

CLINICAL REFERENCE

# Preconception Care



*A Comprehensive Clinical Guide to Optimising  
Health Before Pregnancy*

FOR DOCTORS & MEDICAL STUDENTS

**Compiled & launched by Dr. Sunita Tandulwadkar**

25 July 2026

TEN CHAPTERS

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## CHAPTER 01

# General Preconception Counselling: Building the Foundation for a Healthy Pregnancy

### IN THIS CHAPTER

Objectives of Preconception Counselling

Why Every Woman Should Receive Preconception Counselling

The Burden of Poor Preconception Health

Identifying Women Who Need Preconception Counselling

Assessment of Reproductive Intentions

Comprehensive Risk Assessment

## Introduction

Preconception counselling is a cornerstone of modern reproductive healthcare and represents one of the most effective preventive strategies for improving maternal, fetal, neonatal, and long-term child health. It encompasses a comprehensive assessment and optimization of a woman's physical, nutritional, psychological, genetic, and social health before conception. Rather than beginning care after pregnancy is

confirmed, preconception counselling aims to ensure that women enter pregnancy in the best possible health, thereby reducing preventable maternal and neonatal morbidity and mortality. Globally, nearly half of all pregnancies are unplanned, limiting opportunities to optimize health before conception. In India, this challenge is compounded by a high prevalence of anaemia, nutritional deficiencies, chronic diseases, inherited disorders such as  $\beta$ -thalassaemia, obesity, and undiagnosed mental health conditions. These factors frequently exist before pregnancy and significantly influence pregnancy outcomes. Consequently, preconception counselling should not be regarded as a separate clinical service but as an integral component of routine healthcare for all women of reproductive age. Recent international recommendations advocate a paradigm shift from pregnancy-centred care to woman-centred, life-course reproductive healthcare. Every healthcare encounter with a woman of reproductive age should therefore be viewed as an opportunity to discuss future reproductive intentions and optimize health before pregnancy.

## **Objectives of Preconception Counselling**

The primary objective of preconception counselling is to identify and modify biomedical, behavioural, nutritional, environmental, occupational, psychological, and social factors that may adversely influence pregnancy outcomes. Specific objectives include:

- Assessment of reproductive intentions.
- Optimization of chronic medical disorders.
- Identification of nutritional deficiencies.
- Promotion of healthy lifestyle practices.

- Review of medications and avoidance of teratogenic drugs.
- Genetic risk assessment.
- Vaccination counselling.
- Screening for infectious diseases.
- Mental health evaluation.
- Birth spacing counselling.
- Fertility awareness education.

Through early intervention, preconception counselling substantially reduces congenital anomalies, preterm birth, fetal growth restriction, stillbirth, maternal complications, and neonatal mortality.

## **Why Every Woman Should Receive Preconception Counselling**

Historically, reproductive healthcare has focused primarily on antenatal care after pregnancy confirmation. However, critical embryological events occur during the first four to six weeks after conception, often before a woman seeks medical attention. Organogenesis, placentation, neural tube closure, and epigenetic programming begin immediately after fertilization. Therefore, many interventions initiated during pregnancy may occur too late to prevent congenital anomalies or adverse developmental programming. Preconception counselling provides an opportunity to identify risks before conception, allowing adequate time for intervention. This approach not only improves pregnancy outcomes but also promotes long-term health across generations through optimization of maternal health before conception.

## **The Burden of Poor Preconception Health**

Preconception health challenges remain substantial in many low- and middle-income countries. Major concerns include:

- High prevalence of unintended pregnancies.
- Maternal anaemia.
- Micronutrient deficiencies.
- Obesity and overweight.
- Diabetes mellitus.
- Thyroid disorders.
- Hypertension.
- Mental health disorders.
- Tobacco and alcohol consumption.
- Genetic disorders.
- Vaccine-preventable infections.

Many of these conditions remain undiagnosed until pregnancy, when opportunities for prevention become limited.

## **Identifying Women Who Need Preconception Counselling**

Although every woman of reproductive age should receive preconception advice, certain groups particularly benefit from comprehensive counselling. These include:

- Newly married couples.
- Couples planning their first pregnancy.

- Women with infertility.
- Women with previous miscarriage.
- Women with previous stillbirth.
- Women with recurrent pregnancy loss.
- Women with previous congenital anomalies.
- Women with chronic medical disorders.
- Women taking long-term medications.
- Women above 35 years.
- Women with obesity or undernutrition.
- Women with family history of inherited disorders.
- Couples planning assisted reproductive treatment.

Early counselling enables individualized reproductive planning and risk reduction.

## **Assessment of Reproductive Intentions**

Every clinical encounter with a woman of reproductive age should include discussion regarding future pregnancy plans. A simple question such as **"Would you like to become pregnant within the next year?"** provides valuable guidance for subsequent counselling. If pregnancy is desired, structured preconception evaluation should be initiated. If pregnancy is not desired, effective contraception and reproductive health promotion should be discussed while continuing preventive healthcare. This reproductive life planning approach enables women to make informed decisions regarding fertility, contraception, pregnancy timing, and family size.

## **Comprehensive Risk Assessment**

Effective counselling begins with a detailed assessment of potential risk factors.

## **Medical History**

Important components include:

- Diabetes mellitus
- Hypertension
- Thyroid disease
- Epilepsy
- Asthma
- Cardiac disease
- Renal disorders
- Autoimmune disorders
- Psychiatric illness
- Tuberculosis
- Previous surgeries

Optimization of these conditions before conception significantly improves maternal and fetal outcomes.

## **Obstetric History**

Previous pregnancy outcomes should be reviewed carefully. Particular attention should be given to:

- Miscarriage

- Stillbirth
- Preterm birth
- Congenital anomalies
- Gestational diabetes
- Hypertensive disorders
- Postpartum haemorrhage
- Caesarean delivery

Previous adverse pregnancy outcomes often recur unless appropriate preventive measures are instituted before conception.

## **Lifestyle Optimization**

Lifestyle modification forms the foundation of successful preconception care.

## **Body Weight**

Body mass index should ideally be optimized before conception. Women with obesity experience increased risks of:

- Infertility
- Miscarriage
- Neural tube defects
- Gestational diabetes
- Hypertension
- Caesarean delivery
- Stillbirth
- Macrosomia

Conversely, underweight women face increased risks of infertility, fetal growth restriction, preterm birth, and nutritional deficiencies. Weight reduction of 5–10% among overweight women substantially improves fertility, ovulatory function, insulin sensitivity, and pregnancy outcomes.

## **Nutrition**

Nutritional counselling should emphasize balanced diets rich in:

- Fruits
- Vegetables
- Whole grains
- Dairy products
- Lean protein
- Healthy fats

Women should receive individualized advice according to dietary habits, vegetarian status, socioeconomic factors, and nutritional deficiencies.

## **Physical Activity**

Regular exercise improves:

- Ovulation
- Insulin sensitivity
- Weight control
- Cardiovascular health
- Mental well-being
- Pregnancy outcomes

Women should be encouraged to engage in at least 150 minutes of moderate-intensity physical activity each week before conception.

## **Smoking**

Smoking adversely affects both female and male fertility. Maternal smoking increases risks of:

- Infertility
- Miscarriage
- Placental abruption
- Placenta previa
- Preterm birth
- Low birth weight
- Sudden infant death syndrome

Complete smoking cessation should be achieved before conception whenever possible. Passive smoking should also be addressed.

## **Alcohol**

No safe level of alcohol consumption has been established during pregnancy. Alcohol exposure before pregnancy recognition may contribute to fetal alcohol spectrum disorders. Women planning pregnancy should discontinue alcohol consumption before conception.

## **Recreational Drugs**

Cannabis, opioids, cocaine, amphetamines, and other recreational substances negatively influence fertility and fetal development. Women

should receive appropriate counselling, addiction support, and referral services where required.

## **Fertility Awareness**

Counselling should include education regarding the fertile window. Women should understand:

- Menstrual cycle physiology.
- Ovulation timing.
- Cervical mucus changes.
- Basal body temperature.
- Ovulation predictor kits.

Women with irregular cycles may require further evaluation for disorders such as polycystic ovary syndrome, thyroid disease, hyperprolactinemia, or premature ovarian insufficiency. Assessment of ovarian reserve using Anti-Müllerian Hormone (AMH) or antral follicle count may be considered in selected women, particularly those over 35 years or with infertility risk factors.

## **Mental Health Assessment**

Mental health represents an often overlooked component of preconception care. Depression, anxiety, chronic stress, previous pregnancy loss, intimate partner violence, and poor social support adversely affect fertility and pregnancy outcomes. Psychological stress influences reproductive function through hypothalamic-pituitary-ovarian axis dysregulation, potentially resulting in menstrual irregularities, anovulation, infertility, miscarriage, and adverse obstetric

outcomes. Validated screening tools such as PHQ-4, PHQ-9, GAD-7, and the Edinburgh Postnatal Depression Scale may be incorporated into routine preconception practice for women with identified risk factors. Women with significant symptoms should be referred for psychological evaluation and treatment before conception.

## **Chronic Disease Optimization**

Women with chronic medical disorders require disease stabilization before pregnancy. Important conditions include:

- Diabetes mellitus
- Thyroid disorders
- Hypertension
- Epilepsy
- Asthma
- Chronic kidney disease
- Cardiac disorders
- Autoimmune diseases

Medication review is equally important because several commonly prescribed drugs possess teratogenic potential. Close collaboration between obstetricians and relevant specialists facilitates individualized management.

## **Medication Review**

All prescription medications, over-the-counter drugs, herbal supplements, and nutraceuticals should be reviewed before conception. Potentially teratogenic medications requiring substitution include:

- ACE inhibitors
- Angiotensin receptor blockers
- Sodium valproate
- Methotrexate
- Mycophenolate mofetil
- Isotretinoin
- Warfarin
- Certain antineoplastic agents

Whenever possible, safer alternatives should be introduced before pregnancy.

## **Vaccination Counselling**

Preconception counselling should include assessment of immunization status. Vaccines commonly recommended before pregnancy include:

- Measles-Mumps-Rubella (MMR)
- Varicella
- Hepatitis B
- Human Papillomavirus (HPV)
- Influenza
- COVID-19

Live vaccines should be administered at least four weeks before conception, whereas inactivated vaccines may be given according to national recommendations. Appropriate vaccination protects both mother and infant through passive transfer of maternal antibodies.

## **Genetic Counselling**

Family history remains an important component of preconception assessment. Genetic counselling should be considered for:

- Recurrent pregnancy loss
- Previous child with congenital anomaly
- Intellectual disability
- Consanguineous marriage
- Family history of inherited disorders
- Hemoglobinopathies
- Chromosomal abnormalities

Carrier screening facilitates informed reproductive decision-making and reduces recurrence risk.

## **Psychosocial Counselling**

Holistic preconception care extends beyond physical health. Healthcare providers should discuss:

- Family support
- Marital relationships
- Occupational hazards
- Domestic violence
- Financial preparedness
- Work-life balance
- Sleep hygiene

- Stress management

Partner participation enhances counselling effectiveness and encourages shared responsibility for reproductive health.

## **Components of an Ideal Preconception Visit**

A comprehensive consultation should include:

- Reproductive life planning
- Medical history
- Family history
- Lifestyle assessment
- Physical examination
- Nutritional evaluation
- Laboratory investigations
- Medication review
- Vaccination assessment
- Genetic counselling
- Mental health screening
- Fertility counselling
- Birth spacing advice
- Individualized follow-up plan

This structured approach enables comprehensive risk reduction before conception.

## **Public Health Perspective**

Preconception counselling aligns closely with the Sustainable Development Goals by reducing maternal mortality, neonatal mortality, congenital anomalies, and childhood disability. Integrating preconception care into routine outpatient services, primary healthcare, family planning clinics, adolescent health programmes, infertility services, and chronic disease clinics expands access to preventive reproductive healthcare. Every healthcare professional caring for women of reproductive age—including obstetricians, physicians, endocrinologists, family physicians, paediatricians, and nurses—should incorporate preconception counselling into routine practice. Such integration supports healthier pregnancies, healthier mothers, and healthier future generations.

## **Conclusion**

General preconception counselling is a comprehensive, evidence-based intervention that extends beyond preparation for pregnancy to encompass lifelong reproductive health. By identifying and modifying medical, nutritional, behavioural, environmental, psychological, and genetic risk factors before conception, healthcare providers can substantially reduce preventable maternal and neonatal complications. Routine assessment of reproductive intentions, lifestyle optimization, chronic disease management, mental health screening, medication review, immunization, and fertility education should become standard components of care for all women of reproductive age. Integrating preconception counselling into everyday clinical practice represents one

of the most effective strategies for improving maternal, fetal, and child health while promoting healthier families and communities.

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## CHAPTER 02

# Preconception Investigations: A Comprehensive Approach to Risk Assessment and Optimization Before Pregnancy

### IN THIS CHAPTER

Objectives of Preconception Investigations

Candidates for Preconception Evaluation

Comprehensive Clinical Assessment

Baseline Laboratory Investigations

Complete Blood Count

Blood Group and Rh Typing

## Introduction

Preconception care has emerged as one of the most important preventive strategies in reproductive medicine. It aims to identify, evaluate, and modify biomedical, behavioral, environmental, nutritional, and psychosocial factors before conception to improve maternal, fetal, and neonatal outcomes. Preconception investigations constitute the foundation of this process by enabling early identification of medical

disorders, nutritional deficiencies, infectious diseases, genetic conditions, and lifestyle-related risk factors that may adversely influence fertility and pregnancy.

Nearly half of all pregnancies worldwide are unintended, and an even higher proportion occur without prior medical consultation in many developing countries. Consequently, many women enter pregnancy with undiagnosed chronic illnesses, untreated nutritional deficiencies, inappropriate medications, or preventable infections. Since embryogenesis begins immediately after conception and major organ systems develop within the first few weeks of gestation, many adverse influences act before the first antenatal visit. Therefore, comprehensive evaluation before conception offers a unique opportunity to optimize maternal health, reduce preventable complications, and improve lifelong health outcomes for both mother and child.

## **| Objectives of Preconception Investigations**

The primary objectives of preconception investigations are to identify modifiable maternal and fetal risk factors, optimize chronic medical disorders, detect nutritional deficiencies, review medication safety, assess genetic risks, evaluate immunity against vaccine-preventable diseases, and initiate appropriate interventions before conception. A structured preconception evaluation also provides an opportunity to counsel couples regarding healthy lifestyle practices, reproductive planning, folic acid supplementation, immunization, and appropriate pregnancy timing.

Rather than relying on routine investigations for every woman, modern preconception care advocates an individualized approach based on age,

medical history, family history, obstetric history, occupational exposure, and specific risk factors. Such risk-based evaluation ensures judicious use of investigations while maximizing maternal and fetal benefits.

## **Candidates for Preconception Evaluation**

Every woman of reproductive age should be offered preconception counselling whenever pregnancy is anticipated. However, certain groups derive particular benefit from comprehensive preconception investigations. These include women planning their first pregnancy, couples seeking pregnancy after marriage, women in the interpregnancy period, women with infertility or recurrent pregnancy loss, those with previous adverse pregnancy outcomes, women with chronic medical disorders, women taking long-term medications, those with hereditary disorders, women exposed to occupational hazards, and couples with a family history of congenital anomalies or genetic diseases. Preconception evaluation is equally valuable before assisted reproductive techniques, where optimization of maternal health contributes significantly to treatment success.

## **Comprehensive Clinical Assessment**

The preconception consultation begins with a detailed medical history and physical examination. History should include menstrual regularity, obstetric outcomes, infertility evaluation, contraception, previous surgeries, chronic illnesses, medication use, allergies, vaccination status, family history of hereditary disorders, occupational exposures, dietary habits, smoking, alcohol consumption, recreational drug use, physical activity, mental health, and psychosocial circumstances.

A complete physical examination includes measurement of height, weight, body mass index (BMI), blood pressure, pulse rate, thyroid examination, breast examination, cardiovascular assessment, respiratory examination, abdominal examination, pelvic examination when indicated, and assessment of nutritional status. Early identification of obesity, undernutrition, hypertension, thyroid enlargement, cardiac murmurs, or other abnormalities allows timely referral and intervention before conception.

## **Baseline Laboratory Investigations**

Although laboratory investigations should be individualized, several baseline tests are recommended for most women planning pregnancy.

## **Complete Blood Count**

Complete blood count (CBC) is an essential component of preconception evaluation. It identifies anemia, polycythemia, leukocytosis, thrombocytopenia, and other hematological abnormalities. Peripheral blood smear examination may provide additional information regarding iron deficiency, megaloblastic anemia, hemoglobinopathies, or hemolytic disorders.

Iron deficiency remains the commonest cause of anemia among women of reproductive age. Serum ferritin should be performed when iron deficiency is suspected despite normal hemoglobin values. Serum vitamin B12 and folate estimation may be indicated in women with macrocytic anemia, vegetarian diets, gastrointestinal disorders, or neurological symptoms. Correction of anemia before pregnancy reduces maternal morbidity, postpartum hemorrhage, preterm birth, fetal growth restriction, and neonatal complications.

## **Blood Group and Rh Typing**

Determination of ABO blood group and Rh factor should be performed before pregnancy. Identification of Rh-negative women facilitates appropriate counselling regarding Rh immunoglobulin prophylaxis during future pregnancies and after sensitizing events.

## **Urinalysis**

Routine urine examination identifies proteinuria, glycosuria, hematuria, pyuria, and urinary tract infections. Women with recurrent urinary tract infections, diabetes, renal disease, or previous adverse pregnancy outcomes may require urine culture before conception.

## **Screening for Diabetes Mellitus**

Diabetes mellitus significantly increases the risk of miscarriage, congenital anomalies, fetal macrosomia, preeclampsia, stillbirth, and neonatal complications. Screening before conception allows optimization of glycemic control before organogenesis begins.

Women without known diabetes should undergo fasting blood glucose assessment or HbA1c when risk factors are present. Women with established diabetes require comprehensive evaluation including HbA1c, renal function, retinal examination, cardiovascular assessment, neuropathy screening, and urine albumin estimation. An HbA1c target below 6.5% is generally recommended before conception whenever achievable without significant hypoglycemia. Potentially teratogenic medications should be discontinued and replaced with pregnancy-

compatible therapies such as insulin or selected oral agents where appropriate.

## **Evaluation of Hypertension**

Blood pressure should be measured in all women planning pregnancy. Women with chronic hypertension require evaluation for target organ damage including renal disease, left ventricular hypertrophy, retinopathy, and cardiovascular complications.

Baseline investigations may include serum creatinine, electrolytes, urine protein assessment, electrocardiography, and echocardiography in selected patients. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should be discontinued before conception because of their teratogenic potential. Pregnancy-compatible antihypertensive medications should be initiated when indicated, and women at high risk of preeclampsia should receive individualized counselling regarding low-dose aspirin prophylaxis after conception.

## **Thyroid Function Assessment**

Normal thyroid function is essential for fertility, implantation, placental development, and fetal neurodevelopment. Thyroid dysfunction may impair conception and increase the risk of miscarriage, preterm birth, hypertensive disorders, and adverse neonatal outcomes.

Thyroid-stimulating hormone (TSH) is the preferred initial screening test. Free thyroxine measurement is indicated when TSH is abnormal. Women with subclinical hypothyroidism may require anti-thyroid peroxidase antibody testing to guide treatment decisions. Levothyroxine dosage should be optimized before conception, and women should be

counselled regarding the increased thyroid hormone requirement during pregnancy.

Women with hyperthyroidism require disease stabilization before pregnancy. Radioactive iodine therapy should be avoided in women planning pregnancy within the following months, while surgery may be considered in selected cases. Medication review is essential because methimazole exposure during early pregnancy has been associated with embryopathy.

## **Nutritional Assessment**

Maternal nutritional status directly influences fertility, embryonic development, placental function, fetal growth, and long-term offspring health.

Body mass index should be calculated for every woman. Obesity increases the risk of infertility, gestational diabetes, hypertensive disorders, cesarean delivery, congenital anomalies, and stillbirth. Weight reduction through dietary modification and regular physical activity should be encouraged before conception. Even modest weight loss significantly improves metabolic health and reproductive outcomes.

Women with severe obesity may benefit from bariatric surgery, although pregnancy should generally be postponed until nutritional status stabilizes after surgery. Conversely, underweight women require evaluation for chronic illnesses, eating disorders, malabsorption syndromes, and nutritional deficiencies before attempting conception.

## **Evaluation of Respiratory Disorders**

Asthma is among the commonest chronic diseases encountered during reproductive age. Poorly controlled asthma is associated with maternal hypoxia, fetal growth restriction, preterm birth, and pregnancy complications.

Preconception evaluation should assess symptom control, pulmonary function when indicated, medication adherence, and trigger avoidance. Inhaled corticosteroids and beta-agonists remain the preferred maintenance therapies, whereas unnecessary long-term systemic corticosteroids should be minimized whenever clinically feasible. Collaborative management involving obstetricians and respiratory physicians optimizes pregnancy outcomes.

## **Neurological Disorders**

Women with epilepsy require careful preconception planning because both seizures and antiepileptic medications influence pregnancy outcomes.

Medication review aims to achieve seizure control using monotherapy at the lowest effective dose whenever possible. Drugs with high teratogenic potential should be avoided when suitable alternatives exist. Women taking antiepileptic medications should receive high-dose folic acid supplementation beginning before conception. Multidisciplinary management involving neurologists and obstetricians reduces maternal and fetal risks.

## **Cardiovascular Assessment**

Pregnancy imposes major physiological demands on the cardiovascular system. Women with congenital or acquired heart disease should undergo comprehensive cardiac evaluation before conception.

Assessment may include electrocardiography, echocardiography, functional capacity evaluation, and medication review. Women receiving anticoagulation require transition from warfarin to pregnancy-compatible alternatives before conception when indicated. Pregnancy may be contraindicated in selected women with severe pulmonary hypertension, markedly impaired ventricular function, advanced valvular disease, or previous peripartum cardiomyopathy. Early specialist consultation facilitates individualized risk assessment and counselling.

## **Renal Evaluation**

Chronic kidney disease increases maternal and fetal risks including hypertension, preeclampsia, fetal growth restriction, preterm birth, and progressive renal dysfunction.

Preconception evaluation includes serum creatinine, estimated glomerular filtration rate, blood urea nitrogen, electrolyte assessment, urinalysis, urine protein estimation, urine culture, and renal ultrasonography when indicated. Women with renal transplantation require individualized counselling regarding timing of pregnancy, immunosuppressive medications, and multidisciplinary follow-up involving nephrologists and maternal-fetal medicine specialists.

## **Autoimmune Disorders**

Women with systemic lupus erythematosus, antiphospholipid syndrome, rheumatoid arthritis, inflammatory bowel disease, and other autoimmune disorders require careful assessment before conception.

Disease activity should ideally remain well controlled for at least six months before pregnancy. Teratogenic medications such as methotrexate and mycophenolate mofetil should be discontinued and replaced with safer alternatives. Autoantibody testing, renal function assessment, and evaluation for thrombotic risk may be required according to the underlying disease.

## **Infectious Disease Screening**

Preconception screening should include evaluation for HIV, hepatitis B, hepatitis C, syphilis, tuberculosis, and sexually transmitted infections according to individual risk factors and national recommendations.

Women lacking immunity to rubella or varicella should receive vaccination before conception. Screening and treatment of genital infections reduce adverse pregnancy outcomes including miscarriage, preterm birth, neonatal infection, and congenital disease.

## **Genetic Screening**

Family history remains the cornerstone of genetic risk assessment. Couples with previous children affected by congenital anomalies, recurrent pregnancy loss, consanguinity, intellectual disability, or inherited disorders should receive genetic counselling before conception.

Carrier screening may be indicated for thalassemia, sickle cell disease, spinal muscular atrophy, cystic fibrosis, fragile X syndrome, and other inherited conditions depending on ethnicity and family history. Appropriate counselling allows informed reproductive decision-making and discussion of prenatal diagnosis or assisted reproductive options when necessary.

## **Mental Health Evaluation**

Mental health disorders frequently remain underdiagnosed during the preconception period. Screening for depression, anxiety disorders, bipolar disorder, substance abuse, eating disorders, and psychosocial stress should form part of routine evaluation.

Women receiving psychotropic medications require individualized assessment balancing maternal disease control against fetal safety. Psychological counselling, social support, and coordinated psychiatric care improve maternal well-being and pregnancy outcomes.

## **Medication Review**

Every prescribed, over-the-counter, and herbal medication should be reviewed before conception. Potentially teratogenic drugs should be discontinued whenever possible and replaced with pregnancy-compatible alternatives.

Particular attention should be given to antihypertensive agents, antiepileptic medications, anticoagulants, retinoids, immunosuppressive drugs, antithyroid medications, psychotropic agents, and weight-loss medications. Medication optimization before conception reduces fetal exposure during the critical period of organogenesis.

## **Lifestyle and Environmental Assessment**

Lifestyle counselling is an integral component of preconception evaluation. Smoking cessation, avoidance of alcohol and recreational drugs, regular exercise, healthy nutrition, adequate sleep, and stress management significantly improve reproductive outcomes.

Occupational exposure to radiation, pesticides, heavy metals, organic solvents, and industrial chemicals should be assessed. Women should also receive counselling regarding dental health, environmental toxins, domestic violence, and workplace hazards that may influence pregnancy outcomes.

## **Conclusion**

Preconception investigations provide the scientific foundation for individualized reproductive care by identifying medical, nutritional, genetic, infectious, environmental, and psychosocial risk factors before conception. Comprehensive assessment enables timely optimization of chronic diseases, correction of nutritional deficiencies, medication review, immunization, lifestyle modification, and targeted interventions that substantially reduce maternal and neonatal morbidity. Integrating structured preconception investigations into routine healthcare transforms pregnancy from a reactive process into a preventive strategy, ensuring that women enter pregnancy in the best possible state of health and thereby improving outcomes for future generations.

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## CHAPTER 03

# Preconception Nutrition: Optimizing Nutritional Status Before Pregnancy

### IN THIS CHAPTER

Importance of Preconception Nutrition

The Indian Perspective

Objectives of Preconception Nutritional Assessment

Nutritional Assessment Before Pregnancy

Medical and Dietary History

Anthropometric Assessment

## Introduction

Preconception nutrition is a fundamental pillar of reproductive health and one of the most effective interventions for improving maternal, fetal, and neonatal outcomes. Nutritional status before conception significantly influences fertility, implantation, placentation, embryogenesis, fetal growth, birth outcomes, and the long-term health of the offspring. The preconception period provides a unique opportunity to identify and correct nutritional deficiencies, optimize body weight, improve metabolic health, and establish healthy dietary practices before pregnancy begins. Since critical developmental events

such as implantation, placentation, and organogenesis occur within the first few weeks after conception, interventions initiated after pregnancy recognition may be too late to prevent several adverse outcomes. Therefore, nutritional optimization should begin before conception and continue throughout pregnancy and lactation. The World Health Organization (WHO) and the International Federation of Gynecology and Obstetrics (FIGO) recognize preconception nutrition as a cornerstone of comprehensive preconception care. Nutritional counselling should not merely focus on dietary advice but should include screening for anemia and micronutrient deficiencies, optimization of body mass index (BMI), identification of metabolic disorders, correction of unhealthy eating habits, folic acid supplementation, and individualized dietary planning for both partners. Such an integrated approach improves fertility, reduces pregnancy complications, and contributes to healthier future generations.

## **Importance of Preconception Nutrition**

Nutrition during the preconception period has profound effects on reproductive physiology. Adequate nutrient stores are essential for ovulation, hormonal balance, fertilization, embryo implantation, placental development, and fetal organogenesis. Deficiencies of essential vitamins and minerals, obesity, undernutrition, insulin resistance, and poor dietary quality increase the risk of infertility, miscarriage, congenital anomalies, fetal growth restriction, preterm birth, hypertensive disorders, gestational diabetes, and long-term metabolic diseases in the offspring. The concept of the **Developmental Origins of Health and Disease (DOHaD)** suggests that maternal nutritional status before and during early pregnancy programs fetal gene

expression and metabolism through epigenetic mechanisms. Nutritional insults during this critical period may predispose children to obesity, hypertension, diabetes mellitus, cardiovascular disease, and metabolic syndrome later in life. Consequently, improving maternal nutrition before conception benefits not only pregnancy outcomes but also the lifelong health of the next generation.

## **The Indian Perspective**

India faces a unique nutritional challenge characterized by the coexistence of undernutrition and overnutrition. While a substantial proportion of women continue to suffer from anemia, protein deficiency, vitamin deficiencies, and low BMI, an increasing number are affected by obesity, insulin resistance, polycystic ovary syndrome (PCOS), non-alcoholic fatty liver disease, and metabolic syndrome. This "double burden of malnutrition" poses significant challenges for reproductive health. Vegetarian dietary patterns, common in many parts of India, may provide inadequate amounts of vitamin B12, highly bioavailable iron, complete proteins, calcium, omega-3 fatty acids, and zinc if not appropriately planned. Frequent pregnancies, menstrual blood loss, food taboos, inadequate dietary diversity, excessive tea or coffee consumption with meals, and socioeconomic disparities further contribute to nutritional deficiencies. Therefore, preconception nutritional counselling in India must be individualized, culturally acceptable, economically feasible, and based on locally available foods rather than generalized dietary recommendations.

## **Objectives of Preconception Nutritional Assessment**

The goals of nutritional assessment before pregnancy include:

- Identification of nutritional deficiencies.
- Optimization of BMI.
- Improvement of metabolic health.
- Prevention of congenital anomalies.
- Enhancement of fertility.
- Reduction of pregnancy complications.
- Promotion of healthy dietary habits.
- Correction of unhealthy lifestyle practices.
- Individualized supplementation where required.
- Nutritional counselling for both partners.

Preconception nutrition should therefore be regarded as a preventive healthcare intervention rather than merely dietary advice.

## **Nutritional Assessment Before Pregnancy**

A comprehensive nutritional assessment forms the basis of individualized counselling.

## **Medical and Dietary History**

Assessment should include:

- Dietary pattern (vegetarian/non-vegetarian)
- Meal frequency and diversity
- Intake of fruits, vegetables, dairy products, and protein
- Consumption of processed foods
- Tea and coffee intake
- Alcohol and tobacco use

- Previous nutritional deficiencies
- History of eating disorders
- Physical activity
- Weight changes
- Medical disorders such as diabetes, thyroid disease, PCOS, gastrointestinal disorders, or malabsorption syndromes

## Anthropometric Assessment

Measurement of height, weight, BMI, waist circumference, and body composition helps identify women who are underweight, overweight, or obese. The ideal preconception BMI ranges from **18.5 to 24.9 kg/m<sup>2</sup>**. Women outside this range should receive individualized counselling and weight management before conception.

## Body Weight and Pregnancy Outcomes

### Underweight

Women with BMI below 18.5 kg/m<sup>2</sup> are more likely to experience:

- Delayed conception
- Ovulatory dysfunction
- Nutritional deficiencies
- Miscarriage
- Preterm birth
- Low birth weight
- Small-for-gestational-age infants
- Reduced maternal nutritional reserves

Management focuses on gradual weight gain through energy-dense, nutrient-rich foods, correction of underlying illnesses, treatment of eating disorders where present, and adequate protein intake.

## **Overweight and Obesity**

Obesity has emerged as one of the most important modifiable preconception risk factors. Maternal obesity increases the likelihood of:

- Infertility
- Polycystic ovary syndrome
- Gestational diabetes mellitus
- Hypertensive disorders
- Cesarean delivery
- Congenital anomalies
- Fetal macrosomia
- Stillbirth
- Childhood obesity

Even a modest reduction of 5–10% of body weight before conception significantly improves ovulatory function, insulin sensitivity, and pregnancy outcomes. Lifestyle modification combining dietary intervention and regular physical activity remains the first-line treatment.

## **Macronutrient Requirements**

Balanced nutrition requires adequate intake of carbohydrates, proteins, and fats.

## Carbohydrates

Complex carbohydrates should constitute approximately 45–60% of total daily energy intake. Whole grains, millets, legumes, fruits, and vegetables provide sustained energy while maintaining glycemic control. Highly refined carbohydrates and sugar-sweetened beverages should be minimized because they contribute to insulin resistance and obesity.

## Proteins

Adequate protein intake is essential for follicular development, embryo implantation, placental growth, and fetal tissue formation. Women planning pregnancy should consume approximately **1.0–1.2 g/kg/day** of protein depending on BMI and physical activity. High-quality protein sources include:

- Milk and dairy products
- Eggs
- Fish
- Poultry
- Lean meat
- Soy products
- Pulses and legumes
- Nuts and seeds

Vegetarians should combine cereals and pulses to improve protein quality and essential amino acid balance.

## Healthy Fats

Healthy fats contribute to hormone synthesis, cell membrane integrity, fetal brain development, and absorption of fat-soluble vitamins. Recommended sources include:

- Nuts
- Seeds
- Olive oil
- Mustard oil
- Groundnut oil
- Fatty fish
- Flaxseed
- Walnuts

Trans fats and excessive saturated fats should be avoided.

## Micronutrient Nutrition

### Iron

Iron deficiency anemia remains one of the most common nutritional disorders among women of reproductive age. Iron deficiency contributes to:

- Maternal fatigue
- Reduced fertility
- Preterm birth
- Low birth weight

- Maternal mortality
- Postpartum hemorrhage

Women should undergo hemoglobin estimation before conception, and iron supplementation should be initiated whenever deficiency is identified.

## **Folic Acid**

Folic acid is indispensable for DNA synthesis and neural tube development. Routine supplementation of **400 µg daily** should begin at least one month before conception and continue through the first trimester. Women at high risk—including those with previous neural tube defect-affected pregnancies, diabetes, obesity, malabsorption disorders, or antiepileptic medication use—should receive **4–5 mg daily** under medical supervision.

## **Vitamin B12**

Vitamin B12 deficiency is increasingly recognized among vegetarian populations. Deficiency may result in:

- Infertility
- Neural tube defects
- Recurrent miscarriage
- Megaloblastic anemia
- Neurodevelopmental impairment

Women consuming vegetarian diets should be screened when clinically indicated and supplemented appropriately.

## **Vitamin D**

Vitamin D deficiency is highly prevalent despite abundant sunlight in many regions. Low vitamin D levels have been associated with:

- Infertility
- PCOS
- Endometriosis
- Gestational diabetes
- Preeclampsia
- Reduced bone mineralization

Supplementation should be individualized according to serum vitamin D concentrations and local guidelines.

## **Calcium**

Adequate calcium intake before conception contributes to maternal bone health and reduces the risk of hypertensive disorders during pregnancy. Dairy products, ragi, sesame seeds, green leafy vegetables, and fortified foods are important dietary sources.

## **Iodine**

Iodine is essential for thyroid hormone synthesis and fetal brain development. Women planning pregnancy should ensure adequate iodine intake through iodized salt and iodine-rich foods. Deficiency increases the risk of miscarriage, hypothyroidism, congenital hypothyroidism, and impaired neurodevelopment.

## **Omega-3 Fatty Acids**

Omega-3 fatty acids, particularly DHA, contribute to fetal brain and retinal development. Women who do not consume fish may obtain omega-3 fatty acids from flaxseed, chia seeds, walnuts, or algae-derived supplements.

## **Nutrition in Polycystic Ovary Syndrome**

PCOS is frequently associated with obesity, insulin resistance, metabolic syndrome, and infertility. Dietary management should emphasize:

- Weight reduction when overweight
- Low glycemic index foods
- Increased dietary fibre
- Adequate protein intake
- Regular physical activity
- Limitation of processed foods and sugary beverages

Even modest weight loss can restore ovulation and improve fertility.

## **Male Nutrition**

Male nutritional status also influences reproductive outcomes. Obesity, smoking, alcohol, micronutrient deficiencies, and poor dietary habits adversely affect sperm count, motility, morphology, and DNA integrity. Couples should therefore receive joint nutritional counselling emphasizing healthy body weight, balanced nutrition, regular exercise,

adequate sleep, and avoidance of tobacco, alcohol, and recreational drugs.

## **Lifestyle Measures Supporting Nutrition**

Nutritional counselling should be integrated with healthy lifestyle practices, including:

- Regular physical activity (at least 150 minutes/week)
- Adequate hydration
- Seven to eight hours of quality sleep
- Stress management
- Avoidance of tobacco, alcohol, and recreational drugs
- Limitation of ultra-processed foods
- Mindful eating habits

These measures enhance metabolic health and complement nutritional interventions.

## **Conclusion**

Preconception nutrition is a cornerstone of preventive reproductive healthcare. Optimizing nutritional status before conception improves fertility, supports healthy implantation and placentation, reduces congenital anomalies, lowers maternal and neonatal complications, and promotes lifelong health in offspring. A comprehensive preconception nutritional assessment should include evaluation of BMI, dietary quality, lifestyle, micronutrient status, metabolic health, and chronic medical conditions. Individualized counselling, correction of nutritional deficiencies, appropriate supplementation, and culturally appropriate

dietary planning for both partners should become routine components of preconception care. Integrating nutrition into every preconception consultation provides a valuable opportunity to improve pregnancy outcomes and contribute to healthier families and communities.

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## CHAPTER 04

# Preconception Counselling and Folic Acid Supplementation: A Comprehensive Approach to Optimizing Pregnancy Outcomes

### IN THIS CHAPTER

Importance of Preconception Counselling

Who Should Receive Preconception Counselling?

Components of a Comprehensive Preconception Assessment

Lifestyle Modification Before Pregnancy

Nutritional Assessment and Micronutrient Supplementation

Medical Disorders Requiring Optimization

Preconception counselling (PCC) is a proactive, evidence-based healthcare strategy designed to optimize the health of women and couples before conception, thereby improving maternal, fetal, and neonatal outcomes. Rather than beginning care after pregnancy is

confirmed, preconception care recognizes that the health of both parents before conception significantly influences pregnancy success, fetal development, and the lifelong health of the offspring. The World Health Organization (WHO) defines preconception care as the provision of biomedical, behavioral, and social health interventions before conception to improve pregnancy outcomes and reduce maternal and child morbidity and mortality. Similarly, the Centers for Disease Control and Prevention (CDC) describes preconception care as a series of interventions aimed at identifying and modifying risks before pregnancy through prevention, education, and appropriate management.

Pregnancy is often recognized only after several weeks of gestation, by which time organogenesis has already commenced. Critical developmental events such as neural tube closure occur by the 25th–28th day after conception, making interventions initiated after pregnancy confirmation less effective in preventing congenital anomalies. Consequently, optimizing maternal nutrition, controlling chronic diseases, reviewing medications, ensuring immunization, and initiating folic acid supplementation before conception are fundamental components of modern reproductive healthcare.

## **Importance of Preconception Counselling**

Preconception counselling aims to prepare women physically, mentally, socially, and nutritionally for pregnancy. It provides an opportunity to identify modifiable risk factors that may adversely affect fertility, pregnancy, fetal growth, delivery, and neonatal health. The objectives include reducing maternal and neonatal morbidity and mortality, preventing congenital anomalies, improving pregnancy planning,

promoting healthy lifestyle practices, and ensuring that women enter pregnancy in optimal health.

The concept is particularly relevant in countries such as India, where a significant proportion of pregnancies remain unplanned and nutritional deficiencies, anemia, obesity, diabetes, hypertension, and infectious diseases continue to contribute substantially to adverse maternal and neonatal outcomes. Early counselling enables healthcare providers to address these issues before conception, reducing complications that are difficult to modify once pregnancy has begun.

## **Who Should Receive Preconception Counselling?**

Preconception counselling should be considered a routine component of reproductive healthcare for every woman of childbearing age, irrespective of whether pregnancy is immediately planned. Women most likely to benefit include those planning pregnancy within the next year, recently married couples, women with infertility or recurrent pregnancy loss, couples seeking spacing between pregnancies, women with chronic medical illnesses, women taking long-term medications, women with genetic disorders or a family history of congenital anomalies, and women exposed to tobacco, alcohol, recreational drugs, or occupational hazards. Women living with HIV or other sexually transmitted infections also require individualized counselling to minimize vertical transmission and optimize pregnancy outcomes.

Importantly, preconception counselling is increasingly recognized as a couple-based intervention. Male health, including smoking, alcohol consumption, obesity, diabetes, occupational exposures, and genetic disorders, influences sperm quality, fertilization, embryo development,

and pregnancy outcomes. Therefore, counselling should actively involve both partners whenever possible.

## **Components of a Comprehensive Preconception Assessment**

A systematic preconception evaluation begins with a detailed medical, surgical, obstetric, menstrual, medication, family, occupational, dietary, lifestyle, and psychosocial history. Physical examination includes measurement of body mass index (BMI), blood pressure, cardiovascular assessment, thyroid examination, and general nutritional evaluation.

Laboratory investigations should be individualized according to patient characteristics and risk factors. Baseline investigations generally include complete blood count, blood grouping and Rh typing, blood glucose estimation or HbA1c where indicated, thyroid function tests in high-risk women, screening for HIV, hepatitis B, syphilis, rubella immunity, urine examination, and additional investigations such as hemoglobin electrophoresis or genetic carrier screening in selected populations. Women with previous adverse pregnancy outcomes may require thrombophilia evaluation, autoimmune screening, or specialized genetic testing.

## **Lifestyle Modification Before Pregnancy**

Lifestyle optimization represents one of the most effective interventions during the preconception period. Women should be encouraged to achieve a healthy BMI through balanced nutrition and regular physical activity. Obesity increases the risk of infertility, miscarriage, gestational diabetes, hypertensive disorders, cesarean delivery, congenital anomalies, and stillbirth, whereas undernutrition contributes to anemia,

fetal growth restriction, and low birth weight. Smoking cessation should be strongly encouraged, as tobacco exposure increases infertility, ectopic pregnancy, placental complications, preterm birth, fetal growth restriction, and sudden infant death syndrome. Alcohol should be completely avoided while attempting conception because no safe threshold has been established during pregnancy. Recreational drugs should also be discontinued.

Moderate physical activity for at least 150 minutes per week, stress reduction, adequate sleep, and maintenance of mental well-being contribute significantly to reproductive health. Couples should also receive counselling regarding environmental toxins, occupational exposures, pesticide contact, radiation, heavy metals, and air pollution, all of which may adversely affect fertility and fetal development.

## **Nutritional Assessment and Micronutrient Supplementation**

Adequate maternal nutrition before conception has profound effects on placental development, fetal organogenesis, and long-term metabolic health. Dietary counselling should emphasize consumption of fruits, vegetables, whole grains, legumes, dairy products, lean proteins, and healthy fats while minimizing ultra-processed foods, trans fats, and excessive sugar intake.

Iron deficiency remains one of the most common nutritional disorders among women of reproductive age. Screening for anemia before conception enables timely treatment, reducing the risk of maternal mortality, preterm birth, low birth weight, postpartum hemorrhage, and poor neonatal outcomes. Iron supplementation should be individualized according to hemoglobin levels and iron status.

Additional micronutrients including vitamin D, iodine, vitamin B12, calcium, zinc, and omega-3 fatty acids should be supplemented when deficiency is suspected or confirmed. Women following vegetarian or vegan diets require particular attention to vitamin B12 intake.

## **Medical Disorders Requiring Optimization**

### **Anemia**

Anemia should be identified and corrected before conception. Iron deficiency remains the leading cause, although folate deficiency, vitamin B12 deficiency, hemoglobinopathies, chronic diseases, and parasitic infestations should also be considered. Women should undergo hemoglobin estimation, and treatment should continue until iron stores are replenished. Correction of anemia before pregnancy substantially reduces maternal and perinatal complications.

### **Diabetes Mellitus**

Pregestational diabetes is associated with spontaneous abortion, congenital malformations, fetal macrosomia, stillbirth, neonatal hypoglycemia, and maternal complications. Preconception counselling should aim to achieve excellent glycemic control before conception, preferably with HbA1c below 6.5% without significant hypoglycemia. Women should undergo retinal examination, renal function assessment, thyroid evaluation, cardiovascular assessment, and medication review. Potentially teratogenic drugs should be discontinued, and insulin therapy initiated whenever necessary. Effective contraception should continue until optimal metabolic control is achieved.

## **Hypertension**

Women with chronic hypertension require blood pressure optimization before conception. Secondary causes should be investigated when indicated, and target organ damage should be assessed. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers are contraindicated during pregnancy because of fetal toxicity and should be replaced with pregnancy-compatible antihypertensive medications before conception. Lifestyle modification, dietary sodium restriction, regular exercise, and weight management remain essential components of care.

## **Thyroid Disorders**

Both hypothyroidism and hyperthyroidism may impair fertility and increase the risk of miscarriage, preeclampsia, preterm birth, and impaired neurodevelopment. Women with known thyroid disease should achieve euthyroidism before conception. Levothyroxine dosage often requires adjustment immediately after pregnancy confirmation, emphasizing the importance of preconception planning.

## **Epilepsy**

Women with epilepsy require individualized counselling balancing seizure control against teratogenic medication risks. Wherever possible, monotherapy at the lowest effective dose should be used before conception. High-dose folic acid supplementation is recommended because several antiepileptic medications interfere with folate metabolism.

## **Cardiac Disease**

Women with congenital or acquired cardiac disorders should undergo comprehensive cardiovascular evaluation before pregnancy. Risk stratification helps identify women in whom pregnancy may be safely undertaken and those in whom pregnancy poses unacceptable maternal risk. Medication review, surgical correction when indicated, and multidisciplinary management improve outcomes.

## **Autoimmune and Renal Disorders**

Systemic lupus erythematosus, antiphospholipid syndrome, rheumatoid arthritis, inflammatory bowel disease, chronic kidney disease, and other autoimmune conditions should ideally remain clinically stable for several months before conception. Disease activity, medication safety, renal function, and immunological status should be carefully evaluated before pregnancy.

## **Mental Health**

Psychological well-being is an integral component of preconception care. Depression, anxiety disorders, bipolar disorder, and schizophrenia require stabilization before conception. Abrupt discontinuation of psychiatric medications should be avoided. Instead, women should receive individualized counselling regarding medication safety, relapse prevention, and psychosocial support.

## **Immunization Before Pregnancy**

Vaccination status should be reviewed before conception. Women lacking immunity should receive appropriate immunization against rubella, varicella, hepatitis B, influenza, tetanus, diphtheria, pertussis, and human papillomavirus according to national recommendations. Live vaccines should be administered at least one month before conception to avoid fetal exposure.

## **Genetic Counselling**

Genetic counselling plays a pivotal role in couples with a history of congenital anomalies, recurrent miscarriages, intellectual disability, consanguinity, or inherited disorders. Carrier screening for thalassemia, sickle cell disease, spinal muscular atrophy, cystic fibrosis, and other inherited conditions should be offered according to ethnic background and family history. Couples identified as carriers should receive counselling regarding reproductive options including prenatal diagnosis and assisted reproductive technologies with preimplantation genetic testing when appropriate.

## **Folic Acid Supplementation: The Cornerstone of Preconception Care**

Among all preconception interventions, folic acid supplementation has demonstrated the greatest impact on preventing congenital anomalies, particularly neural tube defects (NTDs). Folate is a water-soluble B vitamin essential for DNA synthesis, cell division, methylation reactions, and rapid embryonic growth. Neural tube closure occurs approximately 25–28 days after conception, often before pregnancy

recognition. Therefore, supplementation initiated after pregnancy confirmation may fail to prevent NTDs. Women at average risk should receive **400 µg (0.4 mg) of folic acid daily**, beginning at least one month before conception and continuing through the first trimester. Higher-risk women—including those with previous NTD-affected pregnancies, pregestational diabetes, obesity, malabsorption disorders, hemoglobinopathies, antiepileptic drug therapy, or folate metabolism disorders—should receive **4–5 mg daily** under medical supervision.

Beyond prevention of neural tube defects, adequate folate status has been associated with reduced risks of congenital heart defects, cleft lip and palate, certain urinary tract anomalies, preterm birth, placental dysfunction, megaloblastic anemia, and elevated homocysteine levels. Emerging evidence also suggests potential benefits for neurodevelopment, cognitive function, and long-term metabolic health.

## **Public Health Importance**

Integrating preconception counselling into routine primary healthcare represents a cost-effective strategy for improving reproductive health indicators. In low- and middle-income countries, strengthening preconception services can significantly reduce preventable maternal deaths, congenital anomalies, low birth weight, preterm birth, and neonatal mortality. Community awareness programmes, school-based reproductive health education, premarital counselling, digital health platforms, and routine counselling during family planning visits can substantially increase the reach of preconception care.

Healthcare providers, including obstetricians, family physicians, endocrinologists, nutritionists, mental health professionals, and public

health workers, should collaborate to provide multidisciplinary, patient-centered care tailored to each woman's individual risks and reproductive goals.

## **Conclusion**

Preconception counselling has evolved from a supplementary healthcare service into an indispensable component of reproductive medicine. By identifying risk factors before conception, optimizing chronic medical disorders, promoting healthy lifestyles, correcting nutritional deficiencies, updating immunization status, reviewing medications, and initiating timely folic acid supplementation, healthcare providers can significantly improve maternal, fetal, and neonatal outcomes. Universal implementation of comprehensive preconception care has the potential to reduce preventable congenital anomalies, improve pregnancy planning, and contribute to healthier future generations. As reproductive healthcare increasingly emphasizes prevention rather than treatment, preconception counselling should become a routine standard of care for every woman of reproductive age.

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## CHAPTER 05

# Preconception Counselling and Folic Acid Supplementation: Preventing Congenital Anomalies Before Pregnancy

### IN THIS CHAPTER

Need for Preconception Counselling

Goals of Preconception Counselling

Women Who Should Receive Preconception Counselling

Components of Preconception Counselling

Medical History

Obstetric History

## Introduction

Preconception counselling is a comprehensive, evidence-based approach aimed at optimizing the health of women and couples before conception to improve pregnancy outcomes and reduce maternal and neonatal morbidity and mortality. It encompasses biomedical, nutritional, behavioral, genetic, psychosocial, and environmental interventions that identify and modify risk factors before pregnancy occurs. Among all preconception interventions, folic acid supplementation remains one of

the most effective, affordable, and scientifically validated measures for preventing neural tube defects (NTDs) and improving fetal development. The first few weeks after conception represent a critical period of embryogenesis during which organogenesis occurs rapidly. Neural tube closure is completed by approximately 28 days after conception, often before pregnancy is recognized. Consequently, folic acid supplementation initiated after pregnancy confirmation may not provide adequate protection against neural tube defects. Universal preconception counselling and timely folic acid supplementation are therefore essential components of preventive reproductive healthcare.

## **Need for Preconception Counselling**

The burden of adverse pregnancy outcomes remains significant worldwide. Unplanned pregnancies, nutritional deficiencies, obesity, diabetes, thyroid disorders, anemia, sexually transmitted infections, epilepsy, mental health disorders, advanced maternal age, and substance abuse continue to contribute to maternal and neonatal complications. Preconception counselling enables healthcare providers to identify these risks before conception, allowing adequate time for intervention. Women who receive structured preconception care are more likely to enter pregnancy with optimal nutritional status, controlled medical disorders, updated immunization, healthier lifestyles, and appropriate folic acid supplementation. Rather than being limited to high-risk women, preconception counselling should become part of routine healthcare for every woman of reproductive age.

## **Goals of Preconception Counselling**

The objectives of preconception counselling include:

- Promoting healthy pregnancy planning.
- Identifying medical and genetic risk factors.
- Correcting nutritional deficiencies.
- Optimizing chronic medical disorders.
- Preventing congenital anomalies.
- Reviewing medications for teratogenicity.
- Encouraging healthy lifestyle practices.
- Providing reproductive counselling.
- Reducing maternal and neonatal morbidity and mortality.
- Improving long-term health of future generations.

These goals emphasize prevention rather than treatment, making preconception counselling a highly cost-effective public health intervention.

## **Women Who Should Receive Preconception Counselling**

Although every woman of reproductive age benefits from preconception counselling, particular attention should be given to:

- Women planning pregnancy.
- Newly married couples.
- Women with infertility.
- Women with recurrent pregnancy loss.
- Women with previous adverse pregnancy outcomes.
- Women with diabetes, hypertension, epilepsy, thyroid disease, or renal disorders.

- Women taking long-term medications.
- Women with obesity or undernutrition.
- Women with HIV or other sexually transmitted infections.
- Women with substance use disorders.
- Couples with hereditary disorders or previous children with congenital anomalies.

Early counselling enables individualized care and improves pregnancy preparedness.

## **Components of Preconception Counselling**

Comprehensive preconception care should include detailed assessment of:

### **Medical History**

Evaluation should include chronic illnesses, previous surgeries, medications, allergies, immunization status, and previous hospitalizations.

### **Obstetric History**

Previous miscarriage, stillbirth, preterm birth, cesarean delivery, hypertensive disorders, gestational diabetes, congenital anomalies, and postpartum complications should be reviewed.

### **Family History**

Genetic disorders, congenital anomalies, hereditary cancers, hemoglobinopathies, intellectual disability, and recurrent pregnancy loss

within the family should be documented.

## **Lifestyle Assessment**

Smoking, alcohol consumption, recreational drug use, dietary habits, physical activity, occupational hazards, sleep quality, and stress should be evaluated.

## **Physical Examination**

Assessment includes height, weight, BMI, blood pressure, thyroid examination, cardiovascular evaluation, and nutritional assessment.

## **Laboratory Evaluation**

Investigations should be individualized but commonly include:

- Complete blood count
- Blood grouping and Rh typing
- Blood glucose estimation
- Thyroid function tests
- Urine examination
- HIV screening
- Hepatitis B screening
- Syphilis screening
- Rubella immunity
- Additional investigations according to risk profile

Laboratory evaluation helps identify treatable conditions before pregnancy begins.

## **Folic Acid: Biological Importance**

Folic acid is the synthetic form of folate, a water-soluble B-complex vitamin essential for DNA synthesis, RNA transcription, amino acid metabolism, methylation reactions, and cellular proliferation. Rapidly dividing embryonic cells require adequate folate for normal development. Deficiency during early embryogenesis interferes with neural tube closure, resulting in severe congenital anomalies. Since humans cannot synthesize folate, adequate dietary intake and supplementation are necessary.

## **Neural Tube Development**

The neural tube develops during the third and fourth weeks after fertilization. Closure occurs between **day 21 and day 28** following conception. Failure of complete neural tube closure results in neural tube defects such as:

- Spina bifida
- Anencephaly
- Encephalocele

Because neural tube closure occurs before most pregnancies are recognized, supplementation must begin before conception.

## **Neural Tube Defects**

Neural tube defects represent one of the most common preventable congenital anomalies worldwide. Risk factors include:

- Folate deficiency

- Previous NTD-affected pregnancy
- Maternal diabetes
- Obesity
- Antiepileptic medications
- Hyperthermia
- Vitamin B12 deficiency
- Genetic susceptibility
- Malabsorption disorders

Adequate folic acid supplementation can prevent up to 70% of neural tube defects.

## Recommended Folic Acid Supplementation

### Women at Average Risk

Women planning pregnancy should receive: **400 micrograms (0.4 mg) daily** Supplementation should begin **at least one month before conception** and continue until completion of the first trimester.

### Women at High Risk

Women with increased risk require: **4–5 mg folic acid daily** High-risk groups include:

- Previous neural tube defect pregnancy
- Diabetes mellitus
- Obesity
- Malabsorption syndromes

- Use of antiepileptic medications
- Multiple gestation
- Hemoglobinopathies
- Family history of neural tube defects

High-dose supplementation should be initiated before conception under medical supervision.

## **Dietary Sources of Folate**

Natural food sources include:

- Green leafy vegetables
- Spinach
- Broccoli
- Asparagus
- Citrus fruits
- Lentils
- Beans
- Chickpeas
- Peanuts
- Liver
- Eggs
- Fortified cereals

However, dietary intake alone is often insufficient to achieve optimal folate status before pregnancy. Therefore, routine supplementation remains essential.

## **Additional Benefits of Folic Acid**

Emerging evidence suggests folic acid may reduce the risk of:

- Congenital heart defects
- Orofacial clefts
- Certain urinary tract anomalies
- Preterm birth
- Placental complications
- Hyperhomocysteinemia
- Maternal megaloblastic anemia

Adequate folate also supports placental development, fetal growth, and normal hematopoiesis.

## **Other Micronutrients During Preconception**

Although folic acid remains the primary focus, other nutrients should also be optimized. These include:

- Iron
- Vitamin B12
- Vitamin D
- Calcium
- Iodine
- Zinc
- Omega-3 fatty acids

Correction of multiple nutritional deficiencies before conception provides additive benefits for maternal and fetal health.

## **Lifestyle Counselling**

Women should receive advice regarding:

- Healthy balanced diet
- Regular exercise
- Weight optimization
- Smoking cessation
- Alcohol avoidance
- Avoidance of recreational drugs
- Stress management
- Adequate sleep

Lifestyle modification complements nutritional interventions and improves reproductive outcomes.

## **Medication Review**

Several medications interfere with folate metabolism. These include:

- Valproate
- Carbamazepine
- Phenytoin
- Methotrexate
- Sulfasalazine
- Trimethoprim

Women taking these medications require individualized counselling and higher-dose folic acid supplementation when appropriate.

## **Public Health Importance**

Universal folic acid supplementation represents one of the most successful preventive strategies in maternal healthcare. Countries implementing food fortification and routine supplementation have demonstrated substantial reductions in neural tube defects and healthcare costs. Public awareness campaigns, premarital counselling, school health education, and integration of folic acid counselling into primary healthcare can significantly improve uptake.

## **Role of Healthcare Providers**

Healthcare professionals should:

- Promote pregnancy planning.
- Recommend folic acid before conception.
- Identify high-risk women.
- Counsel regarding nutrition.
- Review medications.
- Encourage healthy lifestyles.
- Educate couples regarding neural tube defect prevention.
- Ensure continuity of care throughout pregnancy.

Every healthcare encounter involving women of reproductive age should be viewed as an opportunity to reinforce these messages.

## **Conclusion**

Preconception counselling and folic acid supplementation are among the most effective preventive interventions in reproductive medicine. Timely identification of maternal risk factors, optimization of nutritional status, healthy lifestyle modification, and universal folic acid supplementation before conception substantially reduce congenital anomalies, improve pregnancy outcomes, and promote lifelong health in offspring. Because neural tube closure occurs before pregnancy is usually recognized, supplementation should begin at least one month before conception. Integrating preconception counselling into routine healthcare ensures that every woman has the opportunity to begin pregnancy in optimal physical and nutritional health, ultimately contributing to healthier mothers, healthier children, and healthier communities.

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## CHAPTER 06

# Preconception Immunisation: Protecting Maternal and Fetal Health Before Pregnancy

### IN THIS CHAPTER

Objectives of Preconception Immunisation

Principles of Preconception Vaccination

Importance of Counselling

Burden of Vaccine Preventable Diseases During Pregnancy

Recommended Vaccines Before Pregnancy

Measles-Mumps-Rubella (MMR)

## Introduction

Preconception care has become an integral component of reproductive healthcare, focusing on optimizing maternal health before conception to improve pregnancy outcomes. Among the various interventions included in preconception care, immunization remains one of the most effective and cost- efficient preventive strategies. Vaccination before pregnancy protects women against vaccine- preventable diseases, reduces maternal morbidity and mortality, prevents congenital

infections, and provides passive immunity to newborns during the first months of life. Pregnancy induces significant physiological and immunological changes that increase susceptibility to infectious diseases and may alter disease severity. Certain infections acquired during pregnancy, particularly during the first trimester, can lead to miscarriage, congenital malformations, fetal growth restriction, stillbirth, preterm birth, or neonatal morbidity. Since several vaccines, especially live attenuated vaccines, cannot be administered during pregnancy, the preconception period offers the ideal opportunity to assess immunity and administer necessary vaccines safely. Preconception immunization should therefore be considered an essential component of routine reproductive health services, ensuring that every woman enters pregnancy with optimal protection against preventable infectious diseases.

## **Objectives of Preconception Immunisation**

The primary objective of preconception vaccination is to establish immunity before conception, thereby minimizing infectious risks throughout pregnancy. Specific goals include:

- Preventing maternal infections during pregnancy.
- Reducing miscarriage, stillbirth, and preterm birth.
- Preventing congenital infections and congenital anomalies.
- Reducing maternal hospitalization and intensive care admissions.
- Providing passive antibody transfer to the fetus.
- Improving neonatal survival and infant health.
- Contributing to herd immunity and community disease control.

Vaccination before conception not only protects the mother but also safeguards fetal development during the critical period of organogenesis, when infections can have devastating consequences.

## Principles of Preconception Vaccination

Preconception immunization begins with a systematic evaluation of vaccination history and immunity status. During the preconception visit, healthcare providers should obtain detailed information regarding:

- Previous childhood immunizations
- Adult vaccination records
- Previous vaccine-preventable infections
- Occupational exposure
- Travel history
- Chronic medical disorders
- Immunocompromised conditions
- Previous adverse reactions to vaccines

Whenever vaccination records are unavailable, serological testing may be considered for selected diseases such as rubella and varicella. Women found to be susceptible should receive vaccination before pregnancy. A fundamental principle is that **live attenuated vaccines should be completed before conception**, and pregnancy should be postponed for at least one month after administration. In contrast, **inactivated vaccines may be administered before conception and many can also be safely given during pregnancy when indicated**. Women should receive counselling regarding vaccine safety, effectiveness, timing, documentation, and contraceptive requirements following live vaccines.

## **Importance of Counselling**

Successful vaccination programs depend not only on vaccine availability but also on effective counselling. Vaccine hesitancy remains an important barrier worldwide. Healthcare providers should discuss:

- Benefits of vaccination
- Vaccine safety
- Timing before pregnancy
- Contraindications
- Need for temporary contraception after live vaccines
- Documentation of vaccination history

Counselling should also address common misconceptions regarding infertility, congenital anomalies, miscarriage, and vaccine safety. Providing written educational material improves vaccine acceptance and adherence.

## **Burden of Vaccine Preventable Diseases During Pregnancy**

Several infections carry significant maternal and fetal risks. Rubella infection during early pregnancy is associated with congenital rubella syndrome, characterized by deafness, cataracts, congenital heart disease, developmental delay, and neurological impairment. Varicella infection may result in severe maternal pneumonia, hospitalization, and congenital varicella syndrome characterized by limb hypoplasia, skin scarring, neurological abnormalities, and ocular defects. Influenza infection increases the risk of severe respiratory disease, hospitalization,

ICU admission, preterm birth, and adverse neonatal outcomes. COVID-19 infection has been associated with severe maternal disease, respiratory failure, ICU admission, preterm birth, and maternal mortality. Hepatitis B infection during pregnancy carries a high risk of vertical transmission, particularly in mothers with high viral loads, predisposing infants to chronic hepatitis, cirrhosis, and hepatocellular carcinoma.

## **Recommended Vaccines Before Pregnancy**

### **Measles-Mumps-Rubella (MMR)**

The MMR vaccine remains one of the most important vaccines during preconception care. Rubella infection during the first trimester can result in congenital rubella syndrome, making immunity assessment essential. Women without documented immunity should undergo Rubella IgG testing where appropriate or receive vaccination before pregnancy. Because MMR is a live attenuated vaccine, conception should be avoided for at least one month following vaccination. Routine administration during pregnancy is contraindicated.

### **Varicella Vaccine**

Women without a history of chickenpox or previous vaccination should be assessed for varicella immunity. Primary maternal infection carries substantial risks including severe pneumonia and congenital varicella syndrome. Two doses of varicella vaccine administered four to eight weeks apart provide excellent protection. Pregnancy should be delayed for one month following the final dose because varicella vaccine is live attenuated.

## **Human Papillomavirus Vaccine**

HPV vaccination substantially reduces the incidence of cervical cancer, vulvar cancer, vaginal cancer, anal cancer, and genital warts. Routine vaccination is recommended between 9 and 26 years of age, while shared clinical decision-making is advised for women aged 27–45 years. Although no harmful fetal effects have been demonstrated, HPV vaccination should be postponed until after pregnancy if pregnancy occurs during the vaccination schedule.

## **Hepatitis B Vaccine**

Universal screening for hepatitis B infection should be part of preconception assessment. Women lacking immunity should receive the standard three-dose vaccination schedule (0, 1, and 6 months). Hepatitis B vaccine is safe both before and during pregnancy and significantly reduces maternal infection and vertical transmission.

## **Influenza Vaccine**

Pregnant women experience more severe influenza due to physiological changes in cardiopulmonary function and immunity. Annual influenza vaccination is recommended for women planning pregnancy, particularly before influenza season. Maternal immunization also provides passive antibody protection to infants during the first six months of life when they are too young for vaccination.

## **COVID-19 Vaccination**

Current evidence demonstrates that COVID-19 vaccination significantly reduces severe disease, maternal hospitalization, ICU admission, mechanical ventilation, and maternal mortality. Vaccination before pregnancy also results in transplacental antibody transfer, providing neonatal protection during early infancy. Women planning pregnancy should remain updated according to current national booster recommendations.

## **Risk-Based Vaccination**

Certain women require additional vaccines depending on occupation, travel, medical conditions, or environmental exposure. Risk-based vaccines include:

- Hepatitis A
- Meningococcal vaccine
- Rabies vaccine
- Japanese Encephalitis vaccine
- Typhoid vaccine
- Pneumococcal vaccine (selected high-risk women)

Healthcare workers, laboratory personnel, travelers to endemic regions, women with chronic liver disease, immunocompromised individuals, and those with occupational animal exposure should receive individualized vaccination recommendations.

## **Live Vaccines and Pregnancy**

Live attenuated vaccines contain weakened organisms capable of replication. Although fetal transmission remains extremely rare, theoretical fetal risks exist. Live vaccines contraindicated during pregnancy include:

- MMR
- Varicella
- Live attenuated influenza vaccine

Whenever these vaccines are indicated, they should be administered before conception, and pregnancy should be postponed for at least one month. Accidental vaccination during pregnancy is not considered an indication for pregnancy termination, but appropriate counselling and follow-up should be provided.

## **Vaccination Timeline Before Pregnancy**

An organized vaccination schedule improves compliance.

### **Approximately six months before planned conception**

- Hepatitis B vaccine
- HPV vaccine
- Catch-up vaccines

### **Two to three months before conception**

- MMR vaccine
- Varicella vaccine

## **One month before conception**

- Completion of all live vaccines
- Confirmation of immunity when indicated

## **At conception planning**

- Seasonal influenza vaccine
- COVID-19 booster if recommended
- Review vaccination records

This timeline ensures adequate immune response before pregnancy begins.

## **Role of Healthcare Providers**

Every healthcare encounter involving women of reproductive age represents an opportunity for vaccination assessment. Healthcare professionals should:

- Review vaccination history
- Identify susceptible women
- Screen for rubella and varicella immunity when indicated
- Counsel regarding vaccine benefits
- Address vaccine hesitancy
- Maintain accurate immunization records
- Coordinate catch-up vaccination
- Encourage pregnancy planning after completion of live vaccines

Primary care physicians, obstetricians, gynecologists, family physicians, nurses, and public health workers all contribute to successful implementation of preconception immunization programs.

## **Clinical Scenario**

A 24-year-old woman planning her first pregnancy presents for preconception counselling without vaccination records. Laboratory evaluation demonstrates negative Rubella IgG and Varicella IgG antibodies. Management includes administration of MMR and varicella vaccines, counselling regarding temporary contraception for one month after vaccination, initiation of folic acid supplementation, completion of routine preconception evaluation, and advice to attempt conception only after the recommended waiting period. This case illustrates how preconception assessment prevents congenital infections before pregnancy begins.

## **Benefits of Preconception Immunisation**

Maternal benefits include reduced severe infections, hospitalization, ICU admission, pregnancy complications, and maternal mortality. Fetal benefits include prevention of congenital rubella syndrome, congenital varicella syndrome, fetal infection, miscarriage, stillbirth, congenital anomalies, and preterm birth. Neonatal benefits include passive antibody transfer, protection during early infancy, reduced neonatal infection, fewer hospital admissions, and improved infant survival. From a public health perspective, improved vaccination coverage reduces disease transmission, healthcare costs, and long-term disability while strengthening community immunity.

## **Current International Recommendations**

International organizations uniformly recommend vaccination review during preconception counselling. Current guidance emphasizes:

- Routine assessment of vaccination status during every preconception visit.
- Evaluation of rubella and varicella immunity.
- Administration of indicated live vaccines before pregnancy.
- Routine hepatitis B vaccination for susceptible women.
- Annual influenza vaccination.
- COVID-19 vaccination according to current recommendations.
- Incorporation of vaccination into routine reproductive healthcare services.

These recommendations are endorsed by major professional organizations and form the foundation of modern preconception care.

## **Conclusion**

Preconception immunization represents one of the most effective preventive interventions in reproductive medicine. Vaccinating women before conception substantially reduces maternal morbidity, prevents congenital infections, decreases adverse pregnancy outcomes, and improves neonatal health through passive antibody transfer. Systematic assessment of vaccination history, individualized risk evaluation, timely administration of vaccines, and comprehensive counselling should become standard practice during every preconception consultation. As global efforts increasingly focus on preventive healthcare, integrating

immunization into routine preconception care offers a powerful strategy for achieving healthier pregnancies, healthier infants, and healthier communities.

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CHAPTER 07

# Preconception Counselling for Prevention of Hypertensive Disorders of Pregnancy

## IN THIS CHAPTER

Hypertensive Disorders of Pregnancy

Importance of Preconception Counselling

Risk Factors for Hypertensive Disorders

Maternal Risk Factors

Recurrence Risk

Pathophysiology

## Introduction

Hypertensive disorders of pregnancy (HDP) remain one of the leading causes of maternal and perinatal morbidity and mortality worldwide. They comprise chronic hypertension, gestational hypertension, preeclampsia, eclampsia, and chronic hypertension with superimposed preeclampsia. Collectively, these disorders complicate approximately 5–10% of pregnancies and contribute significantly to maternal deaths, preterm birth, fetal growth restriction, placental abruption, stillbirth, and long-term cardiovascular disease in both mother and child. Preconception counselling provides a valuable opportunity to identify

women at increased risk of HDP, optimize modifiable risk factors, review medications, assess cardiovascular health, and institute preventive strategies before conception. Women with a previous history of hypertensive disorders require individualized counselling regarding recurrence risk, pregnancy planning, aspirin prophylaxis, calcium supplementation, and long-term cardiovascular follow-up. Effective preconception care can substantially reduce adverse maternal and fetal outcomes by shifting the focus from treatment to prevention.

## **Hypertensive Disorders of Pregnancy**

Hypertensive disorders during pregnancy include:

- Chronic hypertension
- Gestational hypertension
- Preeclampsia
- Eclampsia
- Chronic hypertension with superimposed preeclampsia

Among these, preeclampsia is the most serious disorder and is characterized by new-onset hypertension after 20 weeks of gestation associated with proteinuria or evidence of maternal organ dysfunction and/or uteroplacental insufficiency.

## **Importance of Preconception Counselling**

Women with a previous history of HDP frequently seek counselling before planning another pregnancy. Appropriate counselling allows healthcare providers to:

- Estimate recurrence risk.

- Optimize maternal health.
- Identify modifiable risk factors.
- Review antihypertensive medications.
- Counsel regarding aspirin prophylaxis.
- Recommend lifestyle modifications.
- Plan surveillance during future pregnancy.
- Address long-term cardiovascular risks.

Preconception counselling also reduces maternal anxiety by providing realistic expectations regarding future pregnancies.

## **Risk Factors for Hypertensive Disorders**

Several maternal characteristics increase the risk of HDP.

### **Maternal Risk Factors**

- Previous preeclampsia
- Chronic hypertension
- Diabetes mellitus
- Chronic kidney disease
- Autoimmune disorders
- Obesity
- Maternal age  $\geq 35$  years
- Multiple pregnancy
- Assisted reproductive technology
- Family history of preeclampsia
- Nulliparity

- Long interpregnancy interval

Identification of these factors before conception enables individualized preventive strategies.

## **Recurrence Risk**

Women with previous hypertensive disorders often ask whether the condition will recur. Recurrence depends upon:

- Severity of previous disease.
- Gestational age at onset.
- Presence of fetal growth restriction.
- Presence of chronic hypertension.
- Associated maternal disorders.

Women who developed early-onset preeclampsia requiring preterm delivery have a substantially higher recurrence risk than women with mild late-onset disease. However, recurrence is not inevitable, and many women subsequently experience uncomplicated pregnancies following appropriate preconception optimization.

## **Pathophysiology**

The exact cause of preeclampsia remains incompletely understood. Current evidence suggests abnormal placentation leading to inadequate trophoblastic invasion of spiral arteries, placental ischemia, endothelial dysfunction, inflammation, oxidative stress, and imbalance between angiogenic and antiangiogenic factors. Although placental abnormalities manifest during pregnancy, many maternal cardiovascular and metabolic

risk factors are present before conception, reinforcing the importance of preconception intervention.

## **Preconception Assessment**

Every woman with previous HDP should undergo comprehensive evaluation before conception.

## **Medical History**

Assessment should include:

- Type of hypertensive disorder
- Gestational age at diagnosis
- Severity of hypertension
- Previous medications
- Obstetric complications
- Family history
- Current blood pressure
- Cardiovascular symptoms

## **Physical Examination**

Evaluation includes:

- Blood pressure measurement
- Body mass index
- Cardiovascular examination
- Thyroid examination
- Peripheral edema assessment

- Weight measurement

## Laboratory Evaluation

Recommended investigations include:

- Complete blood count
- Serum creatinine
- Liver function tests
- Urine protein estimation
- Urinalysis
- Blood glucose
- HbA1c when indicated
- Lipid profile
- Thyroid function tests
- Electrolytes

Additional investigations should be individualized according to maternal risk factors.

## Blood Pressure Optimization

Women with chronic hypertension should achieve optimal blood pressure control before conception. Target blood pressure should generally remain below **140/90 mmHg**, while avoiding excessive lowering that may compromise placental perfusion after conception. Home blood pressure monitoring may improve long-term control and patient engagement.

## **Medication Review**

Medication review is a critical aspect of preconception counselling.

## **Medications to Avoid**

The following drugs should be discontinued before conception:

- ACE inhibitors
- Angiotensin receptor blockers
- Direct renin inhibitors

These medications are associated with fetal renal dysgenesis, oligohydramnios, pulmonary hypoplasia, and neonatal renal failure.

## **Preferred Antihypertensive Agents**

Pregnancy-compatible medications include:

- Labetalol
- Nifedipine
- Methyldopa

Women should transition to safer medications before conception whenever possible.

## **Aspirin Prophylaxis**

Low-dose aspirin is one of the most effective interventions for prevention of preeclampsia among high- risk women. Current recommendations advise:

- **75–150 mg daily** (commonly 81–150 mg depending on national guidelines)
- Initiation between **12 and 16 weeks of gestation**, and no later than 16 weeks whenever possible
- Continuation until **36 weeks** or delivery according to local protocols

Women should be counselled before conception regarding the rationale, benefits, and safety of aspirin therapy so that treatment can begin promptly in early pregnancy.

## | Calcium Supplementation

Women with low dietary calcium intake benefit from calcium supplementation during pregnancy. Adequate calcium intake reduces the incidence of hypertensive disorders, particularly among populations with low baseline calcium consumption. Dietary counselling before conception should emphasize calcium-rich foods including:

- Milk
- Yogurt
- Cheese
- Ragi
- Sesame seeds
- Green leafy vegetables

## | Lifestyle Modification

Lifestyle optimization remains fundamental to HDP prevention.

## Weight Management

Obesity significantly increases the risk of preeclampsia. Women should achieve healthy body weight before conception through:

- Balanced nutrition
- Calorie control
- Regular exercise
- Behavioural modification

## Physical Activity

Moderate physical activity improves:

- Cardiovascular fitness
- Insulin sensitivity
- Weight control
- Blood pressure regulation

Women should perform at least **150 minutes of moderate-intensity exercise per week** before pregnancy unless contraindicated.

## Nutrition

Dietary counselling should encourage:

- Fruits
- Vegetables
- Whole grains
- Lean proteins

- Low saturated fat intake
- Reduced processed foods

Extreme salt restriction is **not recommended** for prevention of hypertensive disorders in otherwise healthy women.

## Screening for Cardiovascular Disease

Women with previous preeclampsia have increased lifetime risks of:

- Chronic hypertension
- Coronary artery disease
- Stroke
- Heart failure
- Chronic kidney disease
- Type 2 diabetes mellitus

Preconception consultation provides an opportunity to initiate long-term cardiovascular risk reduction through regular follow-up and lifestyle modification.

## Fetal Risks

Hypertensive disorders may adversely affect fetal development through placental insufficiency. Potential complications include:

- Fetal growth restriction
- Oligohydramnios
- Preterm birth
- Placental abruption
- Stillbirth

- Neonatal intensive care admission

Women should receive counselling regarding these risks while emphasizing that appropriate surveillance substantially improves outcomes.

## **Counselling Regarding Future Pregnancy**

Important counselling messages include:

- Previous HDP does not necessarily recur.
- Early antenatal booking is essential.
- Blood pressure should be monitored regularly.
- Low-dose aspirin should begin early when indicated.
- Healthy body weight should be maintained.
- Diabetes and thyroid disorders should be controlled.
- Smoking should be avoided.
- Regular physical activity should continue before conception.
- Warning symptoms require immediate medical attention.

## **Warning Signs Requiring Urgent Evaluation**

Women planning pregnancy should understand symptoms suggestive of preeclampsia during future pregnancy. These include:

- Persistent headache
- Visual disturbances
- Facial swelling
- Sudden edema
- Epigastric pain

- Reduced fetal movements
- Breathlessness
- Convulsions

Prompt recognition facilitates early intervention and reduces complications.

## **Contraception Following HDP**

Women not immediately planning another pregnancy should receive effective contraception. Most contraceptive methods are suitable after recovery from HDP, although selection should consider:

- Current blood pressure
- Cardiovascular risk
- Breastfeeding status
- Associated medical disorders

Long-acting reversible contraception offers excellent efficacy for pregnancy spacing.

## **Long-Term Follow-Up**

Women with previous hypertensive disorders should not be discharged from medical care after the postpartum period. Annual evaluation should include:

- Blood pressure measurement
- Weight assessment
- Blood glucose
- Lipid profile

- Kidney function
- Lifestyle review

Early identification of chronic hypertension and cardiovascular disease improves long-term health.

## **Role of Healthcare Providers**

Healthcare providers should:

- Identify women at increased risk.
- Optimize chronic hypertension.
- Review medications.
- Counsel regarding aspirin.
- Encourage healthy lifestyle modification.
- Promote weight management.
- Arrange early antenatal care.
- Monitor long-term cardiovascular health.

Collaborative care involving obstetricians, physicians, nephrologists, cardiologists, and dietitians provides the best outcomes.

## **Conclusion**

Preconception counselling plays a pivotal role in reducing the burden of hypertensive disorders of pregnancy. Identification of high-risk women before conception, optimization of blood pressure, medication review, weight management, lifestyle modification, and timely initiation of aspirin prophylaxis substantially reduce maternal and fetal complications. Women with previous hypertensive disorders should

receive individualized counselling regarding recurrence risk, early pregnancy surveillance, and lifelong cardiovascular health. Integrating cardiovascular risk assessment into routine preconception care not only improves pregnancy outcomes but also contributes to long-term prevention of chronic cardiovascular disease in women.

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## CHAPTER 08

# Preconception Mental Health: Promoting Psychological Well-being Before Pregnancy

### IN THIS CHAPTER

Importance of Mental Health Before Pregnancy

Burden of Mental Health Disorders in Women of Reproductive Age

Common Mental Health Conditions in the Preconception Period

Depression

Anxiety Disorders

Bipolar Disorder

## Introduction

Mental health is an essential component of preconception care and plays a pivotal role in reproductive health, fertility, pregnancy outcomes, and child development. The World Health Organization defines mental health as a state of well-being in which individuals realize their abilities, cope with normal life stresses, work productively, and contribute to their communities. Women entering pregnancy with untreated mental health disorders are at increased risk of infertility, miscarriage, preterm birth, low birth weight, postpartum depression, impaired mother–infant bonding, and adverse neurodevelopmental outcomes in offspring.

Despite these significant implications, mental health assessment remains one of the most neglected aspects of preconception care. The preconception period offers a valuable opportunity to identify psychological disorders, optimize treatment, review psychotropic medications, strengthen coping mechanisms, and provide psychosocial support before conception. Mental well-being should therefore be considered as important as physical health in preparing a woman for pregnancy. Comprehensive preconception counselling should integrate mental health screening, individualized risk assessment, lifestyle interventions, and multidisciplinary management whenever necessary.

## **Importance of Mental Health Before Pregnancy**

Mental health influences every stage of reproduction, from fertility and conception to pregnancy, childbirth, and parenting. Psychological stress affects the hypothalamic-pituitary-ovarian axis, leading to menstrual irregularities, anovulation, reduced fertility, and sexual dysfunction. Women with anxiety or depression often experience poor nutrition, inadequate sleep, substance use, reduced adherence to medical treatment, and delayed healthcare-seeking behaviour, all of which adversely affect pregnancy outcomes. Untreated mental illness before conception is associated with increased risks of spontaneous abortion, hypertensive disorders of pregnancy, gestational diabetes, preterm labour, fetal growth restriction, operative delivery, postpartum depression, and impaired maternal-infant attachment. Optimizing psychological well-being before conception significantly improves maternal confidence, treatment adherence, pregnancy planning, and family functioning.

## **Burden of Mental Health Disorders in Women of Reproductive Age**

Mental health disorders are among the leading causes of disability worldwide. Depression and anxiety are particularly common among women of reproductive age due to hormonal fluctuations, social pressures, caregiving responsibilities, infertility, pregnancy loss, domestic violence, and occupational stress. Many women remain undiagnosed because symptoms are attributed to routine stress or because they hesitate to seek help due to stigma. Cultural misconceptions often prevent open discussions regarding emotional health, resulting in delayed diagnosis and treatment. Routine mental health screening during preconception visits can substantially improve early identification and intervention.

## **Common Mental Health Conditions in the Preconception Period**

### **Depression**

Depression is characterized by persistent sadness, loss of interest, fatigue, sleep disturbance, altered appetite, impaired concentration, feelings of guilt, and hopelessness. Women with untreated depression may neglect nutrition, discontinue medications, avoid medical care, or engage in unhealthy behaviours that adversely affect pregnancy. Early diagnosis and treatment before conception improve both maternal health and pregnancy outcomes.

## **Anxiety Disorders**

Anxiety disorders include generalized anxiety disorder, panic disorder, phobias, obsessive-compulsive disorder, and post-traumatic stress disorder. Excessive anxiety may interfere with fertility treatment, sexual relationships, sleep, and overall quality of life. Severe anxiety during pregnancy has been associated with preterm birth, low birth weight, and postpartum mood disorders.

## **Bipolar Disorder**

Women with bipolar disorder require careful preconception planning because pregnancy and the postpartum period increase the risk of mood relapse. Medication review is essential to balance maternal disease control against potential fetal risks. Abrupt discontinuation of mood stabilizers should be avoided, as relapse may have serious consequences for both mother and fetus.

## **Schizophrenia and Psychotic Disorders**

Women with chronic psychotic illnesses often require multidisciplinary management before conception. Stabilization of symptoms, review of antipsychotic medications, social support, and family counselling improve reproductive outcomes and parenting capacity.

## **Eating Disorders**

Anorexia nervosa, bulimia nervosa, and binge eating disorder can impair fertility and contribute to nutritional deficiencies, miscarriage, fetal growth restriction, and obstetric complications. Nutritional

rehabilitation and psychological therapy should ideally be completed before pregnancy.

## **Psychological Stress and Fertility**

Chronic stress alters neuroendocrine function through activation of the hypothalamic-pituitary-adrenal axis. Elevated cortisol levels may impair ovulation, menstrual regularity, implantation, and sexual function. Couples undergoing infertility treatment often experience considerable emotional distress, which may further reduce treatment adherence and quality of life. Stress reduction strategies, mindfulness-based interventions, cognitive behavioural therapy, and counselling have demonstrated benefits in improving emotional well-being and coping during fertility treatment.

## **Risk Factors for Poor Mental Health**

Several factors increase vulnerability to psychological disorders before pregnancy, including:

- Previous psychiatric illness
- Infertility
- Recurrent pregnancy loss
- Previous stillbirth
- Chronic medical illness
- Domestic violence
- Financial hardship
- Social isolation
- Substance abuse

- Unplanned pregnancy
- Occupational stress
- Caregiver burden
- Poor family support

Recognition of these risk factors allows early intervention and individualized care.

## **Mental Health Screening**

Routine screening should become part of every preconception consultation. Screening does not establish a diagnosis but identifies women requiring further evaluation. Validated screening tools include:

- Patient Health Questionnaire-9 (PHQ-9)
- Patient Health Questionnaire-2 (PHQ-2)
- Generalized Anxiety Disorder-7 (GAD-7)
- Edinburgh Postnatal Depression Scale (EPDS)
- WHO Well-Being Index (WHO-5)

Women with positive screening results should undergo comprehensive psychiatric assessment before pregnancy planning.

## **Preconception Mental Health Assessment**

A comprehensive evaluation should include:

- Previous psychiatric diagnoses
- Current symptoms
- Medication history
- Hospital admissions

- History of self-harm or suicide attempts
- Substance use
- Family history of psychiatric illness
- Relationship quality
- Domestic violence
- Social support
- Sleep patterns
- Occupational stress
- Reproductive goals

Assessment should also identify protective factors such as supportive relationships, healthy coping mechanisms, financial stability, and community support.

## **Psychotropic Medication Review**

Medication review is a critical component of preconception counselling. Decisions should balance the risks of untreated psychiatric illness against potential fetal effects of medication. General principles include:

- Avoid abrupt discontinuation of psychotropic medication.
- Use monotherapy whenever possible.
- Prescribe the lowest effective dose.
- Avoid unnecessary polypharmacy.
- Review teratogenic potential before conception.
- Involve psychiatrists in shared decision-making.

Women should be counselled that uncontrolled psychiatric illness often poses greater risks than carefully selected medications.

## **Lifestyle Interventions**

Lifestyle modification significantly improves psychological well-being before pregnancy. Recommended interventions include:

- Regular physical activity
- Balanced nutrition
- Adequate sleep
- Mindfulness and meditation
- Yoga
- Relaxation techniques
- Limiting caffeine
- Avoiding alcohol, tobacco, and recreational drugs
- Maintaining social connections
- Structured daily routines

Exercise has consistently demonstrated benefits in reducing symptoms of mild-to-moderate depression and anxiety while improving overall quality of life.

## **Partner and Family Support**

Mental health should be viewed within the context of family relationships. Partner involvement improves treatment adherence, emotional support, communication, and shared decision-making. Family members should be educated regarding early warning signs of psychological distress and encouraged to participate in supportive care. Couples experiencing infertility, recurrent pregnancy loss, or chronic

illness particularly benefit from joint counselling sessions that address emotional concerns alongside medical management.

## **Domestic Violence and Reproductive Coercion**

Healthcare providers should sensitively screen for intimate partner violence, emotional abuse, sexual coercion, and reproductive coercion during preconception consultations. These experiences significantly increase the risk of depression, anxiety, substance abuse, unintended pregnancy, sexually transmitted infections, and poor pregnancy outcomes. Women experiencing violence should receive confidential support, safety planning, and referral to appropriate social and legal services.

## **Substance Use and Mental Health**

Alcohol, tobacco, cannabis, opioids, and other recreational substances frequently coexist with mental health disorders. Substance use impairs fertility, increases pregnancy complications, and may worsen psychiatric symptoms. Preconception care should include screening, brief intervention, motivational counselling, and referral to addiction specialists when required.

## **Role of Healthcare Providers**

Healthcare professionals play a crucial role in promoting mental well-being before pregnancy. Every preconception consultation should include:

- Mental health screening
- Assessment of stress and coping

- Review of psychiatric history
- Medication evaluation
- Lifestyle counselling
- Suicide risk assessment when indicated
- Referral for specialist care when necessary
- Follow-up planning

An empathetic, non-judgmental approach encourages disclosure of psychological concerns and strengthens the therapeutic relationship.

## **Multidisciplinary Care**

Optimal management often requires collaboration between obstetricians, psychiatrists, psychologists, family physicians, reproductive endocrinologists, nutritionists, and social workers. Multidisciplinary care ensures comprehensive treatment addressing medical, psychological, and social determinants of health. Women with severe psychiatric disorders should ideally achieve sustained clinical stability before attempting conception.

## **Public Health Perspective**

Integrating mental health into routine preconception care supports national and global efforts to improve maternal and child health. Community awareness programmes, reduction of stigma, accessible psychological services, digital mental health platforms, and training of healthcare professionals can substantially improve early diagnosis and treatment. Promoting mental well-being before pregnancy contributes to healthier pregnancies, improved parenting, stronger family relationships, and enhanced child development.

## **Conclusion**

Mental health is an indispensable component of comprehensive preconception care. Psychological well-being influences fertility, pregnancy outcomes, maternal health, and the long-term development of children. Routine screening for depression, anxiety, severe mental illness, substance use, and psychosocial stress should become standard practice during preconception consultations. Individualized counselling, medication review, lifestyle modification, partner involvement, and multidisciplinary care enable women to enter pregnancy with optimal emotional and psychological health. Integrating mental health into preconception care strengthens reproductive outcomes and supports healthier families and communities.

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## CHAPTER 09

# Sexual Well-Being, Reproductive Rights, STI Awareness, Contraception Counselling and Informed Reproductive Choices in Preconception Care

### IN THIS CHAPTER

Importance of Sexual Well-Being in Preconception Care

Components of Sexual Health

Physical Factors

Psychological Factors

Relationship Factors

Social and Cultural Factors

## Introduction

Sexual and reproductive health is a fundamental component of overall health and well-being. It extends beyond the absence of disease to encompass physical, emotional, mental, and social well-being in relation to sexuality and reproduction. Comprehensive preconception care should therefore include assessment of sexual health, reproductive rights, prevention of sexually transmitted infections (STIs),

contraception counselling, and support for informed reproductive decision-making. These aspects influence fertility, pregnancy outcomes, relationship satisfaction, psychological health, and quality of life. Despite their importance, discussions regarding sexuality often remain neglected in routine clinical practice because of cultural barriers, embarrassment, lack of time, or inadequate provider training. Consequently, many women continue to experience untreated sexual dysfunction, reproductive coercion, unintended pregnancy, and preventable sexually transmitted infections. The World Health Organization defines sexual health as a state of physical, emotional, mental, and social well-being related to sexuality rather than merely the absence of disease or dysfunction. Sexual health also requires respect for human rights, freedom from coercion, discrimination and violence, and the ability to have safe, satisfying, and consensual sexual experiences. Incorporating sexual health into preconception counselling allows healthcare providers to identify hidden concerns, provide evidence-based counselling, and improve reproductive outcomes through holistic care.

## **Importance of Sexual Well-Being in Preconception Care**

Sexual well-being significantly influences fertility, intimate relationships, emotional health, and reproductive planning. Healthy sexual relationships promote psychological well-being, reduce stress, strengthen partner communication, and facilitate planned pregnancies. Conversely, untreated sexual dysfunction, chronic pelvic pain, anxiety, relationship conflict, and intimate partner violence adversely affect reproductive health and may delay conception. Many women do not

voluntarily disclose sexual concerns during medical consultations. Healthcare providers should therefore create a safe, confidential, and non-judgmental environment that encourages open discussion. Routine inquiry regarding sexual function, relationship satisfaction, pain during intercourse, reproductive intentions, and contraception should become an integral component of every preconception consultation. Early identification of sexual health concerns enables timely intervention and prevents long-term physical and psychological consequences.

## **Components of Sexual Health**

Sexual health is multidimensional and is influenced by biological, psychological, interpersonal, and sociocultural factors.

### **Physical Factors**

Physical health directly affects sexual function. Hormonal balance, reproductive anatomy, chronic illnesses, pelvic floor disorders, endometriosis, menopause, obesity, diabetes, thyroid disorders, and medication use may influence sexual desire, arousal, lubrication, orgasm, and comfort during intercourse.

### **Psychological Factors**

Mental well-being plays a central role in sexual function. Stress, anxiety, depression, body image concerns, previous traumatic experiences, infertility-related distress, and fear of pregnancy may reduce sexual desire and satisfaction. Addressing psychological factors through counselling or mental health referral often improves both sexual function and reproductive outcomes.

## Relationship Factors

Healthy communication, emotional intimacy, mutual respect, and trust are essential for satisfying sexual relationships. Relationship conflicts, poor communication, sexual incompatibility, domestic violence, and reproductive coercion frequently contribute to sexual dysfunction and should be explored sensitively during counselling.

## Social and Cultural Factors

Religious beliefs, cultural expectations, myths surrounding sexuality, gender inequality, limited access to healthcare, and societal stigma may influence sexual behaviour and healthcare-seeking patterns. Counselling should respect cultural values while providing scientifically accurate information that supports informed decision-making.

## Female Sexual Response

Female sexual response is dynamic and influenced by emotional context, relationship quality, hormonal status, and individual experiences. Unlike earlier linear models, contemporary understanding recognizes that many women experience **responsive desire**, in which sexual desire develops after emotional intimacy or sexual stimulation rather than occurring spontaneously. This concept is particularly important when counselling couples who incorrectly perceive the absence of spontaneous desire as abnormal. Healthcare providers should reassure couples that variability in sexual response is common and that emotional intimacy often precedes desire in women. Counselling based on contemporary models helps reduce unnecessary anxiety and relationship conflict.

## **Female Sexual Dysfunction**

Female Sexual Dysfunction (FSD) is defined as persistent disturbances in sexual desire, arousal, orgasm, or sexual pain associated with personal distress. It affects approximately 40–50% of women during their lifetime but remains substantially underdiagnosed due to embarrassment, cultural stigma, and lack of routine screening. Common forms include:

### **Desire Disorders**

Women may experience reduced sexual interest, diminished sexual thoughts, decreased motivation for intimacy, or absence of sexual fantasies. Hormonal disorders, depression, medications, chronic illness, relationship difficulties, and psychological stress are frequent contributors.

### **Arousal Disorders**

Difficulty becoming sexually aroused, inadequate genital lubrication, and reduced subjective excitement characterize arousal disorders. Management requires identification of underlying medical, hormonal, and psychological factors.

### **Orgasmic Disorders**

Delayed, infrequent, or absent orgasm despite adequate stimulation may occur because of anxiety, medications, neurological disorders, pelvic surgery, or relationship issues. Education, behavioural therapy, and treatment of underlying conditions improve outcomes.

## **Genito-Pelvic Pain and Penetration Disorders**

Dyspareunia, vaginismus, fear of penetration, and pelvic floor hypertonicity significantly impair sexual function and may delay conception. Evaluation should include assessment for infections, endometriosis, vulvodynia, pelvic floor dysfunction, hormonal deficiency, and psychological trauma. Multidisciplinary management involving physiotherapists, psychologists, and gynecologists often provides the best outcomes.

## **Taking a Sexual History**

A structured sexual history is an essential component of comprehensive preconception counselling. Healthcare providers should ensure privacy, confidentiality, and respectful communication while avoiding judgmental language. Important areas include:

- Sexual orientation and gender identity.
- Current and previous sexual partners.
- Number of partners.
- Types of sexual activity.
- Sexual satisfaction.
- Pain during intercourse.
- Sexual desire and arousal.
- Previous sexually transmitted infections.
- Condom use.
- Contraceptive practices.
- Pregnancy intentions.

- History of sexual abuse, coercion, or intimate partner violence.

Using open-ended questions facilitates discussion and strengthens the therapeutic relationship. Women should be reassured that such questions are routine components of comprehensive reproductive healthcare.

## **Reproductive Rights**

Reproductive rights are fundamental human rights that enable individuals and couples to make informed decisions regarding reproduction without coercion, discrimination, or violence. These rights include access to accurate information, quality reproductive healthcare, contraception, infertility treatment, safe pregnancy care, and freedom to decide whether and when to have children. Respect for reproductive autonomy requires healthcare providers to deliver unbiased, evidence-based information while supporting patient preferences. Informed consent, confidentiality, privacy, and shared decision-making should guide every clinical encounter. Reproductive counselling should empower women rather than direct their reproductive choices.

## **Sexually Transmitted Infection Awareness**

Sexually transmitted infections remain a major public health concern and contribute significantly to infertility, ectopic pregnancy, chronic pelvic pain, recurrent pregnancy loss, adverse pregnancy outcomes, and neonatal infections. Common STIs include:

- Chlamydia trachomatis
- Neisseria gonorrhoeae
- Syphilis
- Human papillomavirus

- Herpes simplex virus
- Human immunodeficiency virus
- Hepatitis B
- Trichomoniasis

Many infections remain asymptomatic, emphasizing the importance of risk assessment and screening before conception. Women with previous STIs, multiple sexual partners, inconsistent condom use, or partners with high-risk behaviour should undergo appropriate laboratory evaluation before attempting pregnancy.

## **Prevention of Sexually Transmitted Infections**

Effective prevention combines behavioural, educational, and biomedical strategies. Recommended preventive measures include:

- Consistent and correct condom use.
- Limiting the number of sexual partners.
- Mutual monogamy.
- HPV vaccination.
- Hepatitis B vaccination.
- Regular STI screening in high-risk individuals.
- Early diagnosis and treatment.
- Partner notification and treatment.
- Counselling regarding safer sexual practices.

Early treatment before conception reduces infertility, miscarriage, preterm birth, congenital infections, and neonatal complications.

## **Contraception Counselling**

Contraception counselling should be individualized and centred on reproductive goals. Women should receive comprehensive information regarding available contraceptive methods, effectiveness, advantages, disadvantages, contraindications, reversibility, and protection against sexually transmitted infections. Counselling should include:

- Current reproductive intentions.
- Desired timing of pregnancy.
- Previous contraceptive experiences.
- Medical eligibility.
- Lifestyle considerations.
- Partner involvement.
- Future fertility plans.

No single contraceptive method is suitable for every woman. Shared decision-making improves continuation rates and patient satisfaction.

## **Informed Reproductive Choices**

Informed reproductive choice allows women and couples to make voluntary decisions regarding pregnancy planning based on accurate information and personal values. Healthcare providers should discuss:

- Timing of pregnancy.
- Birth spacing.
- Fertility awareness.
- Family planning methods.

- Risks associated with advanced maternal age.
- Fertility preservation when appropriate.
- Genetic counselling.
- Assisted reproductive technologies when indicated.

Women should never feel pressured toward pregnancy, contraception, sterilization, or assisted reproduction. Respect for autonomy remains central to ethical reproductive care.

## **Communication Skills in Sexual Counselling**

Successful counselling depends upon empathy, active listening, confidentiality, cultural sensitivity, and effective communication. Healthcare providers should:

- Use open-ended questions.
- Normalize discussion of sexual concerns.
- Avoid medical jargon.
- Respect privacy.
- Encourage partner participation when appropriate.
- Validate patient concerns.
- Maintain a non-judgmental attitude.

Patients often remember the manner in which counselling was delivered as much as the information provided. Compassionate communication enhances trust, disclosure, adherence, and long-term therapeutic relationships.

## **Role of Healthcare Providers**

Every healthcare encounter involving women of reproductive age represents an opportunity to promote sexual and reproductive health. Healthcare professionals should:

- Routinely inquire about sexual health.
- Assess reproductive goals.
- Screen for sexual dysfunction.
- Identify intimate partner violence.
- Counsel regarding STI prevention.
- Provide contraception counselling.
- Promote reproductive rights.
- Encourage HPV vaccination.
- Facilitate referral to specialists when indicated.

Integrating these services into routine preconception care improves reproductive autonomy and pregnancy outcomes.

## **Conclusion**

Sexual well-being, reproductive rights, STI prevention, contraception counselling, and informed reproductive choices are integral components of comprehensive preconception care. Sexual health extends beyond disease prevention to encompass physical, emotional, psychological, and social well-being. Routine assessment of sexual function, respectful communication, prevention of sexually transmitted infections, individualized contraception counselling, and support for reproductive autonomy enable women to make informed decisions regarding their

reproductive future. Incorporating these principles into everyday clinical practice promotes healthier relationships, safer pregnancies, improved fertility, and better maternal and neonatal outcomes while upholding the dignity and rights of every individual.

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## CHAPTER 10

# Healthy Timing and Spacing of Pregnancy: A Preconception Care Approach

### IN THIS CHAPTER

Concept of Healthy Timing and Spacing of Pregnancy

Importance of Healthy Birth Spacing

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## Introduction

Healthy Timing and Spacing of Pregnancy (HTSP) is a fundamental component of comprehensive preconception care and reproductive health. It refers to planning pregnancies at appropriate intervals and at the most suitable time in a woman's life to optimize maternal, fetal, neonatal, and child health outcomes. Birth spacing is no longer viewed solely as a family planning intervention but as a preventive healthcare

strategy that contributes significantly to reducing maternal mortality, neonatal mortality, preterm birth, low birth weight, and adverse obstetric outcomes. The World Health Organization (WHO) emphasizes that every pregnancy should be planned, intended, and supported by appropriate preconception counselling and access to effective contraception. Healthy spacing allows women adequate time to recover physically, emotionally, nutritionally, and socially before embarking on another pregnancy. Despite remarkable progress in maternal healthcare, closely spaced and unintended pregnancies remain common worldwide, particularly in low- and middle-income countries. Inadequate birth spacing contributes substantially to maternal anemia, nutritional depletion, recurrent obstetric complications, and neonatal morbidity. Effective preconception counselling provides an ideal opportunity to discuss reproductive intentions, assess contraceptive needs, optimize medical conditions, and facilitate informed decision-making regarding pregnancy planning.

## Concept of Healthy Timing and Spacing of Pregnancy

Healthy Timing and Spacing of Pregnancy encompasses two equally important concepts:

- **Healthy Timing**, which refers to planning pregnancy at an optimal maternal age and when chronic medical conditions are well controlled.
- **Healthy Spacing**, which refers to maintaining an adequate interval between pregnancies to allow complete maternal recovery and improve pregnancy outcomes.

Birth spacing should be individualized according to maternal age, parity, previous obstetric history, fertility goals, medical disorders, socioeconomic circumstances, and couple preferences. Rather than promoting a single contraceptive method, modern preconception care emphasizes informed choice through individualized counselling and shared decision-making.

## **Importance of Healthy Birth Spacing**

Appropriate spacing between pregnancies benefits the mother, baby, family, and society. Following childbirth, the maternal body undergoes significant physiological changes including restoration of nutritional stores, uterine involution, hormonal normalization, and psychological adjustment to parenthood. Insufficient recovery time predisposes women to nutritional deficiencies, maternal exhaustion, and obstetric complications during subsequent pregnancies. Healthy birth spacing contributes to:

- Reduced maternal morbidity and mortality
- Lower incidence of maternal anemia
- Improved nutritional recovery
- Reduced risk of preterm birth
- Lower incidence of low birth weight
- Decreased fetal growth restriction
- Reduced neonatal mortality
- Improved breastfeeding duration
- Better cognitive and emotional development of children
- Improved family well-being and socioeconomic stability

- Enhanced reproductive autonomy and informed family planning

Birth spacing also enables couples to prepare financially, emotionally, and socially for another child, promoting healthier family relationships and improved parenting outcomes.

## WHO Recommendations for Healthy Timing and Spacing

The World Health Organization recommends specific interpregnancy intervals based on available scientific evidence. After a **live birth**, couples should wait **at least 24 months before attempting the next pregnancy**, resulting in an interval of approximately **three years between consecutive births**. This duration allows maternal nutritional restoration, recovery from pregnancy-related physiological changes, and optimal child care for the previous infant. Following **miscarriage or induced abortion**, WHO recommends waiting at least **six months before conceiving again**, although recent evidence suggests individualized counselling based on maternal health and emotional readiness. Women with previous cesarean delivery should be counselled regarding the increased risks associated with short interpregnancy intervals, including uterine rupture, abnormal placentation, scar complications, and adverse maternal outcomes.

## Risks Associated with Short Interpregnancy Interval

An interpregnancy interval of less than 18 months, particularly less than six months, has consistently been associated with adverse maternal and neonatal outcomes. Maternal complications include:

- Iron deficiency anemia

- Nutritional depletion syndrome
- Hypertensive disorders
- Placental abruption
- Premature rupture of membranes
- Increased cesarean delivery
- Postpartum hemorrhage
- Maternal exhaustion

Fetal and neonatal complications include:

- Preterm birth
- Low birth weight
- Small-for-gestational-age infants
- Fetal growth restriction
- Congenital anomalies in selected populations
- Neonatal intensive care admission
- Increased neonatal mortality
- Infant mortality

Short spacing following cesarean delivery also increases the likelihood of uterine scar dehiscence and rupture in subsequent pregnancies. These risks highlight the importance of counselling women regarding optimal timing of future pregnancies before hospital discharge after childbirth.

## **Consequences of Long Interpregnancy Interval**

While short intervals receive considerable attention, excessively long intervals (>5–10 years) have also been associated with increased pregnancy complications. Women may experience higher risks of

preeclampsia, gestational hypertension, dysfunctional labor, and cesarean delivery. Maternal aging and the development of chronic medical disorders further contribute to these risks. Therefore, counselling should focus on achieving an optimal balance rather than simply delaying pregnancy indefinitely.

## **Preconception Assessment for Birth Spacing**

Every preconception consultation should begin by assessing reproductive intentions. Healthcare providers should discuss:

- Does the couple desire pregnancy?
- How many children are planned?
- What interval between pregnancies is preferred?
- Are there medical conditions requiring optimization before conception?
- Is effective contraception currently being used?
- Does the couple understand available contraceptive choices?

Assessment should include medical, obstetric, menstrual, contraceptive, nutritional, psychological, and social histories. Women with chronic diseases may require specialist referral before planning pregnancy. This individualized assessment ensures that pregnancy occurs only when maternal health has been optimized.

## **Reproductive Life Planning**

Reproductive Life Planning is an evidence-based strategy that encourages individuals and couples to proactively consider their

reproductive goals throughout their lives. It includes decisions regarding:

- Whether to have children
- Number of desired children
- Timing of first pregnancy
- Appropriate spacing between pregnancies
- Choice of contraception
- Fertility preservation when indicated

Discussing reproductive intentions during routine healthcare visits enables healthcare providers to offer anticipatory guidance and personalized reproductive care.

## **Contraceptive Counselling: A Continuum of Care**

Effective contraceptive counselling is central to healthy birth spacing. Counselling should be viewed as an ongoing process rather than a single consultation. Women should receive comprehensive, unbiased, and evidence-based information regarding available contraceptive methods, effectiveness, side effects, reversibility, and suitability according to their reproductive goals. Quality counselling should address the "Five A's":

- **Acceptability**
- **Accessibility**
- **Availability**
- **Affordability**
- **Accountability**

Counselling should also include discussion regarding sexually transmitted infection prevention, follow-up care, management of side effects, and reassurance regarding future fertility. Method-specific counselling significantly improves continuation rates and patient satisfaction.

## **Individualized Contraceptive Selection**

No single contraceptive method is ideal for every woman. Selection should consider three major determinants:

1. Woman's profile
2. Method characteristics
3. Clinical and social context

Factors influencing contraceptive choice include:

- Age
- Parity
- Desire for future fertility
- Breastfeeding status
- Obesity
- Diabetes mellitus
- Hypertension
- Thyroid disorders
- Cardiovascular disease
- Smoking
- Migraine
- Risk of sexually transmitted infections

- Sociocultural preferences
- Cost and accessibility

Shared decision-making improves contraceptive acceptance and long-term continuation.

## WHO Medical Eligibility Criteria (MEC)

The WHO Medical Eligibility Criteria provides evidence-based recommendations for safe contraceptive use in women with medical disorders. Methods are categorized into four groups:

- **Category 1:** No restriction for use.
- **Category 2:** Advantages generally outweigh theoretical or proven risks.
- **Category 3:** Risks usually outweigh advantages; use only if no better alternative exists.
- **Category 4:** Unacceptable health risk; method should not be used.

The MEC framework assists clinicians in selecting the safest contraceptive option for women with complex medical conditions while minimizing unnecessary restrictions.

## Modern Contraceptive Options

A wide range of reversible and permanent contraceptive methods enables individualized family planning.

## Combined Oral Contraceptives (COCs)

COCs remain among the most commonly used reversible contraceptives. Newer formulations with shortened hormone-free

intervals (24/4 regimens) and extended-cycle schedules reduce hormone withdrawal symptoms, improve ovarian suppression, and minimize withdrawal bleeding.

## Progestin-Only Pills (POPs)

POPs are particularly valuable for breastfeeding women, women over 35 years who smoke, those with hypertension, obesity, migraine without aura, diabetes, and thromboembolic risk factors. Their safety profile allows broader use than estrogen-containing contraceptives.

## Centchroman (Chhaya)

Centchroman (Ormeloxifene), marketed under the national family planning programme as **Chhaya**, is a non-hormonal selective estrogen receptor modulator. It is administered twice weekly for the first three months and once weekly thereafter. Advantages include reversibility, absence of hormonal side effects, safety during breastfeeding, and suitability for women preferring non-hormonal contraception. Women should be appropriately evaluated before initiation, particularly for liver disease, cervical pathology, chronic illness, or menstrual disorders.

## Injectable Contraceptives

Depot Medroxyprogesterone Acetate (DMPA) provides highly effective contraception for three months through ovulation suppression, cervical mucus thickening, and endometrial thinning. It is appropriate for many women, including those unable to use estrogen-containing contraceptives. However, counselling should include possible delayed return of fertility, altered bleeding patterns, and reversible reduction in

bone mineral density. The subcutaneous formulation (DMPA-SC) facilitates self-administration and expands access.

## **Long-Acting Reversible Contraception (LARC)**

Long-acting reversible contraceptives, including intrauterine devices (IUDs) and subdermal etonogestrel implants, are among the most effective reversible contraceptive methods, with failure rates below 1%. Their major advantages include prolonged efficacy, minimal user dependence, rapid return of fertility after removal, and excellent continuation rates. They are suitable for adolescents, nulliparous women, postpartum women, and those seeking long-term but reversible contraception.

## **Barrier Methods**

Male and female condoms remain important because they are the only contraceptive methods providing dual protection against both unintended pregnancy and sexually transmitted infections, including HIV. Although typical-use failure rates are higher than LARC methods, condoms should be encouraged, particularly for individuals at risk of sexually transmitted infections.

## **Permanent Methods**

Female sterilization and vasectomy remain suitable options for couples who have completed their families. Counselling should emphasize permanency, procedural risks, and availability of highly effective reversible alternatives.

## **Method-Specific Counselling**

Choosing an appropriate contraceptive method is only the beginning. Women should receive detailed counselling regarding:

- Correct method use
- Expected bleeding changes
- Management of side effects
- Warning symptoms
- Need for follow-up
- Return of fertility
- Protection against sexually transmitted infections
- Transition to pregnancy planning

Comprehensive counselling significantly improves adherence, continuation, and satisfaction with contraceptive methods.

## **Public Health Perspective**

Birth spacing contributes directly to several Sustainable Development Goals, including reducing maternal mortality, ending preventable neonatal deaths, promoting gender equality, and ensuring universal access to sexual and reproductive healthcare. Expanding contraceptive access through community-based programmes, trained counsellors, digital health initiatives, and integration with maternal and child health services can substantially reduce unintended pregnancies and improve maternal and child health indicators.

## Conclusion

Healthy Timing and Spacing of Pregnancy is a cornerstone of modern preconception care. Appropriate birth spacing allows women to recover physiologically and psychologically, reduces maternal and neonatal complications, and enhances the well-being of families and communities. Every reproductive healthcare encounter should include assessment of reproductive intentions, individualized contraceptive counselling, and evidence-based guidance on optimal pregnancy timing. The use of WHO Medical Eligibility Criteria, availability of diverse contraceptive options, and promotion of informed choice empower women to achieve their reproductive goals safely. Integrating healthy birth spacing into routine preconception services represents a cost-effective, evidence-based strategy for improving maternal, fetal, and neonatal outcomes while advancing reproductive rights and public health.

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