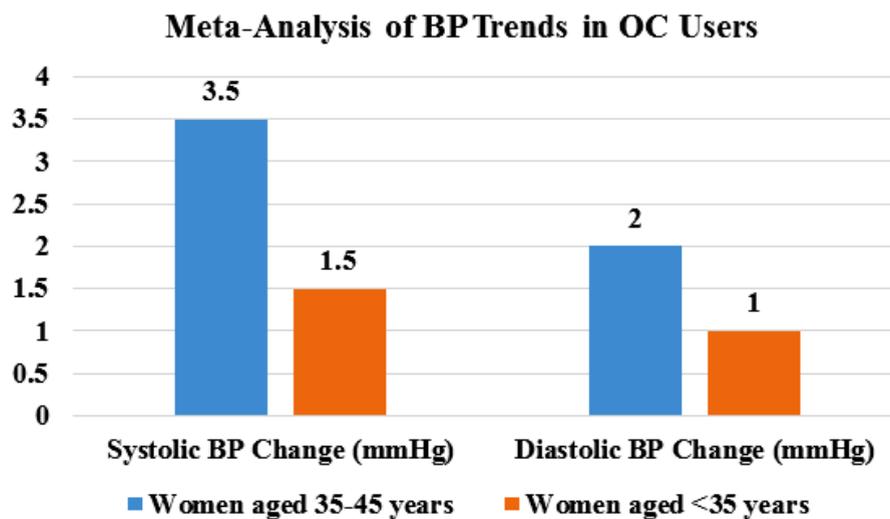


Fig. 5. Meta-Analysis of BP Trends in OC Users

practitioners to personalise suggestions to their patients’ unique needs and preferences.⁴⁸ Women with higher cardiovascular risk, for example, may benefit from low-dose oestrogen or progestin formulations, but others may prefer non-hormonal techniques entirely.⁴⁹ Furthermore, incorporating shared decision-making into the contraceptive counselling process enables patients to communicate their concerns and desires about contraceptive techniques.⁵⁰ This strategy improves patient satisfaction and adherence, allowing women to make more educated decisions regarding their reproductive health.

Limitations and Future Directions

The current data exploring how oral contraceptives (OCs) influence blood pressure

(BP) faces significant challenges, primarily due to its reliance on observational studies. These studies often analyse data retrospectively, making it difficult to isolate the direct impact of OCs from confounding factors such as lifestyle, pre-existing health conditions, and genetic predispositions. Such limitations can lead to misinterpretations, potentially skewing clinical recommendations and patient care.

The Need for Randomized Controlled Trials (RCTs)

Randomized controlled trails (RCTs) are essential to overcome these constraints. RCTs reduce confounding variables by randomly assigning subjects to either an OCs or a placebo, providing more reliable proof of OC-BP causality.

Table 7. Clinical Recommendations Based on Results³⁸⁻⁴²

Recommendation	Target Group
Use progestin-only or non-hormonal OCs	Women with hypertension
Monitor BP every 6 months after starting OCs	All OC users, especially older women
Discontinue OCs if BP rises >10 mmHg above baseline	High-risk individuals

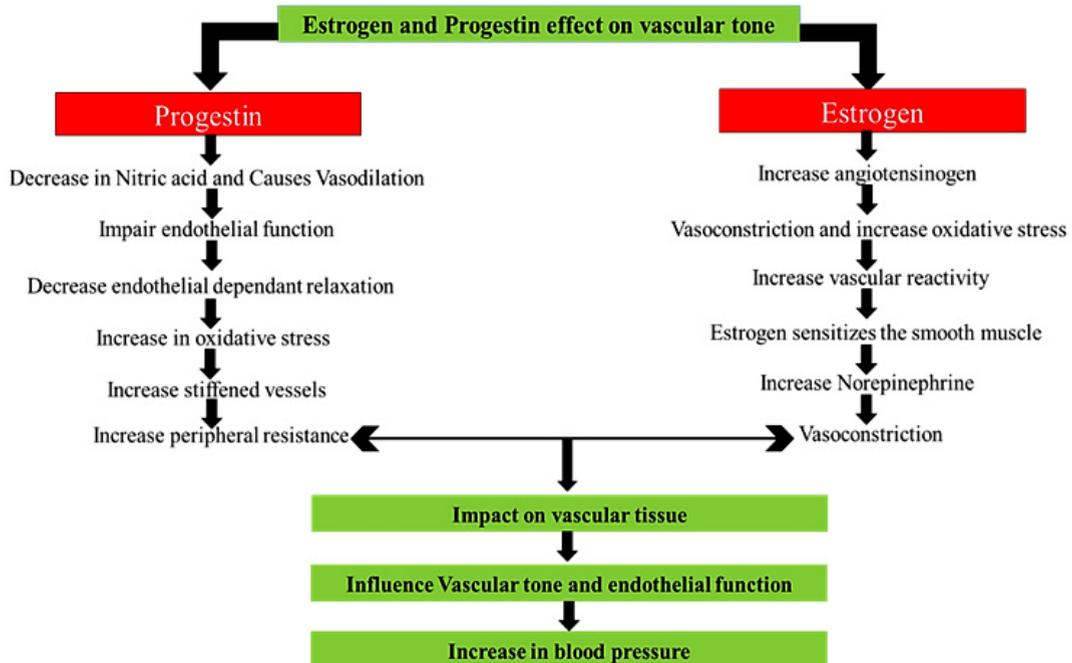


Fig. 6. Estrogen and Progestin effect on blood pressure.⁵

Long-term RCTs are crucial for assessing OCs long-term effects on BP and identifying prolonged use concerns.

Inclusion of Diverse Populations

Future study should involve participants of various ages, nationalities, and health situations. This method will reveal how OCs affects different populations, enabling the development of patient-specific contraceptives.

Mechanistic Studies and Therapeutic Approaches

Investigating the mechanisms through which OCs influence BP such as their effects on the RAAS could pave the way for targeted therapies. Lifestyle adjustment or RAAS inhibitors may reduce BP effects in vulnerable people.

Implications for Clinical Practice and Policy

Future study results will have far-reaching ramifications for healthcare practice. Healthcare providers can better administer OCs with individualised instruction, especially for women at risk of hypertension or cardiovascular disease. Policymakers might also use this evidence to expand contraceptive alternatives and education, empowering women to make educated reproductive health.

Direct Comparison of OC Preparations

Comparative studies evaluating the BP effects of different OC formulations are essential. These studies will help identify safer alternatives for women at risk, ensuring that contraceptive solutions align with individual health profiles.

CONCLUSION

Oral contraceptives, especially those comprising estrogen and progestin, significantly influence blood pressure, resulting in elevated systolic and diastolic measurements. The risk increases with extended use, high-dose estrogen formulations, and in women with predisposed factors including elevated BMI, advanced age, and pre-existing hypertension. Progestin-only pills are linked to negligible alterations in blood pressure, rendering them a favorable choice for women with elevated cardiovascular risk.

While the observed increases in blood pressure are generally modest in absolute terms, their cumulative effect over time particularly in high-risk individuals may be clinically meaningful

and warrants caution. It is also important to distinguish between statistical and clinical significance: although some changes reached statistical significance, their real-world impact on individual patient profiles and duration of use.

Clinical guidelines underscore the need of personalized contraceptive choices, especially for women with hypertension and cardiovascular issues. Consistent blood pressure monitoring is essential, particularly during the initial months of OCs therapy, to identify and address possible hazards promptly. Future research should prioritize longitudinal studies in diverse population to enhance our understanding of these effects and support the development of safer contraceptive strategies. These findings are vital for guiding clinical management and informing public health policies aimed at reducing cardiovascular risk associated with OCs use.

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The authors do not have any conflict of interest

Data availability

This statement does not apply to this article

Ethics Statement

this review work did not involve human participants, animal subjects, or any material that requires ethical approval

Informed Consent Statement

This study did not involve human participants, and therefore, informed consent was not required.

Clinical trial registration

This research does not involve any clinical trials

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Not applicable.

Authors contribution

Umesh Laddha: Supervision, Writing-review and editing; Kavita Kshirsagar: Data collection, Writing- original draft; Gayatri Kotwal: Data collection, Writing- original draft; Akshada Jadhav: Data collection, Writing- original draft; Devyani Patil: Data collection, Writing- original draft; Gangadhar Magar: Conceptualization, Data collection, Writing- original draft.

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