

A Literature Review on Contraceptive Methods for Women with Hypertension

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Publication Date: 2025/10/25

Abstract: Hypertension is one of the leading risk factors for cardiovascular disease and disproportionately affects women of reproductive age. Selecting a safe and effective contraceptive method for hypertensive women is critical to prevent complications. Estrogen-containing contraceptives may exacerbate blood pressure elevation and increase cardiovascular risk. This literature review aims to identify safe contraceptive methods for women with hypertension and summarize the current evidence to guide clinical decision-making. A systematic search was conducted in PubMed and ScienceDirect using keywords related to contraception, hypertension, and women. Inclusion criteria covered studies published between 2020–2025 involving hypertensive women using hormonal or non-hormonal contraceptives, reporting blood pressure or cardiovascular outcomes. Following PRISMA guidelines, 20 studies were selected and synthesized narratively. Combined hormonal contraceptives (CHC) were associated with increased blood pressure and higher stroke risk (adjusted OR 1.44–2.08). Progestin-only methods (POP, DMPA, implants) demonstrated no significant effect on blood pressure. Intrauterine devices (copper IUD and LNG-IUD) were the safest options, with no effect on blood pressure and high contraceptive efficacy. Contraceptive choices for women with hypertension should prioritize progestin-only and non-hormonal methods. CHC should be avoided in women with uncontrolled hypertension. Comprehensive counseling and routine blood pressure monitoring are essential to ensure safety and optimize reproductive health outcomes.

Keywords: Hypertension, Contraception, Women, Progestin-Only, IUD, Systematic Review.

How to Cite: Monika Intan Kulsumatuti; Sodik Kamal (2025) A Literature Review on Contraceptive Methods for Women with Hypertension. *International Journal of Innovative Science and Research Technology*, 10(10), 1207-1214
<https://doi.org/10.38124/ijisrt/25oct720>

I. INTRODUCTION

Hypertension is one of the most common chronic health problems worldwide, including in Indonesia, and is a major risk factor for cardiovascular diseases such as stroke, kidney failure, and coronary heart disease. The World Health Organization (WHO) reported that hypertension was responsible for approximately 7 million deaths and 12.8% of all global deaths in 2019. Data from Indonesia's Basic Health Research (Riskesdas) 2018 showed that the prevalence of hypertension among the adult population reached 30.3%, with a higher prevalence in women compared to men. Hormonal factors, pregnancy, and menopause increase women's vulnerability to hypertension, requiring special attention in the management of reproductive health for this population group[1].

Contraception is a key intervention in family planning programs to prevent unintended pregnancies, regulate birth spacing, and improve maternal health[2]. However, selecting the appropriate contraceptive method for women with hypertension requires careful consideration because some types of contraception, particularly those containing estrogen such as combined hormonal contraceptives (CHC), may raise

blood pressure through activation of The Renin Angiotensin Aldosterone System (RAAS) and sodium retention, potentially increasing the risk of cardiovascular complications[3].

Several studies have reported an association between the use of combined hormonal contraceptives and increased blood pressure as well as stroke incidence. Meta-analyses have shown that CHC use increases the risk of hypertension by 1.44 times and the risk of stroke by 2.08 times compared to non-users[4]. In contrast, progestin-only contraceptives (progestin-only pills / POP, implants, DMPA injections) and non-hormonal methods such as copper IUDs are relatively safer, as they do not significantly affect blood pressure[5]. Nonetheless, some studies have reported a trend of increased blood pressure in long-term DMPA users, although this was not statistically significant.

A key challenge remains the limited knowledge among women regarding safe contraceptive methods for hypertensive conditions, as well as insufficient evidence-based counseling from healthcare providers. This knowledge gap can lead to inappropriate method selection and increased risk of cardiovascular complications.

Therefore, a comprehensive literature review is needed to identify safe and effective contraceptive methods for women with hypertension and to provide evidence-based recommendations for clinical practice. This review is

expected to serve as a valuable resource for healthcare providers in delivering counseling and supporting patients in making informed decisions about contraception, ultimately improving quality of life and reducing the risk of hypertension-related complications.

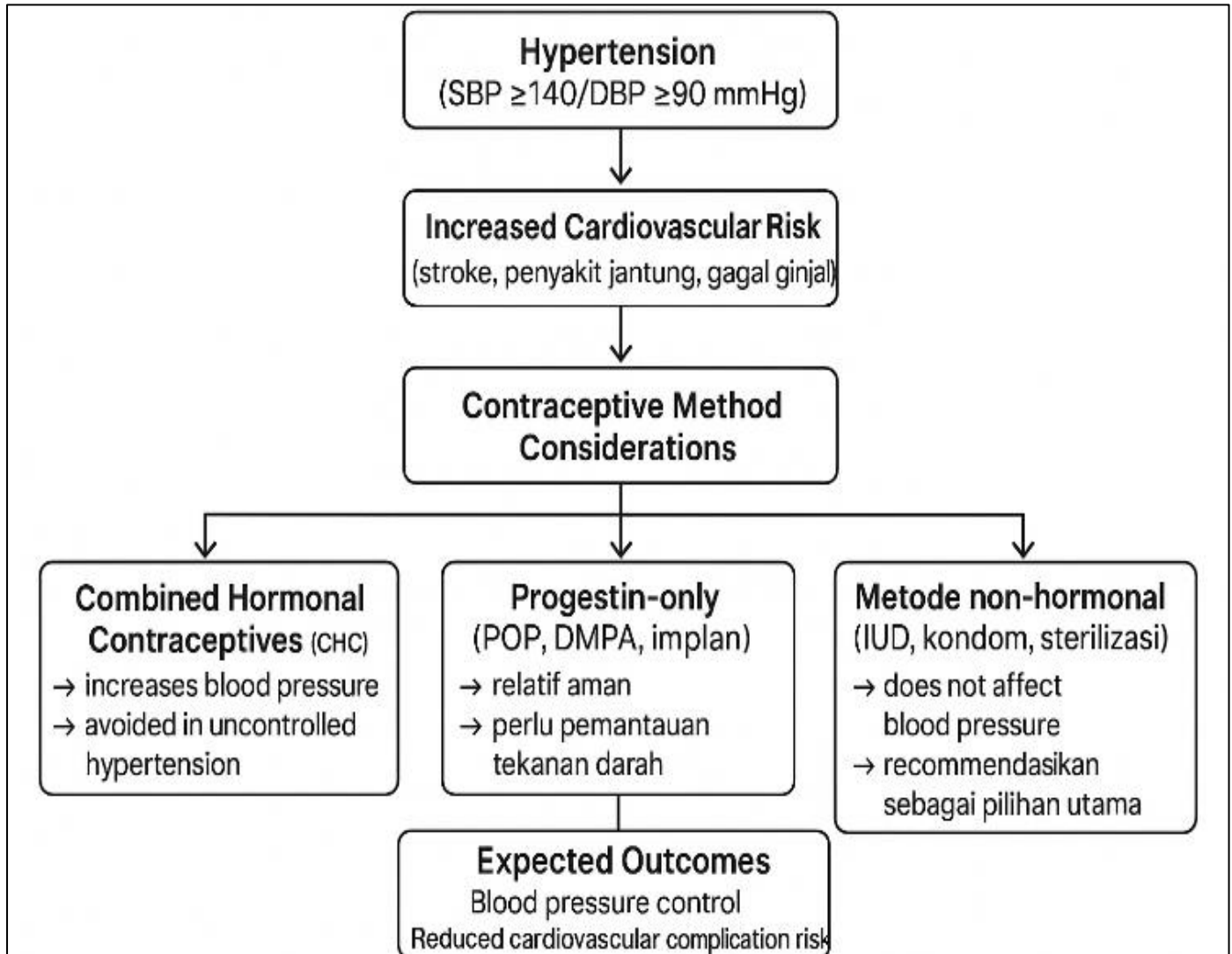


Fig 1 Conceptual Framework Diagram

II. LITERATURE REVIEW

Hypertension is a chronic condition characterized by a persistent elevation of systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg, and it remains one of the leading contributors to global morbidity and mortality, accounting for approximately seven million deaths annually[6]. Its pathophysiology involves activation of The Renin Angiotensin Aldosterone System (RAAS), increased peripheral vascular resistance, and endothelial dysfunction, which together result in increased cardiac workload[7]. Women are at greater risk of developing hypertension than men, particularly after the age of 35, as hormonal fluctuations, pregnancy, and menopause may exacerbate blood pressure dysregulation[8]. This increased susceptibility limits contraceptive options for hypertensive women, as some

hormonal methods can further elevate blood pressure and increase cardiovascular risk[9].

Contraceptive methods are broadly categorized as hormonal or non-hormonal. Hormonal methods include estrogen-containing combined hormonal contraceptives (CHC), such as combined oral pills, patches, and vaginal rings, which inhibit ovulation but can raise blood pressure via RAAS activation [10]. The risk of hypertension and cardiovascular events is higher in long-term CHC users, smokers, and women with uncontrolled hypertension[11]. Progestin-only contraceptives (POC), including progestin-only pills (POP), depot medroxyprogesterone acetate (DMPA) injections, and implants, are considered safer alternatives for hypertensive women because they do not contain estrogen, although DMPA has been associated with a slight, non-significant rise in blood pressure in some

users[12]. Non-hormonal methods, including copper intrauterine devices (IUDs), barrier methods (condoms, diaphragms), and tubal sterilization, do not affect blood pressure and are highly recommended, particularly for women with severe or uncontrolled hypertension[13].

Several studies have reported a significant association between CHC use and an increased risk of hypertension and stroke. A meta-analysis by Zuhaira et al. (2022) revealed that CHC users had a 1.44-fold higher risk of developing hypertension and a 2.08-fold higher risk of stroke compared with non-users[14]. Conversely, POP and levonorgestrel-releasing IUD (LNG-IUD) have not been shown to significantly affect blood pressure and are recommended by both the World Health Organization (WHO) Medical Eligibility Criteria (MEC) and the United States Medical Eligibility Criteria (USMEC) as safe contraceptive options for hypertensive women, particularly those with well-controlled blood pressure[15].

Contraceptive choice is also shaped by psychological and social factors. The Health Belief Model (HBM) suggests that women who perceive a higher risk of hypertension-related complications are more likely to choose safer methods such as POP or IUD[16]. Andersen's Behavioral Model adds that predisposing factors (age, education), enabling factors

(access to healthcare), and need factors (health status) play a significant role in contraceptive decision-making[17]. Comprehensive counseling from healthcare providers, physicians, midwives, and nurses is therefore essential to ensure women understand the risks and benefits of each method and receive regular blood pressure monitoring[18]. A patient-centered care approach improves adherence, safety, and satisfaction with contraceptive use[19].

Despite a growing body of evidence, research gaps remain. Few longitudinal studies have investigated the long-term impact of POP and DMPA on blood pressure control, and there is a lack of region-specific data from Asian populations, including Indonesia, where dietary patterns and hypertension prevalence may differ[20]. Furthermore, limited knowledge and engagement of women in contraceptive decision-making at the primary care level may hinder optimal contraceptive use[21]. Overall, the literature highlights that contraceptive selection for hypertensive women must be evidence-based, considering blood pressure control, comorbidities, and patient preferences[22]. CHC should be avoided, whereas POP, LNG-IUD, and non-hormonal methods are recommended as safer alternatives[23]. Individualized contraceptive counseling and healthcare provider support can improve safety and enhance the quality of life for women with hypertension[24].

Table 1 Comparison of Contraceptive Methods for Women with Hypertension

Contraceptive Method	Mechanism of Action	Effect on Blood Pressure	Cardiovascular Risk	WHO/USMEC Recommendation	Clinical Notes
Combined Hormonal Contraceptives (CHC) (combined pills, patch, vaginal ring)	Inhibits ovulation, thickens cervical mucus, alters endometrium	Increases blood pressure via RAAS activation and sodium retention	Increases risk of stroke, myocardial infarction, and thromboembolism, especially in uncontrolled hypertension	Category 3–4 (not recommended for SBP ≥ 160 mmHg / DBP ≥ 100 mmHg)	Avoid in moderate–severe hypertension. May be considered in well-controlled mild hypertension with close BP monitoring.
Progestin-Only Pill (POP)	Thickens cervical mucus, partially inhibits ovulation	No significant effect on blood pressure	Low cardiovascular risk	Category 2 (generally safe)	Suitable for women with estrogen contraindications. Requires daily adherence.
DMPA Injection (Depo-Medroxyprogesterone Acetate)	Suppresses ovulation via GnRH inhibition	Slight increase in BP, not statistically significant	Low cardiovascular risk	Category 2 (generally safe)	BP monitoring is recommended, especially with long-term use.
Subdermal Implant	Continuously releases progestin, inhibits ovulation	No significant effect on BP	Low cardiovascular risk	Category 2 (safe to use)	Effective for 3–5 years, suitable for long-term users.
Copper IUD (Cu-IUD)	Copper ions are spermicidal, preventing fertilization	No effect on BP	No cardiovascular risk	Category 1 (no restriction for use)	First-line option for women with severe hypertension.
Levonorgestrel IUD (LNG-IUD)	Locally releases levonorgestrel, thickens cervical	No effect on BP	Low cardiovascular risk	Category 2 (safe to use)	Provides additional benefit of reducing menstrual bleeding.

Contraceptive Method	Mechanism of Action	Effect on Blood Pressure	Cardiovascular Risk	WHO/USMEC Recommendation	Clinical Notes
	mucus, thins endometrium				
Barrier Methods (condoms, diaphragm)	Prevents sperm from entering the uterus	No effect	None	Category 1 (safe to use)	Effectiveness highly dependent on correct and consistent use.
Tubal Sterilization	Permanent occlusion of fallopian tubes	No effect	None	Category 1 (safe to use)	Permanent method; recommended for women who have completed childbearing.

III. METHODS

➤ Study Design

This study employed a systematic literature review design, aimed at identifying, analyzing, and synthesizing scientific evidence on contraceptive methods for women with hypertension. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and reproducibility.

➤ Search Strategy

A comprehensive literature search was conducted between January 2020 and December 2025 using the following electronic databases: Pubmed and ScienDirect. The search terms used were: “(“contraception” OR “contraceptive methods” OR “birth control”) AND (“hypertension” OR “high blood pressure”) AND (“women” OR “female”) AND (“safety” OR “cardiovascular risk”).”. Boolean operators (AND/OR) were applied to combine keywords. Reference lists of relevant articles were also screened manually to identify additional studies.

Table 2 Eligibility Criteria (PICOST Framework)

Component	Inclusion Criteria	Exclusion Criteria
Population (P)	Women of reproductive age (15–50 years) with controlled or uncontrolled hypertension	Men, children, elderly, or populations without hypertension
Intervention (I)	Use of hormonal contraceptives (COC, POP, DMPA, implant, patch) or non-hormonal methods (copper IUD, barrier, sterilization)	Studies not specifying contraceptive method or unrelated to hypertension
Comparison (C)	Hormonal vs non-hormonal methods, users vs non-users	Studies with no comparator group
Outcome (O)	Blood pressure change, cardiovascular risk (stroke, MI), adverse effects	Studies not reporting BP or cardiovascular outcomes
Study Design (S)	RCTs, cohort studies, case-control studies, cross-sectional studies	Narrative reviews, editorials, case reports without empirical data
Time (T)	Published between 2020–2025	Articles published before 2020

➤ Study Selection

The study selection process followed four PRISMA stages:

- **Identification:**
112 records were identified through database search.
- **Screening:**
49 records were excluded based on title and abstract review.

- **Eligibility:**
63 full-text articles were assessed for eligibility, with 43 excluded for not meeting criteria.

- **Inclusion:**
20 studies were included in the final synthesis.

A PRISMA flow diagram was created to visualize the selection process.

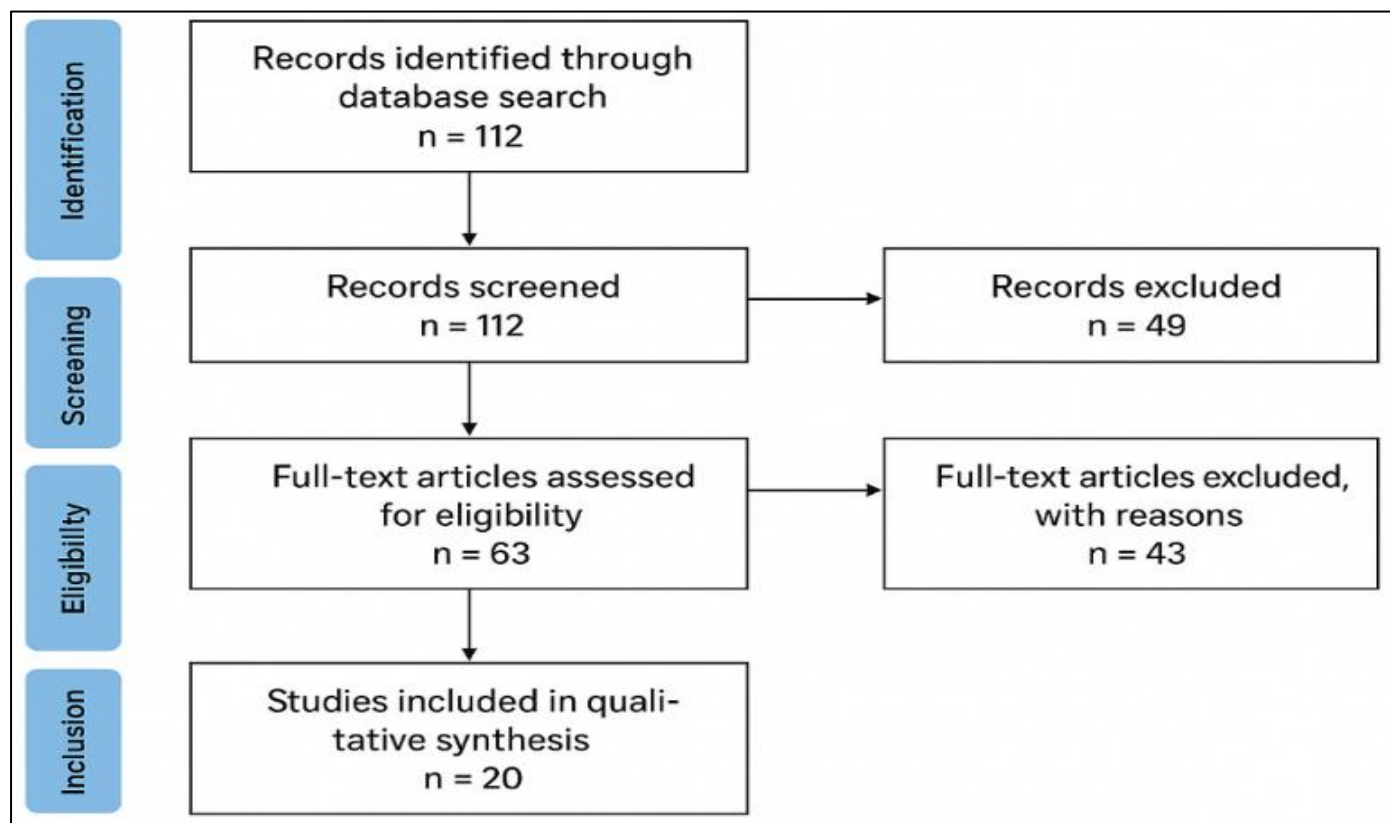


Fig 2 PRISMA Flow Diagram

➤ Quality Assessment

Critical appraisal was performed using the Joanna Briggs Institute (JBI) Critical Appraisal Tools appropriate for each study design (RCT, cohort, cross-sectional). Two reviewers independently assessed methodological quality. Only studies with moderate to high quality scores were included in the synthesis.

➤ Data Extraction and Synthesis

Key data extracted from each study included:

- Author(s), year of publication, country
- Study design and sample size
- Type of contraceptive method used
- Participant characteristics (age, blood pressure status)
- Primary outcomes (blood pressure change, cardiovascular events)
- Secondary outcomes (adverse effects, discontinuation rate)

Data were synthesized narratively, focusing on the relationship between contraceptive method and blood pressure outcomes, cardiovascular risk, and guideline recommendations. Quantitative pooling (meta-analysis) was not performed due to heterogeneity of study designs and outcome measures.

IV. RESULTS AND DISCUSSION

➤ Result

A total of 112 articles were initially identified through database searches. After removing duplicates and screening

titles and abstracts, 63 full-text articles were assessed for eligibility. Following detailed evaluation, 20 studies met the inclusion criteria and were included in the final synthesis (see PRISMA flow diagram).

➤ Key Findings

• Combined Hormonal Contraceptives (CHC)

- ✓ Consistently associated with increased blood pressure and higher risk of stroke (adjusted OR 1.44–2.08).
- ✓ Contraindicated in women with uncontrolled hypertension (SBP ≥ 160 mmHg or DBP ≥ 100 mmHg).

• Progestin-Only Contraceptives (POP, DMPA, implant)

- ✓ Generally, showed no significant change in blood pressure compared to baseline.
- ✓ DMPA demonstrated a slight but non-significant upward trend in SBP after 12 months of use.
- ✓ Implants were considered safe and effective for long-term use with minimal cardiovascular impact.

• Intrauterine Devices (Copper IUD and LNG-IUD)

- ✓ Reported as the safest option for women with hypertension.
- ✓ No measurable effect on blood pressure; some studies reported additional benefits such as reduced menstrual bleeding with LNG-IUD.

- *Barrier Methods and Tubal Sterilization*
- ✓ No effect on blood pressure or cardiovascular risk.
- ✓ Sterilization recommended for women who have completed childbearing.

A summary of the findings is presented in Table 1, which compares the mechanism of action, effect on blood pressure, and safety recommendations for each contraceptive method.

➤ Discussion

The findings of this review reaffirm the contraindication of estrogen-containing contraceptives in women with moderate to severe hypertension, consistent with WHO and USMEC guidelines. The observed elevation in blood pressure among CHC users is biologically plausible, as estrogen promotes sodium and water retention and increases hepatic production of angiotensinogen, thereby activating the renin-angiotensin-aldosterone system (RAAS) and elevating systemic vascular resistance.

Conversely, progestin-only methods present a safer alternative, as they do not significantly affect RAAS activity. This aligns with previous systematic reviews indicating that POP, DMPA, and implants do not significantly increase cardiovascular risk in hypertensive women. Nevertheless, DMPA use warrants careful monitoring, especially in women with borderline blood pressure or additional cardiovascular risk factors.

The IUD (both copper and LNG-IUD) emerges as the preferred method for hypertensive women, offering a non-hormonal or localized hormonal effect that does not interfere with systemic blood pressure regulation. LNG-IUD provides additional therapeutic benefits such as reducing menorrhagia, which can be particularly helpful in hypertensive women at risk of anemia.

From a clinical perspective, individualized counseling plays a crucial role in contraceptive decision-making. Health professionals must assess blood pressure status, cardiovascular risk profile, and patient preference before recommending a method. Regular follow-up and blood pressure monitoring should be integrated into contraceptive services, especially for users of hormonal methods.

➤ Clinical Implications

Avoid CHC in women with uncontrolled hypertension to prevent cardiovascular complications. Prefer progestin-only and non-hormonal methods, especially LNG-IUD and Cu-IUD, as first-line options. Monitor blood pressure periodically for all users of hormonal contraceptives. Strengthen patient education and counseling, empowering women to make informed choices regarding family planning.

➤ Limitations

This review is limited by heterogeneity among included studies in terms of study design, sample characteristics, and follow-up duration. Furthermore, most studies were observational, which may introduce confounding factors. There is a need for longitudinal and randomized controlled

trials to confirm long-term safety of progestin-only methods in hypertensive populations, particularly in low- and middle-income countries.

V. CONCLUSION

This systematic review demonstrates that contraceptive choice for women with hypertension must be individualized and guided by evidence-based recommendations. Estrogen-containing combined hormonal contraceptives (CHC) are associated with increased blood pressure and higher cardiovascular risk, making them contraindicated in women with uncontrolled or severe hypertension.

Progestin-only methods (POP, DMPA, implants) and non-hormonal methods (Copper IUD, LNG-IUD, barrier methods) are generally safe, with minimal or no impact on blood pressure. Among these, IUDs represent the most reliable and safe option for hypertensive women, with LNG-IUD offering additional benefits such as reduction of menstrual bleeding.

Appropriate contraceptive counseling, routine blood pressure monitoring, and shared decision-making between health providers and patients are crucial to ensuring reproductive health and minimizing complications in this high-risk population.

RECOMMENDATIONS

Based on the findings of this review, the following recommendations are proposed:

➤ For Clinical Practice

- Avoid prescribing CHC to women with SBP ≥ 160 mmHg or DBP ≥ 100 mmHg.
- Prefer Copper IUD or LNG-IUD as first-line options for women with hypertension.
- Provide regular blood pressure monitoring for women using POP or DMPA.
- Deliver comprehensive contraceptive counseling, including risk-benefit discussion, to support informed decision-making.

➤ For Public Health Policy

- Integrate blood pressure screening into family planning services.
- Develop educational programs for both health workers and women of reproductive age regarding safe contraceptive choices for hypertensive patients.
- Ensure availability of non-hormonal and progestin-only contraceptive methods at primary healthcare facilities.

➤ For Future Research

- Conduct prospective cohort studies or randomized controlled trials evaluating the long-term impact of progestin-only contraceptives on blood pressure control.

- Explore socio-cultural factors influencing contraceptive choices among hypertensive women, particularly in low- and middle-income countries.
- Investigate cost-effectiveness of integrating hypertension screening with family planning services to improve maternal health outcomes.

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