HEALTHY PARENTS, HEALTHY CHILD INITIATIVE:

GUIDELINE FOR IMPLEMENTATION OF EVIDENCE-BASED STRATEGIES, FOLLOWING PRIMARY HEALTH CARE APPROACH, DURING THE PRE-CONCEPTION AND PRENATAL PERIOD FOR PROMOTING THE HEALTH OF THE COUPLE, MOTHER AND NEWBORN

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Mumbai 18/01/2019

सत्यमेव जयते

डॉ. प्रदीप व्यास, भा.प्र.से.
प्रधान सचिव
Dr. Pradeep Vyas, I.A.S.
Principal Secretary

महाराष्ट्र शासन
सार्वजनिक आरोग्य विभाग
१०वा मजला, गोकुळदास तेजपाल रुग्णालय कॉम्प्लेक्स बिल्डींग,
नविन मंत्रालय, मुंबई- ४०० ००१
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GOVERNMENT OF MAHARASHTRA
Public Health Department
10th Floor, G.T. Hospital Complex Building,
New Mantralaya, Mumbai- 400 001.
Phone : 022-22617388 Fax : 022-22617999
E-mail : psec.pubhealth@maharashtra.gov.in

Message

Maharashtra is the second most populous state after Uttar Pradesh (total population: 112.3 million, Census 2011); third largest state in terms of geographic area after Rajasthan and Madhya Pradesh (Total areas: 307,713 km^2). It is also the third most urbanized state with about 45% of the population living in urban areas.

The state has made very good progress in reducing maternal and child death rates in recent times. For instance, from 2012 to 2016, the under-5 mortality rates have declined from 28 to 21 per 1000 live births. Similarly Maternal Mortality Ratio has come down from 166 to 61 per 100,000 live births during 1997-98 to 2014-16. However stark disparity exists. Maternal and child deaths are higher in some tribal and rural pockets of the State. Despite good progress, an estimated 37,521 children below five years die annually due to preventable causes, out of whom 23,227 dies in first 28 days (61%), a proportion much higher than global average (44 percent). An estimated 1200 mothers die due to maternal causes in the state every year.

Public Health Department, Government of Maharashtra is committed to reduce the maternal and child death rates further by increasing coverage of services, rational deployment of human resources, developing capacity of the human resources for health in areas of skilled birth attendance and essential newborn care, strengthening the procurement and supply chain of essential health commodities (drugs and vaccines) and improving quality of services.

One of the main strategies for further reduction of maternal and child mortality is to integrate the most recent evidence into routine practice. There is emerging body of evidence that pre-conception care is critical for promoting maternal and newborn health. Low birth weight and preterm babies are major public health challenges and prevention of low birth weight and preterm babies by promoting pre-conception care will not only prevent neonatal mortality but also childhood mal-nutrition, neurocognitive impairment, birth defects and non-communicable disease in adult life. Similarly, incorporation of new evidence during antenatal care will further contribute to reduction of maternal and child mortality in the state. I am happy that Public Health Department of Government of Maharashtra has rolled out **Healthy parent: healthy child** initiative for systematic implementation of pre-conception care and added newer evidence-based strategies to the antenatal care in Peth and Sinnar blocks of Nashik, jointly with UNICEF and Bharati Vidyapeeth Deemed University Medical College, Pune which will go a long way in generating evidence for reducing maternal and child mortality in the state.

Pradeep Vyas

Dr. Pradeep Vyas

बेटी बचाओ
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जन्म व मृत्युची नोंदणी करा.
REGISTER ALL BIRTHS AND DEATHS

सत्यमेव जयते
Dr. Anup Kumar Yadav, I.A.S.
Commissioner, Health Services and
Mission Director, National Health Mission

सार्वजनिक आरोग्य विभाग
महाराष्ट्र शासन

GOVERNMENT OF MAHARASHTRA
Commissioner, Health Services and
Mission Director, National Health Mission
Office of the State Health Society, Public Health Department
"Arogya Bhavan", 3rd Floor, St. George's Hospital Compound,
P.D'melo Road, Fort, Mumbai - 400 001.
Tel. : 022-2262 0235 Fax : 022-2264 2955
E-mail : mdnrhm.mumbai@gmail.com
Web : www.nrhm.maharashtra.gov.in

Message

Maharashtra has one of the most resilient health systems in India. National Health Mission and Public Health Department of Government of Maharashtra are committed to providing quality health services to the population of the state. Notwithstanding the recent reduction of maternal and child death rates in the state, these rates are much higher as compared to the developed countries. For instance, the neonatal mortality rates in Japan is 0.9 against 13 per 1000 live birth in Maharashtra in 2016. Similarly, the maternal mortality ratios of countries like Poland, Iceland, Greece and Finland are as low as 3 as against 61 per 100000 live births in Maharashtra in 2016.

India has the largest number of low birth weight babies in the world. Low birth weight is defined as newborn with birth weight less than 2500 gram. These babies are at increased risk of under five mortality, stunting and poor cognitive development, and of chronic disease in the adult life.

Innovative strategies need to be implemented for reduction of the maternal and under five mortality and for preventing low birth weight in the state. Protecting and promoting woman's reproductive health can advance the health not only the woman but also of the newborn and child in a major way. It is said that teach a man, you teach an individual, teach a woman and you teach generations. Promoting health of girls and women is the most effective way for promoting the health of entire family. I am happy that **Healthy parent: healthy child** initiative is being implemented in Peth and Sinnar blocks of Nashik district, through a partnership between Government of Maharashtra, UNICEF and Bharati Vidyapeeth Deemed University Medical College, Pune, which aims at promoting health of women during pre-conception and antenatal period for preventing maternal and child deaths and for preventing low birth weight. I am sure the learnings from the pilot intervention will help in formulating strategies for further prevention of maternal and child deaths and promoting their health for scaling up of these interventions in the entire state.

Dr. Anup Kumar Yadav

मुलगी वाचवा
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महाराष्ट्र

GOVERNMENT OF MAHARASHTRA

STATE FAMILY WELFARE BUREAU
MAHARASHTRA

Additional Director Telephone No. Office Telephone No. (EPABX)	26058996 (P) 26058739 (O) 26058139 (O) 26058476 (O)	State Family Welfare Bureau Kutumb Kalyan Bhavan, Behind Pune Railway Station, Pune 411 001 (Maharashtra) Fax: 020-26058766/26058218 Email ID: rch.jsy@gmail.com/ jssk.cell@gmail.com
Health Services		No. SFWB/UNICEF/foreword/ 5832 /2019 Date: 21/6/2019

Foreword

Maharashtra is one of the better performing states with third lowest under-5 child mortality rates and second lowest maternal mortality ratio among large states in India in 2016. However, when compared to the developed countries, these rates are still high. It is critical to scale up the coverage and quality of reproductive, maternal, neonatal, child health and adolescent (RMNCHA) services across all health facilities. Further, following the principle of continuum of care, services and healthy behaviours must be promoted across home and community, outreach and facility levels as well as along the life cycle. Emerging evidence in the areas of RMNCHA warrant continuous adaptation of these evidence into routine practice for further reduction of maternal and child mortality in the state.

Anemia is a major public health issue in Maharashtra and the prevalence among the ever-married women 15-49 years with anemia in Maharashtra during 2005-6 and 2015-16 remained at 48%. Even though percentage of Women whose BMI is below normal (< 18.5 kg/m2) has reduced from 36.2% to 23.5% during 2005-06 to 2015-16, it remains high. Further, high prevalence of other risk factors like adolescent pregnancies increases risk and prevalence of low birth weight babies in the state.

Government of Maharashtra, in partnership with UNICEF and Bharati Vidyapeeth Deemed University Medical College, Pune has initiated a **Healthy Parent: Healthy Child** Project in Peth and Sinnar blocks of Nashik district for promoting pre-conception care and antennal care. The intervention focuses health check up, laboratory investigation, appropriate treatment and behaviour change among the eligible women who are planning pregnancies. To our knowledge, this is one of the first intervention in India to promote pre-conception care in a systematic and comprehensive manner among eligible women who are planning pregnancies. This intervention, aims at promoting maternal health, preventing low birth weight, neonatal mortality, cognitive impairment, malnutrition in children and preventing chronic diseases in adulthood. Recent evidence on care during antenatal period are incorporated for preventing maternal and child deaths. I am confident that the interventions will generate evidence on effectiveness and feasibility of these strategies for wider scale up and replication.

(Dr. Archana Patil)
Additional Director Health Services
State Family Welfare Bureau, Pune

United Nations Children's Fund
'B' wing, R - 2,
Technopolis building,
Ground floor, Mahakali Caves Road,,
Near MIDC, Opp. Holy Family School,
Andheri (East),
Mumbai - 400 093.
India

Telephone 91 22 26875172/73/74
91 22 65740098

Fax 91 22 26875171

www.unicef.org

Preface

Maharashtra has achieved remarkable progress in the reduction of maternal and child death rates in recent times. UNICEF is committed to support Government of Maharashtra is achieving the targets of Sustainable Development Goals (SDG) related to children including SDG three: Ensure healthy lives and promote well-being for all at all ages, prioritizing targets related to maternal and child health and universal health coverage. The maternal and child health situation in the state is characterized by stark disparity. The Under five mortality rate (U5MR) is 21 per 1000 live births and U5MR in rural areas is almost double that of the urban areas (27 versus 14 per 1000 live births). The neonatal mortality rates in girls and boys are 9 and 17 respectively, which increases greatly to 23 in girls and increase only modestly 20 in boys for U5MR per 1000 live births highlighting neglect of the female children at household level (SRS 2016).

UNICEF advocated with the Public Health Department of Government of Maharashtra for roll out of evidence based intervention in two blocks of Nashik for preventing maternal and child deaths and promoting their health. Further UNICEF convened partnership with Bharati Vidyapeeth Deemed University Medical College, Pune, participated in drafting of the guideline and in imparting the training for roll out of the evidence based intervention. This **Healthy parent: healthy child** initiative aims at promoting maternal and child health in a holistic manner following the principle of continuum of care from family and community, outreach and health facility for reducing maternal and child mortality. The pre-conception care is being rolled out in a holistic manner. Rashtriya Bal Swasthya Karyakram 2018 recommends the pre-conception interventions focusing mainly on the behavioural aspect. The programme in Nashik aims at demonstrating a model and generating evidence of the pre-conception programme in the primary health care setting. I am confident that this project will generate necessary evidence on feasibility and effectiveness of pre-conception care and facilitate the roll out of these interventions not only in Maharashtra but in the whole country.

Rajeshwari Chandrasekar
Chief of the Field Office
15 January 2019

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BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY), PUNE, INDIA
Founder Chancellor : Dr. Patangrao Kadam
MEDICAL COLLEGE, PUNE
Pune-Satara Road, Dhankawadi, Pune India - 411043.
DEPARTMENT OF COMMUNITY MEDICINE
★ Accredited with 'A+' Grade (2017) by NAAC ★
★ Category-I University Status by UGC ★
PRINCIPAL
Brig. (Retd) Dr. N. S. Mani
M.D. (Pathology)
Email : bvpcommunitymedicine@yahoo.co.in
HEAD OF DEPARTMENT
Dr. Mrs. J. S. Gothankar
M.D.(Preventive & Social Medicine)
Phone : 020-24373226, 24364561, Ext. Office : 247, H.O.D. : 246, Fax No : 020-24372175

Ref. No. : BVDU/MC/CM/ 710 /2019 Date : 21 / 1 /2019

Prof. J. S. Gothankar,
Prof. and Head, Dept. of Community Medicine
Bharati Vidyapeeth Deemed to be University
Medical College,
Pune 43

Message

Bharati Vidyapeeth Deemed to be University Medical College, Department of Community Medicine is happy to be associated with the pre-conception health care initiative, '**Healthy parents: healthy child**' implemented in a tribal (Peth) and rural block (Sinnar) of Nashik district of Maharashtra. The programme is supported by UNICEF and implemented through government health system. This is an unique opportunity to implement activities for health promotion of women (and men) before conception, which has potential for preventing maternal and newborn ill health and death. In the national programme, the adolescent health and nutrition programmes are already implemented under the umbrella of Rashtriya Kishore Swasthya Karyakram. Current pre-conception programme includes primarily the family planning and peri-conceptual folic acid supplementation. With the launch of Rashtriya Bal Swasthya Karyakram in 2018, the pre-conception programme has been initiated in India focusing mainly on the behavioural aspect. The **Healthy parent: healthy child initiative** in Nashik aims at demonstrating feasibility of the pre-conception programme in the primary health care setting, which will provide evidence on the impact of the pre-conception care in improving the pregnancy outcome. Its proper implementation along with standard ante natal care, in long term will certainly reduce maternal, neonatal mortality, low birth weight and prematurity, birth defects and cognitive impairment.

A pictorial flier related to birth defects was created and used by ASHAs for creating awareness and reporting newborns with physical birth defects. The implementation of pre-conception care has a strong component of Behavior Change Communication. A pictorial flipbook is also prepared and used in these blocks. The Marathi Audio Visual film prepared for Nashik district can be used in other areas too. Further the impact assessment of the programme is being implemented by Bharati Vidyapeeth Deemed University Medical College with support from Government of Maharashtra and UNICEF, which will generate evidence, which is first of its kind in not only India but the whole world. Pre-conception care initiatives are certainly up scalable across state and country. I am sure the guidelines will be very useful to medical and para-medical personnel working in public health department.

Prof. J.S. Gothankar

CONTRIBUTORS

Government of Maharashtra:

1. Dr. Pradeep Vyas, MD, IAS, Principal Secretary, Public Health Department, Government of Maharashtra, GoM
2. Mr. Anup Kumar Yadav, IAS, Mission Director, National Health Mission, Commissioner Health Services, GoM
4. Dr. (Smt.) Archana Patil (MD, PhD), Additional Director of Health Services, State Family Welfare Bureau, Pune, GoM
5. Dr Satish Pawar (MD, PhD), Additional Mission Director, National Health Mission, GoM
6. Dr. Aniruddha Deshpande, Assistant Director, Health Services, State

UNICEF Maharashtra:

1. Ms. Rajeshwari Chandrasekar, Chief, Field Office
2. Prof. Aparna Shrotri, Senior Maternal Health Consultant
3. Dr. M. Karnataki, Senior Maternal Health Consultant
4. Dr. Khanindra Bhuyan, Health Specialist
5. Ms. Rajalakshmi Nair, Nutrition Specialist
6. Ms. Harsha Mehta, Communication for Development Officer
7. Dr. Swati Mohapatra, Communication, Advocacy and Partnership Specialist
8. Ms. Anuradha Nair, Inclusive Social Policy Specialist
9. Dr. Mangesh Gadhari, Health Officer
10. Dr. Aparna Deshpande, Nutrition Officer
11. Dr. Ravindra Bagal, State Child Health Consultant

B V Deemed University Medical College, Pune

1. Prof. J. S. Gothankar, Head of Department, Department of Community Medicine
2. Prof. Prakash Doke, Professor, Department of Community Medicine

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CONTENTS

ABBREVIATIONS

ACOG	American College of Obstetricians and Gynecologists
ANC	Ante Natal Care
ARR	Annual Rate of Reduction
ART	Anti-Retroviral Treatment
ARV	Antiretroviral
ASB	Asymptomatic Bacteriuria
ASHA	Accredited Social Health Activist
AWC	Anganwadi Center
BCC	Behaviour Change Communication
BMI	Body Mass Index
CPD	Cephalopelvic disproportion
CTG	cardio tocography
DH	District Hospital
DLHS	District Level Household Survey
DMPA	Depo-Medroxyprogesterone Acetate
EID	Early Infant Diagnosis
FA	Folic Acid tablets
FOGSI	Federation of Obstetrics and Gynecological Societies of India
FRU	First Referral Unit
GDM	Gestational Diabetes Mellitus
GOI	Government of India
GOM	Government of Maharashtra
GTT	Glucose Tolerance Test
HELLP	Haemolysis, Elevated Liver enzymes, Low Platelet count
IFA	Iron Folic Acid tablets
INAP	India Newborn Action Plan
IQ	Intelligence Quotient
ICTC	Integrated Counselling and Testing Center
IUCD	Intra Uterine Contraceptive Device
LBW	Low Birth Weight
MMR	Maternal Mortality Ratio
MNT	Medical Nutrition Therapy
MOHFW	Ministry of Health and Family Welfare, GOI
MPCE	Monthly Per Capita Expenditure
NACO	National AIDS Control Organization
NCDs	Non-communicable Diseases
NFHS	National Family Health Survey
NIPI	National Iron Plus Initiative
OC	Oral contraceptive
PHC	Primary Health Center
PPTCT	Prevention of Parent to Child Transmission of HIV
PRBC	Packed RBC
RBSK	Rashtriya Bal Swasthya Karyakram
RCH	Reproductive and Child Health
RDA	Recommended Daily Allowances
RH	Rural Hospital
RPMNCHA	Preconception to Reproductive Preconception Maternal Neonatal Child Health
RTIs	Reproductive Tract Infections
SBA	Skilled Birth Attendant
SBR	Still Birth Rates
SC	Subcenter
SDH	Sub-District Hospital
SGA	Small for Gestational Age
STIs	Sexually Transmitted Infections
TT	Tetanus Toxoid
Td	Tetanus and adult diphtheria
TSH	Thyroid Stimulating Hormone
U5MR	Under five mortality rate
UNICEF	United Nations Children's Fund
UPT	Urine Pregnancy Tests
USG	Ultrasonography
VHND	Village Health and Nutrition Days
WH	Women's Hospital
WHO	World Health Organization

PURPOSE OF THE GUIDELINE

Continuum of care, through a life cycle approach during pre-conception, pregnancy, labor and childbirth, newborn period and childhood, and at home or community; outreach and health facility, are critical for promoting the health of mothers and children and for preventing morbidity and death. India Newborn Action Plan (INAP) has been implemented in India since 2014. The two goals of INAP are to end Preventable Newborn Deaths and achieve "Single Digit Neonatal Mortality Rate" by 2030, with all the states to individually achieve this target by 2035, and to end Preventable Stillbirths to achieve "Single Digit stillbirth rates (SBR)" by 2030, with all the states to individually achieve this target by 2035. 'Pre-conception and Antenatal Care' is one of the packages of intervention for reducing neonatal mortality and stillbirth. Rashtriya Bal Surakshya Karyakram: Journey of The First 1000 Days, was launched by the Ministry of Health and Family Welfare, Government of India in April 2018, which focusses on educating the parents and care givers about healthy behaviors and practices for ensuring the best during first 1000 days of life, which is critical for laying a solid foundation for the whole life. This program highlights the importance of pre-conception care and focuses on raising awareness on pre-conception care among men and women. However, pre-conception care has not been rolled out systematically focusing on both behavioral and service delivery elements at the primary health care settings in India. WHO recommends fourteen interventions during the pre-conception period. In 2016, a revised ANC guideline was published by WHO. An expert group, under the guidance of the Government of Maharashtra reviewed the evidence, identified key strategies for promoting pre-conception care as well as care during the antenatal period and decided to implement these strategies in two blocks of Nashik district (Peth and Sinner) for assessing the operational feasibility and impact. This project, named as **Healthy Parents: Healthy Child Initiative**, was launched on World Health Day, 7 April 2018 by senior Panchayat leaders and state and district-level officials, in the presence of officials from UNICEF. This guideline, developed for the healthcare providers at the district, block and village levels including frontline functionaries, describes the strategies and steps for implementation of pre-conception care and new strategies of antenatal care in the two blocks of Nashik. Further, the BCC materials and reporting formats to be used are highlighted. These interventions are aimed at complementing the ongoing **Reproductive Maternal Neonatal Child Health and Adolescents (RMNCHA) interventions, which now may be rechristened as RPMNCHA, P for Preconception**. Based on the feasibility, effectiveness and cost-effectiveness of these strategies, the **aim** is to scale up these interventions in the whole state.


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बाळाच्या
ा, आशा, अंगणवाडी सेविकांशी संपर्क साधावा.
राज्य आरोग्य शिक्षण व संपर्क विभाग, पुणे-०६ द्वारा

1: Introduction, low birth weight, prematurity and under-five mortality, and social determinants of health

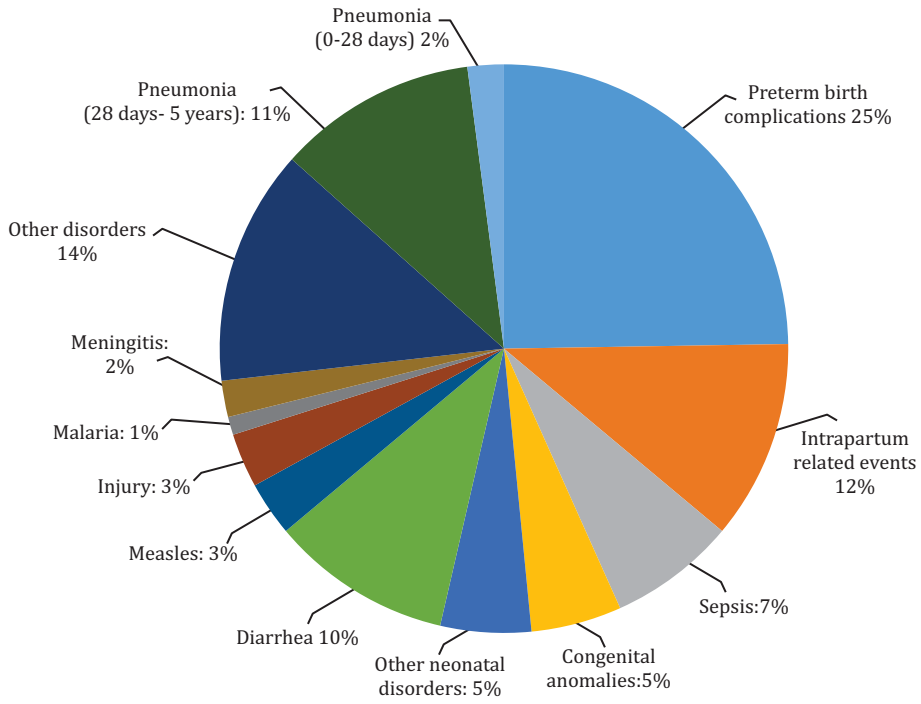
1.1 INTRODUCTION

Maharashtra has made good progress in reducing maternal and under-five mortalities in recent times. The Maternal Mortality Ratio (MMR) in Maharashtra declined from 166 to 61 per 100,000 live births between 1997-98 and 2014-16.[1] During 2007 to 2016, the under-five child mortality rate (U5MR) in the state declined from 42 to 21 per 1000 live births, currently it is third lowest among the large states in India, after Kerala (11) and Tamil Nadu (19).[2] However, an estimated 37,521 children below five years die annually due to preventable causes, out of them 23,227 die in the first 28 days (61%), a proportion much higher than the global average (46%) during the same period. Low birth weight (LBW) and prematurity are major causes of U5MR in Maharashtra and in India.

1.1 Situation of LBW, prematurity and U5MR in India

In India, preterm birth complications are the most important causes of U5MR (25%); followed by pneumonia (13%); intrapartum-related events (11%); and diarrhea (10%) (Figure 1).[3]

Figure 1: Causes of U5MR in India



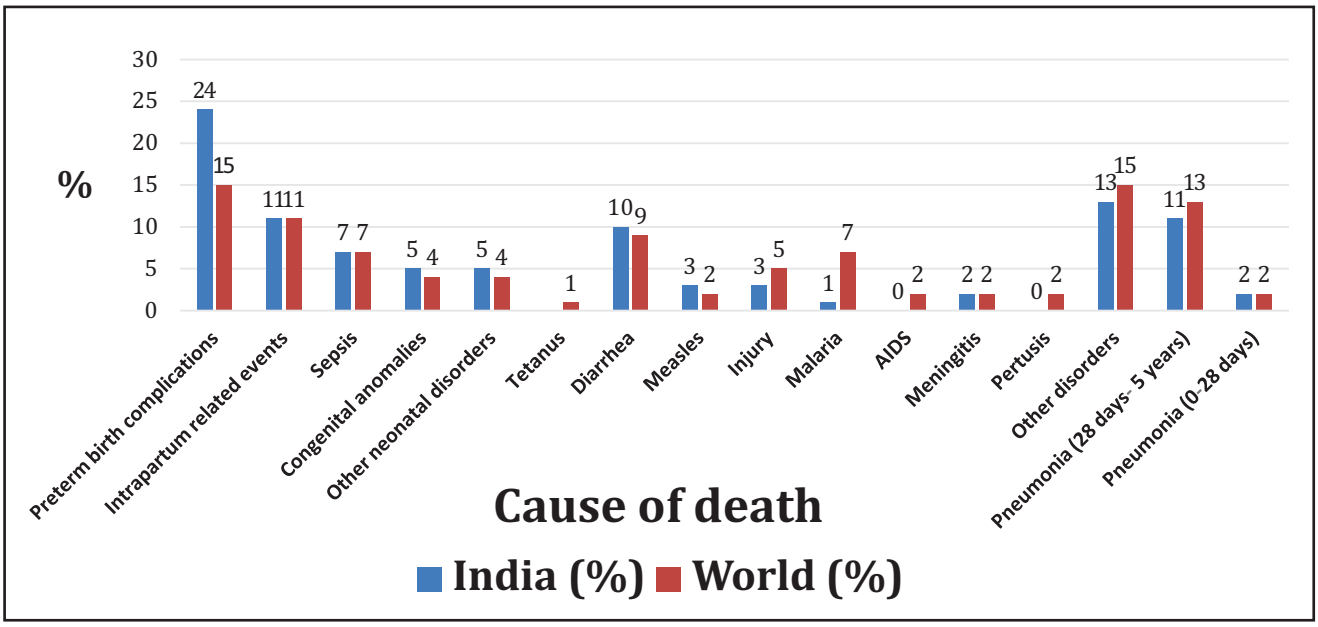
India has the largest number of LBW babies in the world. LBW is defined as a newborn with birth weight less than 2500 grams. **LBW babies are at increased risk of under-five mortality, stunting and poor cognitive development, and of non-communicable diseases (NCDs) in the adult life**.[4] Out of an estimated 20 million LBW infants born globally every year, about 7.5 million are born in India (37%). In India, the prevalence of LBW is 28% of total live births and as many as 46.9% of babies are small for gestational age, the second highest in the world after Pakistan. Globally, LBW babies constitute only about 14% of children born but they account for 60–80% of neonatal deaths.[5]

Being born small might be due to preterm birth (defined as births taking place before 37 completed weeks of pregnancy) or Small for Gestational Age (SGA), or a combination of the two. SGA is defined as a birth weight lower than the 10th centile for a specific completed gestational age by gender, using the Alexander reference population (US National Center for Health Statistics, 1991).[6] Term-SGA is defined as a baby born SGA at 37 or more completed weeks of gestation, and preterm-SGA is defined as infants born SGA at fewer than 37 weeks of gestation. In 2012, an estimated

15 million babies worldwide (11% of live births) were born preterm, 85% of these born at 32–36 weeks. **Preterm and SGA babies are the biggest risk factors for more than 80% of neonatal deaths and these babies are also at higher risk of post-neonatal death, growth retardation, poor cognitive development and chronic diseases in adulthood**. South Asia has the highest prevalence of SGA babies in the world.[7]

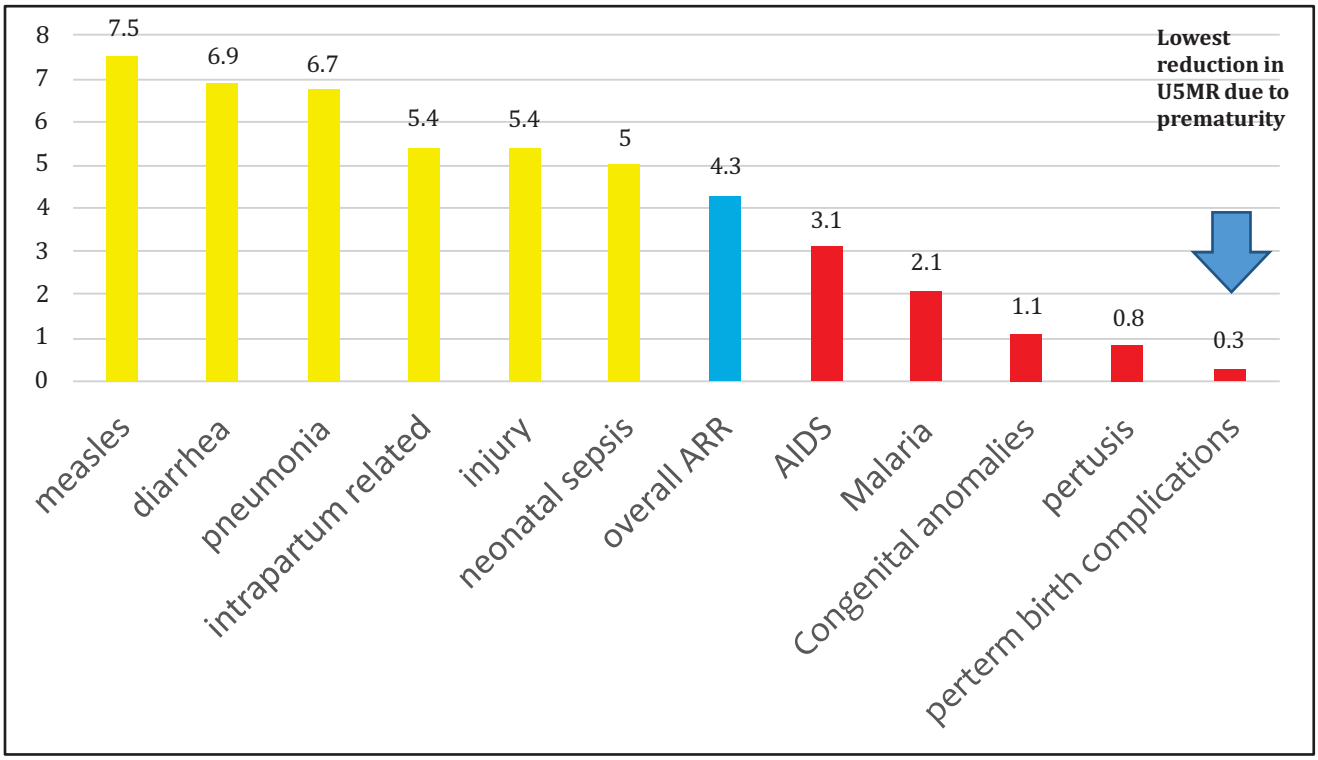
The share of pre-term birth complication in under-five mortality in India is significantly higher at 24% than the global average at 15% (Figure 2).[8]

Figure 2: Causes of under-five deaths in India versus the world in 2013



Further, there has been little reduction of under-five deaths due to prematurity during 2000 to 2013 in India (Figure 3).[9]

Figure 3: Average annual rate of reduction (ARR) of under-five mortality due to different causes during 2000 to 2013 in India.



1.2. LBW and NCDs in adulthood

As mentioned earlier, LBW increases the risk of premature death due to NCDs during adulthood[10] and many studies are currently going on for its prevention globally and in India.[11] The first world congress on fetal origins of adult disease was held in Mumbai in 2001. Cohort studies have been implemented in Mysore, Vellore, Delhi and Pune for understanding the risks associated with LBW.[12] A randomized controlled trial has been implemented since 2005 in Mumbai to assess the impact of improving dietary intake of multiple micronutrients by providing a snack made of green leafy vegetables, fruits and milk powder to women in the pre-conception period and during ANC, in reducing LBW babies.[13] A systematic review of the use of multiple micronutrients during pregnancy, recommended its use in developing countries as pregnant women receiving multiple-micronutrient supplementation had fewer LBW and SGA babies and stillbirths as compared to those receiving only iron with or without folic acid.[14] The Healthy Life Trajectories Initiative, which follows a developmental origin of health and diseases (DOHaD), has been initiated with funding from the National Natural Science Foundation of China, Department of Biotechnology of India, the Medical Research Council of South Africa and The Canadian Institutes of Health Research, in collaboration with the World Health Organization (WHO), to address the increasing burden of NCDs – including obesity, diabetes, cardiovascular disease and poor mental health – around the world. Four separate but harmonized intervention studies have been implemented in Soweto, Mysore, Shanghai, and three provinces in Canada.[15]

1.3. Risk factors for prematurity and LBW

Three types of risk factors have been identified for prematurity. One of such risk factors include social and economic factors (poverty, low educational level of the mother, adolescent pregnancies) and race (in the United States, blacks are twice as likely as whites to experience preterm birth). The health of the mother is an important predictor of LBW. Those with body mass index (BMI) less than 18.5, suffering from syphilis, having a small cervix, and abusing tobacco and alcohol have higher risk of preterm births. Another risk factor is maternal infection and inflammation like chorioamnionitis, which increases the risk of preterm babies. Thirdly genetic factors play a role, and mothers with preterm births have higher risk in subsequent pregnancies. In about 50% of preterm births, the cause is unknown.[16]

The risk factors for LBW include poor maternal nutrition including maternal underweight,[17] maternal anemia (in low-income countries, 25% of LBW is attributable to maternal anemia during pregnancy[18]), medical conditions related to chronic hypertension and preeclampsia/eclampsia,[19] maternal age among others. Pre-pregnancy BMI is an important predictor of LBW and preterm babies and is more important than the weight gain during pregnancy.[20] Infants born to teenagers and women at advanced age are at greater risk for stillbirth, preterm birth, neonatal death, congenital anomaly, and LBW.[21]

Maternal education, BMI less than18.5, short stature (height less than 145 cm) and lack of antenatal visits (less than 4 visits) are significant predictors of LBW in India. Women with 'no education' had the greatest risk of giving birth to an infant with LBW followed by women with "primary education".[22]

BMI of mothers is also a major risk factor for childhood undernutrition in India and the five most important predictors of childhood stunting and underweight are short maternal stature; a mother with noeducation, extreme poverty, poor dietary diversity, and maternal underweight.[23]

1.4. Prevalence of anemia and low BMI

Anemia is a major public health issue in Maharashtra and its prevalence among the ever-married women of 15-49 years of age during 2005–6 and 2015–16 remained unchanged at 48%. The proportion of women whose BMI is below normal (< 18.5 kg/m^2) has reduced from 36.2% to 23.5% during 2005–06 to 2015–16.[24] The prevalence of low BMI varies widely in the population. The majority of tribal population groups in India had BMI less than 18.5 kg/m^2, which implies long- term undernutrition.[25]

1.5. Situation of LBW and prematurity in Maharashtra

The U5MR due to LBW and prematurity is much higher (23%) in Maharashtra than the National average (14%).[26] The LBW prevalence came down from 22% to 18% in India and from 22.1% to 19.5% in Maharashtra between 2005–06 and 2015–16.[27] Some of the risk factors for LBW and preterm babies in Maharashtra are shown in the Table 1 below.

Table 1: Risk factors for LBW and preterm births in Maharashtra

Sl. No.	Indicators	Total (%)	Rural (%)	Urban (%)
1.	Women aged 15–19 years who were already mothers or pregnant at the time of the NFHS 4 (%)*	8.3	10.4	6
2.	Mothers with BMI<18.5 (%)*	23.5	30.0	16.8
3.	Mothers with BMI ≥ 25*	23.4	14.6	32.4
4.	% of mothers who ate less during pregnancy than normal[28]	29.4	30.4	28.2
5.	Mothers who consumed iron folic acid for 100 days or more when they were pregnant (%)*	40.6	37.9	43.9
6.	Pregnant women aged 15–49 years and anemic (Hb<11.0 g/dl) *	49.3	49.9	48.5
7.	Non-pregnant women aged 15–49 years and anemic (<12.0 g/dl) (%)*	47.9	47.7	48.2
8.	Mothers who had full (ANC) (at least four ANC visits, at least one tetanus toxoid (TT) injection and iron folic acid tablets or syrup taken for 100 or more days)*	32.4	29.6	35.7
9.	Women who consumed any tobacco#	9.0	11.3	6.0
10.	Women who smoked tobacco#	0.4	0.4	0.4
11.	Women who consumed alcohol#	0.5	0.7	0.4

(Source: *NFHS 4, #DLHS-4)

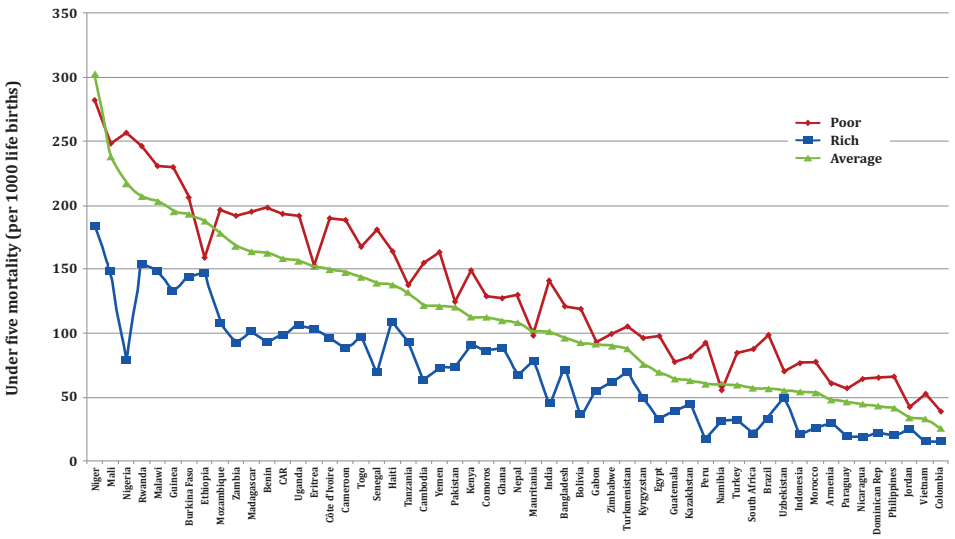
1.6. Addressing social determinants of health, reduction of poverty, improving expenditure on food at household level for promoting pre-conception health

Social determinants of health are defined by WHO as the conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of resources and power at global, national and local levels, which are mostly responsible for health inequities - the avoidable differences in health status seen within and between countries.[29] Of the many social determinants of health, in this section, we discuss only poverty.

1.6.1. Association of wealth and U5MR

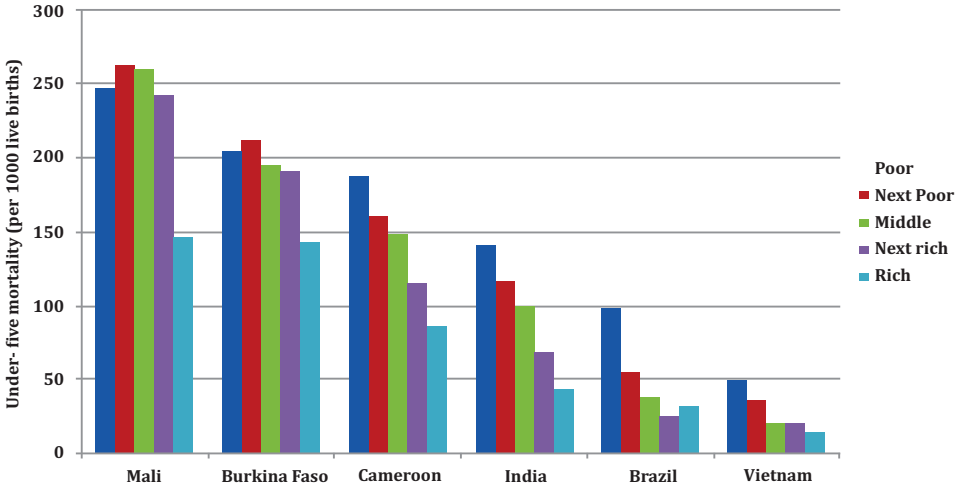
Poverty is an important risk factor for child death and undernutrition. Poorer groups experience higher childhood mortality rates than better-off citizens, virtually in all the 55 low- and middle-income countries (including India), where such data is available (Figure 4).[30]

Figure 4: Under-five mortality (per 1000 live births), among the poorest and richest quintile and the total population, 55 countries. (Figure reproduced from T. A. J. Houweling and A. E. Kunst, Socioeconomic inequalities in childhood mortality in low- and middle-income countries: a review of the international evidence, British Medical Bulletin 2010)



In fact, social gradient in health is observed in some countries including India which signifies that mortality is higher in the successive poorer groups and is not restricted to only between the poorest and richest groups (Figure 5).

Figure 5. Under-five mortality (per 1000 live births) by wealth quintile (Figure reproduced from T. A. J. Houweling and A. E. Kunst, Socioeconomic inequalities in childhood mortality in low- and middle-income countries: a review of the international evidence, British Medical Bulletin 2010)



Health (including of women in the pre-conception period) and the economy are inextricably linked. Mortality rates in England and Wales declined long before the advent of modern medical care during the twentieth century.[31]

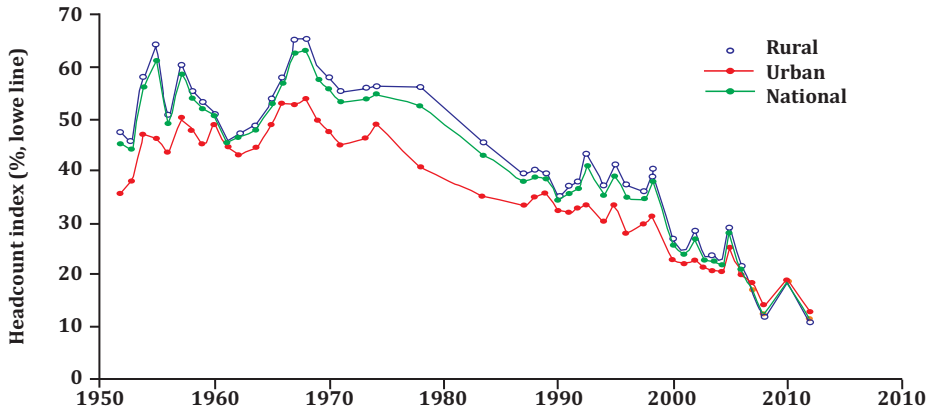
Good health is a fundamental human right of everyone. Further, it is also the basis for job productivity and the capacity to learn in school. Societies with a heavy burden of disease tend to experience severe impediments to economic progress. Conversely, several of the great "takeoffs" in economic history – such as the rapid growth of Japan in the early 20th century, and the dynamic development of southern Europe and East Asia beginning in the 1950s and 1960s – were supported by important breakthroughs in public health, disease control, and improved nutritional intake (which improves energy levels and productivity of workers, reduces the vulnerability to infectious disease).

Diseases reduce annual incomes of individuals and the society and prospects for economic growth. There is an increased burden of disease on the poor because firstly, the poor are much more susceptible to disease because of lack of access to adequate nutrition and clean water and sanitation, safe housing, medical care, and information about preventive behaviors. Secondly, the poor are much less likely to seek medical care even when it is urgently needed, because of their lack of out-of- pocket resources needed to cover health expenses. Thirdly, out-of-pocket outlays for serious illness can push them into a poverty trap from which they do not recover, by forcing them into debt or into the sale or mortgaging of productive assets (such as land). A serious illness may plunge a household into prolonged impoverishment, extending even to the next generation as children are forced to drop out from schools and join the workforce.[32] In India, it is estimated that every year, 55 million people are pushed to poverty due to healthcare expenses.[33]

1.6.2. Increase in per capita income since 1991 and reduction of poverty

Since the economic liberalization, per capita income in India increased from INR 6270 in 1991 to INR 93,293 in 2016.[34] Further, there has been rapid reduction of poverty in India (Figure 6).[35]

Figure 6: Reduction of poverty in India ((Figure reproduced from Gaurav Datt, Martin Ravallion, Rinku Murgai; Poverty reduction in India: Revisiting past debates with 60 years of data, 26 March 2016)

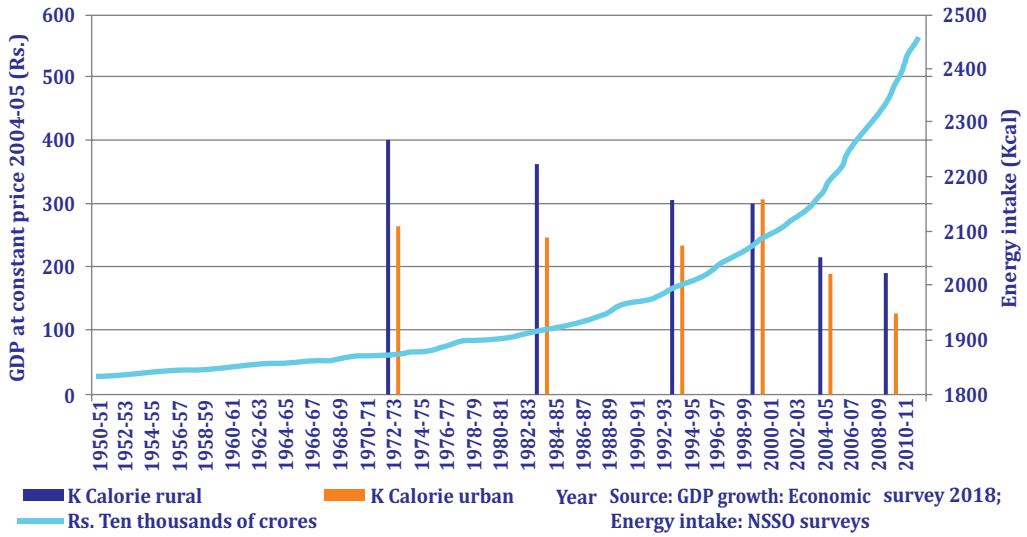


Poverty levels are not uniformly distributed and among the tribal population in India the poverty level is disproportionately higher. NFHS 4 of 2015–16 shows that 49% of the scheduled tribes of India are in the lowest wealth quintile compared to 26.6% of scheduled castes, 18.3% of other backward castes, 9.7% of other castes and 25.3% of those whose caste is not known.[36]

1.6.3. Decline in consumption of nutrients despite rapid economic growth

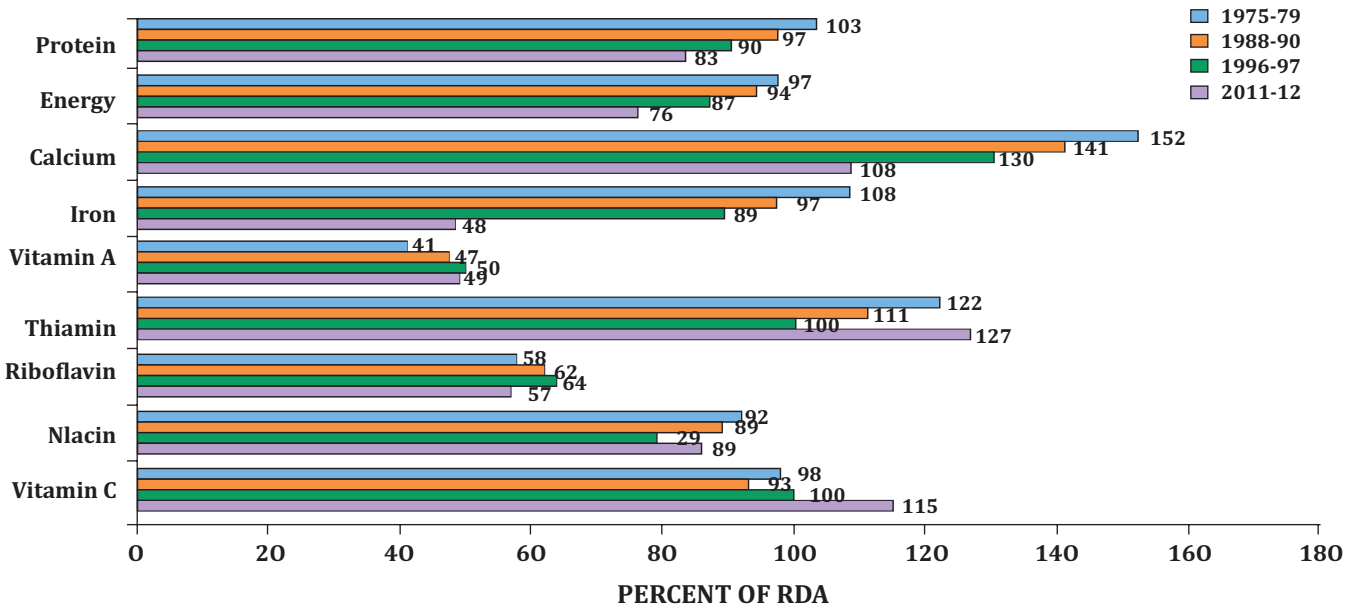
Despite rapid economic growth, there was progressive reduction of per capita calorie intake in both rural and urban areas in India (Figure 7).[37]

Figure 7: Time trends in the GDP growth and the energy consumption in rural and urban areas of India (Figure reproduced from Ramachandran P. Dual Nutrition Burden in India: Challenges and Opportunities. *Proc Indian Natn Sci Acad* 84 No. 4 December 2018 pp. 803-807)



Not only calories, but decline in consumption of various nutrients has been observed in the rural areas of the country over the last 30 years (between 1975–79 and 2011–12) (Figure 8).[38]

Figure 8: Trend of consumption of various nutrients in rural areas of India since 1975



Such a decline in calorie intake despite rapid economic growth in India is somewhat surprising as globally, during 1990 to 2010, there was a 2% per annum increase in real per capita incomes, which varied between regions and countries.

The 2% per annum growth in real per capita incomes between 1990 and 2010 resulted in increased demand for and consumption of dietary energy supplies by about 210 kcal per person per day, or 8% globally. The increase was larger in the developing countries (275 kcal/person/day) than in the developed countries (86 kcal/person/day).

The rise in income and food energy has been accompanied by changes in the composition of diets. Worldwide, the proportion of cereals, roots and tubers declined significantly, whereas there was an increase in the consumption of fruits and vegetables, and animal products, including fish.[39]

Experts have tried to understand this "Calorie consumption puzzle" of decline in the calorie intake despite economic growth in India. Possible reasons for these include people choosing to consume fewer calories, dietary diversification, cultural factors acting as a barrier for consumption of high-calorie foods, impoverishment of the majority of the population, utilization of household expenses towards non-food expenditure, specifically healthcare.[40]

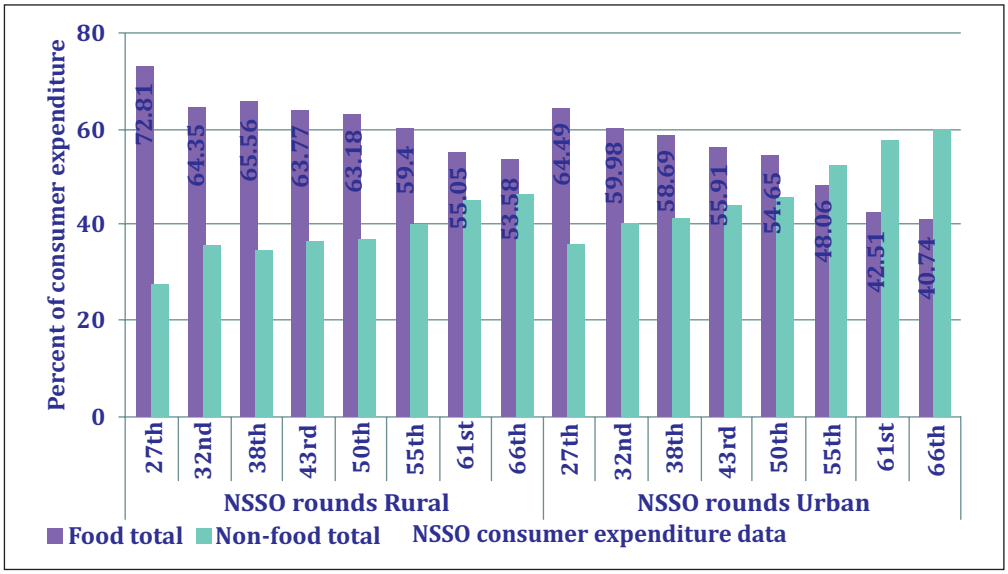
It is important to note that in India, there is much variation in the calorie consumption according to the monthly per capita expenditure (MPCE). At the national level, the average dietary energy intake per person per day was 2233 Kcal for rural India and 2206 Kcal for urban India, which has not changed significantly in the last twenty years. The average calorie intake increased steadily with the MPCE class. Among the bottom 5% of the rural population ranked by MPCE, 57% of households had calorie intake below 2160 Kcal/consumer unit/day, the proportion falling to 39% for the next 5%, and continuing to fall in successive MPCE groups until it reached to only about 2% for the top 5% of the population. Similarly, the proportion of urban households with calorie intake below 2160 Kcal/consumer unit/day was 59% for the bottom 5% of the population, falling to 47% for the next 5%, and reaching 1.6% for the top 5% of the population.[41]

In 2013, the National Food Security Act (NFSA 2013) was passed in India with an objective of providing subsidized food grains to two-thirds of India's population as a legal entitlement. The Act provides food grains of 35 kg per household per month at subsidized rates under the targeted public distribution system, a meal free of charge during pregnancy and six months after childbirth, maternity benefits of not less than Rs. 6000 for all pregnant and lactating mothers (except those in state or central government services or in services of public sector units or receiving similar benefits) and food supplementation to all children from six months to fourteen years of age through the Integrated Child Development Services and Midday meal scheme.

1.6.4. Progressive reduction of food expenses and increase in non-food expenses since 1970

Between 1970 and 2012, there has been a progressive reduction in the household expenditure on food, whereas non-food expenditure steadily increased in both rural and urban areas as shown by different NSSO consumer expenditure data (Figure 9).[42]

Figure 9: Progressive reduction in the expenditure on food, and increase in non-food expenditure at household areas in rural and urban areas in India (Figure reproduced from P. Ramachandran, K Kalaivani. Nutrition Transition in India: Challenges in Achieving Global Targets, Proc Indian Natn Sci Acad 84 No. 4 December 2018 pp. 821-833)



Globally, it is recommended that economic growth can contribute to food and nutrition security (adequate in quantity and quality in terms of diversity, nutrient content and safety), if the growth reaches and involves the poor, resulting in increasing their income, if the poor persons use their additional income for improving the quantity and quality of their diet, water and sanitation and on health services. Women's empowerment is crucial for ensuring that income is spent on health and nutrition. Further, governments need to spend additional public revenues on safety nets and key public goods and services such as education, infrastructure and public health measures (Reference: 39).

1.6.5. Different socio-cultural practices impact the health and nutrition of women

Socio-cultural practices impact the health and nutrition of women. There is also seasonal variation of income and expenditure, and therefore in food consumption and in consequent malnutrition levels of children among various population groups including the tribal population. For example, among the tribal population of Dharni block of Melghat, Amravati district, Maharashtra, economic stability was highest in winter after harvesting and it decreased gradually during monsoons due to several reasons like expenditure on festivals, repayment of loans and investments in farming activities. The population had very little savings and monthly ration was purchased at a subsidized rate from the Public Distribution Shops. There was little spending on food items other than cereals and pulses. The end of each harvest season saw a significant amount being spent on festivals. A major proportion of their income was used to repay agriculture-related loans that had been mainly obtained from local money lenders. It was estimated that adults in the study area consumed only 2000 Kcal per day, against the requirement of a moderately working male of approximately 2800 Kcal, and for females it ranges between 2220 Kcal to 2800 Kcal. Thus, there was long-term shortfall in caloric intake, resulting in a very high prevalence of adults with low BMI. Further, poor infant and young child feeding practices resulted in very high levels of malnutrition in children in the area.[43]

Gender plays a key role in the distribution of food within households and in India, culturally, women eat after serving food to the male members of the household. A simple intervention of the men and women eating their meals together as a family contributed to drastic reduction of malnutrition in children and promoting food security among women.[44] Discrimination against the girl child in India results in 239,000 excess deaths per year. Any intervention to reduce discrimination against girls in terms of food and healthcare allocation should target reducing poverty and low social development, and should reduce patriarchal values and increase investment in girls' education.[45] Myths and misconception also play a role and 32% of pregnant women reported that they consumed less food during pregnancy than when non-pregnant, probably due to the fear of having a large baby, which would create a problem during delivery.[46]

Thus poor health and nutrition status in women and children at the household level are due to several factors like poverty, inadequate consumption of nutrients and, decreasing expenditure on food items and increasing expenditure on non-food items, gender bias and myths and misconceptions related to food consumption and pregnancy among others.

1.7. Priority for reduction of LBW, neonatal mortality, stillbirth

WHO, in 2014, has set global targets for improvement of maternal, infant and young child nutrition by 2025, including 30% reduction in LBW.[47] The Government of India launched the India Newborn Action Plan (INAP) in 2014 with the objective of reducing the neonatal mortality and still birth rates to single digit per 1000 total births by 2030 in India. One of the six elements of INAP is Pre-conception and Antenatal Care.[48] In 2016, the Federation of Obstetrics and Gynecological Associations of India recommended rollout of Pre-conception care in India.[49] Further, in 2018, a guideline for the First 1000 Days, which includes pre-conception care was published by the Government of India.[50]

1.8. Evidence on pre-conception care and growing consensus for its scale-up

Pre-conception care is a set of interventions that are to be provided before pregnancy to promote the health and well-being of women and couples as well as to improve the pregnancy and child health outcomes. Pre-conception care is the provision of biomedical, behavioral and social health interventions to women and couples before conception occurs (WHO 2012).[51] Every woman of reproductive age who is capable of becoming pregnant is a candidate for pre-conception care, regardless of whether she is planning to conceive. Even though there has been a growing body of evidence of the benefits of pre-conception health promotion since 1987,[52] for the first time, the Center for Disease Control recommended strategies to improve pre-conception health in the United States, in 2006.[53] In 2011, Pan American Health Organization, Regional office of WHO recommended fourteen interventions for pre-conception care as highlighted below:[54]

- Using body mass index (BMI) to monitor nutritional status prior to pregnancy.
- Folic acid (FA) and multivitamin supplementation.
- Preventing and treating anemia with iron.
- Micronutrients and reproductive health of women.
- Detecting and treating sexually transmitted infections (STIs) before pregnancy.

- Deparasitization in areas of high prevalence.
- Detecting and treating chronic diseases (cardiovascular, nutritional, endocrine).
- Detecting, preventing, and managing domestic violence.
- Detecting, preventing, and managing alcohol and tobacco consumption.
- Detecting, preventing, and managing depression.
- Detecting and preventing cervical cancer.
- Complete immunization series.
- Detecting and treating periodontal disease.
- Preventing pregnancy in adolescents.

In 2013, WHO recommended the rollout of the pre-conception care globally.[55] In 2012, March of Dimes and other partners recommended acceleration of the programs for prevention and care of preterm births globally which includes pre-conception care.[56] WHO, in the policy brief released in 2013, has included the following interventions in the pre-conception package.

- Nutritional Interventions: Screening for anemia and diabetes, supplementing iron and folic acid, monitoring nutritional status, supplementing energy- and nutrient-dense food, iodization of salt.
- Screening of women for tobacco consumption and counsel for cessation.
- Programs for reducing use of psychoactive substance.
- Detailed family history to identify risk factors for genetic conditions, genetic counseling, carrier screening and testing and appropriate care.
- Providing guidance and information on environmental hazards and their prevention, avoiding unnecessary radiation exposure in occupational environment in medical setting, avoiding unnecessary pesticide use, protecting from lead exposure, counseling for reducing indoor pollution.
- Avoiding too-early, unwanted and rapid successive pregnancies by promoting usage of contraceptives.
- Care of infertility.
- Preventing, detecting and managing STIs and HIV.
- Reducing interpersonal violence.
- Assessing psychosocial problems and mental health issues.
- Vaccination against rubella, tetanus and diphtheria, Hepatitis B.

Systematic review of pre-conception interventions in different countries of the world. The interventions have been classified into three groups:[57]

A. Interventions with significant impact estimates for maternal, fetal and neonatal outcomes, do not require any further evaluation, can be recommended for implementation:

These interventions include prevention of female genital mutilation and prevention of teenage pregnancy, birth spacing and inter-pregnancy intervals, maintenance of ideal pre-pregnancy weight, peri-conceptional folic acid and multivitamin, diabetic care and management.

B. Some evidence (limited number of studies) on maternal, fetal, neonatal and their later life. Still has some gaps and requires further exploration and evaluation:

These interventions include general pre-conception counseling, diet and exercise, vitamin A supplementation, intimate partner violence, prevention and treatment of sexually transmitted infections and HIV/AIDS, immunization such as tetanus, medication use, substance abuse (smoking, alcohol, caffeine, illicit drugs) and environmental exposure (radiation, chemicals).

C. Interventions that showed clear benefits during pregnancy and are never studied during the pre-conception period definitely require evaluation during the pre-conception period:

These interventions include prevention of coerced sex/sexual abuse, advanced maternal age, post-abortion care, genetic counseling and screening, iron supplementation, iodine supplementation, balanced protein energy, Vitamin D supplementation, Vitamin B6 and B12 supplementation, depression/ anxiety, bipolar disease, schizophrenia, immunization such as hepatitis B, Varicella, Rubella, influenza, Human Papilloma Virus, prevention and management of malaria, heart disease, rheumatoid arthritis, epilepsy, phenylkenouria, thyroid management, systemic lupus erythematosus, thrombophilia, periodontal disease, management of other infections such as asymptomatic bacteruira, Group B streptococcus and toxoplasmosis, indoor air pollution, overcrowding, lack of water and sanitation, prior stillbirth, prior miscarriages, and prior cesarean section.

Reduction of maternal mortality through provision of pre-conception and antenatal care

Pre-conception counseling and education can help in reducing maternal ill health and adverse consequences. Correcting anemia before conception can reduce the maternal deaths due to complications of very severe anemia as well as due to obstetric complications like postpartum hemorrhage and sepsis. The indirect causes of maternal deaths such as heart disease can be better managed if diagnosed before conception. Infective conditions such as infective hepatitis, malaria, dengue, influenza can be largely controlled through behavior change for clean water, hand hygiene and other simple preventive interventions.

Maharashtra is currently in obstetric transition three (MMR Maternal Mortality Ratio: 299 – 50 maternal deaths/100 000 live births) and progressing towards Stage IV (MMR < 50 maternal deaths/100 000 live births), during which there is a low fertility rate and indirect causes of maternal mortality, chronic-degenerative diseases like diabetes mellitus, hypertension, and heart diseases become the predominant cause of mortality.[58] Early detection and treatment of chronic diseases during the pre-conception phase will save the lives of many mothers.

The first ever Lancet series on pre-conception care was published in April 2018, which focused on promoting a healthy lifestyle and nutrition during the pre-conception period. The strategies of supplementation and fortification, cash transfers and incentives, and behavior change interventions were recommended for large-scale interventions.[59]

There is a growing experience in implementing pre-conception care initiatives in both middle- and high-income countries. Countries with experience are Italy, the Netherlands, the Philippines, Sri Lanka and USA. However, the evidence on how to deliver pre-conception care has been weak.[60]

1.9. Current recommendations regarding antenatal care

Neonatal Integrated Management of Childhood Illness (IMCI), evidence-based interventions, Pan American Health Organization (PAHO), and Texas Children's Hospital, Washington DC, US (2011) listed 27 interventions during pregnancy.[61] During 2016, WHO published revised ANC guidelines.[62] Further, a Lancet series on maternal health was published in 2016. The National Institute for Health and Care Excellence (NICE) guidelines (2007) for Antenatal Care for Uncomplicated Pregnancies have been updated in 2017. These are briefly summarized.

WHO has recommended a minimum of 8 antenatal contacts to reduce perinatal mortality and improve women's experience of care. The recommended 5 groups of interventions include:

A. Nutritional interventions.
B. Maternal and fetal assessment.
C. Preventive measures.
D. Interventions for common physiological symptoms: nausea, vomiting, heartburn, constipation, leg cramps, low backache/pelvic pain, varicose veins and edema.
E. Health system interventions to improve utilization and quality of ANC.

The interventions being practiced are grouped as recommended, not recommended, or recommended under certain conditions i.e. context-specific recommendations (Table 2).

Table 2. Dietary/Nutritional interventions recommended by WHO

Intervention	Recommendation
Healthy eating and keeping physically active	Recommended
Restricting caffeine intake > 300 mg	
Daily 30-60 mg elemental iron & 400 mcg folic acid to reduce maternal anemia, puerperal sepsis, LBW, preterm birth	
Folic acid 400 mcg pre-conception to 12 weeks to prevent NTD	
Elemental calcium supplementation daily oral at least 1g to reduce the risk of preeclampsia in low-intake populations	
Multiple micronutrients, Vitamin B6, Vitamin E and C, Vitamin D for improving maternal & perinatal outcome	Not recommended
Dietary salt restriction, fish oil, lycopene, or nutritional supplementation like folic acid, Mg, Vitamin C, E, Zn, for PE prevention	

Maternal and fetal assessments

Clinical screening:

- Maternal height, weight recording and BMI calculation at first visit.
- Screening for tobacco, alcohol or other substance use at every contact. Blood pressure (BP), edema, proteinuria, screening for IUGR by fundal height measurement at each visit.
- Screening for active tuberculosis (TB) if prevalence ≥ 100/100,000.
- Intimate partner violence/domestic violence, abuse when there is capacity to provide a supportive response.
- Anemia detection: Full blood count testing /on-site hemoglobinometer use.
- Blood group testing and Rh typing.
- Screening for HIV, syphilis, gestational diabetes mellitus (GDM), hepatitis B hemoglobinopathy.
- Detecting and treating symptomatic and asymptomatic bacteriuria (ASB): Midstream urine culture, if not available, on-site urine Gram staining/dipstick test.

Ultrasonography (USG): One scan before 24 weeks for assessment of fetal gestational age, fetal anomalies, multifetal pregnancy, if available offer first scan between 10 weeks to 13 weeks + 6 days for gestational age assessment.

Routine antenatal cardiotocography (CTG) or routine Doppler USG are not recommended for improving maternal and perinatal outcome.

Additional assessments recommended include screening for risk of venous thromboembolism, prenatal screening for chromosomal abnormalities (e.g. Down's syndrome), Rubella susceptibility testing at first visit, measurement of symphysio-fundal height at all visits from 25 weeks for screening for fetal growth restriction.

Preventive interventions

- Preventive antihelminthic treatment after first trimester in endemic areas.
- Antibiotic treatment for ASB to prevent preterm birth and LBW.
- Tetanus toxoid vaccination to all pregnant women (PW) to prevent neonatal tetanus. Tetanus and diphtheria(Td) vaccination is being recommended during pregnancy for dual protection.[63] Tetanus, diphtheria and acellular pertussis vaccination (Tdap) is the preferred vaccine during pregnancy as per American College of Obstetricians and Gynecologists (ACOG) guidelines[64] endorsed by Federation of Obstetrics and Gynecological Societies of India (FOGSI).

Indian Perspective: Maternal health division, Ministry of Health and Family Welfare (MoHFW), GOI guidelines, including those on skilled birth attendance, village health and nutrition days, calcium supplementation during pregnancy and lactation, gestational diabetes management, deworming, and screening of hypothyroidism during pregnancy among others, guide the antenatal care among women attending the hospitals in the government sector. Current guidelines recommend WHO 2002 focused ANC model of 4 antenatal checkups, screening for HIV, syphilis, GDM screening at registration and repeating GDM screening at 24-28 weeks. Rashtriya Bal Swasthya Karyakram (RBSK) division, MoHFW, GOI has released guidelines for screening for hemoglobinopathies in India (2016). In view of the high prevalence of hemoglobinopathy carrier states, screening is recommended at multiple time points that include premarital, pre-conception and universal screening during early pregnancy. The screening needs to be offered to couples with appropriate genetic counselling early in pregnancy. If both partners are carriers, then referral to higher centers is required for prenatal diagnosis and further care. Tetanus toxoid vaccination is now being replaced by tetanus and diphtheria vaccination during pregnancy. Tetanus, diphtheria and acellular pertussis vaccination is the preferred vaccine during pregnancy as per international guidelines endorsed by FOGSI.

Certain screening tests and their schedule and interventions are different for different populations. The choice of interventions therefore needs to be specific for the Indian population and resources available. Based on the new evidence getting accumulated, the guidelines are getting updated and new recommendations are being released. It is therefore necessary to constantly update the evidence regarding antenatal assessments, screening and interventions, and to implement the feasible interventions.

Intensification of antenatal care (ANC): In Maharashtra, the percentage of mothers who had at least 4 ANC visits has increased from 59.8% to 72.2% between 2005–06 and 2015–16. During the same period, full ANC has improved from 14.7% to 32.4%, which is very low.

Most of the interventions recommended in these guidelines are implemented in the state but these need acceleration as full ANC coverage is very low. In view of these new guidelines for ANC, some of the evidence-based interventions focusing on improving the neonatal outcome have been introduced. The selection is based on feasibility in the existing primary health care system and resource requirements. Emphasis will be on screening for risk indicators at each antenatal contact and appropriate care to those at risk of adverse perinatal outcome. A risk management plan specifying the role of each category of healthcare provider with referral guidelines will be followed. The present intervention will strengthen the existing ongoing interventions. The following interventions are proposed during pregnancy:

1. Prenatal Care: Clinical screening for risk indicators for adverse neonatal outcome, Preventing exposure to tobacco, alcohol. Monitoring blood pressure, proteinuria, weight gain during pregnancy. Dietary intervention, nutrient supplementation, immunization against tetanus/Td. Screening for anemia, its prevention and correction, deparasitization. Recognition of danger signs during pregnancy and appropriate care.
2. Preventing influenza with vaccination.
3. HIV and Syphilis screening and case management.
4. Screening for Rh typing and preventing Rh isoimmunization.
5. Screening for sickle cell hemoglobinopathy.
6. Screening for GDM and management.
7. Screening for hypothyroidism during pregnancy.
8. Antenatal corticosteroids in preterm labor, Nifedipine in preterm labor, antibiotics for preterm premature rupture of membranes.
9. Treating Urinary Tract Infection (UTI), malaria, RTI/STI during pregnancy.
10. Screening for fetal growth restriction, preventing fetal death.
11. Preventing post term pregnancy.

Monitoring the interventions: The interventions will be implemented through the Primary Health Centre (PHC) and the Sub-centers. Medical Officers and Auxiliary Nurse Midwives (ANMs) will be trained in pre-conception care and care during pregnancy. They will implement the interventions in each village with the help of the Accredited Social Health Activists (ASHA) workers.

Monitoring the intervention: The following indicators will be monitored every month:

- Women below 19 years of age counseled for postponing pregnancy.
- Women having body mass index (BMI) < 18.5 Kg/m^2 counseled for increasing body weight through dietary intervention.
- Women having BMI ≥ 25 Kg/m^2 counseled for weight reduction through dietary intervention and exercise guidance.
- Women having mild/moderate anemia given Iron Folic Acid (IFA) for 3 months and the resulting change in their hemoglobin (Hb) level.
- Women consuming tobacco and/or alcohol use reporting cessation before conception.
- Women who have received folic acid three months before pregnancy.
- Women receiving albendazole every six months.
- Women reporting symptoms suggestive of STI/RTI treated adequately.
- Women having been diagnosed with chronic medical conditions receiving care by specialist.
- Women accepting contraception for postponing pregnancy until the risk is managed.
- Women receiving behavior change counseling for general health and pregnancy.

The interventions for pregnant women will be monitored using the indicators that are already present in the Reproductive Child Health (RCH) register. However, select indicators that will be added include BMI, identification and referral of high-risk pregnancies, consumption of tobacco and alcohol.

1.10. Involvement of men in reproductive health care

Although a woman will carry and deliver the child, a man also has a crucial role in the successful outcome of pregnancy. A variety of factors, from genetics and lifestyle to environmental exposures and hormones, can affect a man's fertility. Health conditions in men may affect fertility. Many medicines may reduce male libido, contribute to erectile dysfunction, and have toxic effects on sperms. Exposure to environmental hazards, radiation, heat, pollutants, lead, mercury and other occupational chemicals have been shown to affect sperm quality. Pre-conception care provides an opportunity to men for disease prevention and health promotion and improving childbirth outcome. It helps in the preparation for fatherhood. Men are the main decision makers for the majority of the households and influence the uptake of care by women. Hence the aim should be to involve men in pre-conception care. Although the current focus is on women, eventually men also need to be motivated to participate in a planned parenthood program. Involvement of men in reproductive healthcare is elaborated in detail in Chapter 4.

1.11. Healthy Parents, Healthy Child Initiative

Healthy Parents, Healthy Child is an initiative of the Government of Maharashtra, which is being implemented in two blocks of Sinnar and Peth of Nashik district with the support of UNICEF and Bharati Vidyapeeth Deemed University Medical College, Pune.

Seven interventions have been selected based on the epidemiology and magnitude of the problem, feasibility in the primary health care setting, and resource availability. The following interventions are being implemented among eligible aspiring women planning their pregnancy, which will help in improving their and their newborn babies' health:

1. Achieving normal BMI prior to pregnancy.
2. Preventing and treating anemia with iron and deworming medicine.
3. Periconceptional folic acid to reduce neural tube defects.
4. Quitting tobacco, alcohol to reduce LBW.
5. Preventing pregnancy in adolescent girls to avoid hazards of teenage pregnancy and to have optimal inter-pregnancy interval following miscarriage or childbirth.
6. Detecting and treating RTI/STIs before pregnancy by creating reproductive health awareness in young couples.
7. Detecting and managing chronic diseases before pregnancy and screening for sickle cell hemoglobinopathy carrier state.

Further, the antenatal care for women will be strengthened under this initiative as mentioned above. Care during delivery and postnatal period will be continued as per the national guidelines.

This module provides guidelines for the healthcare providers and the community on how to ensure that every woman in the reproductive age group wishing to have pregnancy has access to and receives high quality pre-conception and prenatal care to reduce morbidity and mortality in mothers and adverse outcomes of pregnancy including preterm and LBW infants, congenital birth defects, and neonatal mortality. The rollout will take place at the PHC and its sub-centers through trained ANMs and medical officers with the help of ASHAs and Anganwadi workers. The equipment and supplies needed for implementing these interventions are mentioned in Annexure 7.1. The approximate budget for implementation of a pre-conception and antenatal care project is given in Annexure 7.2.

The selected pre-conception interventions are explained in detail in Chapter 2 and evidence-based interventions during the antenatal period are highlighted in Chapter 3. The guidelines of the Government of India (GOI), WHO and papers in peer-reviewed journals have been used as the reference documents and this document should be used in conjunction with all GOI guidelines for RMNCHA.


सुरक्षित मातृत्वाची सप्तपदी

2: Pre-conception Intervention Package

2.1 ACHIEVING NORMAL BMI PRIOR TO PREGNANCY

2.1.1 Nutrition in adolescence

Adolescence is a period of rapid growth, during which adolescents require additional high-quality nutrients. Improving nutrition at the household level, promoting sanitation and addressing gender issues are critical for improving nutrition before marriage. These interventions need to be initiated during adolescence and soon after marriage for improving birth outcomes. It is critical that every newly married woman or those wishing to conceive should have nutritional assessment to ensure that:

- They have normal BMI (between 18.5 to 25) before they get pregnant.
- They have normal blood hemoglobin (12 g/dl) levels before they get pregnant.
- They avoid getting pregnant till they are below 19 years of age.

The important nutritional interventions before pregnancy are summarized below.

2.1.2 Calculate pre-pregnancy BMI and optimize before conception

Pre-pregnancy BMI is an indicator to find the nutritional status of a woman in the reproductive age group. BMI is calculated with the help of a person's height and weight by using the following formula.

$$BMI = Weight(kg)/Height(m)^2$$

By recording height in meters and weight in kilograms accurately, we can calculate BMI. By using ready charts, we can estimate the BMI. BMI is a good indicator of a woman's nutritional status and it indicates if the woman has normal weight or if she is underweight, overweight or obese (Table 3).

Table 3. BMI classification

Weight Category	BMI (Kg/m^2) International	BMI (Kg/m^2) Indians/Asians[65]
Underweight:	< 18.5	< 18.5
Normal	18.5 - 24.9	18.5 to 22.9
Overweight	25.0–29.9	23 to 24.9
Obese	≥30.0	≥ 25

BMI before Pregnancy

- BMI should be calculated for nutritional evaluation of women before pregnancy.
- Efforts should be taken before planning pregnancy to normalize BMI through nutritional support measures to increase or lower weight as needed. This can be done by promoting desired dietary changes and physical activity.

2.1.3. Maternal under nutrition and pregnancy outcome

BMI of <18.5 Kg/m^2 is associated with under nutrition. Woman having low pre-pregnancy.

weight are at increased risk of having:

- Preterm delivery.
- Intrauterine fetal growth restriction resulting in LBW baby.
- Perinatal death (Stillbirth + Early neonatal death within 7 days of life).

2.1.4 Obesity and pregnancy outcome

Overall 23.4% women have BMI>25 Kg/m^2 in Maharashtra. Maternal over-nutrition resulting in obesity has adverse effects on the health of the mother and baby during pregnancy (Table 4). It is necessary to have normal weight before pregnancy for reducing neonatal problems.

Table 4. Effects of Obesity on Pregnancy

Mother	Baby
Gestational Diabetes Mellitus	Fetal malformations: Neural tube defects, other defects (cardiac, gastrointestinal tract)
Chronic hypertension	Large for gestational age baby
Gestational hypertension, Preeclampsia	Injury to baby during difficult delivery
Post term pregnancy	Fetal growth restriction
Prolonged and difficult labour, Cephalo Pelvic Disproportion (CPD) Higher rates of caesarean section	Unexplained Stillbirth
Thrombophlebitis, Pelvic infection, UTI, wound infection	Prematurity
Post-partum anemia	Increased risk of neonatal mortality and morbidity

2.1.5 Obesity and women's health in general

- Obesity increases chances of infertility, problems in having regular ovulation and irregular menstruation.
- Obesity increases the risk of diabetes, chronic hypertension, heart disease in future life.

Table 5 shows the activities to be carried out for increasing or decreasing body weight and thus the BMI among women.

Table 5. Actions for various categories based on BMI

Underweight: BMI <18.5	Normal: BMI 18.5 to 25	Overweight: BMI 25.0–29.9	Obese: BMI ≥ 30.0
1. Counsel for four to five high-calorie healthy meals containing whole grains, cereals like rice, wheat flour, dal, fruit, vegetables including green leafy vegetables, milk, and healthy unsaturated oils like vegetable oils (soybean oil, canola oil, sunflower oil, peanut oil, sesame oil), milk and milk products, fish, chicken, mutton and eggs whenever possible and feasible[i]. The diet chart for women with low BMI is mentioned in Annexure 7.3.	Do counselling to continue balanced diet and monitor BMI regularly	1. Have a healthy eating plan	1. Have a healthy eating plan
2. Monitor BMI regularly		2. Reduce quantity of food, limit junk food, sugar, oils and fats	2. Reduce quantity of food, limit junk food, sugar, oils and fats
3. Defer pregnancy till BMI is between 18.5 to 25		3. Increase physical activity	3. Increase physical activity
4. If no improvement, consult the Medical Officer		4. Reduce sedentary time	4. Reduce sedentary time
			5. Defer pregnancy till BMI is between 18.5 to 25
			6. Examination by medical officer (blood sugar estimation, TSH tests as needed)

2.1.6 Role of health personnel

ANM:

- Measure the woman's height and weight and calculate her BMI from the BMI chart provided. Categorize her as normal, underweight, overweight or obese.
- Underweight woman: Ask woman's history of food consumption (frequency and diversity), eating habits, and socioeconomic status. Explain the influence of low BMI on maternal and perinatal outcome. Counsel her for supplementing energy-rich nutrient-dense food.
- If the woman has BMI ≥ 30 Kg/M^2, explain adverse effects of obesity on pregnancy outcome and the need to have medical evaluation by Medical officer at PHC/rural hospital (RH). Counsel for diet planning, regular exercise and regular weight checks.
- Explain to the couple the need to postpone the pregnancy until the recommended weight loss is achieved. Discuss the various contraception options available and provide contraception of choice.
- Check weight every month to see whether there is expected change, check whether her diet is improved as suggested. See whether the couple is using contraceptives.

Medical Officer at PHC:

Conduct complete physical examination and screen overweight women for any risk factors for diabetes mellitus and history suggestive of thyroid dysfunction. If at risk, get a glucose tolerance test (GTT) done to rule out diabetes mellitus and thyroid function test to rule out hypothyroidism. Give diet/exercise guidance. If the woman has BMI ≥ 30 Kg/M^2, encourage her to achieve at least 5–10% weight loss before planning pregnancy. Counsel for use of contraception till then.

DH Physician:

If abnormal GTT or thyroid stimulating hormone (TSH) levels are found, further investigations and treatment can be undertaken under the guidance of an internal medicine specialist.

2.2 PREVENTING AND TREATING ANEMIA WITH IRON

2.2.1 Facts about anemia[66]

Prevalence:

- Adolescent girls and adult women should have hemoglobin of 12 g/dl.
- 47.9% of non-pregnant non-lactating women in the reproductive age group in the state are anemic (NFHS 4).
- Different studies indicate that about 1–3% of women are severely anemic in Maharashtra.

Effects of anemia

- Fatigue, fainting, reduced physical capacity and work performance.
- There may be difficulty in memorizing, reduced intelligence quotient (IQ) and reduced school performance.
- Lowered immunity to fight against microbes with increased chances of getting infections, causing repeated illnesses.
- Anemia in adolescence if undetected persists in adulthood and is associated with an increased risk of anemia during pregnancy and shows its adverse effects on the mother's health.
- Anemia is the underlying cause for 20–40 % of maternal deaths.
- The newborn baby of an anemic woman is often premature and LBW.

Causes of anemia

- The commonest cause of anemia is dietary deficiency of iron, B12, folic acid, and proteins which are required for formation of hemoglobin.
- Worms take away the nutrients from the body and some worms suck blood.
- Excessive bleeding during menstruation or any bleeding can cause anemia.
- Malaria causes destruction of RBCs and leads to anemia.
- Chronic infections, kidney disease also cause anemia.
- Certain inherited disorders of hemoglobin formation (Sickle cell disease and thalassemia). can lead to severe recurrent anemia.

2.2.2 Detecting anemia in non-pregnant women of reproductive age

- Looking for pallor on nail beds, palm of hand, tongue, eyes.
- Blood testing for hemoglobin estimation.
- Finding the severity of anemia:
  - Mild anemia: Hb 11.0–11.9 g/dl.
  - Moderate anemia: 8.0–10.9 g/dl.
  - Severe anemia: < 8 g/dl.

2.2.3 Treatment and prevention of anemia with IFA tablets

Women having hemoglobin of 12 g/dl or more: For preventing anemia, give one iron and folic acid tablet containing 60 mg elemental iron + 500 mcg folic acid (sugar-coated, red color) once a week.

Women having mild (Hb: 11 to 11.9 g/dl) or moderate anemia (Hb: 8 to 10.9 g/dl): Give two IFA tablets (each with 60 mg elemental iron and 500 mcg folic acid), once daily, for 3 months, orally. Follow up every month to check compliance. Repeat Hb estimation after 3 months. If hemoglobin levels have improved to normal, discontinue the treatment, but continue with the prophylactic IFA dose once a week.

- IFA tablets should be taken 2 hours after meals to get greater benefit.
- Coffee, tea, soft drinks, milk, calcium, magnesium interfere with iron absorption and hence should not be taken with iron.
- Vitamin C contained in citrus juice, tomato juice helps iron absorption.
- Counsel for nutritious diet containing foods rich in iron, vitamins, proteins and other nutrients (e.g., green leafy vegetables, whole grains, jaggery, lentils and beans, black gram, groundnuts, nuts, ragi, milk, poultry, meat, liver, eggs, fish).
- Worms cause anemia. Give her tablet Albendazole, 400 mg orally, single dose. This should be repeated every 6 months. For preventing worm infestation, hand washing, use of toilet and proper food hygiene is important. Wearing footwear is necessary to prevent hookworm infection.
- After taking tablets for 3 months if the hemoglobin fails to show a rise refer her to First Referral Unit (FRU/) district hospital (DH) for investigations to determine the cause of anemia. (Complete blood count, peripheral blood smear, smear for malarial parasite etc.)

2.2.4 Management of severely anemic women at FRU/DH

Girls/women who have Hb below 8 g/dl should be urgently referred to DH/FRU for evaluation and treatment.

2.2.5 Role of health personnel

ANM:

- Test hemoglobin of every woman wishing to have a child and find out if she is anemic and note the degree of anemia. Explain to her the consequences of anemia during pregnancy.
- If Hb is 12 g/dl, give IFA tablet once a week. Give her tab Albendazole and repeat it every 6 months. Explain to her the importance of consumption of IFA tablets and maintain her Hb above 12 g/dl before planning pregnancy.
- If Hb is between 8 to 11.9 g/dl, give two IFA tablets once daily for 3 months. Repeat Hb estimation after 3 months. Note the improvement. Refer to MO if no improvement.
- Counsel the woman for balanced diet.
- Explain to the couple the need to postpone the pregnancy until her hemoglobin level reaches 12 g/dl. Discuss the various contraception options available to them and provide contraception of the couple's choice.
- Ask her to make a monthly visit and see whether the woman is taking IFA tablets, check whether her diet is improved as suggested and whether the couple is using the contraceptive method.
- If Hb < 8 g/dl: Refer to FRU. Do a monthly follow-up for her.

Medical Officer (MO) PHC: Examine women having Hb < 8 g/dl and look for any illness/complication requiring specialist opinion at DH. Perform basic investigations for finding cause. If Hb is above 6 gm/dl, treat with oral iron. See the response after 1 month. If no improvement, refer her to physician at district hospital. If Hb < 6, refer to DH directly.

DH: Investigations to find the cause and provide treatment. Blood transfusion for very severely anemic women.

2.3 PERICONCEPTION FOLIC ACID SUPPLEMENTATION

2.3.1 Rationale

Folic acid is one of the most important B-complex vitamins needed before and during pregnancy. Studies have shown that adequate intake diminishes the risk that a baby will suffer from neural tube defects (NTDs). The neural tube is the structure from which the brain and spinal cord develop during the first 3 months of gestation. If it does not mature and close properly by 28 days after conception, certain defects such as spina bifida, encephalocele and anencephaly can appear. Anencephalic baby cannot survive. Baby having spina bifida gets infantile paralysis, lack of sphincter control, and learning disabilities (Figure 10 A, B).

Figure 10. A. Anencephalic

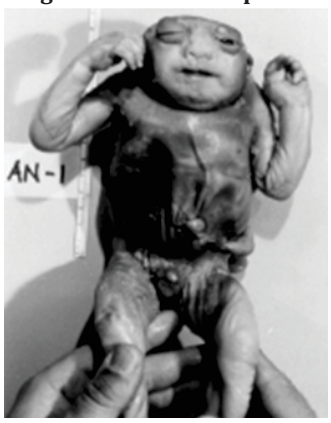
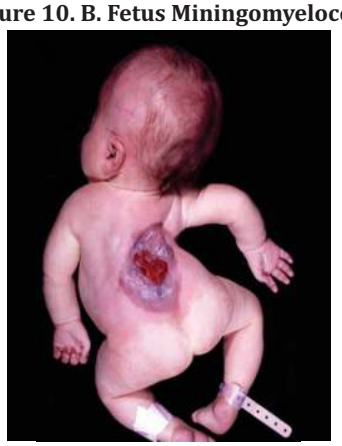


Figure 10. B. Fetus Miningomyelocele



The following women are at high risk for NTDs and other congenital malformations:

- History of giving birth to baby having NTD, Family history of NTDs.
- Women who are taking antiepileptic medicines.
- Women having diabetes.
- Obese women with a BMI ≥30 kg/m^2.
- Mothers with sickle cell anemia or thalassemia.

2.3.2 Preventive intervention

Folic Acid: Periconceptional consumption of folic acid reduces the occurrence of neural tube defects by about 70%. Some women are at greater risk of giving birth to babies with NTDs. Folic acid reduces the risk in them also. It can also reduce the possibility of some other birth defects (cleft lip, cardiac defects).

All potential pregnant mothers: Administer folic acid 400 µg/day orally from three months before pregnancy to three months of pregnancy.[67]

In women at high risk for NTDs: Administer 5 mg/day of folic acid from at least 3 months before pregnancy until 3 months of pregnancy.

Women should be encouraged to eat well, include vegetables and seasonal fruits in their diet. This helps in getting the vitamins and reduces the risk of LBW babies and birth defects.

2.3.3 Role of health personnel

ANM:

- ASHA/ANM should visit every woman of reproductive age wishing to have a baby in the near future and register her in the eligible couple register.
- If the woman wishes to have pregnancy soon, explain the benefits of starting folic acid tablets 3 months before pregnancy and continuing 3 months after conception and provide folic acid tablets.

2.3.4 Key messages

- Nutritional imbalances can have adverse effects on pregnancy outcome.
  - Mother: Anemia, hypertension, complications during delivery.
  - Baby: Congenital malformations, preterm and LBW baby.
- Nutritional interventions before pregnancy can improve the birth outcome.
- Women should plan pregnancy when the BMI is in the normal range and anemia is corrected with regular intake of IFA tablets and proper diet.
- Taking deworming medicine helps in reducing the risk of anemia.
- Folic acid tablets taken before pregnancy reduce the chance of getting a baby having certain types of birth defects (NTDs).
- Adolescent girls/women of reproductive age should consume a diet rich in micronutrients.

2.4 QUITTING TOBACCO AND ALCOHOL

2.4.1 Tobacco exposure

Tobacco smoke contains toxic substances which affect the fetal development. Nicotine reduces blood flow in the placenta and can induce a state of acute hypoxemia. Carbon monoxide increases the level of carboxy- hemoglobin in the blood of both mother and fetus, reduces oxygen transport and release of oxygen in the fetal tissues and organs, produces fetal hypoxia and affects fetal development.

- Consumption or exposure to tobacco during pregnancy is associated with LBW babies and perinatal death.
- Tobacco in any form is harmful. Smoking by the mother and exposure to tobacco smoke when others smoke around the woman is harmful (passive smoking). Dried/roasted tobacco powder application to gums and teeth (Misri) is also associated with LBW.
- The minimum quantity of tobacco consumption which causes problems is not known hence all tobacco consumption should be avoided throughout pregnancy.

2.4.2 Adverse effects of tobacco on pregnancy outcome

- Infertility, Miscarriage.
- Baby is likely to be born preterm or to have LBW due to intrauterine growth restriction. One in every five babies born to mothers who smoke during pregnancy has LBW.
- Antepartum Haemorrhage (APH): Smoking can cause premature separation of placenta during pregnancy.
- The risk of stillbirth is increased.
- Babies born to women who smoke are more likely to have birth defects like cleft lip or cleft palate. Overall risk of congenital malformation is increased.
- Babies whose mothers smoke while pregnant and babies who are exposed to second hand smoke after birth are three times more likely to die from sudden infant death syndrome than babies who are not exposed to cigarette smoke.

2.4.3 Alcohol consumption during pregnancy

The children of pregnant women who drink alcohol during pregnancy suffer from many health problems such as poor growth, birth defects, low IQ or behavioral abnormalities which are called as fetal alcohol syndrome. Alcohol can harm the baby at any stage during a pregnancy even soon after conception. The effects last throughout life. There is no cure for these disorders. The minimum quantity of alcohol consumption which causes problems is not known hence total quitting is recommended.

2.4.4 Fetal alcohol syndrome

- Affected children have facial abnormalities, such as smooth ridge between the nose and upper lip (this ridge is called the philtrum), wide-set and narrow eyes (Figure 11 A and B).
- Microcephaly (small head size), mental retardation.
- Low body weight, shorter-than-average height.
- Poor coordination, poor memory, difficulty with attention, poor reasoning, judgment skills, difficulty in school (especially with mathematics), learning disabilities, low IQ.

- Mental health problems, hyperactive behaviors, severe tantrums, irritability, trouble getting along with others, difficulties with social interaction.
- Speech and language delays.
- Difficulty in activities of day-to-day living (bathing, dressing etc.).
- Some children can have alcohol-related birth defects: vision or hearing problems, problems with the heart, kidneys, or bones.

These disorders are completely preventable if a woman does not drink alcohol during pregnancy. If a woman is drinking alcohol during pregnancy, she should stop drinking. As the brain growth takes place throughout pregnancy, the sooner a woman stops drinking the safer it will be for her and her baby.

Figure 11. A. Fetal alcohol syndrome

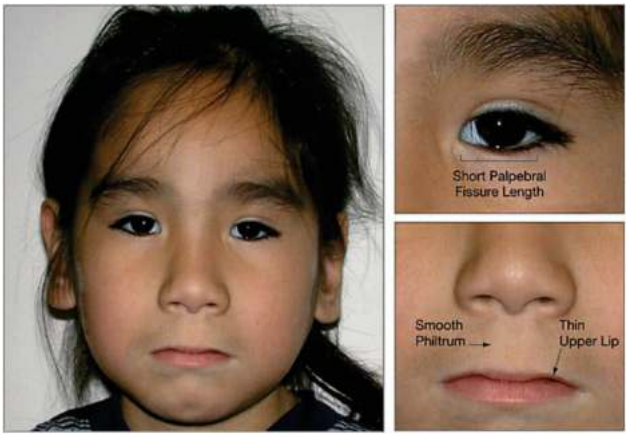
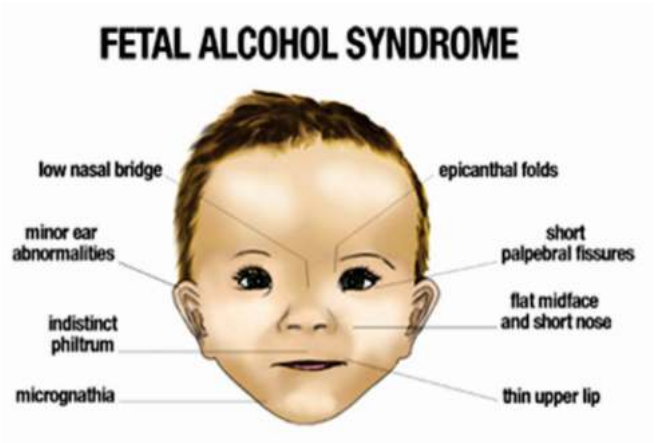


Figure 11. B. Fetal alcohol syndrome



2.4.5 Role of ASHA/ANM

- Screen every eligible woman wishing to have pregnancy for tobacco exposure, active as well as passive smoke exposure and for alcohol intake.
- Encourage her to stop smoking, and applying misri before becoming pregnant and as soon as she knows that she is pregnant. Encourage her to stay in a smoke-free environment. Avoid all smoke.
- Educate her regarding the adverse effects of tobacco and alcohol on the baby.
- Those women who drink alcohol should be encouraged to quit drinking alcohol for better development of child. Those wishing to quit and are finding it difficult to quit should be referred to medical officer who can then refer them to specialised centre for help if needed.

2.5 PREVENTING PREGNANCY IN ADOLESCENTS AND PROMOTING OPTIMAL INTER-PREGNANCY INTERVAL

2.5.1 Pregnancy in adolescents

Safe age for first pregnancy is between 21 and 35 years.

Pregnancy in adolescent age is a major challenge to the girl and her family. It can be seen in married adolescents following early marriages and non-use of contraception till safe age for childbirth. It can be a premarital pregnancy in an unwed girl.

Pregnancy in adolescence has many health problems. Height gain and development of bones is yet incomplete and stops due to pregnancy. The pelvic bones are not yet fully developed. This can cause prolonged and difficult labor. Chances of requiring operative delivery are high. Pregnancy complications like anemia, hypertensive disease are more likely (Table 6).

Table 6. Risks Associated with teenage pregnancy

Mother	Baby
Anemia	Preterm delivery
Increased risk of Hypertension/Eclampsia	Fetal growth restriction/LBW
Difficult labor increasing chances of operative delivery	Increased perinatal mortality

Premarital pregnancy: Pregnancy in teenage girls can also be a premarital pregnancy due to coerced sex and lack of reproductive awareness. Risk-taking behavior and peer pressure are contributory factors. Premarital pregnancy is often hidden for a long time and the girl often gets deficient antenatal care due to neglect. There is a risk of unsafe abortion and its complications, leading even to maternal death. Unsafe abortion is still responsible for about 8% maternal deaths in India. The girl can be a victim of domestic violence. Discontinuation of education, loss of career opportunities is possible. It is necessary to create awareness amongst adolescent girls regarding the risks associated with and methods for preventing unwanted pregnancy. Discussing contraception and safe abortion should not be a taboo. Adolescents can use condom, combined oral pills, emergency contraception pill. Insertion of copper intra uterine device (IUD) or 3-monthly Injection Antara (DMPA) can be considered in nulliparous adolescents wishing to have longer duration of contraception (Medical Eligibility Criteria for Contraceptive use Category 2).[68]

2.5.2 Planning pregnancy after abortion

Ovulation resumes soon after abortion and a woman can conceive by 10-14 days of spontaneous or induced abortion. Pregnancy within 6 months of abortion can be associated with increased risk of obstetric complications. Hence women should be counseled to postpone pregnancy for at least 6 months by using effective contraception.

2.5.3 Planning pregnancy after childbirth

For improving the health of a woman and her young child, the interval between two childbirths should be at least 3 years. The recommended interval before attempting the next pregnancy after a live birth is at least 24 months.

Benefits of optimal inter-pregnancy interval

There is reduced risk of pregnancy complications. The mother has more time to improve her nutrition to support the next pregnancy. She can breastfeed longer and will be in a better position to take care of her baby, hence the baby will get health and nutritional benefits. There is enhanced mother-baby bonding by breastfeeding, facilitating the child's overall development.

A short inter-pregnancy interval is associated with an increased risk of pregnancy complications and a greater chance of having preterm and LBW baby. If breastfeeding is stopped before 6 months, the newborn does not receive the benefits of breast milk and there is diminished mother-baby bonding, affecting the baby's development.[69]

Resumption of ovulation after childbirth is somewhat unpredictable and depends on the breastfeeding pattern. In women who are not breastfeeding, fertility can return by 4 weeks.

In women not exclusively breastfeeding, fertility can return by 6 weeks. Women should know that they can conceive even before getting the first menstruation after childbirth. Hence it is necessary to start using reliable contraception by 6 weeks after childbirth.

For adequate spacing between two childbirths women can use Intrauterine contraceptive device (IUCD), condoms and emergency contraception pills. The lactation amenorrhea method can be practiced soon after delivery until all 3 criteria are met (effective if exclusive breastfeeding day and night, menses have not returned, baby < 6 months old). They can also use new methods including Inj Antara,[70] Progestin only pills, and Tab. Chhaya (Ormiloxefene)[71] that are available at RH/SDH/DH. They can start using Oral Contraceptive (OC) pills after 6 months of childbirth.

Contraceptive counseling should include information about all available methods, their benefits, limitations and side effects. Women should be counseled on the health aspects of family planning. Medical eligibility should be checked as per the checklists provided under the program.

2.5.4 Key messages

- Counsel the adolescent girls to delay the first pregnancy till the age of 21.
- Interval between two childbirths should be at least 3 years.
- Women should postpone pregnancy for at least 6 months following an abortion.
- Hormonal emergency contraception should be used only as an emergency and not for regular contraception.

2.5.5 Role of health personnel

ASHA:

- During monthly contact with women of reproductive age, find out whether they wish to have a pregnancy and whether they are fit to have pregnancy.
- Counsel the couples about safe timing for conception, health risks of pregnancy during adolescence and short inter pregnancy interval.

- Refer the eligible couples to ANM for contraception counseling and care.
- Distribute the contraceptives as instructed by ANM/MO.

ANM/MO:

Adolescent girls

- Encourage girls and their parents to continue school education of girls.
- Encourage development of other abilities/skills (sports, languages, etc.) in them.
- Create reproductive health awareness. Impart sexuality education (age-appropriate).
- Empower girls to resist coerced sex.
- Counsel parents for preventing early marriages.
- Counsel the couple to use contraceptives for postponing first pregnancy.
- Provide access to safe abortion care at comprehensive abortion care center for premarital pregnancies.

Women and couples of reproductive age

- Counsel adolescent married women aged <19 years regarding safe age for first pregnancy, available methods to postpone pregnancy, provide method-specific counseling and provide contraceptive of choice.
- Create awareness regarding return of fertility after abortion and childbirth and health risks of short inter-pregnancy interval.
- Provide contraception counseling to avoid unintended pregnancy.
- Provide contraceptive method of choice.
- Eliminate myths and misconceptions about contraceptive methods.
- Refer women having unwanted pregnancy to appropriate comprehensive abortion care center.

2.6 PREVENTING REPRODUCTIVE TRACT INFECTIONS (RTIS) AND HIV INFECTION

2.6.1 Background

Women often get infections in their reproductive organs, which are called as RTIs. The causes can be poor menstrual hygiene, unsafe abortion, unclean delivery and unsafe sex. The infections that are transmitted from an infected partner to an uninfected sexual partner during sexual intercourse are called sexually transmitted infections (STIs). The predominant mode of transmission of HIV is through unsafe sex. STIs affect both men and women, but the health problems can be more serious in women. In women lesions are often not visible externally and women do not seek medical advice early.

- In women, some STIs can lead to infection of fallopian tubes and can result in infertility. In men, some STIs can cause infertility.
- STIs increase the chance of getting HIV infection.
- STIs in a pregnant woman can be transmitted to her baby.

2.6.2 Effects of STIs on pregnancy

- Most infections can cause preterm births, LBW, premature rupture of membranes leading to neonatal infections.
- Syphilis, a bacterial STI can cause stillbirth, congenital syphilis and neonatal death.
- Gonorrhea, chlamydial infection can cause neonatal eye infection (conjunctivitis).
- HIV-infected women can transmit the infection to their baby during pregnancy, labor, and through breastfeeding.
- Genital herpes infection can cause neonatal herpes, pneumonia.

2.6.3 Symptoms of RTI in women

- Vaginal discharge, vulval itching, difficult urination, frequency of urination.
- Lower abdominal pain.
- Ulcer, warty growth, painful vesicles and other lesions on private parts.
- Swelling in groin region.

It is important to note that in a recent survey (DLHS 4), 4.5% of women gave history of having vaginal discharge within 3 months preceding the survey.

2.6.4 Diagnosis

- Examination of external genitalia for any lesions, groin region for swollen lymph nodes.
- Speculum examination: Look for mucopurulent cervicitis, inflamed vagina, offensive excessive watery frothy discharge. Sometimes discharge can be curdy white associated with intense itching (Candidiasis) or it can be grey white with a fishy odor (Bacterial vaginosis).
- Vaginal examination might be painful if the infection has ascended to the pelvis (PID).
- Blood test: VDRL test can detect syphilis. HIV test can detect HIV infection.

2.6.5 Treatment

Women having symptoms suggestive of RTI should be encouraged to report to the health center and seek medical help to get cured from infection. Treatment is available from the medical officer at the PHC.

- There are kits of medicines provided for each group of symptoms (Syndrome).
- The counselor should encourage the women to have voluntary HIV testing.
- The team at the PHC should help the women to make informed decisions regarding pregnancy, specially care before and during pregnancy.

National AIDS Control Organization, India has prepared drug treatment kits based on syndromic management of RTI/STI. After history-taking, based on clinical examination and minimal investigations available, the couple will have diagnosis of the syndrome and will receive the treatment as per the color-coded kits provided under the program (Table 7).

Table 7. Content of STI/RTI drug kits

Sl. No	STI/RTI Syndromic diagnosis	Name of the Kit	Color coding	Content of the Kits (Name of the drugs)
1	Urethral Discharge (UD), Cervicitis (CD), Ano-rectal discharge (ARD). Painful Scrotal Swelling (PSS), Presumptive treatment (PT)	Kit 1	Gray	1 tablet of Azithromycin (1 gram)/ 2 tablets of Azithromycin (500 mg) and 1 tablet of Cefixime (400 mg)
2	Vaginitis (VD)	Kit 2	Green	1 tablet of Secnidazole (2 gram)/ 2 tablets of Secnidazole (1 gram) and Fluconazole (150 mg)
3	Genital Ulcer Disease Non-Herpetic (GUD-NH)	Kit 3	White	Injection Benzathine penicillin (2.4 MU) + 1 tablet of Azithromycin (1 gram) + distilled water 10 ml
4	Genital Ulcer Disease Non-Herpetic (GUD-NH) for patients allergic to penicillin	Kit 4	Blue	28 tablets or capsules of Doxycycline (100 mg) + 1 tablet of Azithromycin (1 gram)/ 2 tablets of Azithromycin (500 mg)
5	Genital Ulcer Disease-Herpetic (GUD-H)	Kit 5	Red	21 tablets of Acyclovir (400 mg)
6	Lower abdominal pain (LAP/PID)	Kit 6	Yellow	1 capsule of Tablet Cefixime; 28 tablets of Metronidazole 400 mg. 28 tablets or capsules of Doxycycline (100 mg)
7	Inguinal bubo (IB)	Kit 7	Black	42 tablets or capsules of Doxycycline (100 mg) + 1 tablet of Azithromycin (1 gram)

HIV-infected women can be guided to the Anti-Retroviral Treatment (ART) center to receive ART medicines. ART can reduce the viral load to undetectable levels, which greatly reduces the risk of transmission to the baby. They can make informed reproductive decisions by availing pre-conception care and modifying their childbirth plans. She can get other STIs treated before conception.

2.6.6. Counseling messages

- RTIs can be prevented by proper menstrual hygiene, avoiding unsafe abortion and delivering in a hospital by skilled birth attendant (SBA).
- STIs can be prevented by following safe sex practices by avoiding premarital sex, being faithful to one sexual partner and by correct, consistent use of condom.
- STIs can be detected and treated with medicines that are available free of charge in Government health facilities. Most STIs (except viral STIs) can be cured by taking the complete course of medicines.
- Untreated RTIs and STIs increase the risk of getting HIV infection.
- Untreated persons having STI can spread the infection hence the sexual partner needs to take complete treatment.
- It is necessary to prevent getting STIs and HIV to protect the fetus from getting infected. HIV can be transmitted to the baby during pregnancy, delivery and breastfeeding. Knowing the HIV status before pregnancy helps in taking measures to protect the baby.
- RTIs and STIs can lead to infertility, miscarriages and other adverse effects on pregnancy outcome.

2.6.7 Role of health personnel

ANM

- Create awareness amongst the adolescents and young couples regarding the modes of transmission of HIV infection and other RTIs/STIs and ways of protecting themselves from getting infected.
- Counsel women having high risk behavior for risk reduction through behavioral change.
- Encourage them to know the HIV status by visiting integrated testing and counselling center (ICTC) and getting counseling regarding health interventions to stay healthy.

MO: Diagnosis of RTI/STI and treatment as per National AIDS Control Organization (NACO) guidelines.

2.7 DETECTING AND MANAGING CHRONIC DISEASES BEFORE PREGNANCY

2.7.1 Background

Some diseases are known to have an adverse effect on maternal health and pregnancy outcome.

- Diabetes mellitus.
- Heart disease.
- Chronic hypertension, chronic kidney disease.
- Epilepsy.
- Thyroid disorders.

Detecting and treating these diseases before pregnancy can improve the chances of successful pregnancy. Every eligible woman should be encouraged to make a visit to PHC medical officer for medical checkup before planning pregnancy. The details of health problems, medicines being taken should be told to doctor. Health checkup should be undertaken. Any health problem that requires special treatment before pregnancy should be discussed and necessary measures should be taken. Ongoing medicines for any disease need to be reviewed before pregnancy to check whether they are safe to continue during pregnancy.

2.7.2 Diabetes mellitus (DM)

Detecting and controlling diabetes before conception reduces the chances of birth defects and having macrosomic (large for dates) babies. Women who are obese or have a close relative who is diabetic are more likely to have diabetes. Women who had a stillbirth following loss of fetal movements, who had hypertension, preeclampsia, gave birth to a large baby or baby having birth defects are more likely to have diabetes. Diabetes can be detected by testing the blood sugar levels in fasting state and after oral glucose. In the general population the risk of severe birth defects is around 2–3%. In women having poorly controlled diabetes before pregnancy, the risk increases to 6-9% (cardiac, NTD, other). Well-controlled diabetes mellitus (DM) prior to conception has been shown to reduce birth defect rate back to baseline rate in the general population. Poor control can be known by testing blood for glycated hemoglobin (HbA1C).

- Women who had gestational diabetes in prior pregnancy should get their blood sugar and glycated hemoglobin checked and plan their pregnancy when diabetes is well controlled (Hb A1C < 6.5%).[72]
- If they are obese they should reduce their weight.
- They should consume folic acid 5 mg daily starting 3 months prior to planned pregnancy to reduce the occurrence of baby with birth defects (NTDs).

The diagnosis of diabetes mellitus is shown in Table 8 below.

Table 8. Diagnosis of Diabetes Mellitus:

	Fasting Plasma Glucose mg/dl (No intake 8 h)	2-hour plasma glucose after 75 g glucose)	Random Plasma glucose	Hb A1C
Normal	<100 mg/dl	< 140 mg/dl		< 5.7%
Diabetes	≥126 mg/dl	≥ 200 mg/dl	200 mg/dl	≥ 6.5 %
Increased risk of diabetes	100-125 mg/dl (impaired fasting glucose)	140-199 mg/dl (impaired glucose tolerance)		5.7-6.4%

About 5% women (15–49 years of age) in the state had high blood sugar >140 mg /dl (NFHS 4). The American diabetes association recommends that persons having BMI ≥ 25 (or Asians ≥ 23 Kg/M2) with one or more additional risk factor for diabetes (first-degree relative with diabetes, hypertension, Poly Cystic Ovarian Syndrome, acanthosis nigricans, history of gestational diabetes) should be screened for diabetes mellitus.[59] For all others, testing should begin at age 45 years.

2.7.2 Heart disease

Some women have heart disease. Rheumatic fever in childhood can cause defects in the heart valves and can affect the function of the heart. Some defects in the heart can be since birth (congenital heart disease). The diseased heart cannot tolerate any excessive strain. Pregnancy puts an additional burden on the diseased heart. The women become breathless even with small activities. The risks of complications increase significantly. Heart disease worsens during pregnancy, delivery and soon after delivery. It can be life-threatening for the woman. A pregnant woman's life is endangered due to cardiac failure, infection in the heart (bacterial endocarditis) and other complications. The baby is also likely to be preterm and LBW.

Symptoms

- Some women may not have any symptoms.
- Breathlessness on less than usual exertion, fatigue, swelling over feet, syncope, chest pain. Sometimes she can become breathless even at rest, have cough at night with blood in sputum which is dangerous.

Signs:

- Auscultation of chest: precordial murmurs, abnormal heart rhythm.
- Signs of cardiac failure, crepitations at lung bases.

Such women should be referred to a specialist at FRU or district hospital. Electrocardiography, 2D Echo cardiography should be carried out as required to confirm the diagnosis. Women with signs of cardiac failure need immediate hospitalization under care of a specialist.

Management

Before conception, women with preexisting heart disease should receive counseling regarding maternal and fetal risks during pregnancy. Some defects in the heart can be corrected by surgery on heart before pregnancy. Some girls having heart disease are operated upon by a heart surgeon and receive some special medicines (anticoagulants) to avoid formation of blood clot. These women should consult a specialist before planning pregnancy as their medicine plan needs to be changed during pregnancy for the safety of the baby. It is important to report to a specialist soon after confirmation of pregnancy. Anemia increases the risk of heart failure and should be corrected before planning pregnancy. Any infection, (urinary, respiratory, dental) increases the risk of heart failure and needs to be treated promptly.

2.7.3 Chronic hypertension and chronic renal disease

Women having chronic hypertension before becoming pregnant are at high risk of developing preeclampsia during pregnancy. These women need to visit a physician to find out about the severity of hypertension, cause of their high blood pressure and the medicines to control blood pressure. They must also discuss about their intentions to go for a pregnancy and find out about their fitness for the same before planning pregnancy. About 9% of women (15–49 years) in the state had high blood pressure (NFHS 4).

Women with chronic renal disease are at greater risk of chronic hypertension and development of preeclampsia. They should discuss about the risks before planning pregnancy. Women having significant proteinuria and a previous history of kidney disease should undergo complete evaluation by a physician to find out whether they have a renal disease.

2.7.4 Epilepsy

Women having epilepsy receive medicines to keep their fits under control. Some of these medicines have adverse effects on the developing baby. The type of medicines and dose of antiepileptic drugs taken by the mother during the first trimester have an impact on the risk of major congenital malformation in the baby.

Medical consultation and counseling before planning pregnancy helps women to reduce the risk of having a baby with a malformation by reducing the number of drugs, the dose and switching over to less harmful drugs before pregnancy. They should discuss the appropriate time for conception with their physician. Folic acid 5 mg daily should be started 3 months before conception. Diet should be rich in micronutrients.

Some anticonvulsant medicines are known to be associated with birth defects (e.g. Valproate, Phenobarbital). Selecting a relatively safe drug, lowest possible effective dose, single drug as against multiple drugs can be some strategies to be discussed prior to conception. Some women may be receiving medications for years after a seizure and for them discontinuation of medication may be considered in consultation with a specialist.

2.7.5 Thyroid disorders

Thyroid hormone deficiency in women can cause irregular menstruation, inability to conceive and recurrent abortions. There is increased risk of preeclampsia, placental abruption and post-partum hemorrhage. A common cause of thyroid hormone deficiency is deficient intake of iodine leading to a condition called hypothyroidism. Iodine deficiency during pregnancy can result in poor mental development of the child with poor IQ. Consumption of iodized salt helps in preventing iodine deficiency.

A clinical picture raising suspicion of hypothyroidism includes fatigue, lethargy, weakness, sleepiness, constipation, loss of hair, menstrual irregularities, infertility, recurrent miscarriages, weight gain, hypertension, dry skin and enlarged thyroid.

Hypothyroidism can be diagnosed by blood test. TSH levels are checked first. If TSH levels are elevated, complete thyroid function tests should be carried out. The woman should be referred to a physician at a district hospital for further care. Hypothyroidism is treated by levothyroxine tablets taken orally early morning on an empty stomach. The women who are diagnosed to have hypothyroidism should plan pregnancy when their TSH level is normal. The dose of thyroid hormone needs to be increased during pregnancy as pregnancy progresses and TSH levels need to be monitored periodically. Such women should be under the care of a specialist soon after detection of pregnancy and throughout pregnancy for adjusting the dose of levothyroxine.[60]

2.7.6 Roles and responsibility of health personnel

- ANM will encourage every eligible woman to have a health checkup done by the medical officer.
- MO PHC will conduct the pre-conception risk assessment and health checkup of every registered woman as recommended.
- Physician at DH will see all the referred women, conduct their health assessment and provide the necessary pre-conception care and counseling regarding safe timing for having pregnancy.

2.8 Operationalization of pre-conception care

The pre-conception care will be implemented along with other RMNCHA activities in the population. During the monthly home visit to eligible couples, ASHA will conduct behavior change communication on the need of pre-conception care and counsel the women on nutrition, sexual and reproductive health, and prevention of addiction. ASHA will refer the eligible women (preferably with their husbands) to the ANM on Village Health, Nutrition and Sanitation Day.

ANM will review the list of eligible women from each village and register them for pre-conception care. She will screen the women for any pre-conception risk indicator and provide appropriate intervention (Table 9). She will counsel the women having risk factors for preterm birth/LBW baby to postpone pregnancy until the risks are managed. The ANM will refer the eligible women to a medical officer for a pre-conception health checkup. She will counsel and refer the women reporting pathological vaginal discharge, along with their husband to PHC for treatment. She will do a monthly follow-up of the registered women and record changes in weight, hemoglobin, contraceptive usage, addictions etc. with reinforced counseling. She will provide the necessary nutritional supplements (IFA prophylaxis/ therapy), deworming, peri-conceptional folic acid and contraceptives as indicated. The ANM will complete the baseline information of each of the eligible women during the first visit in the format provided in Annexure 7.5. During the follow up visits of the eligible women every month, ANM will complete the information in the format provided in Annexure 7.5. ANM will note the women conceiving during the period of observation /intervention and register them for antenatal care.

The Medical Officer at the PHC will conduct risk assessment and offer clinical care and will be responsible for overall implementation of pre-conception interventions in the PHC population. The Medical Officer will carry out the history-taking, clinical examination and will provide necessary treatment. He will screen the women for chronic medical diseases needing attention before conception (severe anemia, obesity, epilepsy, hypertension, cardiac disease, RTI, goiter, tuberculosis, thyroid dysfunction, psychiatric disorders) and will review any ongoing medicines. He will refer the women having a medical condition to a physician at the DH as necessary for further evaluation and treatment of severe anemia, epilepsy, thyroid dysfunction, diabetes mellitus, suspected cardiac disease and any other significant health problem. A laboratory technician will collect blood for different laboratory tests as per protocol including hemoglobin, blood group ABO and Rh type, solubility test for sickle cell anemia, random blood sugar by glucometer, HIV, VDRL and serum TSH. Further investigations like oral glucose tolerance test, thyroid function tests, electrophoresis for sickle cell anemia will be performed as indicated.

Table 9. Pre-conception Risk Indicators: Checklist for intervention

Status	Intervention
Age < 19 years	Defer pregnancy till age 20
BMI < 18.5 Kg/m^2	Increase weight: Nutrition guidance. Defer pregnancy till BMI improves
BMI > 30 Kg/m^2	Weight reduction. Medical checkup. Defer pregnancy till BMI optimization
Hemoglobin < 12 g/dl	IFA tablets, deworming; Defer pregnancy till Hemoglobin is 12 g/dl or more
Exposure to tobacco in any form	Counseling to quit
Consumption of alcohol	Counseling to quit
Willing to postpone pregnancy	Contraception provision
Desire to have a pregnancy	Periconceptional Folic acid
Symptoms suggestive of RTI/STI	Check up and treatment at PHC
Medical disease	Referral to a specialist as appropriate and treatment
Women reporting missed period	UPT, ANC registration

3: Interventions During Pregnancy

3.1. PRENATAL CARE

3.1.1 Screening pregnant women for risk indicators for adverse neonatal outcome

Maternal conditions leading to preterm birth, fetal growth restriction, fetal asphyxia, and certain neonatal infections can be detected during pregnancy and appropriately managed to reduce neonatal morbidity. Every pregnant woman should be screened for risk indicators leading to increased neonatal morbidity and mortality.

Screening helps us to identify pregnant women in need of extra care.

Screening can be clinical (risk factors from history-taking, clinical examination – BP, weight) or laboratory tests like HIV, VDRL, proteinuria. Any screening can give negative results which are assuring while in some women the tests can give positive results indicating some risk to the mother, baby or both.

Those detected positive for certain diseases need therapy, further monitoring or additional diagnostic tests. Some screening tests are recommended only once while some need to be repeated during pregnancy for which we need to know the schedule of repeating the test.

3.1.2 Antenatal checkup schedule

The antenatal visit schedule recommended by the GOI consists of a minimum of 4 checkups for an uncomplicated low-risk pregnant woman. This is based on WHO recommendations of 2002. Recent WHO guidelines (2016) recommend a minimum of 8 visits for being able to reduce perinatal mortality.[61] This can be adopted as possible. Table 10 below gives the two recommendations.

Table 10: GOI adopted schedule and WHO ANC recommendation 2016

WHO Focused ANC 2002 GOI-adopted Schedule		WHO Recommendation (2016)
Visit 1	< 12 weeks	Contact 1: Up to 12 weeks
Visit 2	24–26 weeks	Contact 2: 20 weeks Contact 3: 26 weeks
Visit 3	32 weeks	Contact 4: 30 weeks Contact 5: 34 weeks
Visit 4	36–38 weeks	Contact 6: 36 weeks Contact 7: 38 weeks Contact 8: 40 weeks
Return for delivery at 41 weeks if not delivered		

3.1.3 EVALUATION DURING ANTENATAL CHECKUP

At each visit some actions are indicated which are summarized below.

3.1.3.1 Basic evaluation at first visit before 12 weeks should include clinical screening to detect

- Consumption of tobacco (smoking, chewing, *misri* use, passive smoking) and alcohol.
- Age less than 19 years or > 35 years.
- Heavy work schedule, inability to take adequate rest.
- Historic risk indicators: Women giving history of preterm birth/second trimester abortion, birth of LBW baby, stillbirth, congenitally malformed baby, APH, PPH, retained placenta during previous pregnancy are at greater risk of having similar problems in the current pregnancy. Such women should be referred to a specialist.
- Height, weight, calculating BMI in first trimester: < 18.5 or ≥ 30 Kg/ M^2.
- Pallor, icterus, oedema.
- Measurement of blood pressure.

The risk assessment for preterm/SGA babies at first visit is given in Table 11.

Table 11. Risk Assessment for Preterm/SGA (LBW) baby at First Visit

Health status / issues / behaviors	Health status / issues / behaviors
• BMI < 18.5 Kg/m^2, > 30 Kg/m^2, • Height < 145 cm weight < 40 Kg	• Anemia
• Age less than 19 years or > 35 years	• Urinary tract infection (UTI), Malaria, periodontal infections
• Strenuous working, long hours of work, inability to take adequate rest	• Vaginal infections: Bacterial vaginosis
• Inter pregnancy interval < 24 months	
• Previous history of preterm birth, mid-trimester abortion.	
• Tobacco, alcohol, illicit drug consumption	

Women having any of these risk indicators should be made aware of the facts and counseled for reducing the risk by dietary and other interventions. At subsequent monthly visits reinforcement counseling should be given.

Strenuous work: Encourage her to stop doing exertion, and rest for 2 hours in the afternoon in lateral position. Husband and family members to be counseled for this.

Tobacco exposure /Alcohol: Explain the adverse effects and encourage to stop completely.

BMI < 18.5 Kg/M^2 (Height less than 145 cm, weight less than 40 Kg) in first trimester indicate maternal undernutrition. Undernourished pregnant women are at greater risk of delivering preterm or LBW baby. Counsel these women for nutritious diet throughout pregnancy and consumption of IFA tablets.

- Increase daily energy and protein intake to reduce LBW.
- Balanced energy protein intake to reduce stillbirths, SGA babies.
- They should gain more weight during pregnancy (12.5–18 Kg as per the Institute of Medicine Recommendations).
- Restrict caffeine intake to reduce the risk of loss of pregnancy and LBW, if intake > 300 mg/day. A cup of instant coffee contains 60 mg, some commercially brewed coffee brands contain > 150 mg of coffee per serving. Black tea/green tea/iced tea contain < 50 mg /250 ml[73].

BMI > 30 Kg/M^2: Explain the risk and refer to a specialist

Women with previous history of preterm birth should be referred to a specialist in the 4th month of pregnancy. The specialist can perform serial vaginal sonography every 2 weeks from 16 weeks to see if the cervix is short (< 25 mm). The specialist may consider administering weekly injections of 17 alfa hydroxy progesterone 250 mg intramuscular starting from 16 to 21 weeks, continued until 37 weeks to women at risk of preterm birth or performing cervical os tightening in selected cases to postpone the delivery in such women. Evidence shows that progesterone supplementation significantly reduces preterm birth in women with a history of spontaneous preterm birth. Vaginal progesterone 200 mg daily gives comparable results avoiding injections.

Other conditions: Treat UTI, correct anemia. Improving oral hygiene is helpful.

The risk assessment for preeclampsia is shown in Table 12.

Table 12. Risk Assessment for Preeclampsia[62]

High Risk	Moderate Risk
• Hypertension in previous pregnancy	• First pregnancy
• Chronic hypertension	• Age > 40 years
• Diabetes mellitus	• BMI > 35 Kg/m^2 at first visit
• Chronic renal disease	• Pregnancy interval > 10 years
• Autoimmune disease: Antiphospholipid syndrome /SLE	• Family history of preeclampsia
• Twin gestation	

*Women having any of the conditions indicating **high risk** of preeclampsia should be made aware of the facts and referred to a specialist for consultation regarding preventive interventions.*

Box 1. High risk factors for hypothyroidism[74]

- Obesity, H/O infertility, recurrent miscarriages.
- H/O preterm births, intrauterine fetal death, preeclampsia-eclampsia, placental abruption, mental retardation in previous children or in family.
- Symptoms of thyroid dysfunction or presence of goiter.
- H/O thyroid dysfunction or thyroid surgery prior to pregnancy, prior history of postpartum thyroiditis.
- History of autoimmune thyroid disease, Positive thyroid auto antibodies.

Women showing any of the high-risk factors for hypothyroidism need to be referred immediately to the medical officer/specialist as they need to be screened for hypothyroidism by TSH test early in first trimester of pregnancy.

Laboratory tests

- Hemoglobin testing/ Complete blood count including platelets.
- Urine dipstick for protein and sugar.
- Rh, ABO testing.
- VDRL, HIV, Hepatitis B.
- Blood sugar (Screening for gestational diabetes mellitus post glucose).
- Solubility test : Sickle cell hemoglobinopathy.
- RDT for malaria in malaria-endemic areas.
- Screening for hypothyroidism: TSH testing if high risk.

Imaging: If USG has been done between 11–14 weeks, review the report to note the gestation age of the fetus and whether it is singleton pregnancy. At this time, neural tube defects can be detected, and nuchal thickness is measured which along with other biochemical tests helps in screening for chromosomal abnormalities.

3.1.3.2 Evaluation and actions at subsequent visits include the following

- Reviewing results of screening tests performed at first visit and initiating necessary actions for screening positive women (Table 13).
- Screening for fetal structural abnormalities by USG around 16–18 weeks.
- Repeating the screening tests as recommended by national guidelines.
- Instituting preventive interventions.
- Monitoring of blood pressure, proteinuria, fetal growth, danger signs.
- Early detection of any complication and management including referral.
- Education and counseling is an integral component of each contact.

Table 13. Review of Results of Screening Tests, Test Result Disclosure and Action

Screening Result	Action Recommended*
Hb <11 g/dl	IFA 1 tab twice a day, repeat Hb estimation after 1 month
Hb < 7 g/dl	Line listing, Evaluation, Injectable iron, Blood transfusion as clinically indicated
HIV/VDRL negative	Assess Risk; High risk: Retest in 3rd trimester
HIV infected	Refer to ART/PPTCT center, Triple ARV & ANC
VDRL +ve	Inj Benzathine penicillin 2.4 MU after test dose
Rh –ve *(Nonsensitized)*	Husband Rh positive? Indirect Coomb's test
Post 75gms glucose plasma glucose 140 mg% or more	Medical nutrition therapy for 2 weeks. Repeat blood sugar profile after 2 weeks
TSH > 2.5 mIU/l in first trimester or > 3 mIU/l after first trimester	Refer for Levothyroxine therapy
Solubility test positive	Confirmation by HPLC at DH, testing of husband, genetic counseling

*Please see relevant sections for details

Second visit 18–20 weeks

- Repeat Hemoglobin estimation, Urine analysis.
- Monitor blood pressure. Note increase in weight from previous visit. Calculate in kg/month. Note fundal height.
- Review USG report for fetal structural defects, number of fetuses, placental location. Fetal cardiac defects are better detected at this time. However, considering the legal limit of 20 weeks for medical termination of pregnancy, the detection and further action for major structural anomalies need to be expedited.

Third visit 26–28 weeks

- Complete physical examination by medical officer. Auscultate chest.
- Monitor blood pressure. Calculate weight gain from previous visit in kg/month.
- On the day of the visit, calculate the duration of pregnancy in weeks + days and measure the fundal height and check whether it is corresponding with the period of amenorrhea. Measuring fundal height in cm gives better idea about fetal growth. Height in cm usually corresponds with gestational period in weeks. A lag of > 2 weeks needs evaluation by a specialist to detect fetal growth restriction.
- Repeat Hemoglobin estimation, Urine analysis.
- Repeat screening for GDM if negative at first visit.

Fourth visit: 30–32 weeks

- Monitor blood pressure. Calculate weight gain from previous visit in kg/month.
- Screen for IUGR. If IUGR suspected, refer to a specialist for evaluation.
- Repeat Hemoglobin estimation, Urine analysis.

Fifth visit: 36 weeks

- Monitor blood pressure. Calculate weight gain from previous visit in kg/month.
- Check fetal presentation, fetal heart rate, look for fetal growth restriction. Refer if breech, overdistended uterus, suspected IUGR.
- Repeat Hemoglobin, Urine routine.

3.1.3.3 Medications

- Give folic acid during first trimester.
- Start prophylactic or therapeutic IFA tablets after 12 weeks as per hemoglobin level and continue till delivery.
- Give tab Albendazole single dose during second trimester.
- Give calcium one tablet twice a day from second trimester till delivery.
- Inj TT/Td as per protocol.
- Offer Influenza vaccine during influenza season.

3.1.3.4 Education and Counseling

- Nutrition guidance, rest and exercise, healthy life style.
- Visit schedule and procedures to be carried out during each visit.
- Identification of birth companion and making birth plan, birth preparedness, institutional delivery.
- Breast feeding: Early initiation, exclusive breast feeding, early skin to skin contact.
- Contraception including PPIUCD.
- Importance of MCP card.
- Prompt reporting for danger signs.

3.2 SCREENING FOR NUTRITIONAL ANEMIA, PREVENTION AND CORRECTION

3.2.1 Introduction

Anemia in pregnant women is hemoglobin level of < 11 g/dl. Nutritional deficiency is the commonest cause of anemia. Anemia contributes to 20% of maternal deaths. Around 50% of pregnant women and 58% of lactating women are anemic (NFHS 4). National anemia reduction targets for 2022 are (at the rate of 3 percentage points per annum from baseline) to reduce the prevalence among pregnant women to 32% and among lactating women to 40% (Anemia Mukt Bharat 2018). [61]

3.2.2 Effects of anemia on the mother and baby

Table 14. Shows the effects of anemia on mother and baby.

Table 14. Effects of anemia on the mother and baby

Maternal	Baby
Increased risk of cardiac failure	Fetal growth restriction (IUGR)
Inability to withstand third-stage hemorrhage, can go in shock with moderate blood loss	Prematurity
During Puerperium: Risk of puerperal sepsis, Poor establishment of lactation, Puerperal venous thrombosis, Pulmonary embolism	Poor stores of iron at birth, risk of anemia during infancy

3.2.3 Screening test and interpretation

Hemoglobin is tested by Sahle's method at first visit. It is repeated during the visit at 24–26 weeks, 32 weeks and at 36 weeks. The recent guidelines recommend Hb estimation by digital hemoglobinometer at all ANC contact points. At all high case load facilities at block level and above Hb testing by using semi auto analyzers is recommended.[52] (Refer to the Anemia Mukt Bharat operational guidelines).

Degree of anemia:

- Mild: Hb 10 to 10.9 g/dl
- Moderate: Hb 7 to 9.9 g/dl
- Severe: Hb < 7 g/dl

Even when Hb% is normal, the iron stores in the body can be depleted and there can be a state of iron deficiency which needs to be corrected by giving prophylactic IFA tablets.

3.2.4 INTERVENTION

3.2.4.1 Hb ≥ 11 g/dl. Give Prophylaxis

Give one IFA tablet (Elemental iron 60 mg with folic acid (FA) 0.5mg/day sugar coated red color) daily orally for 180 days during pregnancy after first trimester, to be continued after delivery for 6 months. Tablets to be taken 2 hours after meals. Iron and calcium tablets should not be taken together. Tea should not be taken with iron tablets. Citrus fruits/juice helps iron absorption. Nutritional guidance is important for any degree of anemia. Counsel for extra intake of protein, iron and multivitamins.

Deworming medicine helps in preventing anemia. Give one tablet Albendazole (400mg) single dose during second trimester.

3.2.4.2 Mild/Moderate anemia: Hb 7.0 to 10.9 g/dl

Give therapeutic double dose: Give oral IFA two tablets daily. Check response after 4 weeks. Follow up every 2 months by health care worker for compliance of treatment during the contact. The treatment should be continued till the Hb becomes 11 g/dl, then continue one tablet daily till delivery. If no improvement after 2 months of treatment (< 1 g/dl increase) refer to PHC/FRU/DH for investigations and parenteral iron treatment. (IV iron sucrose).[61]

3.2.4.3 Severe anemia: Hb 5.0 to 6.9 g/dl

Refer such women to PHC/RH/SDH/DH for treatment by parenteral iron.

If severe anemia is detected during the third trimester of pregnancy refer to a specialist for complete evaluation and management. Hospitalization helps in investigating the cause of anemia.

Intravenous iron sucrose therapy is indicated if there is intolerance, noncompliance or non-response to oral iron. IV iron can also be considered for women detected to be anemic late in pregnancy or in whom compliance is likely to be low (high chance of lost to follow-up). IV Iron sucrose is safe. It helps in replenishing iron stores faster than oral iron.[64]

General comments:

- IV iron sucrose is a Category B drug which is safe during pregnancy.
- Oral iron should be discontinued 24 hours prior to IV iron sucrose injection.
- Women having anemia due to hemoglobinopathy should not be given IV iron sucrose injections.
- The dose calculation by formula: 2.4 x pre-pregnancy weight in kg x (Hb deficit in g/dl) + 500 mg for stores, rounded up to the nearest 100 mg.
- This generally yields 800-900 mg for an average pregnant woman weighing 45 kg with a Hb deficit of 3–4 g/dl. To remove the complex calculations for dosage, a standard total dose of 800 mg (4 injections of 200 mg) can be administered to pregnant women requiring parenteral iron.
- Each injection can be 200 mg diluted in 100 ml of normal saline should be administered over 15 to 20 minutes under the supervision of a medical officer (slow infusion can be harmful).
- An emergency medicine tray must be ready near the patient.
- All anemic women need to be counseled for increasing dietary intake of proteins, vitamins and iron.
- Repeat Hb estimation after one month. If no improvement is observed in hemoglobin (<1 g/dl increase), refer the woman to a higher center.

Hb < 5 g/dl: Pregnant women having Hb < 5 g/dl at any period of pregnancy must be hospitalized immediately in a center where round-the-clock specialist care is available. They need to be administered packed RBC (PRBC) transfusions under medical supervision.[75]

PRBC transfusion: The following pregnant women must be hospitalized in a district hospital and administered PRBC transfusions under medical supervision:

- Hb < 5 g/dl at any time during pregnancy.
- Hb 5–7 g/dl with impending signs of cardiac failure.
- Severe anemia seen after 34 weeks of pregnancy.
- Women presenting during labor with Hb <7g/dl.
- Severe anemia not due to nutritional deficiency (hemoglobinopathy, hemolysis). Consult a hematologist for treating such women.

Packed red cells are transfused slowly and under supervision.

One unit is expected to raise Hb by about 1 g/dl. Second unit can be given on 3rd or 4th day of first PRBC transfusion. Depending on repeat Hb level decision of 3rd PRBC transfusion may be taken by the specialist.

PRBC transfusion is for immediately increasing the oxygen-carrying capacity. The cause of anemia needs to be investigated and treated simultaneously for a lasting effect.

Refer to the Anemia Mukt Bharat operational guidelines for further information in this regard. Management protocol mentioned in Table 8 of Anemia Mukt Bharat guidelines is contraindicated in patients with hemoglobinopathy (sickle cell disease). Treatment with folic acid is recommended.

3.2.4.4 Points to remember

Correcting anemia early helps in fetal growth, and reduces maternal morbidity due to hemorrhage and sepsis. This will help in reducing maternal and neonatal mortality.

3.2.5 Role of health personnel

ASHA/ANM should mobilize every pregnant woman and counsel her for hemoglobin testing and repeat it as recommended at 4 scheduled visits. Dietary counseling, distribution of IFA tablets and calcium tablets and checking compliance is important.

ANM: Conduct hemoglobin estimation as recommended. Line list severe anemia cases and refer them as recommended. Refer women for parenteral iron therapy as recommended.

PHC/RH: Arrange to provide care to referred anemic women (Inj. IV iron sucrose, investigations). Do the follow up of the woman through delivery and ensure appropriate postnatal care.

CEmONC center: Provision of Inj. IV iron sucrose, special investigations, delivery of very severely anemic women, packed red blood cells transfusions as required. Treat complicated cases.

3.3. PREVENTING PREECLAMPSIA

3.3.1 Background

Hypertensive disorders during pregnancy are responsible for about 14% of maternal deaths in India. Severe preeclampsia and eclampsia are the second major cause of maternal deaths due to cerebral hemorrhage, renal failure, aspiration pneumonia, pulmonary edema, hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome, liver failure and coagulation failure. Perinatal deaths occur due to preterm births, fetal growth restriction, fetal and neonatal asphyxia.

3.3.2 Calcium supplementation

The incidence of hypertension during pregnancy is found to be higher in women having low calcium intake in their diet. Many studies have shown that calcium supplementation during pregnancy reduced the risk of preeclampsia by 31–67% and gestational hypertension by 30% in calcium-deficient women. There is also reduction in preterm, LBW babies.[69]

3.3.2.1 Intervention

Pregnant women should be counseled to increase the dietary intake of calcium and consume calcium tablets to reduce the occurrence of hypertension.

- Calcium carbonate tablets containing 500 mg of elemental calcium and 250 IU of vitamin D3 twice a day with meals from the second trimester of pregnancy until delivery. Drink plenty of fluids. Continue the tablets for 6 months after delivery.
- Calcium and iron supplements should not be taken at one time. They should be taken several hours apart.
- Regular BP monitoring is necessary for early detection of preeclampsia.

3.3.2.2 Role of health personnel

ASHA/ANM should mobilize every pregnant woman and counsel her for a calcium-rich diet, distribute calcium tablets **and check compliance.**

3.3.3 Preventing preeclampsia with low-dose aspirin

Before the onset of hypertension and proteinuria many changes take place in uteroplacental circulation. Abnormal placentation, vascular endothelial dysfunction, platelet activation and aggregation, decrease in the vasodilatory prostaglandins precede the development of hypertension. These changes take place early in the second trimester. Aspirin has an anti-prostaglandin action and helps to restore the ratio of vasodilatory to vasoconstricting prostaglandins.[77]

3.3.3.1 Current evidence suggests that low-dose aspirin 75 mg daily from 12 weeks till term for prevention of preeclampsia benefits women who are at higher risk of developing hypertension during pregnancy, such as:

- Preeclampsia in previous pregnancy.
- Twin pregnancy.
- Diabetes mellitus.
- Chronic hypertension, Chronic renal disease.
- Autoimmune disease: Antiphospholipid syndrome/SLE.

The effect is better when aspirin is started by 16 weeks.

At first antenatal visit, the ANM/MO should check whether the woman is at high risk of developing preeclampsia and refer women at high risk of preeclampsia to a specialist. Regular checking for BP/ proteinuria is still necessary during pregnancy.

3.4. PREVENTING NEONATAL TETANUS AND ADULT DIPHTHERIA

3.4.1 Background

So far only tetanus toxoid vaccination (2 doses or a booster dose) was given to every pregnant woman. This has been now changed to administration of tetanus toxoid and reduced diphtheria toxoid vaccine (Td). In view of the low vaccination coverage and waning immunity following primary vaccination in childhood, outbreaks of diphtheria have been noted in many countries. WHO has been strongly recommending replacement of TT by Td vaccination. Replacement of TT with Td vaccine will boost waning diphtheria immunity in addition to assuring

tetanus protection and help to curtail diphtheria outbreaks; it is highly cost effective and safe and currently being used in 133 countries. Immunization of every pregnant woman during pregnancy using Tetanus Toxoid and Adult diphtheria vaccine (Td) effectively eliminates neonatal tetanus and protects the pregnant woman against tetanus and adult diphtheria.

3.4.2 Intervention

Injection Td is administered intramuscularly to every pregnant woman, first dose at first antenatal visit and second dose after 4 weeks. Women who have received two doses in first pregnancy which was within three years, can receive only one booster dose.

3.4.3 Role of ANM

Td immunization of every pregnant woman.

3.5. PREVENTING INFLUENZA DURING PREGNANCY BY INACTIVATED VACCINE

3.5.1 Background

Pregnant women have reduced immunity to fight against infections. They are at higher risk of getting severe complications if they acquire H1N1 influenza infection during pregnancy. The risk is more during the third trimester of pregnancy.

Effects on Mother and Baby: The morbidity and mortality are high during pregnancy. Pregnant women with flu can have higher rates of stillbirth, spontaneous abortion, and preterm birth. Any fever during the first trimester doubles the risk of neural tube defects.

3.5.2 Intervention

Routine influenza vaccination by inactivated vaccine is recommended for all women who are pregnant (in any trimester) during influenza season.

Do not give live attenuated influenza vaccine (LAIV) to pregnant women.

Avoiding direct contact with someone who is having flu like symptoms should be advised.

3.5.3. Role of health personnel

ANM: Create awareness among pregnant women regarding the risks of H1N1 influenza during pregnancy and counsel for vaccination.

MO at PHC/RH: Administer inactivated influenza vaccine.

Early treatment of flu-like illness: Oseltamivir tablet for 5 days.

DH: Treatment of very sick pregnant women with influenza with complications.

3.6 SCREENING FOR SYPHILIS AND CASE MANAGEMENT DURING PREGNANCY

3.6.1 Introduction and effect on pregnancy

Syphilis is a sexually transmitted bacterial infection. If a pregnant woman is infected by syphilis, the infection can be transmitted to her unborn fetus. Effects on pregnancy include late abortions, stillbirths, neonatal deaths, and infant having active congenital syphilis.

3.6.2 Screening test

At the PHC, perform a RPR/VDRL test on the blood sample of every pregnant woman at first visit. Retest high-risk pregnant women during the third trimester or at labor. Any woman who has delivered a stillborn baby should be tested for syphilis.

VDRL test nonreactive: No further action. Perform risk assessment for STI. If high risk, VDRL negative women should be retested during third trimester.

VDRL reactive: Note the titers. Positive test in any dilution should be treated by antibiotics. During pregnancy, a biological false positive test is possible hence positive results should be confirmed by TPHA test where possible (NACO). Repeat the titer at delivery and assess the infant.

3.6.3 Intervention at PHC/RH

Treatment of maternal infection can prevent and treat established fetal disease/infection.[78, 79]

- Penicillin is the only antibiotic that can cross the placenta in adequate amounts to treat the fetus. Penicillin is more effective in treating fetal infection.
- Benzathine penicillin single injection 2.4 million IU IM after sensitivity test. ***Give this injection in ward setting with all emergency drugs kept ready for managing allergic reaction.***
- Longstanding infection (> 1-year duration): 3 injections at weekly intervals are recommended. Even one injection helps in preventing fetal infection in these cases.
- Erythromycin ethyl succinate 500 mg 4 times a day for 15 days for women who are allergic to penicillin. For late syphilis erythromycin is recommended for 30 days. Erythromycin estolate is contraindicated during pregnancy.
- Alternatively, Azithromycin 2 g can be given orally as a single dose.
- Attempts should be made to complete the treatment early during pregnancy.
- Treating the mother adequately with Benzathine penicillin at least 4 weeks prior to delivery reduces the risk of transmission to the baby.
- Treatment of partner and safe sex counseling is important to avoid re-infection.
- Infant of a VDRL-positive mother needs care by a specialist. Blood sample is tested for VDRL. (Cord blood may give false positive result). Titer 4 times greater than the mother suggests that the infant has congenital syphilis.
- All infants born to seropositive mothers need treatment, prophylactic Inj Benzathine penicillin G 50000 units/Kg IM single dose or therapeutic as recommended for 10 days.

3.6.4 Point to remember

For eliminating congenital syphilis, VDRL test should be done on every pregnant woman at first clinic visit. Early treatment of syphilis during pregnancy prevents infection of the fetus.

3.6.5 Role of health personnel

ASHA/ANM should counsel pregnant women for having syphilis test at first visit.

MO at PHC/RH: Performing VDRL test early in pregnancy on every pregnant woman. Treatment of VDRL-positive pregnant women as per guidelines. Deliver these women at PHC. Treat the newborn baby in consultation with a child specialist.

Specialist at DH/FRU: Treatment of VDRL-positive pregnant women referred. Care of newborn baby and follow-up of the infant.

3.7. PREVENTION OF PARENT TO CHILD TRANSMISSION OF HIV

3.7.1 Introduction

As per India HIV estimations 2017, adult HIV prevalence in Maharashtra was 0.33%.[80] ANC sentinel surveillance for 2016–17 reported the prevalence in pregnant women as 0.26%.[71] Transmission of HIV infection from HIV-infected pregnant woman to her baby is about 30% in the absence of any intervention. Instituting proven interventions during pregnancy, labor and postpartum period coupled with special care to the baby can reduce the risk substantially.

3.7.2 Screening test

Offer HIV counseling and voluntary HIV testing to every pregnant woman during her first antenatal visit with an opt out option.

Perform screening test on finger prick whole blood sample.

Test negative: Negative test result can be disclosed immediately along with counseling to stay negative. Perform risk assessment. Encourage high-risk pregnant women to have repeat test during third trimester.

Test positive: Refer the pregnant woman early to nearest ICTC for test result confirmation. The confirmed positive test result is disclosed by a professional HIV counselor. Encourage the woman to get her spouse tested.

On her arrival to labor room, check the HIV status of every pregnant woman. Counsel the women having uncertain status, for voluntary HIV testing. Perform screening test on finger prick whole blood sample. If the test is positive, explain to the woman that the test will need to be repeated after delivery for confirmation of status. Refer the pregnant woman to the nearest ICTC for test result confirmation. Refer all HIV-positive women to ART center.

3.7.3 Intervention

- If pregnancy is unwanted and is < 20 weeks refer the woman to MTP center. If she wishes to continue pregnancy, refer her early to the PPTCT (prevention of parent to child transmission of HIV) center.
- Explain the benefits of a nutritious diet and micro nutrients in reducing the risk of vertical transmission.
- Explain the importance of safe sex practices for preventing new STIs and other strains of HIV which could harm the baby.
- Encourage regular follow-up at ART and PPTCT centers and adherence to HIV medicines.
- Encourage institutional delivery. Explain the benefits of early reporting to the hospital at the onset of labor.
- Explain safe infant feeding practices, infant care, and protocol for early infant diagnosis.
- Explore stigma and discrimination experienced and offer support.
- Screen for TB and STI at every visit. Ask history of any abnormal vaginal discharge, genital lesions, persistent cough, fever etc.

3.7.3.1 Maternal antiretroviral therapy (ART)

The baseline investigations of Hb, urine, VDRL, screening for hepatitis B and C, ALT, CD4 count, urea/creatinine, blood sugar, and lipid profile are conducted before starting ART. Irrespective of the CD4 count, lifelong ART by triple antiretroviral medicines is initiated. If there is no prior exposure to Efavirenz/Nevirapine; Tenofovir, Lamivudine and Efavirenz (EFV) tablet is started from 14 weeks onwards to be continued throughout pregnancy, labor and after delivery.[81] If there is H/O prior exposure to Nevirapine/EFV then EFV is replaced by a protease inhibitor Lopinavir/Ritonavir). See Table 15 below.

Table 15. Dosage Schedule and Associated Side Effects of Antiretroviral (ARV) Medicines

Name of ARV	Dose	Major Side Effects
Tenofovir (TDF)	300 mg OD	Nephrotoxicity, hypophosphatemia
Lamivudine (3 TC)	300mg OD	Very few, Hypersensitivity, rarely pancreatitis
Efavirenz (EFV)	600 mg OD	Hallucinations, suicidal ideation, nightmare
Lopinavir/Ritonavir (LPV/r)	400/100 mg BD	Gastro-intestinal disturbance, glucose intolerance, lipo-dystrophy and hyperlipidemia

If CD4 is < 250 cotrimoxazole (CPT) 1 double strength (ds) tab is given daily.

3.7.3.2 Care during delivery

Insist on institutional delivery at a PPTCT center as she requires ARV medicines during labor. If she is in advanced labor and is likely to deliver soon conduct her delivery by the following principles:

- Give ARV medicines during labor as per protocol.
- Minimize vaginal examinations and use aseptic techniques.
- Do not rupture membranes artificially unless indicated.
- Avoid giving routine episiotomy.
- Avoid instrumental delivery as much as possible. If indicated low forceps/outlet delivery is preferable to vacuum delivery.
- Follow universal safety precautions during conduct of delivery.
- Avoid suctioning the newborn with nasogastric tube unless indicated.
- Clean the baby of the maternal blood and body fluids before handing over to the relatives.
- Caesarean section is to be done only for obstetric indications and not for prevention of mother to child transmission.

Screening in Labour room: On arrival to labour room, check the HIV serostatus of every pregnant woman and details of ART drugs during pregnancy. If her HIV status is unknown and she is in first stage of labour, offer HIV counseling and testing using whole blood finger prick testing. If the test is positive, explain the woman that the test

will need to be repeated after delivery for confirmation of status. She should be administered the first dose of ART and advised for confirmation of tests through ICTC counselor and lab technician the following day. (NACO 2013)[73]. Refer all HIV positive women to ART center.

3.7.3.3 Care of mother after delivery

- Continue ART lifelong irrespective of the choice of infant feeding. Counsel for adherence to ART medicines.
- Counsel for nutritious diet and nutrient supplements.
- Watch for signs of sepsis.
- Screening for postpartum depression should be done before discharge and during postpartum follow up visits as there is increased risk.
- Encourage to use reliable contraception and continue safe sex practices. Encourage consistent use of condom in addition to other methods of contraception. IUCD (Cu 380 A) can be used by these women (PPIUCD as well as at other indicated time). Injectable contraception (DMPA) is safe.
- Counsel for annual screening for cervical cancer in view of higher risk of associated HPV infection.

3.7.3.4 Care of HIV-exposed infant

Prophylactic ARV: Infant is given Nevirapine (prophylaxis) for 6 weeks irrespective of choice of infant feeding. May be considered for 12 weeks if mother has received ART medicines for < 24 weeks (Table 16). Nevirapine should be started immediately after birth.

Table 16. Dose and Duration of Infant Nevirapine Prophylaxis

Birth Weight	Dose (mg)	Dose (in ml)	Duration
> 2500 g	15 mg once daily	1.5 ml once a day *	Up to 6 weeks irrespective of exclusively breast fed or exclusively replacement fed**
2000 to 2500 g	10 mg once daily	1 ml once a day	
< 2000 g	2 mg/kg once daily in consultation with expert pediatrician	0.2 ml/kg once daily	

**Considering content of 10 mg Nevirapine in 1 ml suspension.*
***May be extended to 12 weeks if mother has not received ART for at least 24 weeks.*

Appropriate infant feeding is initiated as shown below:

1. Exclusive breastfeeding is the recommended infant feeding choice in the first 6 months, irrespective of the fact whether the mother is on ART or infant is provided with ARV prophylaxis for 6 weeks.
2. ***Mixed feeding (Feeding breastfeeds and replacement feeds simultaneously in the first 6 months) should not be done at any cost within the first 6 months*** as it increases the risk of HIV transmission.
3. In situations where breastfeeding cannot be done or on individual parents' informed decision, replacement feeding may be considered only if it is affordable, feasible, acceptable, safe and sustainable (AFASS).
4. Exclusive breastfeeding should be done for at least 6 months, after which complementary feeding should be introduced gradually, irrespective of whether the infant is diagnosed HIV-negative or -positive by early infant diagnosis (EID).
5. Beyond 6 months, if the breastfeeding option has been chosen, breastfeeding should be continued as per (EID) status
    - For infants diagnosed as EID-negative, breastfeeding should be continued until 12 months of age ensuring that the mother is receiving ART. Breastfeeding should be stopped gradually within one month.
    - For breastfeeding infants who are diagnosed HIV-positive, ART should be started, and breastfeeding should be continued till the baby is two years old.[1]

- ***At 6 weeks: Cotrimoxazole (CPT) prophylaxis*** should be started which should be continued till the baby is 18 months old.

- ***Early infant diagnosis(EID) of HIV status:***
  - At 6 weeks, the baby is tested by DNA Polymerase Chain Reaction (PCR) test on dry blood spot (DBS); if DBS test is +ve, confirmatory PCR testing is done on whole blood spot (WBS). For positive babies ART is started at pediatric ART center irrespective of CD4.
  - EID-negative infants are tested again at 6 months and 12 months and 6 weeks after complete stoppage of breastfeeding.

    Rapid HIV test is done first + DBS followed by WBS is tested by DNA PCR. If WBS test is positive, ART is initiated in pediatric ART center.
  - At 18 Months: Confirmation of HIV status should be done at 18 months using 3 rapid tests for all babies irrespective of the earlier EID status. No DNA PCR at 18 months.
- ***Further care:*** Growth and nutrition monitoring, immunization as per schedule.

3.7.4 Points to remember

- Detecting HIV infection in a pregnant woman during her first visit in the first trimester gives an opportunity to start triple antiretroviral medicines early which significantly reduces the risk of transmission to her baby.
- Timely referral to ART center and PPTCT center can help in preventing vertical transmission of HIV. All HIV-infected pregnant women should be provided PPTCT interventions early in pregnancy as far as possible.
- The infant is given prophylactic ARV, is followed carefully and the diagnosis of HIV status is confirmed.

3.7.5 Role of health personnel

ANM should counsel every pregnant woman for HIV testing and perform rapid HIV test on whole blood finger prick sample at first antenatal visit. Disclose the negative test result. Refer women with suspicious test results to ICTC for confirmation. Follow-up of PPTCT center clients.

PHC/RH: Referral of confirmed HIV-infected women to ART center and PPTCT center for enrollment and ART medicines. Follow the women through delivery and ensure the appropriate infant care. Deliver uncomplicated cases when required.[73]

ART/PPTCT center: Provision of ART, safe delivery care, care of exposed infant including early infant diagnosis and care.

3.8 SCREENING FOR RH FACTOR: PREVENTING RH ISOIMMUNIZATION

3.8.1 Introduction

About 4–5% pregnant women attending ANC are likely to be Rh negative. If an Rh-negative woman has married an Rh-positive man, their child is more likely to be Rh-positive. When Rh-negative mother bear an Rh-positive fetus, the Rh antigen from fetal red cells enters the maternal circulation and gives rise to antibody formation in the mother. These antibodies cross the placenta and cause destruction of fetal red cells resulting in fetal anemia. Rh blood group incompatibility between the mother and her fetus is a major cause of hemolytic disease of the newborn. Prevention of such sensitization is possible by antenatal screening and appropriate care.

Pregnancy outcome: The first child usually escapes. Subsequent babies suffer from rapidly increasing jaundice within 24 hours of birth or hydrops fetalis resulting in fetal death. In the subsequent pregnancy, the fetal complications occur at an earlier period during pregnancy.

3.8.2 Screening test

Test the blood of every pregnant woman for blood group and Rh typing at first clinic visit.

- ***Test result Rh positive:*** No specific action. Inform the blood group to her.
- ***Test result Rh negative:*** Get her husband's Rh typing done. If husband is also Rh negative, explain to the couple that no further action is needed.
- ***Pregnant woman Rh negative and her husband positive:*** Explain the need for further evaluation to her.

➢ Ask history about outcome of every pregnancy. H/O neonatal jaundice, hydrops, stillbirths

➢ Note H/O receiving anti D immunoglobulin, time, dose during/following every pregnancy.

➢ Perform indirect Coomb's test (ICT) on woman's blood sample to detect presence of antibodies in the maternal blood.

3.8.3 Intervention

3.8.3.1 ICT Negative

Woman does not have detectable antibodies against Rh antigens. ICT is repeated monthly from 28 weeks.

- External cephalic version is not performed for fetal malpresentation.
- After any episode of bleeding or procedure (e.g. amniocentesis) anti D immunoglobulin is administered (300 micrograms intra-muscular injection).
- At delivery, obtain cord blood sample and send for following tests:
  - Infant's Rh type is tested. If infant is Rh negative, no further action.
- Infant Rh positive: ABO grouping, hemoglobin and hematocrit is done as baseline, Direct Coomb's test, Direct and indirect bilirubin estimation.
- If the baby is Rh positive, administer 300 mcg of anti D IM to mother as early as possible within 72 hours of delivery.
- Refer the baby to a neonatology specialist and observe it for icterus, anemia.

3.8.3.2 ICT Positive

The woman has got antibodies against Rh antigen in her blood. Note the titers. Do not give Anti D to sensitized mother.

- ***Refer her to a tertiary care center*** having a fetal medicine expert. Equipment and expertise for fetal blood sample testing by cordocentesis and intravascular fetal transfusion are needed for management.
- Degree of fetal affection needs to be assessed by Doppler middle cerebral artery peak systolic flow velocity studies (MCA PSV). Serial USG is done to look for early signs of hydrops fetalis.
- Severe affection indicates the need for early delivery of a salvageable fetus.
- For extremely preterm fetus, intrauterine transfusions with O Rh negative fresh packed red cells are carried out to raise the hematocrit.
- Early delivery is planned.
- Baby needs close monitoring, repeated testing for hemoglobin and bilirubin levels.
- Treatment includes phototherapy and exchange transfusion depending upon severity of hyperbilirubinemia.
- Increasing jaundice, rapidly rising unconjugated bilirubin, declining Hb indicate deterioration. There is risk of Kernicteus which can lead to permanent disability or even death of the neonate.

3.8.4 Point to remember

Screening of every pregnant woman for Rh type of her blood, testing husband of Rh-negative pregnant woman to find possibility of Rh incompatibility between the mother and her fetus, and preventing sensitization by administration of anti D injection at all indicated times is important.

3.8.5 Role of health personnel

ASHA/ANM should mobilize and counsel every pregnant woman for blood group testing at first visit and maintain a follow-up of Rh-negative pregnant women.

PHC/RH: Arrange blood group testing and Rh typing of every pregnant woman. The spouse of Rh-negative woman should be tested. Arrange to get ICT on blood sample of pregnant woman having an Rh-positive husband.

Conduct delivery of non-sensitized pregnant woman at PHC. Find out whether the baby is Rh-positive and administer anti D immunoglobulin as per guidelines.

Referral of sensitized cases to specialist.

CEmONC: Arrange care by experts for sensitized women and their babies.

3.9 SCREENING AND MANAGEMENT OF DIABETES MELLITUS IN PREGNANCY

3.9.1 Introduction

Diabetes mellitus (DM) detected for the first time during pregnancy is called Gestational Diabetes Mellitus (GDM). DM diagnosed before pregnancy is pregestational DM. Hyperglycemia associated with pregnancy results in higher maternal and perinatal morbidity and requires meticulous control of blood sugar levels and special care. Of all GDM patients, more than 50% develop Type 2 DM in later life. Effects of GDM on mother and baby are shown in Table 17.

Table 17. Effects of GDM on Mother and Baby

Risks to Mother	Risks to Baby
Increased risk of Preeclampsia, Polyhydramnios	Unexplained sudden fetal death during third trimester leading to stillbirth. Congenital abnormalities.
Prolonged labor due to fetal macrosomia. Maternal injuries during birth of large baby. Increased chances of caesarian section.	Macrosomia (big baby > 4 Kg) leading to birth trauma (due to shoulder dystocia), birth asphyxia and intrapartum fetal death.
Increased risk of chorioamnionitis and postpartum endometritis	Neonatal hypoglycemia, hypocalcemia, respiratory distress syndrome
Recurrent urinary tract infections, fungal vaginitis, skin infections	Prematurity, jaundice, apnea and bradycardia, polycythemia

The risk of fetal anomalies is high in pregestational DM. It is not increased in GDM patients.

3.9.2 Screening and diagnosis of diabetes in pregnancy[82]

All Indian women belong to the high-risk group and should be screened for GDM at the first antenatal visit as early as possible. One-step screening and diagnostic test should be done, and the result should be given to the woman during the same visit. Glucometer must be available at all ANC clinics for detecting women having GDM and in the labor room for close monitoring of GDM cases during labor. Calibration of Glucometer is recommended after 20 measurements using calibration test strips, provided with glucometers.

Screening Procedure: When a pregnant woman comes to the antenatal clinic, irrespective of her meal status, give her 75g glucose orally after dissolving in approximately 300 ml water. Tell her to drink it within 5–10 minutes. If vomiting occurs within 30 min of oral glucose intake, repeat the test next day. If vomiting occurs after 30 minutes, continue the test. Evaluate the blood glucose 2 hours after the oral glucose load by a plasma standardized glucometer.

3.9.3 Interpretation and action

- A value of ≥ 140 mg/dl is considered diagnostic of GDM.
- If the first test is negative, repeat the test during 24–28 weeks.

Positive test result at any visit: If the test is positive at any point (plasma glucose ≥140 mg/dl), start medical nutrition therapy (MNT) and advice regarding physical exercise.

After 2 weeks on MNT and physical exercise, perform 2 h PPPG (post meal plasma glucose).

If 2 h PPPG <120 mg/dl, assure the woman and do a follow-up by frequent repeat blood tests at least once a month during the second and third trimesters.

If 2 h PPPG ≥120mg/dL, explain to the woman that she needs to start medical management (Oral metformin or Inj insulin).

Referral: If MNT fails to control blood sugar, or if there is any complication refer her to a specialist at FRU. A team of diabetologist, sonologist and neonatologist should manage the case in consultation.

3.9.4 Controlling hyperglycemia: Goals for control

- Fasting whole blood glucose should be < 95 mg/dl
- 2 hour post meal blood glucose should be < 120 mg/dl

3.9.4.1 Medical nutrition therapy and physical exercise

Energy requirement increases during the second and third trimesters. Energy intake should be adequate to provide appropriate weight gain during pregnancy. Severe caloric restriction is not recommended as it may result in ketonemia and ketonuria and impair the physical and mental development of the baby.

Calculate calories for 24 hours according to BMI and activity level. For simplicity at field level the following GOI recommendation can be followed (Table 18).

Table 18: Level of activity and energy requirement during pregnancy

Level of Activity	Energy requirement during pregnancy	Total energy requirement (kcal/day)
Sedentary work	1900+350	2250
Moderate work	2230+350	2580
Heavy work	2850+350	3200

Depending upon the weight category the final requirement is calculated by deduction or addition of 500 calories per day (Table 19).

Table 19: Energy requirement during pregnancy based on BMI

Weight category	BMI (Kg/m^2)	Daily Energy Requirement
Underweight	< 18.5	Energy requirement as per level of activity + 500 kcal/day
Normal weight	18.5 to 22.9	Energy requirement as per level of activity
Overweight	23 to 24.9	Energy requirement as per level of activity
Obese	>25	Energy requirement as per level of activity - 500 kcal/day

- Composition of diet – It should include carbohydrates (50–60%), proteins (10–20%) and fats (25–30%) with saturated fat <10%. Plan a diet with the help of a nutritionist.
- Instruct her to take three major meals and 3 snacks.
- Exercise: Walking for 30 minutes a day.

Principles of MNT: Large amounts of carbohydrate foods eaten at one time will lead to high blood glucose level and should be avoided. It is better to spread carbohydrate foods over 3 small meals and 2–3 snacks each day rather than taking 3 large meals.

Complex carbohydrates (whole-grain cereals like oats, bajra, jowar, ragi, whole pulses, vegetables and fruits with skins) should be preferred over simple carbohydrates like food with lots of added sugar or honey, or foods that are made from refined white flour.

Simple carbohydrates like sweets, cakes, puddings, sweet biscuits, pastry, juice, soft drinks, chips, white bread, naan, pizza etc., should be avoided.

The aim should be for 2–3 carbohydrate serves at each major meal and 1–2 carbohydrate serves at each snack. (One serve=approximately 15 grams i.e. 3 teaspoons full of carbohydrate).

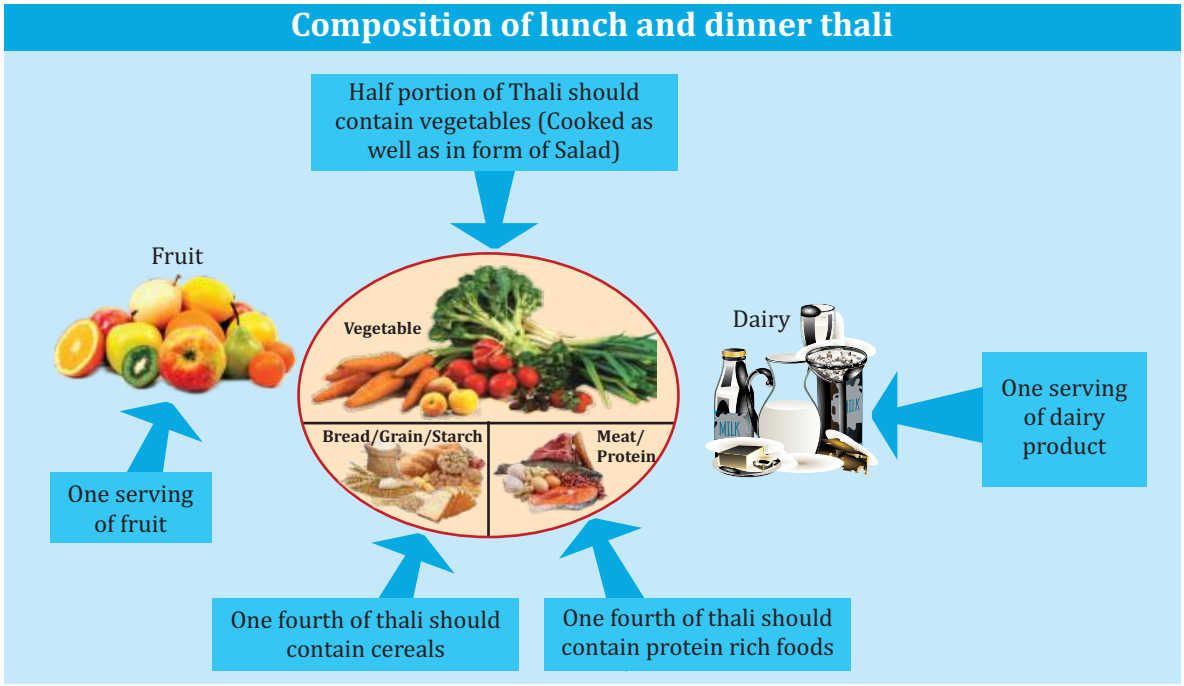
Protein: Protein requirement is increased during pregnancy. At least 3 servings of protein foods are required every day to meet this demand. Sources of protein are milk and milk products, egg, fish, chicken, pulses (dal), nuts, etc.

Fats: She should use less fat in cooking and avoid frying of foods. Reduce intake of ghee, butter, oil, full-cream milk. Avoid high-fat snacks (cakes, biscuits, chocolates and pastries). Use low-fat dairy products in place of whole milk. Use lean meat in place of red meat. Saturated fat intake should be less than 10 % of total calories.

Fiber: High-fiber foods, especially soluble fiber may help control blood sugar. Soluble fiber in flax seeds, psyllium husk, oat bran, legumes (dried beans of all kinds, peas and lentils), and pectin (from fruit, such as apples) and root vegetables (such as carrots) are helpful.

After 2 weeks of MNT, 2-hour postprandial blood sugar should be tested. If it is < 120 mg/dl, continue MNT and physical exercise. Monitor PPG as suggested by physician, at least once a month. The composition of lunch and dinner thali is shown in Figure 12.

Figure 12. Composition of Lunch and Dinner Thali (Figure reproduced from Diagnosis & Management of Gestational Diabetes Mellitus, Technical and Operational Guidelines, Ministry of Health and Family Welfare, Government of India. Feb 2018).



3.9.4.2 Medical management (oral antidiabetic - metformin and insulin therapy)

If MNT fails to achieve 2 h PPG <120 mg/dl within two weeks of therapy, ***metformin or insulin is the accepted management for pregnant women with GDM.***

- Insulin can be started anytime during pregnancy.
- *Metformin* can be considered after 20 weeks of gestation. Dose 500 mg twice daily. Blood sugar level to be repeated biweekly, dose is increased as required, maximum up to 2 g/day.
- Hypoglycemia and weight gain are less with Metformin than with insulin.
- If insulin is required in high doses, Metformin can be added to the treatment.
- Common side effects: Diarrhea, nausea, stomach pain, heartburn, gas.
- Serious effects: Lactic acidosis, hypoglycemia.

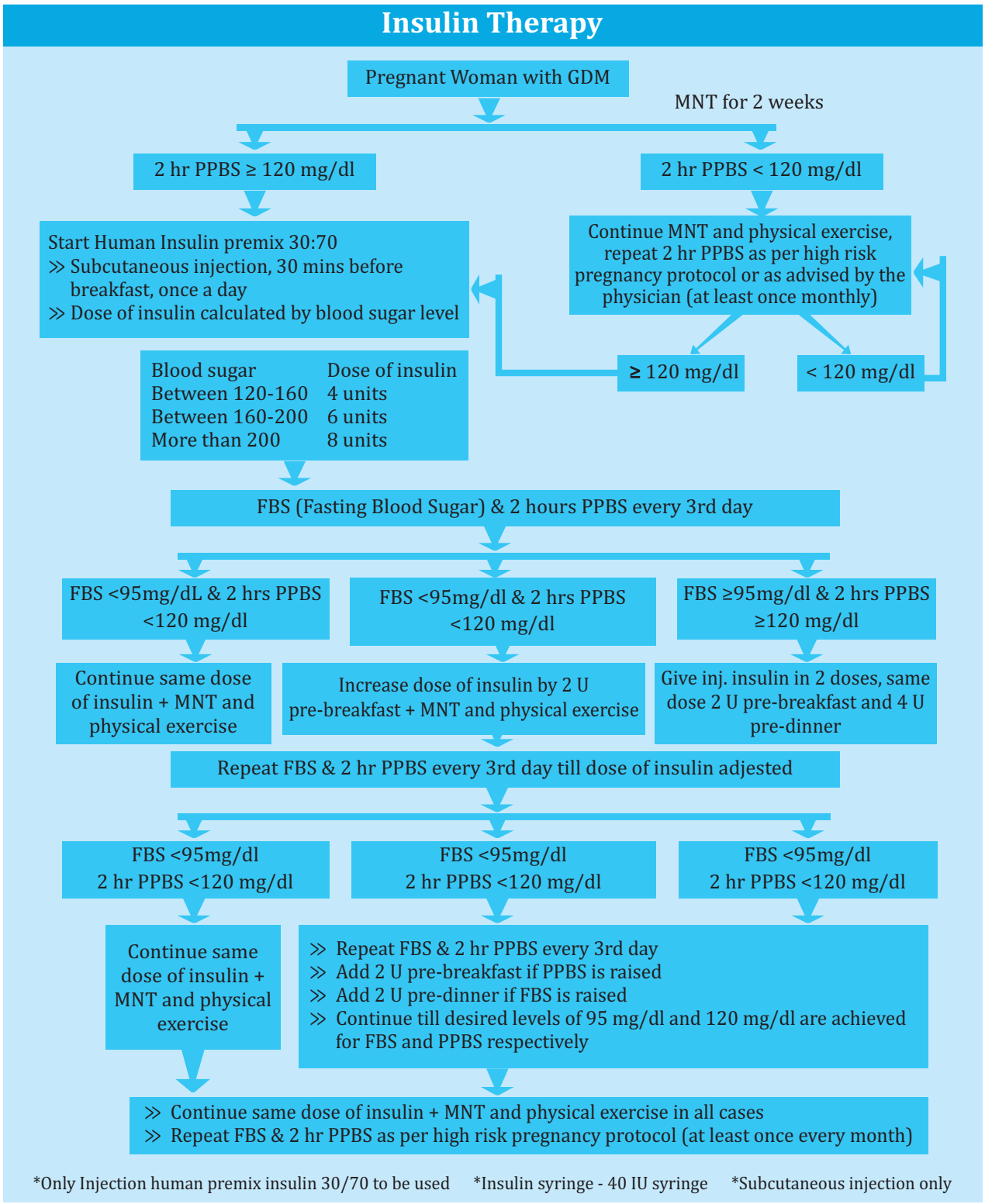
Administering Insulin:

- Inj Human Premix Insulin 30/70 to be administered.
- Insulin syringe: 40 IU syringe to be used.
- Insulin Vial: 40 IU/ml to be used.
- Insulin pen includes an insulin cartridge, dial to measure dose and a disposable needle.
- Open vials in current use: Store in refrigerator at 4–8^0 C or in cool dark place.
- Inj to be given subcutaneously 30 minutes before breakfast, once a day.
- Site of injection: Front or lateral aspect of thigh or over abdomen.
- Dose to be calculated as per blood glucose level. The recommended starting dose:
  - BSL 120-160 mg/dl: 4 IU
  - BSL 160-200 mg/dl: 6 IU
  - BSL > 200 mg/dl: 8 IU
- Fasting and 2-h PP BSL to be done every third day.
- Goal: Fasting < 95 mg/dl; 2-hour PP < 120 mg/dl.
- Increase the dose as per fasting and PP sugar levels (Figure 13).
- Early recognition of hypoglycemia and prompt treatment is important. Ask the woman to keep glucose powder or sugar with her.

Referral to higher center:

- Fasting BSL > 150 mg/dl and post meal > 250 mg/dl even after giving metformin or insulin.
- If pregnant woman requires > 20 units insulin/day or metformin > 2 g/day, she should be referred to a higher center.
- Nausea, vomiting and not able to take food orally.
- Symptoms of hypoglycemia more than once in a day.

Figure 13. Insulin Therapy (Figure reproduced from Diagnosis & Management of Gestational Diabetes Mellitus, Technical and Operational Guidelines, Ministry of Health and Family Welfare, Government of India. Feb 2018)



3.9.5 Antenatal care

For GDM cases antenatal care should be provided by gynecologist.

USG should be done at 18–20 weeks for excluding fetal malformations. USG should be repeated at 28–30 weeks and at 34–36 weeks' gestation for assessing fetal growth and amniotic fluid index (AFI).

Monitor the weight gain during pregnancy.

At each ANC visit look for macrosomia or fetal growth restriction, polyhydramnios, hypertension, proteinuria and other obstetric complications.

If the blood glucose level is uncontrolled or if there is any other complication of pregnancy, the woman should be referred to a higher facility and the frequency of antenatal visits should be increased.

3.9.5.1 Fetal surveillance in pregnant women with GDM

Women with GDM are at an increased risk for fetal death and this risk is increased in women requiring insulin. Fetal heart rate should be monitored by auscultation at each antenatal visit. Antepartum fetal monitoring is necessary to prevent intrauterine fetal death and to decide the timing of delivery.

Explain to the woman about daily fetal activity assessment. Ask her to lie down on her side after a meal and note how long it takes for the fetus to kick 10 times. If the fetus does not kick 10 times within 2 hours, she should immediately consult a healthcare worker and should be referred to a higher center for further evaluation.

Nonstress test (NST) is started from 32 weeks onwards.

USG: Fetal growth and liquor volume are assessed by USG. Umbilical artery Doppler studies help in detecting fetal jeopardy and in deciding the time of delivery.

3.9.6 Labor and Delivery

Women with GDM on insulin therapy with uncontrolled blood glucose levels (2 h PPPG ≥120 mg/dl) or insulin requirement >20 U/day should be referred around 34–36 weeks to gynecologist at CEmONC center for planning of delivery.

Timing of delivery: If a woman with GDM with well-controlled plasma glucose has not already delivered spontaneously, induction of labor should be scheduled at or after 39 weeks' pregnancy.

Women with GDM with poor plasma glucose control, those with risk factors like hypertensive disorder of pregnancy, previous stillbirth and other complications should be delivered earlier. The timing of delivery should be individualized by the obstetrician based on results of fetal monitoring tests.

Vaginal delivery should be preferred, and caesarean section should be done for obstetric indications and in case of fetal macrosomia.

If delivery is required between 24–34 weeks, Inj Dexamethasone should be given as per protocol. More vigilant monitoring of blood sugar should be done for next 72 hours. If blood sugar is increased the insulin dose should be adjusted accordingly.

Women with well controlled blood sugar levels can be delivered at the respective facility.

Management of GDM patient on Insulin treatment during labor:

- The morning dose of Insulin or metformin should be withheld on the day of induction/labor.
- Monitor plasma glucose 2-hourly by a glucometer during labor.
- Keep the patient well-hydrated. Start IV infusion with normal saline.
- Urine should be tested for sugar and ketones.
- Regular insulin is added if BSL is > 120 mg. The dose is to be increased depending upon blood sugar levels (as given in Table 20 below).
- Start prophylactic antibiotics.

Table 20: Management of GDM patient on Insulin treatment during labor

Blood Sugar Level	Amount of Insulin added in 500 ml NS	Rate of NS Infusion
90 – 120 mg/dl	0	100 ml/hr(16 drops/min)
120-140 mg/dl	4 U	100 ml/hr(16 drops/min)
140-180 mg/dl	6 U	100 ml/hr(16 drops/min)
➢ 180 mg/dl	8 U	100 ml/hr(16 drops/min)

3.9.7 Immediate neonatal care for baby of mother with GDM

All neonates should receive immediately essential newborn care with emphasis on early breastfeeding to prevent **hypoglycemia**. All babies of GDM mothers should be monitored for hypoglycemia at or within one hour of delivery.

Any normal-weight newborn with blood glucose less than 45 mg/dl and (< 54 mg/dl if intrauterine growth restricted newborn) should be considered as 'baby with hypoglycemia'. Baby should be managed by a specialist. Monitoring should be continued every 4 hours (prior to next feed) till four stable glucose values are obtained. Neonate should be observed for other neonatal complications like respiratory distress, convulsions, and hyperbilirubinemia.

Management of hypoglycemia should be done as given in Table21(Source:GOI guidelines)[74].

Table 21. Management of hypoglycemia

01	Whenever there is suspicion of hypoglycemia BS should be checked immediately with glucometer. In all babies born to diabetic mother, BS should be checked by glucometer between 1-2 hours after birth.
02	If blood sugar values is <45 mg/dl, this should be considered as 'hypoglycemia', move to next step.
03	Newborn with hypoglycemia - immediately ask mother to give breast feed without any delay. Direct breast feeding is the best management step for neonatal hypoglycemia. If the infant is unable to suck, expressed breast milk from mother should be given. If mother is not in a position to give breast feed or no breast milk secretion, baby should be given any formula feed. One of the good options is to dissolve one TSF of sugar in 100 ml of normal cow's milk and give. If the lactation management centre (Human Milk Banks) is available at the facility then it can also be involved in feeding the baby.
04	Once feed has been given, check blood sugar again after one hour. If blood sugar is >45 mg/dl, 2 hourly feeding (breast feeding is the best option but if not available, formula feed can be given) should be ensured by explaining to mother/ relatives and supervised.
05	If at any time blood sugar by glucometer is <20 mg/dl, give immediate intravenous bolus injection of 10% dextrose 2 ml/kg body weight of baby. This should be followed by intravenous infusion of 10% dextrose at a rate of 100 ml/kg/day. Blood sugar should be checked 30 minutes after starting the infusion. If it is still less than 20 mg/dl, infant should be referred to higher centre where paedatrician is available.

3.9.8 Post-delivery follow-up

Maternal glucose levels usually return to normal after delivery.

- On Day 3 of delivery: Perform fasting and 2-hour post prandial (PP) plasma glucose.
- At 6 weeks: Perform 75 g oral GTT. PP < 140 mg/dl is normal.
- Fasting plasma glucose: ≥ 126 mg/dl, and 2-hour plasma glucose ≥ 200 mg/dl indicates diagnosis of Diabetes mellitus.
- PP between 140–199mg/dl: Impaired glucose tolerance (IGT).

If the test is normal the woman is counseled about lifestyle modifications, weight monitoring and exercise. These women are at high risk to develop Type 2 diabetes mellitus in future. They should attend NCD clinic for annual screening. Oral glucose tolerance test (OGTT) should be repeated every year. If the test is positive: Woman is advised to consult a physician.

3.9.9 Pre-conception care and counseling

Women with history of GDM should be counseled about optimization of BMI before next pregnancy. She should have adequate control of blood sugar before next pregnancy. She should take folic acid 5 mg daily for 3 months prior to planned pregnancy.

Points to remember and counseling messages:

- Every pregnant woman should be screened for GDM at her first ANC visit.
- During pregnancy, blood sugar needs to be controlled. Poor sugar control is harmful.
- GDM can be easily controlled by diet and exercise.
- If blood glucose is not controlled by diet, oral metformin or insulin injections are required.
- Insulin injections will be stopped after delivery in most cases.
- Pregnant women with GDM should deliver at well-equipped health facilities. It will help in management of any complications in the baby.
- Pregnant women with GDM and their offspring are at increased risk of developing Type 2 diabetes mellitus in later life.
- The woman needs to follow a healthy lifestyle regarding diet and exercise and regular medical checkup is important.

3.10 Role of health personnel

ASHA/ANM should mobilize pregnant women and counsel them for timely testing for GDM and follow-up.

MO at PHC/RH: Identification of GDM cases by counseling and testing plasma sugar level two hours post 75-gram glucose. Initiate MNT for those detected to have GDM. Check response after 2 weeks of MNT. Start medical management for women with post meal plasma glucose > 120 mg (metformin/insulin injections). Deliver uncomplicated cases, provide postpartum follow-up care.

Specialist at DH/ CEmONC: Medical management by insulin, monitoring for control, fetal monitoring, obstetric management. Managing all referrals and obstetric/medical complications.

3.11. SCREENING FOR HYPOTHYROIDISM DURING PREGNANCY

3.11.1 Introduction

Hypothyroidism is a state of thyroid hormone deficiency. Iodine deficiency and autoimmune thyroid disease are the causative factors. Primary hypothyroidism is elevated TSH levels during pregnancy. It can be overt or subclinical. Untreated hypothyroidism during pregnancy is associated with 2–3-fold risk of pregnancy complications. Presence of thyroid peroxidase (TPO-Ab) antibodies increases the risk of loss of pregnancy.[74]

Prevalence of hypothyroidism during pregnancy in the Indian population, reported in numerous studies, is 4.8–12%: international studies report an estimated prevalence of 2–3%; (overt up to 0.5%, subclinical 2–2.5%).

3.11.2 Effects of hypothyroidism on pregnancy outcome

Effects of Hypothyroidism on Pregnancy Outcome are shown in Table 22.

Table 22. Effects of Hypothyroidism on Pregnancy Outcome

Mother	Baby
Miscarriages, recurrent pregnancy loss	LBW, Fetal growth restriction, Preterm birth
Preeclampsia, Anemia, GDM	Fetal distress during labor, Intrauterine fetal death
Placental abruption, PPH	Cognitive, neurological and developmental impairment leading to low IQ

3.11.3 Screening strategy

The current evidence does not support universal screening for hypothyroidism during pregnancy, however TSH screening is recommended for the high-risk group[83]. Some observations suggest that limiting screening to high risk groups may miss about 30% of cases. National guidelines recommend screening of all pregnant women at risk for hypothyroidism. The Indian Thyroid Society, however, recommends screening for all pregnant women during the first trimester as soon as pregnancy is confirmed.

High risk factors for hypothyroidism

- Residing in an area of known moderate to severe iodine deficiency (Area mapping).
- Obesity: BMI ≥ 30 Kg/M^2 (Pre-pregnancy or first trimester).
- H/O infertility.
- H/O recurrent miscarriages, preterm births, intrauterine fetal demise, preeclampsia-eclampsia, placental abruption.
- H/O diagnosed mental retardation in previous births or in family.
- H/O prior thyroid dysfunction, thyroid surgery or postpartum thyroiditis.
- Symptoms of thyroid dysfunction or presence of goiter.
- Known cases of autoimmune disorders (SLE, rheumatoid arthritis, Type I diabetes mellitus, Addison's disease etc.).
- History of thyroid dysfunction in first-degree relatives (parent, sibling, children). Family H/O autoimmune thyroid disease. Positive thyroid auto antibodies.
- Use of amiodarone or lithium, recent administration of iodinated radiologic contrast.

Screening test

TSH testing. Pregnancy trimester-specific TSH levels should be used for diagnosing hypothyroidism during pregnancy.

Negative test: Normal ranges → During First trimester: 0.1 to 2.5 mIU/l; Second trimester 0.2 to 3 mIU/L; Third trimester: 0.3 to 3 mIU/l).

Positive test: TSH > 2.5 mIU/l (in first trimester)

- Subclinical hypothyroidism (SCH): Serum TSH between 2.5 and 10 mIU/l with normal FT4 level.
- Overt hypothyroidism (OH): Serum TSH > 2.5 to 3 mIU/l with low FT4 levels or TSH >10 mIU/l irrespective of FT4 levels.

3.11.4 Treatment

If TSH is elevated refer the pregnant woman to a physician at the district hospital for starting the treatment. Levothyroxine is the treatment of choice. Starting dose for SCH with TSH<10 mIU/l can be 25 mcg /day and for TSH level > 10 mIU/l it should be 50 mcg/day.[84]

Thyroxine should be taken early morning on an empty stomach. Medicine ingestion and the ingestion of iron supplements, calcium supplements and soy-based food should be separated by at least 4 hours.

Follow Up: TSH should be repeated after 4–6 weeks of starting the treatment to see the response. Target TSH levels should be kept below 2.5 mIU/l in the first trimester and below 3 mIU/l during the second and third trimesters. If target TSH level is not achieved, the dose should be increased by 25 mcg/day. Dose should be adjusted according to

TSH levels. At any time TSH below 0.1 mIU/l should be avoided by decreasing the thyroxine dose by 25 mcg from the current dose.

Uncomplicated cases can be delivered at PHC/RH under supervision of a medical officer. After delivery, if initial TSH was < 10 mIU/l, the treatment is to be stopped. If it was > 10 mIU/l the same dose will need to be continued after delivery. If a woman was on thyroxine before pregnancy she should revert to her pre-pregnancy dose.

TSH should be repeated 6 weeks postpartum and further treatment decided accordingly. There is a risk of developing postpartum dysfunction in women with autoimmune thyroiditis, hence it is important to continue monitoring thyroid function tests for at least 6 months after delivery.

3.11.5 Point to remember

Screen all pregnant women at risk of hypothyroidism by TSH testing. Treat with Levothyroxine if TSH is above normal range. Monitor response. Detecting and correcting thyroid hormone deficiency during early pregnancy helps in proper brain development of fetus and improving the pregnancy outcome.

3.11.6 Role of health personnel

ASHA/ANM should identify pregnant women at risk of hypothyroidism and mobilize and counsel them for timely testing and follow-up.

MO PHC/RH: Identification of risk of hypothyroidism, counseling and testing thyroid function (TSH in early pregnancy). Diagnosis of hypothyroidism by elevated TSH levels

Levothyroxine therapy as advised by specialist, TSH monitoring, referral of complicated cases to specialist, deliver uncomplicated cases, provide postpartum follow-up care.

CEmONC: Provision of care including managing all obstetric/medical complications

3.12. MONITORING WEIGHT GAIN DURING PREGNANCY

3.12.1 Purpose

The nutritional requirements are increased during pregnancy, more so during the third trimester. A pregnant woman needs an additional 350 calories and 15 g proteins daily. Requirements of iron, calcium, and vitamins are also increased.

Monitoring maternal weight gain during pregnancy can alert the healthcare provider of maternal under nutrition. As per Indian Council of Medical Research (ICMR) guidelines the recommended weight gain during pregnancy is 10–12 kg. A pregnant woman should gain around 3-5 kg in the second trimester (0.3 kg/week) and 5–6 kg (0.5 kg/week) in the third trimester.

3.12.2 The recommendations for weight gain

Depend on the pre-pregnancy BMI as given in Table 23 below.[85]

Table 23: Recommendations for weight gain during pregnancy based on the pre-pregnancy BMI

Pre-pregnancy weight	BMI (kg/m^2)	Total weight gain range (kg)
Normal weight	18.5 to 24.9	11.5 to 16 kg
Under weight	Less than 18.5	12.5 to 18 kg
Overweight	25 to 29.9	9.7 to 11.5 kg
Obese	Equal/more than 30	5 to 9 kg

The common cause of poor weight gain is dietary deficiency leading to undernutrition.

3.12.3 Effects of maternal undernutrition

Pregnant women who are underweight and those who fail to gain weight adequately often give birth to LBW baby, both due to prematurity and IUGR increasing the risk of infant mortality and morbidity.

A mother weighing 40 kg or less during the first trimester has a 5–6 times greater risk of having preterm and LBW baby. Maternal height less than 145 cm has a 3 times greater possibility of having a preterm/IUGR baby. Fetal undernutrition can result in chronic diseases in adulthood e.g. diabetes, hypertension, coronary heart disease (fetal origin of adult diseases).

An undernourished mother can suffer from nutritional anemia, increased risk of hypertension, placental abruption and postpartum sepsis.

Women having low BMI have less total blood volume and therefore do not tolerate excessive blood loss at delivery and are prone to go in shock.

3.12.4 Intervention

At first visit (before 12 weeks), record her height and weight. Calculate BMI and classify her as normal, underweight, overweight or obese. Assess quantity and quality of diet. Calculate deficit. Counsel for diet modifications to correct the deficit.

At each subsequent visit note the weight gain since the previous visit and calculate the increase per month. If weight gain is < 1.3 kg/month; ask her the probable cause. Rule out continuing nausea, vomiting, deficient diet, heavy work, domestic abuse, depression, bowel problems, and fever. Refer to a medical officer for treatment for any ill health. Reinforce dietary counseling. Explore mechanisms to provide nutritional supplements in cases having gross nutritional inadequacy that cannot be managed at family level. Take her to local Aanganwadi and arrange for food supplement if possible.

Check weight every month. If weight gain is < 2 kg/month during third trimester, check the fundal height and look for fetal growth restriction.

If the weight gain is excessive, (> 3 kg /month) look for signs of preeclampsia. Record blood pressure and test urine sample for proteins.

3.12.5 Points to remember

- Maternal nutritional requirement is increased during pregnancy and further increased significantly from 28 weeks onwards
- Detecting poor or no weight gain and supplemental nutrition can help in reducing the chance of giving birth to a LBW baby.

3.12.6 Role of health personnel

ANM should record weight of every pregnant woman accurately at every ANC visit. Calculate the weight gain in kg/month from the previous visit. Check whether the weight gain is satisfactory or less. Note if there is excessive weight gain. Counsel the pregnant women having poor or no weight gain during pregnancy for consuming extra meals and energy-dense food. Follow up after 1 month to check whether there is gain in weight and refer to a medical officer if there is no improvement.

MO PHC/RH: Nutrition counseling, provide supplements as possible, detect and treat any ill health. Screen for fetal growth restriction (FGR) and refer to a specialist for evaluation.

CEmONC: Provide care to referred women and manage the cases having severe fetal growth restriction.

3.13. MONITORING BLOOD PRESSURE DURING PREGNANCY: HYPERTENSIVE DISORDERS OF PREGNANCY

3.13.1 Purpose

Hypertensive disorders of pregnancy are responsible for about 14% of maternal deaths in India. Preeclampsia-eclampsia is the second leading cause of maternal mortality in India. Early detection and prompt care can save lives.

3.13.2 Definitions:

The definitions of gestational hypertension, preeclampsia and preeclampsia with severe features are given in Table 24.

Table 24. Definitions of gestational hypertension, preeclampsia and preeclampsia with severe features

Diagnosis	Criteria
Gestational hypertension	BP ≥ 140/90 mmHg at least on 2 occasions 4 hours apart after 20 weeks of gestation
Preeclampsia	Hypertension after 20 weeks of gestation and proteinuria ≥ 1 +
Preeclampsia with severe features	BP ≥ 160/110 mm Hg, Presence of any symptoms like severe headache, blurring of vision, epigastric pain, oliguria, pulmonary edema, HELLP syndrome*, S. Creatinine > 1.1 mg/dl
Eclampsia	Preeclampsia with Convulsions
Chronic hypertension	BP ≥140/90 mm Hg before 20 weeks of gestation

*** HELLP syndrome: Hemolysis, elevated liver enzymes, low platelet count**

Note: Degree of proteinuria has not been included in severe features as it has not shown any correlation with pregnancy outcome

The risks to the mother and baby are shown in Table 25.

Table 25. Risks to Mother and Baby

Maternal	Fetal/Neonatal
Eclampsia	IUGR
Cerebral edema, hemorrhage, thrombosis	Stillbirth
Acute renal failure	Neonatal asphyxia
HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count): Life-threatening condition	
Blood coagulation failure (DIC) leading to hemorrhage	
Aspiration bronchopneumonia, Pulmonary edema	

3.12.3 Intervention

At each scheduled ANC checkup, check the woman's BP in sitting position. If BP is ≥ 140/90 mm Hg, record again after 30 minutes of rest in lateral position. Test her urine sample for proteinuria by dipstick testing at each scheduled ANC visit.

A) If BP ≥ 140/90 mmHg before 12 weeks: Refer to specialist for management of ***chronic hypertension.***

B) If BP ≥ 140/90 and < 150/100 mm Hg after 20 weeks and no proteinuria: Diagnose as ***Gestational hypertension.***

- Weekly clinic visits at PHC to check blood pressure, conduct symptom screening and proteinuria test. Ask the woman to report if there are any warning symptoms of severe preeclampsia (danger signs).
- Advise her to avoid exertion and to rest in left lateral position.
- She is allowed to take normal salt in food, but no extra salt should be added.
- ***During observation if BP starts rising (150/100 mm Hg or more), start antihypertensive medicines.*** Antihypertensive drugs are not beneficial in mild hypertension.
  - o Available options: Methyl dopa, Nifedipine or Labetalol tablets.
- Methyl dopa 250 mg 3 times a day. Can be increased up to 500 mg 4 times a day.
- Nifedepine 10 mg 8 hourly, can be increased to 6 hourly (up to 80 mg/24 hours).
- Labetalol: 100 mg twice a day. Can be increased as required.
- Diuretics are not recommended.

C) If BP ≥ 140/90 mm Hg after 20 weeks, proteinuria, no warning signs: Diagnose as ***Preeclampsia***. Refer to FRU.

- Hospitalization for basic laboratory tests and clinical evaluation.
- Note pregnancy duration. Look for fetal growth restriction.
- If < 37 weeks: Ask her to keep daily fetal movement count (DFMC) chart from 28 weeks onwards, refer to specialist if she reports reduced fetal movements.
- When she is 37 weeks or more: Obstetric management based on maternal/fetal well-being, cervical assessment.
- Early delivery if there are signs of fetal compromise, uncontrolled hypertension or worsening maternal clinical or biochemical parameters.

During observation, if at any time systolic BP is ≥ 160 mm Hg and/or diastolic BP ≥110 mm Hg or if she reports any of the warning signs, manage as severe preeclampsia. She should be referred to a district hospital/ medical college for further care.

3.12.4 Management of severe preeclampsia

Acute onset severe systolic (≥ 160) or diastolic (≥ 110 mmHg) hypertension persistent for 15 minutes or more is hypertensive emergency. Many maternal deaths result from cerebral hemorrhage and cerebral infarction as a result of uncontrolled hypertension.[76] Immediate hospitalization and emergency treatment to control blood pressure is required.

Refer such women to a district hospital after giving initial care:

- Monitor vital signs, BP, knee jerk and fetal heart rate. Urine output charting.
- Watch for warning signs: Severe headache, drowsiness, mental confusion, visual disturbances (e.g. blurred vision, flashes of light, double vision), upper abdominal pain, nausea, vomiting, decreased urine output, exaggerated knee jerk.

3.12.4.1 Control hypertension

Give immediate-release oral nifedipine, oral Labetalol or IV Labatalol to achieve systolic BP between 140–150 and diastolic blood pressure between 90–100 mmHg. Lowering of BP below this level is harmful to the fetus.

Immediate release oral nifedipine: Cheap, easily available, safe medicine. It does not affect the uteroplacental circulation. Nifedipine is a calcium channel blocker and has a direct vasodilator action. Nifedipine can be associated with increased maternal heart rate and hypotension. ***It should not be given sublingually***. WHO recommends a *maximum dose of 30 mg in acute setting.*

Initial dose 10 mg → Record BP after 30 minutes. If BP still high repeat nifedipine.

Alternatively, ***Labetalol*** can be given, which is an adrenergic blocking agent.

Oral Labetalol: 200 mg initially → Record BP after 30 minutes. Repeat 200 mg after 1 hour until the treatment goal is achieved. Maximum dose 1200 mg in 24 hours.[87]

IV Labetalol: It has a quick action and is safe in controlling acute severe hypertension. It is contraindicated in asthma, heart disease and congestive cardiac failure. It may be associated with neonatal bradycardia.

Initial dose 20 mg over 2 minutes → Record BP after 10 minutes, If BP still high → Repeat 40 mg IV → Record BP after 10 minutes, If BP still high→ Repeat 80 mg. After 10 minutes if BP is still high repeat 80 mg or switch over (max dose 220 mg).

- BP monitoring as recommended is essential while administering all medicines.
- The use of these medicines does not require cardiac monitoring.
- Patients may respond to one drug and not to the other and switching to another option having different mechanism of action may be needed.
- Differences in the recommended intervals of monitoring blood pressure reflect the differences in their pharmacokinetics.

Monitoring BP: Once the blood pressure has been brought down to safe levels, record BP every 15 min for 1 hour, every 30 min for 1 hour, every 1 hour for 4 hours. (Can use continuous monitoring if available).

Once the blood pressure is below the threshold level, continue oral nifedipine or labatalol as required to maintain BP 140–150 systolic and 90–100 mm Hg diastolic by giving.

- Tab nifedipine 10 mg three times a day, increased as required (maximum 80 mg /day) or
- Tab labetalol 100 mg twice a day, increased as required.

3.12.4.2 Laboratory Tests

Preeclampsia is associated with impairment of renal, liver and coagulation function. To identify early signs of impaired organ function renal, liver function and coagulation profile needs to be assessed at baseline and periodically thereafter to detect deterioration of organ function. Once proteinuria is detected there is no need to repeat it for quantification.[88]

Urine– Albumin, sugar, Hb%, PCV, Platelets, bleeding time, clotting time, blood urea, serum creatinine, serum uric acid, serum bilirubin, SGOT, SGPT, serum LDH, fundoscopy.

- The baseline lab tests should be done at detection of preeclampsia.
- Repeat twice a week in preeclampsia.[78]
- Thrice a week in preeclampsia with severe features if on expectant treatment.

Watch for critical levels:

- Serum creatinine: 1.2 mg/dl
- SGPT 1.5 times the upper limit of normal (ULN) /> 70 IU/l
- Platelet count: < 100000/ µL

Look for **HELLP Syndrome: It is an emergency requiring urgent referral to a tertiary center.**

Platelet count of ≤ 100,000/µL; AST or ALT levels of ≥ 70 IU/L; LDH ≥ 600 IU/l (with hemolysis as evidenced on abnormal peripheral smear, raised serum bilirubin level). Malaise, nausea, vomiting, epigastric and right upper quadrant pain, headache, visual changes, jaundice, nonspecific viral syndrome types of symptoms.

- Diuretics should not be used unless there are signs of pulmonary edema. Record respiratory rate and auscultate lung bases to look for signs of pulmonary edema.
- **Prevent fits: Magnesium sulfate (MgSO4) is the drug of choice.**

Loading dose 14 grams (4 g IV + 10 g IM) followed by maintenance dose as given in Table 26.

Table 26. Treatment of HELLP with Magnesium sulfate (MgSO4)

Loading Dose (Total 14 grams)	**Maintenance Dose**
4 g of 20% MgSO4 (8ml MgSO4 50% + 12 ml NS/ distilled water in 20 ml syringe. Give slow intravenous in 5-10 minutes.	5 g (10ml) 50% MgSO4 (5 amp) deep IM in alternate buttock every 4 hours
5 g (10mL of 50 %) MgSO4 deep IM in each buttock.	To be continued for 24 hours after last convulsion / delivery, whichever occurs later
If fits recur after 15 minutes of loading dose: 2 g IV (4 ml MgSO4 + 6 ml NS/DW)	Watch for signs of toxicity before next dose. Withhold the next dose in case of presence of any of the following: • Urine output: < 25-30 ml/hour • Deep tendon reflex (knee jerk): Absent • Respiratory rate: < 16/minute
Give antidote Inj. Calcium gluconate (10 ml 10 %) slow IV for respiratory toxicity.	

At Subcenter: Only intramuscular loading dose of 10 g should be given before referral. 5 g (10ml) in a 10 ml syringe MgSO4 deep IM in each buttock.[55]

3.12.4.4 Obstetric management

Preeclampsia with severe features: Hospitalize until delivery and stabilization. Monitor clinical parameters every 4 hours. Perform laboratory tests thrice a week.

- Diagnosed before 24 weeks, termination of pregnancy is recommended as fetal salvage is difficult.
- Between 24–34 weeks expectant management can be considered if fetal and maternal condition permits. Administration of antenatal corticosteroids recommended if indicated. If BP controlled keep woman under regular maternal and fetal surveillance.
- Beyond 34 weeks the decision of terminating pregnancy at any time depends on the clinical circumstances.

Time of delivery, mode depending on maternal, fetal status, cervical status, gestational period and other factors.

During labor monitor BP every hour.

3.12.4.5 Postpartum care

Monitor BP 4-hourly until discharge. Once between Day 3 and 5, if high, on alternate days till BP is normal. Ask H/O severe headache, epigastric pain each time. Repeat lab tests after 48–72 hours. Record BP at 6 weeks and 12 weeks. If BP is high at 12 weeks postpartum, refer her to a physician for evaluation of chronic hypertension.

3.12.5 Management of eclampsia

Nursing care: Keep the patient in a quiet room in a bed with padded rails on sides. Place the woman on her left side. Evaluate vital signs.

- Clean the mouth and nostrils by applying gentle suction. Give oxygen.
- Prevent injury to tongue by putting airway/padded tongue blades.
- Start IV line with Ringer lactate/ Normal saline: Give slowly @ 60 ml/hour.

- Insert Foley catheter. Monitor hourly urine output. It should be at least 30 ml/hour.
- Record fluid intake. Maintenance of proper fluid balance is essential to prevent dehydration or pulmonary edema.
- If not breathing check airway and give bag and mask ventilation.

Control fits: Inj MgSO4 as described for severe preeclampsia.

Control hypertension: Nifedipine or Inj labetalol as described.

Delivering the baby: In eclampsia, delivery should occur within 12 hours of the onset of convulsions. If woman is not in labor: Refer her urgently to FRU as she needs induction of labor.

If woman is in active labor: Monitor the progress of labor and deliver. Augment labor by amniotomy and oxytocin infusion as required. Watch for signs of fetal distress. Cut short the second stage of labor. Give prophylactic oxytocin for active management of third stage of labor. Do not give Inj Methyl ergometrine.

Postpartum care: Fits can also occur for the first time in the immediate postpartum period. Monitor BP and the urine output after delivery. Continue antihypertensive medicines to maintain diastolic BP between 90 – 100 mm Hg. Advise the woman to have her BP checked regularly until BP returns to normal. If BP remains high at 12 weeks, diagnose as chronic hypertension and refer her to a physician for evaluation.

3.12.6 Role of health personnel

ANM: Record blood pressure of every pregnant woman at each scheduled visit and test her urine sample for proteinuria by dipstick test. Note warning signs indicating severe disease.

Categorize the women having hypertension as gestational hypertension, preeclampsia, severe preeclampsia, eclampsia. Refer every woman having preeclampsia to a medical officer for laboratory tests. Refer a woman having fits to FRU.

Refer every woman having severe preeclampsia/eclampsia showing signs of organ dysfunction to DH/medical college hospital.

Give Inj MgSO4 to prevent fits and tab nifedipine to control blood pressure before referral to FRU as per protocol.

Medical officer: Investigate women having preeclampsia to detect organ dysfunction.

Refer women having severe preeclampsia/eclampsia to DH after giving loading dose of MgSO4 and antihypertensive medicines.

Conduct delivery if woman is in advanced labor and then refer.

DH/FRU: To investigate hypertensive women for organ dysfunction and note the severity of the condition, and to offer multi specialty care to critical cases.

Evaluate fetal well being and decide the timing and mode of delivery. Care of newborn.

3.13. MONITORING DANGER SIGNS

Every pregnant woman should be informed about the danger signs which when appear she should report immediately to ASHA/ANM. The following symptoms are indicators of some complications for which emergency evaluation and care could be needed.

- Vaginal bleeding during pregnancy.
- Vaginal watery discharge suggestive of rupture of membranes.
- Pain in abdomen.
- Severe headache, blurred vision, upper abdominal pain, passage of less urine.
- Fever, difficulty in breathing.
- Reduced fetal movements.

The care of women presenting with any of these danger signs includes correct diagnosis, provision of initial care and appropriate referral as indicated.

3.13.1 Vaginal bleeding during early pregnancy

A woman may present with history of a short period of amenorrhea followed by vaginal bleeding. Abortion, hydatidiform mole and ectopic pregnancy are the common underlying conditions, while an occasional woman may simply have delayed menstruation. Ruptured ectopic pregnancy is a life-threatening condition needing immediate surgical intervention. Clinical presentation of abortion may be as Threatened abortion, Incomplete abortion, Complete abortion, Missed abortion or Septic abortion.

3.13.1.1 History and evaluation

- Assess period of amenorrhea, amount and duration of bleeding, nature and severity of pain. Bleeding may be scanty in threatened and missed abortion and profuse in incomplete/ inevitable abortion. Pain is severe in ruptured ectopic pregnancy.
- Perform pelvic examination: Note the condition of cervix, uterine size, look for pain on cervical manipulation and tender adnexal mass.
- Arrange for USG and pregnancy test.
- Make a diagnosis with the help of the following chart. Refer to a specialist for further management.

3.13.1.2 Differentiating features

Differentiating Features of Threatened abortion, Incomplete abortion, Missed abortion, Hydatidiform Mole and Ectopic pregnancy is given in Table 27.

Table 27. Differentiating Features of Threatened abortion, Incomplete abortion, Missed abortion, Hydatidiform Mole and Ectopic pregnancy

Particulars	Threatened abortion	Incomplete abortion	Missed abortion	Hydatidiform Mole	Ectopic pregnancy
Uterine Size in relation to POA	Correspondi ng, Internal os closed	Smaller, Internal os open	Smaller	Larger	Smaller
Vaginal bleeding	Slight	Heavy	Absent or brownish discharge	Recurrent small amount	Slight/absent
Pain	Mild or Absent	Significant cramping pain	Absent	Absent	Severe, continuous
general condition, pallor, tachycardia	Fair	Proportional to blood loss	Fair	Fair	Out of proportion to visible blood loss.
Tenderness Abdomen /vaginal	Absent	Absent (Unless infected)	Absent	Absent	Marked
USG	Intrauterine viable pregnancy	Some products in uterine cavity	Nonviable pregnancy	Snowstorm appearance	Empty uterus pelvic/adnexal mass. Free fluid in abdomen
Risks	Preterm/ IUGR	Hemorrhage, Sepsis	Coagulation failure	Hemorrhage	Shock (Intra peritoneal bleeding)

3.13.1.3 Treatment guidelines

a) ***Threatened abortion:*** Advise avoiding exertion, sexual abstinence and regular ANC follow-up. Pregnancy has higher risk of having recurrent episodes of bleeding, APH, fetal growth restriction, preterm delivery. If the bleeding persists a repeat USG is done to check for fetal viability.

b) ***Missed Abortion:*** Ultrasonography confirms the diagnosis. Bleeding time, clotting time, prothrombin time, platelet count are done as there is risk of coagulation failure with prolonged retention of dead fetus. The pregnancy needs to be terminated. If uterus < 12 weeks, manual/electrical vacuum aspiration is performed at comprehensive abortion care center. If uterus is > 12 weeks refer her to a specialist at RH/DH.

c) ***Incomplete abortion:*** Rapid clinical assessment is done. Antibiotics are started, and uterus is emptied by vacuum aspiration. Resuscitation of shock and blood transfusion may be needed in some women.

d) ***Septic abortion:*** Unsafe abortion, retained products of conception in cases of incomplete abortion, failure to follow adequate aseptic precautions can result in septic abortion. Anemia aggravates sepsis.

Symptoms and signs: Fever, tachycardia, lower abdominal pain, offensive vaginal discharge and pelvic tenderness.

Treatment: Inj. Ampicillin 1g 6-hourly IV, Inj. Gentamicin 80 mg IM 12 hourly, Inj. Metronidazole 500 mg IV 8 hourly slowly. If woman is well, Ampicillin and Metronidazole can be given orally.

Surgical evacuation of uterus under cover of antibiotics if there are retained products.

Cases having severe sepsis with complications need to be referred to DH.

Counsel women having abortion to avoid pregnancy for at least 6 months.

e) ***Ectopic pregnancy:*** The commonest site of ectopic pregnancy is the fallopian tube. It can present as tubal rupture with severe intra peritoneal bleeding leading to shock, tubal abortion or unruptured tubal pregnancy.

Ruptured ectopic pregnancy: Presents with severe and acute pain in abdomen with severe intra peritoneal bleeding. There is tachycardia, severe pallor and hypotension. The abdomen is tender and distended with signs of free fluid in abdomen. Vaginal examination is extremely painful, and an ill-defined mass may be felt in the posterior and lateral fornix. USG shows free fluid in abdomen and vague ill-defined pelvic mass.

Treatment: Urgent referral for management of shock, surgical exploration to stop the bleeding, and blood transfusion.

Some cases have less acute presentation with significant pain in lower abdomen, vaginal bleeding could be slight or even absent. Clinical condition is usually stable. Pallor and tachycardia are present depending on the amount of internal bleeding. There is tenderness in lower abdomen. Cervical movements are painful and fornices are tender. Ultrasonography reveals some free fluid in abdomen. Referral should be made to gynecologist for laparoscopic surgical management. Chronic pelvic inflammatory disease (PID) needs to be excluded.

Unruptured ectopic pregnancy: It is possible to diagnose ectopic pregnancy before it ruptures by having a high index of suspicion. The woman will present with signs and symptoms of pregnancy, may have a unilateral adnexal mass and a positive urine pregnancy test (UPT); USG reveals an empty uterus.

Action: Refer such a woman to a specialist for laparoscopic surgery. Medical management is possible for selected cases by giving Inj Methotrexate under careful monitoring.

f) ***Hydatidiform Mole:*** This is an abnormal pregnancy where there is no fetus, no amniotic sac and the uterus is full of proliferated trophoblastic tissue.

Symptoms and signs: Excessive vomiting, recurrent vaginal bleeding, rarely, passage of grape-like vesicles. Uterus is larger than the POA and soft/doughy in consistency. Ultrasonography reveals snowstorm appearance, absence of fetus, amniotic fluid. The ovaries may be enlarged with multiple cysts. Pregnancy hormone beta HCG is markedly elevated.

Action: Referral to DH/medical college hospital for suction evacuation under general anesthesia. Blood needs to be kept ready as there is a risk of severe hemorrhage during evacuation. Development of gestational trophoblastic neoplasia (GTN) is a possibility for which careful follow-up is necessary.

Follow up: Baseline X-ray chest and hCG levels are tested before discharge. Regular hCG monitoring is done till it falls to normal level and for 6 months thereafter as there is a risk of development of GTN. It is important to avoid pregnancy by using combined oral contraceptive pills during this period. Intrauterine contraception is

not recommended. During follow-up, look for abnormal vaginal bleeding, enlarged soft uterus, and evidence of any metastasis of choriocarcinoma (lungs, brain, anterior vaginal wall).

Pregnancy is allowed when □ hCG level remains normal for 6 months. Referral to tertiary care center is indicated for chemotherapy if □ hCG levels show initial decline followed by a rise or it remains elevated (plateau).

3.13.2 VAGINAL BLEEDING DURING LATE PREGNANCY: ANTEPARTUM HEMORRHAGE (APH)

3.13.2.1 Definition

Bleeding from vagina after 20 weeks of pregnancy and before the birth of child. Two major causes of APH include:

- ***Placenta Previa:*** Bleeding from premature separation of placenta located in lower uterine segment (Figure 14).
- ***Abruptio placentae:*** Bleeding from premature separation of normally located placenta in the upper uterine segment (Figure 15).

Significance: Maternal mortality is high due to hemorrhagic shock and other complications. There is increased risk of atonic PPH after delivery. Lacerations of friable cervix also cause bleeding. Operative delivery rates are high.

Fetal and neonatal mortality is high due to prematurity (spontaneous and iatrogenic), LBW and asphyxia.

Figure 14: Placenta Previa

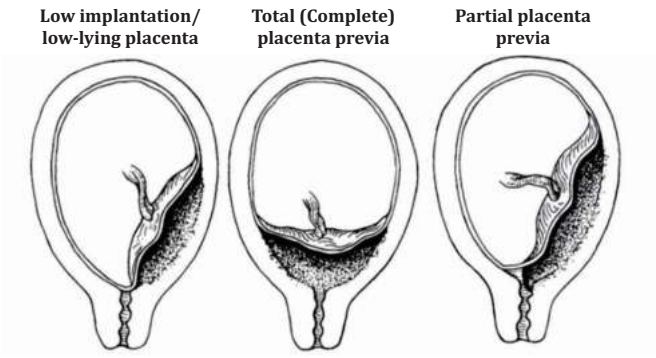
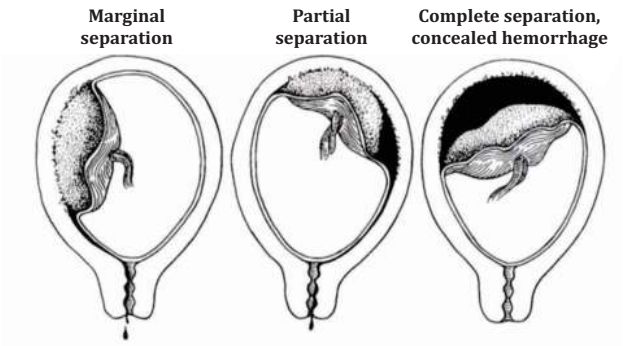


Figure 15: Abruptio Placentae



3.13.2.2 Case management of APH

Referral to FRU is necessary. Even if bleeding is very less, hospitalization is required. Blood needs to be cross-matched and reserved.

History: Ask the period of amenorrhea, fetal movements, time of onset of bleeding, amount, prior H/O warning hemorrhages. Abdominal pain present or absent and its severity, passage of urine. Review prior USG reports if available.

Examination:

- Note pallor, tachycardia, general condition, record blood pressure and assess the amount of blood loss.
- In concealed accidental hemorrhage, although the woman is in shock, her BP may be normal as she could be having prior hypertension. Degree of pallor and tachycardia are more important for assessment of amount of bleeding and general condition.
- Per Abdomen: Note whether uterus is relaxed, contracting and relaxing or hard. Look for uterine tenderness, note fetal presentation and fetal heart rate.
- No vaginal examination to be done until placenta previa is ruled out.

3. 13.2.3 Differentiation between placenta previa and mixed abruptio placentae

Differentiating features between Placenta Previa and Mixed Abruptio Placentae is given in table 28.

Table 28. Differentiation between Placenta Previa and Mixed Abruptio Placentae

Particular	Placenta previa	Concealed or mixed abruptio placentae
Pain	Painless recurrent vaginal bleeding	Painful bleeding
General condition	Pallor, tachycardia, restlessness proportional to visible amount of blood lost	Pallor, tachycardia disproportionately more than the visible amount of vaginal bleeding
Uterus	Relaxed, non-tender uterus, fetal parts felt well	Tense, tender, woody hard uterus, fetal parts cannot be felt
Presentation	May be abnormal or head high floating	Presentation cannot be made out
Fetus	Fetal condition usually well if mother not in shock	Fetus often distressed or dead. Fetal heart sound may not be heard
Dangers	Hypovolemic shock, postpartum hemorrhage	Shock, acute renal failure, Disseminated intravascular coagulation, PPH
Action	No per vaginal examination. IV fluids, referral	IV fluids, referral, monitor clotting time and urine output

Investigations:

- Urgent USG to locate placenta and for assessment of fetal condition and its gestational age.
- Full blood count, bleeding and clotting time, platelet count, prothrombin time.

a) Placenta Previa: If pregnancy duration is > 36 weeks, arranging blood and delivery at well-equipped institution is necessary. Expectant management can be given until 36 weeks for clinically stable patient with moderate blood loss having fetus alive and preterm. Pregnancy is terminated in maternal interest at any time during the observation period if there is uncontrolled bleeding. Caesarean section is required in most cases of placenta previa. Cases having low-lying placenta (Type 1 and Type 2 anterior) can be delivered vaginally by amniotomy and oxytocin infusion. Women having previous caesarean and anterior placenta previa are likely to have morbidly adherent placenta (placenta accreta) leading to furious hemorrhage. Refer such a case to tertiary care center. Such a case needs to have 4 units of blood to be kept ready and preparations for caesarean hysterectomy.

b) Abruptio Placentae: Presents with vaginal bleeding and abdominal pain. Hypertension and proteinuria may be present. In cases of severe abruption, uterus is hard, tender, not relaxing, fetal parts may not be felt well, fetus may be distressed/dead. When the fetus is dead at least 1,500 ml of blood is lost, hence shock is usual. Blood pressure may be normal in spite of being in shock as the initial BP may be high. Coagulation failure leading to severe bleeding is common. Patient can develop acute renal failure.

Management: Refer the woman to tertiary level of care having facility of providing blood and blood components for treatment of DIC. Monitor vitals. Insert Foley catheter and monitor hourly urine output until referral. Check clotting time. Give Ringer lactate for correction of hypovolemia until blood transfusion can be given. Labor is induced by artificial rupture of membrane and oxytocin infusion. Caesarean section may be required for abruption with fetal distress or for heavy bleeding with uninducible cervix.

A patient of concealed accidental hemorrhage can be misdiagnosed as patient in labor with severe anemia with fetal death.

Be prepared to manage PPH in all cases of APH.

3.13.2.4 Referral

ANM/MO should refer a woman having APH to DH/FRU for evaluation and further care.

Care during Referral:

- No vaginal examination to be done until USG is done and placenta previa is excluded.
- If the patient is pale, has tachycardia, start IV Ringer lactate and refer.

If the woman is in shock:

- Arrange for urgent referral. Explain the condition to the relative. Inform the referral center.
- Start two IV lines with number 16 or 18 cannula. Start IV RL. Give 1 liter of RL in first 20 minutes.
- Insert Foley catheter in urinary bladder. Note and record urine output on referral note.
- Accompany her during referral. Monitor vitals during referral.

3.13.3 VAGINAL WATERY DISCHARGE

Managing premature rupture of membranes (PROM).

3.13.3.1 Definition

PROM is rupture of membranes before the onset of labor. Preterm PROM is PROM occurring before 37 weeks. Term PROM is PROM after 37 weeks.

3.13.3.2 Risks

- Maternal risk: Chorioamnionitis. May lead to severe sepsis.
- Neonatal sepsis. Preterm PROM is associated with preterm delivery and results in significant neonatal morbidity and mortality due to prematurity and sepsis.
- Risk of complications is greater if PROM occurs before 34 weeks.
- Risk of infection increases with number of vaginal examinations, the time between rupture of membranes and onset of labor, duration of labor, and mode of delivery.

3.13.3.3 Diagnosis

- History of vaginal watery fluid discharge (should not be confused with vaginal discharge due to vaginitis or frequent urination).
- Sterile speculum examination shows pool of fluid in vagina coming from cervix. Vulval pad is soaked.
- Ultrasonography shows reduced liquor, helps to confirm gestational age, estimated fetal weight, fetal presentation, and fetal malformations.

Avoid vaginal examination as it may lead to ascending infection and preterm labor.

3.13.3.4 Management

a) Preterm PROM: Pregnancy < 34 weeks: Expectant management

Refer the patient to FRU where Special Newborn Care Unit (SNCU) facility is available for hospitalization. Give bed rest. Note maternal pulse, temperature, fetal heart rate 6–8-hourly. Start antibiotics. Erythromycin 250 mg 6-hourly for 7–10 days is recommended (avoid Amoxicillin-clavulinic acid).[82]

Give single course of Inj Dexamethasone (6 mg 12-hourly total 4 doses).

Do not give tocolytic medicines.

Look for signs of chorioamnionitis (fever, tachycardia, tenderness over uterus, foul-smelling liquor, fetal tachycardia, elevated WBC count), advanced labor, fetal distress, for which immediate delivery is indicated.

If there is no indication for immediate delivery, expectant management can be considered at the level of specialist which can be continued until 34 weeks if mother and baby are fine.

Uterine contractions and FHR are monitored. USG is done to monitor the fetal growth and well-being. Watch is kept on signs of chorioamnionitis. If present, labor is induced and broad-spectrum antibiotics are started.

At 34 weeks: Depending on the cervical status, fetal presentation, and fetal condition, mode of delivery is decided and labor is induced.

The number of vaginal examinations is restricted. Strict asepsis is necessary during vaginal examination and conduct of labor.

Women with PPROM should be screened for UTI, STI, and treated.

b) PPROM when pregnancy duration is > 34 weeks and < 37 weeks:

Generally, delivery under cover of antibiotics is recommended.

c) Pregnancy ≥ 37 weeks (Term PROM):

- PROM at term should be managed by delivery as the risk of maternal infection is high with expectant management.
- Hospitalize the woman. Note maternal pulse, temperature, fetal heart rate.
- Assess the cervix, fetal presentation, fetal condition and decide the mode of delivery and induce labor if appropriate.
- Give antibiotics when the membranes have been ruptured for ≥ 18 hours.
- Observe clinical signs of infection, chorioamnionitis.

3.13.3.5 Point to remember

Timely detection and management of premature rupture of membranes is important for preventing sepsis in mother and newborn.

3.13.3.6 Role of health personnel

ASHA/ANM: Recognize the watery discharge reported by pregnant woman before 37 weeks as a danger sign and refer her to RH/FRU. Give first dose of Inj Dexamethasone if pregnancy duration is < 34 weeks.

MO PHC/RH: Administer antibiotic Erythromycin before referral. Continue Inj Dexamethasone.

FRU/DH: Evaluation, confirmation of PROM and obstetric management as appropriate. (Expectant line of treatment or induction of labor).

3.13.4 PAIN IN ABDOMEN

3.13.4.1 Causes

A pregnant woman presenting with pain in abdomen needs to be assessed for finding the cause of pain. Pain in abdomen during early pregnancy could indicate possible threatened abortion or incomplete abortion. Severe pain could be due to ruptured ectopic pregnancy which requires urgent surgical treatment.

Pain in abdomen during late pregnancy can be due to uterine contractions indicating the onset of labor, term or preterm. The pain is similar to true labor pains and coincides with uterine contractions. General condition of the pregnant woman is fair. However, other pregnancy-related causes of pain need to be kept in mind.

- Abruptio placentae: concealed or mixed hemorrhage.
- Rupture of scarred uterus if there is previous caesarean delivery.
- Chorioamnionitis.
- Severe preeclampsia: Pain in upper abdomen (right upper quadrant) is a danger sign.

Sudden severe onset of pain which is continuous and is not like labor pains can be due to accidental hemorrhage due to premature separation of placenta. The bleeding may be concealed. The lives of mother and baby are in danger. Such women need urgent referral to a well-equipped hospital.

If a woman having previous caesarean delivery presents with pain in abdomen near term it is necessary to check that she is having labor pains. Sometimes the pain can be due to rupture of the scar with bleeding inside the abdomen. Pallor and tachycardia may increase. Such a woman also needs urgent referral to CEmONC center.

3.13.4.2 Antenatal corticosteroids in preterm birth

Definition and significance: Preterm labor is onset of labor before 37 completed weeks of gestation. From survival point of view, the gestational age of 34 weeks is important. In India, about 35% neonatal deaths are due to prematurity and its complications. A single course of antenatal corticosteroids administered between 24 to 34 weeks of pregnancy has been shown to reduce the neonatal mortality and morbidity significantly in preterm babies.[81]

Management If pregnancy is < 34 weeks:

1. Antenatal glucocorticosteroid therapy to enhance fetal lung maturity and reduce mortality and morbidity.
2. Inhibition of preterm labor by administering oral tablets of Nifedipine.
3. 'In Utero transfer': Referral of the woman for delivery at a higher center having Special Newborn Care Unit/Neonatal Intensive Care Unit facility. Before referral always give at least the initial shot of steroid mentioning the time on the referral note.

Who can receive antenatal corticosteroid therapy? All women presenting with signs of preterm labor between 24 to < 34 weeks of gestation.

All cases of spontaneous or induced preterm labor for severe preeclampsia, antepartum hemorrhage, women having PROM, where pregnancy duration is < 34 weeks should be given corticosteroids.

Which women should not receive corticosteroid therapy? If there is chorioamnionitis, (infection of fetal membranes) early delivery is safer for both mother and her baby. Signs of chorioamnionitis are: fever, lower abdominal pain, tenderness over the uterus, fetal tachycardia (FHR > 160/minute), foul-smelling liquor.

Intervention[89]

Single course of Inj. Dexamethasone 6 mg 12-hourly IM for 48 hours, total 4 doses or Inj. Betamethasone 12 mg IM every 24 hours for 2 days.

Benefits: Reduction in risk of respiratory distress syndrome (RDS) by 36–50% and of neonatal mortality by 37–40%, was seen if birth was delayed by at least 24 hours after initiation of therapy. The effect persists for 7 days after completion of course. Neonatal morbidity is reduced by 37% (reduced risk of intraventricular hemorrhage, protection against neurological sequelae).

Repeated courses should not be given as there is increased risk of neonatal complications and there are no added benefits. Record BP, urine proteins and sugar, time of giving injection on referral note.

Role of health personnel

ASHA/ANM should screen every pregnant woman for risk of preterm birth. Ask the high-risk women to report warning symptoms indicating possibility of preterm labor:

- Cramping discomfort/pain in lower abdomen, low backache, increased mucoid vaginal discharge
- Intermittent uterine contractions felt during discomfort

These symptoms are likely to be disregarded as normal pregnancy symptoms. In a high-risk case these are helpful in predicting the preterm onset of labor and early referral.

Correct assessment of pregnancy duration

When a pregnant woman reports with pain in abdomen, assess her pregnancy duration accurately (reviewing last menstrual period, date when positive UPT was detected, sonography report in early pregnancy).

Confirm onset of labor: Intermittent painful uterine contractions (4 in 20 minutes or 8 in 60 minutes) resembling true labor pains along with progressive change in the cervical dilatation and effacement assessed over 2 hours.

If a woman is in preterm labor, ANM should give first dose of Inj Dexamethasone before referral. Refer the woman to facility having SNCU. Until referral is possible continue to give Inj Dexamethasone as per protocol.

MO PHC/RH: Diagnose preterm labor. If the pregnancy duration is between 24–34 weeks give a single course of Inj Dexamethasone. Arrange for care of LBW baby.

3.13.4.3 Nifedipine during preterm labor

Purpose: For getting the benefits of antenatal corticosteroids, the birth of a preterm baby has to be postponed by about 48-72 hours. This can be achieved by administering tocolytic medicines to inhibit uterine contractions.

Nifedipine is a tocolytic drug that can inhibit the uterine contractions at least temporarily in preterm labor until effects of Inj. dexamethasone take place.

Nifedipine given orally is an effective, safe, low-cost drug to postpone childbirth in cases of preterm labor. It is more effective and safer than other tocolytic drugs. Nifedipine significantly reduces births within 7 days of treatment, as well as reduces neonatal morbidity (RDS, cerebral hemorrhage, and necrotizing enterocolitis) in babies born before 34 weeks.

Indication: Preterm onset of labor before 34 weeks if

- The cervix is < 3 cm dilated. There is no amnionitis, no fetal distress.
- No preeclampsia or active bleeding.
- No cardiac disease.

Treatment:

Initial dose: 10 mg stat, if uterine contractions continue, repeat every 20 min for 2 more times (total 3 doses).[79]

Maintenance dose: 10-20 mg orally 4-8 hourly for 2-3 days depending upon the response.

Do not give if woman's BP is < 110/70 mmHg. Monitor pulse, B P, signs of respiratory distress, uterine contractions, FHR, vaginal bleeding or leaking.[2]

3.13.5 Fever during pregnancy

Fever during pregnancy is a danger sign to be reported by the family to ASHA/ANM and the woman should be referred to a medical officer.

Common causes of fever requiring specific treatment include urinary tract infections and malaria. Dengue fever, H1N1 infections also need to be kept in mind. If there is history of vaginal watery discharge chorioamnionitis needs to be ruled out.

3.13.6 Urinary Tract Infection (UTI) during pregnancy

UTI is a common complication during pregnancy. It is associated with maternal ill health, and fetal/neonatal problems. Untreated UTI, both asymptomatic and symptomatic, can lead to preterm birth, LBW. Affected mothers can develop pyelonephritis, hypertension or preeclampsia.[90] UTI can present in 3 ways. Asymptomatic bacteriuria (ASB), acute cystitis, and acute pyelonephritis. WHO recommends screening for asymptomatic bacteriuria during pregnancy.[91] Midstream urine culture is recommended. Seven days of antibiotic treatment is recommended for ASB to prevent its complications.

Acute cystitis: Signs and symptoms include hematuria, dysuria, suprapubic discomfort, frequency, urgency, and nocturia. Acute cystitis may get complicated as pyelonephritis.

Urine analysis and Microscopy: Detection of WBCs, red blood cells (RBCs), and protein suggest UTI. Bacteria found in the specimen can help the diagnosis. Treatment is oral antibiotics for 7–10 days.

- Ampicillin 500 mg 4 times daily or Amoxicillin 500 mg 8-hourly.
- Cephalexin 500 mg 2 times daily.
- Amoxicillin-clavulanate 500/125 mg orally twice daily.
- Cephadroxil 500 mg twice daily.

100 mg of Vitamin C daily reduces the incidence of bacteriuria.

If there is no response to initial treatment within 48 hours the woman should be referred to specialist for further evaluation.

Midstream clean-catch urine specimen may be sent to laboratory for urine culture. It can identify causative organisms and help to determine antibiotic sensitivities and start appropriate antibiotic therapy.

Acute pyelonephritis: This is a severe form of UTI which may lead to shock.

Symptoms: Fever (>38°C), chills, renal angle tenderness, anorexia, nausea, and vomiting. Right-side flank pain is more common. Patients may present with hypothermia (as low as 34°C). Patient looks very ill. Frequency, urgency, dysuria and suprapubic pain may be present.

Treatment: Referral to FRU/DH as hospital admission and intravenous (IV) administration of antibiotics is necessary.

Follow-up: Women treated for UTI should be followed carefully as they are at risk of recurrent symptoms and preterm birth.

Key messages:

- UTI can lead to preterm birth and can progress to serious illness.
- ASHA /ANM should recognize symptomatic UTI and refer such women to MO.
- Medical officer should treat the women having acute cystitis with antibiotics.
- Women having acute pyelonephritis should be referred to a higher center.

Role of health personnel:

ASHA /ANM: A woman reporting symptoms of UTI should be referred to medical officer PHC for treatment.

MO PHC: Treat UTI by giving antibiotics. Refer women having pyelonephritis or recurrent UTI to specialist.

Specialist: Hospitalize and treat women having acute pyelonephritis.

3.13.7 Malaria during pregnancy

Malaria during pregnancy is more common, more atypical, more serious and can be fatal.

Effects on pregnancy outcome: Increased risk of spontaneous abortion, preterm birth, fetal growth restriction, fetal distress and stillbirth. Rarely, transplacental spread to the fetus can result in congenital malaria.

Complications: With each bout of malaria, there is a reduction in hemoglobin and profound anemia may develop rapidly. Pregnant woman can develop acute pulmonary edema, hypoglycemia, jaundice, convulsions, altered sensorium, coma.

Clinical presentation:

- Fever, Spleenomegaly.
- Anemia may be the presenting feature of malaria; therefore, all cases of anemia should be tested for malarial parasite.
- Fetal growth restriction may be the only clinical manifestation.

Diagnosis

- Microscopy of stained thick and thin smear is the gold standard.
- Rapid diagnostic tests.
- All fevers should be tested for malaria.
- In endemic areas, the pregnant woman should be routinely tested for malaria at all antenatal visits even if asymptomatic.

Treatment: Give first dose in the presence of the health worker.[92]

P. Vivax: Give Chloroquine tablets for 3 days. Primaquine is contraindicated in pregnant women.

P. Falciparum: More prone to complications, they require different medicines, and should be directed to the nearest FRU immediately. It is better to admit all cases of P. falciparum malaria.

- Assess severity – General condition, pallor, jaundice, BP, temperature.
- Lab tests: Hemoglobin, Parasite count, SGPT, S. bilirubin, S. creatinine, Blood sugar.
- During the first trimester: Quinine is recommended. It may induce hypoglycemia; do not give quinine on empty stomach and tell the woman to eat regularly.
- Artemisinin-based combination therapy ACT is not to be given in the first trimester of pregnancy.
- During the second and third trimester: Artesunate 200 mg one tablet daily for 3 days. Sulfadoxine - Pyrimethamine 2 tablets (750+37.5mg each) on first day only (ACT-SP).[71]

Mixed infections (P. vivax + P. falciparum) treated as falciparum malaria

Treatment of uncomplicated malaria during pregnancy is given in Table 29.[90]

Table 29. Treatment of Uncomplicated Malaria During Pregnancy

	Day 1	Day 2	Day 3
P. Vivax	CQ 250 mg 4 tablets	CQ 250 mg 4 tabs	CQ 250 mg 2 tabs
P. Falciparum *First Trimester*	Quinine: 10mg/kg 3 times daily. Continue up to 7 days.		
P. Falciparum *2nd, 3rd trimester*	AS 200 mg 1 tablet + SP 2 tablets (750 + 37.5 mg each)	AS 200 mg 1 tablet	AS 200 mg 1 tablet
P. Vivax + P. Falciparum	AS 4 tablets of 50 mg + 3 SP tablets (500 mg + 25 mg each)	AS 4 tablets of 50 mg	AS 4 tablets of 50 mg

CQ: Chloroquine 250 mg tablet containing 150 mg base; 25 mg/kg body weight, divided over three days i.e.10 mg/kg on Day 1, 10 mg/kg on Day 2 and 5 mg/kg on Day 3. AS: Artesunate. SP: Sulfadoxine + Pyrimethamine.

Prevention: Use of personal protection measures including insecticide-treated bed nets (ITN) / Long-lasting insecticidal nets (LLIN) should be encouraged during ANC.

3.14 Reproductive Tract Infections (RTI), Sexually Transmitted Infections (STIs)

Reproductive tract infections can be caused by poor genital hygiene, diabetes mellitus, lowered immunity and unsafe sex with an infected partner. Screening for RTIs/STIs during pregnancy is important. Most infections in women are asymptomatic and screening facilitates their detection. Most STIs can be treated. During pregnancy, some STIs can cause serious complications in the baby. Early detection and appropriate treatment can prevent vertical transmission of infections to the baby.

Effects of STIs on pregnancy

- The common STIs in a pregnant woman affecting the outcome of pregnancy are: syphilis, gonorrhea, chlamydia, HIV/AIDS, Hepatitis B, genital herpes, trichomonal vaginitis (TV).
- Candidial vaginitis (CV) and bacterial vaginosis (BV) during pregnancy can cause excessive vaginal discharge. These are not sexually transmitted but can have adverse effects on the baby by causing PROM, preterm birth leading to LBW baby.
- Syphilis can cause stillbirth, congenital syphilis, neonatal death.
- Gonorrhea, chlamydial infection can cause neonatal eye infection.
- Genital herpes infection can cause neonatal herpes, pneumonia, neonatal death.
- HIV is transmitted to the baby during pregnancy, labor, and breastfeeding.

Symptoms in women:

- Vaginal discharge, vulval itching, dysuria, frequency of micturition.
- Lower abdominal pain (PID).
- Genital ulcer, growth, lesion.
- Swelling in groin due to enlarged inguinal lymph nodes.

Signs:

- Local examination helps in detecting genital lesions, herpes, warts, ulcers.
- Speculum examination helps in detecting vaginitis, bacterial vaginosis, mucopurulent cervicitis and conducting simple tests on pathologic vaginal discharge.

Investigations: VDRL, HIV test, Hepatitis B surface antigen test.

Treatment: Symptomatic women with vaginal discharge during the second and third trimester should be treated for BV, TV and yeast infection. Table 30 below summarizes the clinical presentation, treatment and outcome of pregnancy regarding some of the common RTI/STIs.[94]

Table 30. RTI/STI Management During Pregnancy

RTI/STI	Symptoms/Signs	Diagnostic test	Treatment	Effect on pregnancy & Neonate
Trichomoniasis	Frothy, foul-smelling, greenish vaginal discharge, vulval itching, dysuria. Vagina red	Wet saline mount of discharge shows motile organisms	Metronidazole, 400 mg orally twice daily for 7 days or 2 g orally, single dose. Avoid alcohol. Treat partner	PROM, Preterm labor LBW
Bacterial Vaginosis	Greyish, white vaginal discharge, offensive fishy odor	10% KOH mount shows clue cells, fishy odor	Metronidazole 400 mg BD x7 days. No partner treatment	PROM, Prematurity, LBW. Chorioamnionitis, puerperal sepsis
Candidial Vaginitis	Intense vulval itching, burning at urination. Thick curdy white discharge. Vagina red	10% KOH mount shows yeast	Miconazole or clotrimazole, 100 mg intravaginally daily for 6 days or Clotrimazole 500 mg vaginal pessary once at bedtime. Fluconazole not recommended in pregnancy.	
Gonorrhea Chlamydia	Mucopurulent cervicitis, burning micturition, inflamed urethra. Vaginal discharge, lower abdominal pain	Gram stain	Cefixime, 400 mg orally single dose plus Azithromycin, 1g orally single dose 1 hour before food	Prematurity, PROM, Chorioamnionitis, postpartum sepsis. Conjunctivitis in newborn
Syphilis	Genital ulcer Painless swelling in groin (lymph node enlargement)	VDRL	Inj Benzathine Penicillin 2.4 mega units IM after sensitivity testing. If penicillin sensitive: Tab Erythromycin 500 mg 6-hourly x15 days	Abortion, Stillbirth. Prematurity, IUGR. Congenital syphilis
Genital Herpes	Painful genital lesions/ulcers		Tab. Acyclovir 400 mg tds x 7 days. Analgesics, topical anesthetics	Abortion, Prematurity, IUGR, Congenital herpes simplex infection. Neonatal infection

Screening and treatment of asymptomatic women with H/O abortion or preterm delivery for BV is recommended in view of high risk of preterm birth.

Genital Herpes Infection

It is a viral infection by genital herpes simplex Type 2 virus (HSV 2).

First episode has severe symptoms as there are no antibodies in the body. Symptoms include rash on genitalia, severe pain, ulceration, enlarged and painful inguinal lymph nodes. Lesions persist for 2–3 weeks, cervical infection is common with virus shedding for longer duration.

Recurrent episodes have milder symptoms as there are antibodies. Viral shedding occurs for 2–5 days, may be subclinical, cervical involvement is less frequent.

Effects: Infection in early pregnancy may result in spontaneous abortion. In late pregnancy it can lead to preterm birth and neonatal infection. Neonatal herpes can cause lesions on the skin, eye, and mouth. Encephalitis, disseminated multiple organ disease leading to neonatal morbidity and mortality is a possibility.

Neonatal infection occurs mostly around the time of childbirth from virus shed from cervix, fetus contracts the infection at vaginal delivery. Risk of neonatal HSV is high if mother gets primary episode near term (after 34 weeks) and when mother has lesions on genitalia at the time of delivery. Babies born to women with recurrent disease are at very low risk.

Treatment: Tab. Acyclovir 400 mg tds x 7 days. Analgesics, topical anesthetics.

Women with genital herpetic lesions at the onset of labor should be delivered by caesarean section irrespective of duration of rupture of membranes to prevent neonatal herpes.

No partner treatment is recommended for herpes in the absence of active lesions. Sexual abstinence is advised until the lesions heal and treatment is completed.

Treatment of newborn baby: Acyclovir, 10 mg/kg IV 3 times a day for 10 days.

Isolate the baby from other neonates. Close observation for 2 weeks. Mother and baby can be together. She needs to wash hands, avoid contact between lesions, hands and baby. Breast feeding is allowed.

Role of health personnel:

ASHA/ANM: Refer pregnant women giving history suggestive of vaginal discharge or other RTIs to medical officer at PHC.

MO: Diagnosis and treatment of vaginitis and other infections as per guidelines.

3.15 Screening for fetal growth restriction (IUGR)

Depending upon the birth weight and gestational age at birth, both full-term as well as preterm babies will be in one of three groups, small for gestational age (SGA), appropriate for gestational age (AGA), or large for gestational age (LGA) babies.

Intrauterine fetal growth restriction leads to LBW. Neonatal mortality for SGA babies is higher than for babies that are AGA for the same gestational age.

Risk factors

- Maternal: Low BMI (<18.5), short stature (<145 cm), teenage, age > 40, obesity.
- Poor maternal nutrition, Poor weight gain during pregnancy.
- H/O giving birth to LBW baby in previous pregnancy–two-fold increased risk.
- Short inter-pregnancy interval.
- Smoking tobacco, consumption of alcohol.

Causes

- Placental insufficiency due to anemia, preeclampsia, chronic hypertension, renal disease, cardiac disease, sickle cell disease, diabetes mellitus with vascular disease, malaria, twins, autoimmune conditions.
- Vaginal bleeding during pregnancy, placental and cord abnormalities.
- Fetal infections (e.g. Toxoplasmosis, Rubella), Congenital malformations in baby.

Outcome

- Perinatal morbidity and mortality is significantly increased.
- Intrauterine fetal death, birth asphyxia, acidosis, seizures, meconium aspiration, sepsis.
- Neonatal hypoglycemia and hypothermia, polycythemia, hyperbilirubinemia, apneic episodes.
- Abnormal neurologic development.

Screening: All pregnant women should be clinically screened for IUGR.

- During every antenatal checkup the pregnancy duration should be calculated in completed weeks on the day of the visit, and noted. Fundal height should be measured in weeks and to see whether it is equal to, lesser or greater than the period of amenorrhea.
- Measuring fundal height in cm from visits after 24–26 weeks helps in detection of fetal growth restriction. This measurement in cm correlates with weeks of pregnancy. Any lag > 2 weeks should raise suspicion of IUGR.
- Any pregnant woman suspected to have IUGR should be referred for USG.
- All at-risk women need to be watched for IUGR (Previous H/o SGA Baby, H/O pregnancy induced hypertension etc.). For those with risk factors, lagging growth or no growth, serial USG should be performed.

Clinical exam is for screening for IUGR and diagnosis is by USG. Abdominal palpation alone has limited accuracy.

As a simple evaluation of fetal well-being at the PHC and subcenter, ***daily fetal movement count*** (DFMC) should be started from 28–32 weeks. Women perceiving reduced fetal movements should report to the HCW as they need complete evaluation of fetal status.

Simple interventions that can be suggested at the PHC level include:

- Maternal rest in lateral position to maximize uterine blood flow.
- Reduce or eliminate stress, cessation of tobacco use.
- Correction of anemia, improve nutrition, treatment of malaria.
- Tests for diagnosis of sickle cell disease.

Diagnosed cases of IUGR should have further investigations and obstetric management by specialist. USG, NST and Umbilical artery Doppler velocimetry are performed at the referral center. Timing and mode of delivery depend on fetal well-being, maturity, cervical status and evidence of fetal compromise. Induction of labor or caesarean section is performed depending on the individual case.

Preventive interventions

- Smoking cessation is beneficial.
- Low-dose aspirin (antiplatelet agent) started around 12–16 weeks, in women at high risk of preeclampsia, can reduce the risk.
- For diagnosed cases of antiphospholipid syndrome, low-dose aspirin and Inj. heparin can be used by a specialist to give a live birth in cases having prior H/O stillbirth.

3.16 Preventing fetal death

Stillbirth: Baby showing no sign of life at birth after 20 weeks of gestation

Timing of fetal death can be antepartum (fetal death occurring before the onset of labor) or intrapartum (occurring during labor)

Causes:

- Fetal growth restriction due to placental insufficiency due to preeclampsia, diabetes mellitus, renal disease, post-term pregnancy, autoimmune diseases.
- APH, Rh isoimmunization, cholestatic jaundice during pregnancy.
- Syphilis.
- Intrapartum complications: Cord /hand prolapse, knotting of umbilical cord, loops of cord around the neck of infant, fetal distress, prolonged-obstructed labor, uterine rupture, delayed delivery of head in breech presentation, delay in delivery of second twin, shoulder dystocia.
- Hypertonic uterine action and inadequate relaxation of uterus due to excess oxytocin.
- Birth defects.
- Unexplained: Sometimes no cause can be detected.

Risk factors:

- Previous history of preterm, SGA baby, stillbirth, preeclampsia, placental abruption.
- Smoking/tobacco/alcohol/illicit drugs/ exposure to environmental toxins.
- Obesity, Maternal age < 18 years or > 35 years.
- Short inter-pregnancy interval < 24 weeks.

Role of pregnant woman, her family and the village ASHA:

- Optimizing BMI before pregnancy, correction of nutritional deficiency anemia. Pre-conception folic acid.
- Avoiding infections during early pregnancy.
- Being watchful for fetal movements, reporting reduction/ cessation of fetal movements.
- Reporting danger signals (significant abdominal pain, significant itching on body).
- Antenatal care and delivery under care of specialist.

Managing post-stillbirth pregnancy:

A woman with prior history of stillbirth should be referred to a specialist for evaluation, early in pregnancy. She should be seen by a medical officer at every antenatal checkup. Monitoring fetal growth and well-being is important.

- VDRL test: Treatment of syphilis if positive.
- Rh typing and blood group: Check whether Rh negative.
- TSH and other tests as suggested by a specialist.
- Screening and management of diabetes during pregnancy.
- Early USG dating scan (between 11–14 weeks), is useful for monitoring fetal growth. USG at 18–22 weeks for fetal anatomic defects.
- Correct anemia. Inclusion of micronutrients and extra proteins in diet.
- Monitor blood pressure and urine for proteins regularly at every visit. Detection and management of hypertensive disorders is important.
- Detection and management of fetal growth restriction: Record fundal height in cm at every visit. USG 28 weeks onwards for growth parameters as advised by specialist.
- Note any symptom reported by her.
- Note the daily fetal movement count record from the 28th week onwards.
- NST and USG as advised by the specialist.
- Specific clinical interventions as guided by her clinical evaluation.
- Encourage the woman to follow the advice of the specialist regarding timing of birth, mode of delivery.

Women reporting reduced fetal movement should have further evaluation to confirm fetal well-being.

Obstetric management: Timing and mode of delivery based on the clinical evaluation by a specialist. Delivery at 39 weeks or before as indicated. Delivery at CEmONC center, with all preparations ready for operative intervention and special neonatal care.

Assessment of fetal well-being in IUGR and high risk of fetal death.

DFMC: Women should be advised to be aware of their baby's individual pattern of movements. If they are concerned about a reduction in or cessation of fetal movements after 28 weeks of gestation, they should contact their maternity unit. They should be advised to lie on their left side and focus on fetal movements for 2 hours. If they do not feel 10 or more discrete movements in 2 hours, they should contact the ANM or delivery point immediately. This is likely to be a false positive alarm in some women; however, evaluation is needed.

USG: Look for Oligohydramnios (Amniotic fluid index - AFI 5 cm or less or there is no vertical pocket > 2 cm). It indicates fetal compromise. Fetal movements are seen. Estimated fetal weight is noted. Umbilical artery Doppler studies help in identifying fetal jeopardy and deciding the timing of delivery.

Non-stress test: This requires a cardio tocography machine. Baseline FHR pattern and beat to beat variability is seen. FHR is noted in response to fetal movement. Reactive test indicates well fetus (FHR increased by > 15 beats lasting for 15 seconds in response to fetal movement seen on CTG trace).

Fetal compromise is indicated by reduced AFI, nonreactive NST, reduced fetal movements, in which case, further evaluation and immediate delivery are indicated.

3.17 Preventing post-term pregnancy

Post-term pregnancy is a pregnancy that has crossed 42 weeks. This is a high-risk pregnancy. In some women, there is placental insufficiency leading to postmaturity syndrome while in some the placental function continues, leading to large baby. The risks of post-term pregnancy are shown in Table 31.

Table 31. Risks of post-term pregnancy

Maternal Risks	Fetal Risks
Difficult labor	Increased perinatal mortality beyond 42 weeks
Perineal tears due to delivery of a big baby	Uteroplacental insufficiency, resulting in **Postmaturity syndrome***, growth restriction, oligohydramnios, fetal distress and meconium release leading to meconium aspiration syndrome, fetal hypoxia and acidosis
Increased chance of caesarean section	In some cases, fetal macrosomia increasing the risk of shoulder dystocia, risks of injuries to baby

**The baby shows loss of subcutaneous fat, wrinkled, dry, cracked skin described as old man look. It has long thin body and long nails.*

3.17.1 Prevention

- Record expected date of delivery (EDD) of every pregnant woman on her card. Ask her whether her menstrual cycles before conception had been regular.
- ASHA/ANM should check whether the woman has crossed her EDD and refer her to the medical officer.
- Check for any complications. In pregnancies complicated by hypertension, preeclampsia, IUGR, the fetus is at greater risk of asphyxia. Hence these women should not be allowed to cross their EDD. They should be referred to a specialist as they need to be delivered early.
- If the pregnancy is uncomplicated, wait until 41 weeks of pregnancy are completed. Instruct the woman to report if fetal movements are reduced.
- Vaginal examination should be carried out to assess whether the cervix is ripe or unripe (Bishop Score).
- Sweeping of membranes should be done during this examination as it decreases the frequency of post-term pregnancy.
- ***Once 41 weeks are completed, refer her to FRU*** for further evaluation and interventions (fetal surveillance tests, induction of labor etc.).
- Assess gestational age accurately to avoid delivery of a preterm baby. Calculation by date of LMP is likely to be wrong if the woman had prior irregular menstrual cycles or if she has conceived soon after cessation of oral contraceptive pills. Review the early USG reports if any.
- Ask about fetal movements. There may be diminished fetal movements.

In low-risk pregnancies routine induction of labor at 41 weeks' gestation is associated with reduction in perinatal mortality. The risk of fetal distress from uteroplacental insufficiency can be reduced by induction of labor.

Induction of labor can be done by oral or vaginal misoprostol tablets or by oxytocin infusion and ARM.

During labor (induced or spontaneous): Monitor FHR and color of liquor, watch for signs of fetal distress which is common due to cord compression resulting from oligohydramnios. Caesarean is done for fetal distress and for large baby.

Once 42 weeks are completed: Induction of labor is recommended. If the baby is too large or severely compromised, caesarean section is performed.

3.17.2 Role of health professionals

ASHA/ANM: Pregnant women undelivered by their expected date of delivery should be referred to MO.

MO PHC/RH: Confirm duration of pregnancy, look for any complicating factors.

Membrane sweeping to prevent post-term pregnancy.

Referral to a specialist if any complicating factors, or if pregnancy has reached 41 weeks.

Specialist at DH: Assessment and obstetric management as indicated.

3.18 High-risk pregnant women: detection and line listing

The detection and line listing of high-risk pregnant women during the first visit is shown in Table 32.

Table 32: Checklist at First Visit

Sl. No.	Risk Indicator	Action
1	Past H/O TB, Hypertension, Heart disease, Diabetes, Asthma, Epilepsy, H/O ongoing medications	Referral to specialist
2	H/O tobacco use/ Alcohol consumption	Cessation
3	Heavy work/unable to take rest	Extra rest
4	Age < 19 years	Risk awareness
5	Age > 35 years	Referral to specialist
6	BMI < 18.5	Diet intervention
7	BMI ≥ 30	Referral to specialist (BSL, TSH, etc.)
8	Prior second trimester abortion/preterm LBW/ full-term LBW baby	Referral to specialist
9	H/O Preeclampsia/Eclampsia/ APH	Referral to specialist
10	H/O stillbirth/neonatal death	Referral to specialist
11	H/O Caesarean section	Referral to specialist
12	H/O PPH/retained placenta	Referral to specialist
13	Hemoglobin < 7 g/dl	Refer for IV iron sucrose
14	Blood group Rh negative	Husband's Rh, ICT
15	HIV positive	ART/PPTCT center
16	VDRL positive	Inj Benzathine penicillin/antibiotics
17	Post 75 gm glucose BSL ≥ 140 mg	MNT, exercise, referral to specialist
18	TSH elevated	Referral to specialist, Levothyroxine
19	Twin pregnancy (USG diagnosed)	Referral to specialist

The checklist for monitoring the risk and complications during pregnancy is shown in Table 33.

Table 33: Checklist for Monitoring during Pregnancy

Risk Indicator	Action
H/O vomiting/ giddiness/headache/blurred vision/upper abdominal pain /generalized edema	Check blood pressure, proteinuria. Referral to specialist
BP ≥ 140/90 mm of Hg, Urine proteins ≥ +	Referral for management of preeclampsia
BP ≥ 160/110/ Severe Preeclampsia	Inj MgSO4, Nifedipine, Referral
Fits (Eclampsia)	Inj MgSO4, Nifedipine, Referral
Vaginal bleeding	Referral to specialist
Preterm labor 24 to 34 weeks	Inj Dexamethasone, Referral
Preterm leaking (PPROM)	Tab erythromycin, Referral
Fever	Investigate for Malaria, Dengue, Pneumonia. Treatment as required
Urinary infection	Antibiotics
Vaginitis present	Treatment of infections
Weight gain < 1 Kg/month	Diet counseling
Icterus present	Referral to specialist
Fundal height < POA (> 2 weeks lag)	Referral to specialist (USG)
Reduced fetal movements	Referral to specialist
Breech/Transverse lie at 36 weeks	Referral to specialist
Pregnancy 41 weeks	Referral to FRU

4: Male Involvement in Reproduction Healthcare

4.1 Introduction

Male involvement in pre-conception care is critical for their own reproductive health[95] as well as the promotion of the reproductive health of their spouse because bias and discrimination based on gender, and extreme inequality between men and women, prevent the majority of girls and women from seeking healthcare according to their needs.[96,97,98] India ranks low in the global gender gap index (112 out of 134 countries)[99] and men are the main decision-makers for the majority of the households. Male involvement was promoted internationally at the International Conference on Population and Development (ICPD) held in Cairo in 1994.[100] Reproductive health-seeking behavior of an individual depends on individual factors such as self-efficacy and motivation as well as social norms and values.[101,102] Male involvement in reproductive health can facilitate universal access to reproductive health services, increasing the rate of institutional delivery and adoption of family planned by couples. In addition to the rate of utilization of maternal healthcare service, male participation is also positively associated with outcomes of pregnancy. Male involvement in pre-conception care is critical to ensure that every pregnancy is wanted and planned.

4.2 PRE-CONCEPTION CARE FOR MEN

Although a woman will carry and deliver the child, a man also has a crucial role in the successful outcome of pregnancy. A variety of factors, from genetics and lifestyle to environmental exposures and hormones, can affect a man's fertility. Problems in the male partner tend to account for about 40 percent of infertile couples. Improving men's pre-conception health can improve outcomes of pregnancy.

4.2.1 Effects of conditions in men on outcome of pregnancy

A man's lifestyle factors can have a direct impact on his partner's pregnancy.

Tobacco smoking exposes the expectant mother to secondhand smoke and can lead to LBW, IUGR, and preterm birth as well as increasing the risk of sudden infant death syndrome (SIDS).

A man who has HIV or another STI directly puts his pregnant partner and the fetus at risk. Intimate partner violence and coercive relationships can have adverse effects on outcome of pregnancy.

Paternal factors, including genetics and age have an effect on fetal outcomes. Studies have shown a relationship between advanced paternal age and conditions such as autism, and schizophrenia and other mental health disorders.

4.2.2 Effects of men's health on fertility and conception

Health conditions such as diabetes, erectile dysfunction, and testicular conditions (e.g. varicocoele, history of testicular trauma, undescended testes, hypogonadism, retrograde ejaculation) may affect fertility.

Many medicines (e.g. nifedipine, steroids, testosterone, colchicine, selective serotonin reuptake inhibitors [SSRIs], cimetidine, tetracyclines, allopurinol, opiates, ketoconazole) may reduce male libido, contribute to erectile dysfunction, and have toxic effects on sperm.

Tobacco, alcohol and certain drugs (e.g. marijuana, cocaine) can affect spermatogenesis.

Exposure to environmental hazards, radiation, heat, pollutants, lead, mercury and other occupational chemicals have been shown to affect sperm quality.

Chemicals associated with woodworking, painting, making pottery and stained glass, and gun cleaning may affect sperm production.

Stress has been shown to negatively impact sperm morphology and concentration.

According to some studies, every 20 pounds above a man's ideal body weight can lead to a 10% increase in the risk of infertility.

A number of genetic disorders, (e.g. cystic fibrosis, Klinefelter syndrome, polycystic kidney disease), may impair fertility and affect sperm quality.

4.2.3 Benefits of pre-conception care for men

Pre-conception care provides an opportunity to men for prevention of disease, promotion of health, and improving childbirth outcome. There is enhancement of reproductive health and improvement in health behaviors of the couple. It helps in preparation for fatherhood. Male pre-conception care provides an opportunity to improve sperm quality, since damaged sperm can be replaced within 3 months of eliminating the harmful environment.

Goals of pre-conception care for men[103]

- To create reproductive awareness (understanding risk factors related to childbearing).
- To encourage to have a reproductive life plan and to see that all pregnancies are intended and are planned.

4.3 CLINICAL CARE FOR HEALTH ASSESSMENT[104]

4.3.1 Risk Assessment

Take a detailed history and conduct a physical examination looking for signs or conditions that may affect fertility. Assess social history, lifestyle risk factors and behavioral issues (e.g. smoking, substance abuse, unsafe sex). Assess risk of STI, environmental exposures and possibility of occupational hazards. Assess family history of genetic disorders and discuss screening for genetic conditions when indicated.

Note present health conditions, medications, review immunization status.

Assess the man's understanding of reproduction and his reproductive plan.

When a partner's pregnancy is desired, discuss medications, conditions, and activities that may affect fertility.

When a partner's pregnancy is not desired, discuss effective contraceptive methods.

Counseling: On planning the timing of pregnancy; on overcoming fertility issues; modifying health behaviors for improving outcome of pregnancy for his partner and their child.

Consider screening for and counseling to avoid intimate partner violence and coercive relationships and promote respectful and consensual sexual relationships.

Discuss improving capacity for parenthood, understanding critical role in family, gender issues, and emotional health.

4.3.2 Health promotion

There are many steps that men can take to enhance their health, lifestyle and relationship to increase a couple's chances of conceiving.

Making a reproductive life plan: Men should play a direct, active, and constructive role for becoming a parent. He along with his partner should plan when to have a child.

Stop smoking, using "Street" drugs, and drinking excessive alcohol: Smoking is linked with reduced sperm quality, low sperm counts and decreased sperm movement, and with higher numbers of abnormally-shaped sperms. A pregnant woman who is exposed to secondhand smoke has a 20% higher chance of giving birth to a baby with low birth weight than women who are not exposed to secondhand smoke during pregnancy. Heavy alcohol consumption may also have a negative effect on sperm health. Alcohol may also affect the ability to achieve erections. Marijuana and other recreational drug consumption, including anabolic steroids for bodybuilding, should be avoided because some studies suggest they may negatively impact sperm production.

Planning conception at an appropriate age: Fertility in men declines later in life as compared to that of women. Research shows that as a man gets older, both the volume and quality of his semen tend to diminish. There is a decline in the number of healthy sperms and their movement, and they may also be more DNA damage in their sperm. The rate of genetic mutations transmitted via sperm cells increases significantly with age; risk for psychiatric disorders in offspring, especially autism spectrum disorders (ASD) and schizophrenia is also increased.

Improving Nutrition: A diet high in sugar, fat, processed foods is associated with reduced sperm motility. An energy-dense diet is associated with reduced motility, abnormal shapes of sperms and damage to DNA integrity. Animal studies have shown that these changes could be reversed with dietary interventions. Eating healthy foods with plenty of fruits and vegetables, which are rich sources of antioxidants may help to produce healthy sperms. Men should also consume fiber-rich foods, healthy monounsaturated fats, and moderate amounts of lean protein to protect against free radicals, which can cause damage to DNA within sperm cells.

Engaging in Regular physical activity: Men should get regular exercise to reduce stress, to feel better and have long-term health.

Optimization of BMI: Male obesity negatively impacts fertility through changes in hormone levels, as well as direct changes to sperm function and sperm molecular composition, reducing fertility and embryo health.[105] Studies have suggested that couples in whom the man is overweight or obese take longer to conceive than couples with no weight problems. Obesity affects a man's sperm quality, reducing sperm counts and decreasing their motility, as well as increasing damage to genetic material (DNA) in sperm. Recent data has shown that male obesity also impairs offspring metabolic and reproductive health suggesting that paternal health cues are transmitted to the next generation with the mediator mostly likely being the sperm. Excessive body fat is associated with reduced serum testosterone and increased estradiol levels in men. In men having In Vitro Fertilization treatment obesity is associated with reduced development of embryo and decreased live birth rates.

Protection from heat: There's a link between increased temperature of the scrotum and reduced semen quality. Engaging in welding jobs, frequent visits to and long stays in hot tubs, saunas and steam rooms could increase scrotal temperatures, which may decrease sperm counts and sperm quality. Reduced sperm counts may be temporary and could return to normal in a few months once a man controls the exposure to heat.

4.3.3 Clinical interventions

Getting health conditions under control: Screening for hypertension, obesity, diabetes mellitus, mental health disorders should be carried out. Controlling high blood pressure and diabetes may improve a man's chances of getting his partner pregnant.

Preventing and treating Sexually Transmitted Diseases (STDs): Men should get screened and treated for any STDs. They should continue to protect themselves and their partner from STDs during pregnancy.

Managing Medications that may affect sperm count and quality: A variety of medications can affect sperm count and quality. A thorough medication history, including past and current medication use should be reviewed. Calcium channel blockers, cimetidine, colchicin, corticosteroids, cyclosporine, erythromycin, gentamicin, methadone, neomycin, nitrofurantoin, phenytoin, spironolactone, sulfasalazine, tetracycline, thioridazine, Beta blockers, serotonin reuptake inhibitors (SSRI) for depression, finasteride (prostate medicine) could have a negative influence on fertility. Supplemental testosterone can also decrease sperm production. Some chemotherapy drugs and radiation treatments for cancer can cause permanent infertility. A man should speak to his doctor about the medication he is taking and whether it might interfere with his ability to have a child.

Controlling Exposure-Related Damage to Sperm Quality: A number of workplace substances such as lead, mercury, and radiation have been identified as reproductive hazards for men. Exposure to lead in men has shown to be associated with reduced sperm counts, abnormal sperms, reduced motility and altered sexual performance. Exposure to mercury in men is associated with altered hormone levels affecting sexual performance. Kepone, an insecticide is known to produce male infertility. Dibromo chloropropane (DBCP), a pesticide, interferes with the action or production of androgens by the testes.

Ethylene glycol ethers used in electronic manufacturing, fuel dicers, ink photo, lead smelting, battery manufacturing, lead paint, carbon disulfide, ethylene dibromide (chemical industry fumigant), vinyl chloride – (polymerization industry) are other suspected spermatotoxins. Oxidative stress and DNA damage to sperm can be caused by xenobiotics (e.g., polychlorinated biphenyls, dioxins).

Hazardous chemicals can lead to reduced number of sperms, reduced motility, and abnormal sperm shape. Hazardous chemicals may collect in the epididymis, seminal vesicles, or prostate and may kill the sperm. Radiation or chemicals may cause changes or breaks in the sperm DNA. If the sperm's DNA is damaged, it may not be able to fertilize an egg. If a damaged sperm does fertilize an egg, it may result in miscarriage or birth defect in the baby.

Although studies have found that workplace exposures affect the reproductive system in some men, these effects do not necessarily occur in every worker. Whether individuals are affected depends on how much of the hazard they are exposed to, how long they are exposed, how they are exposed, and other personal factors.

Routes of exposure: Harmful substances can enter the body of workers by breathing them in, by contact with skin and by swallowing them (if workers do not properly wash their hands before eating, drinking, or smoking).

Precautions:

- Become familiar with the potential reproductive hazards used in your workplace.
- Consult the Material Safety Data Sheet (MSDS) provided by the employer for information about the hazards and necessary precautions for the material you are using. Follow the safety work practices and procedures implemented to prevent exposures. Participate in all safety and health education, training.
- Wear the appropriate personal protective equipment specified for the job. (Respiratory protection and chemical protective clothing, such as an apron and gloves, made from materials that protect against the chemicals being handled).
- Store chemicals in sealed containers when they are not in use. Use the smallest quantity possible. Practice emergency procedures in case of a spill or other emergency. Avoid skin contact with chemicals. If chemicals contact the skin, follow directions for washing.
- Wash hands before eating, drinking, or smoking.

Avoiding exposure of family to these hazards

A worker can expose his/her family to these hazards by bringing them home from the workplace, on his/her skin, hair, clothes, shoes, tools or car. These may affect a woman's reproductive system or the health of an unborn child. For example, lead brought home from the workplace on a worker's skin, hair, clothes, shoes, tool box, or car can cause severe lead poisoning among family members and can cause neurobehavioral and growth effects in a fetus. Proper work practices and good hygiene are necessary to prevent these effects. To avoid home contamination, change the contaminated clothing and wash with soap and water before going home. Wash work clothing separately from other laundry and avoid bringing contaminated clothing or other objects home.

There is a need to create reproductive awareness in men and for counseling for health-promoting behaviors for having healthy children.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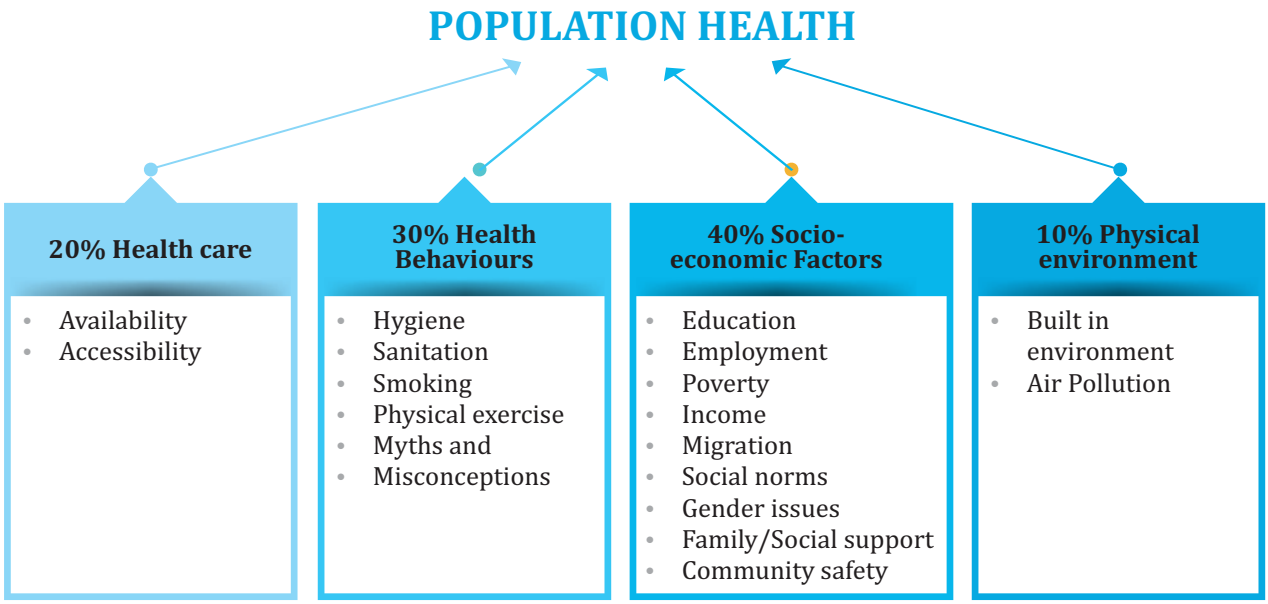
5: Behavior change communication, advocacy and partnership

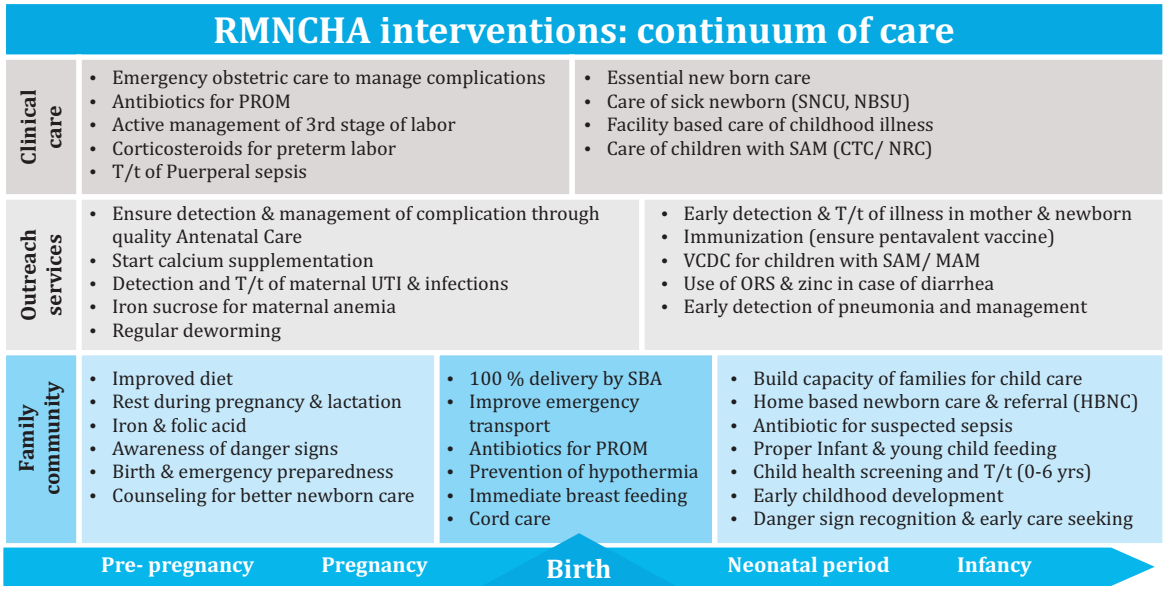
Healthy behavior plays a critical role in the health of an individual. The health of a population is an outcome of physical environmental factors (10%), socio-economic factors (40%), health behaviors (30%) and accessibility and utilization of health services (20%)[106] (Figure 16).

Figure 16: Health of a population and its elements



Continuum of care is an important principle for delivery of services in the context of RMNCHA (Figure 17). One of the three service delivery platforms for RMNCHA interventions is family-community care which primarily includes adoption of safe behavior and care practices and care-seeking for illnesses. The family-community care includes: behavior change communications; community mobilization for improved pre-conceptual, antenatal, intrapartum, and postnatal care practices; care-seeking for illness; and home and community-based newborn care and management of illness.[107]

Figure 17: Continuum of care for RMNCHA interventions



For pre-conception health, the communication campaign needs to address at the individual as well as the population level for prevention and control of obesity and undernutrition, anemia, adolescent pregnancy and non-communicable diseases. Further, change communication should focus on reduction of tobacco and alcohol consumption, exposure to harmful chemicals and drugs and at the same time, consumption of healthy diet and micronutrient supplements, such as folic acid and iron.[108]

The tools for the behavior change communication for pre-conception health have been developed in a participatory manner with the community. These include a healthcare manual, which covers key aspects of health promotion, a checklist for health behavior and outline for health records. This manual will be distributed to each eligible woman planning a pregnancy. Further, a flip chart has been developed for use by the frontline workers for BCC. Text and audio messages have been developed for dissemination using mobile phones and a short film of 28 minutes on pre-conception care has been developed for BCC in the community. The messages for posters for pre-conception care are included in Annexure 7.4.

The advocacy with panchayat functionaries, teachers, community leaders, gatekeepers, women's groups like self-help groups, and adolescent girls, is critical for promoting evidence-based care in the pre-conception and antenatal period. Groups of eligible aspiring women in a village can be formed for supporting each other with behavior change communication, linkage to services and to government schemes.

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7: Annexures

7.1 Supplies needed

Each village should have the following with the ANM at village health and nutrition days (VHND)

- Clinic/VHND/ANC : Height scale, Adult Weighing scale, BMI calculator table, BP machine, Stethoscope/fetal doppler.
- Measuring tape.
- Hb testing kit, Uristick, UPT kits, HIV whole blood finger prick testing kit.
- IFA tablets, Folic acid tablets, Albendazole tablets.
- Contraceptives.
- Reporting formats, Registers.
- Posters, IEC material :Pre-conception care, prenatal care, FP methods, RTI/STI.

At PHC

- ANC : Height scale, Adult Weighing scale, BMI calculator table, BP machine, Stethoscope/Fetal doppler.
- Inj Tetanus toxoid + reduced diphtheria toxoid.
- STI treatment medicines (NACO syndromic management) Benzathine Penicillin.
- Antibiotics (Ampicillin-oral, IV; Gentamycin IM; Metronidazole oral and amp IV, Erythromycin oral.
- Drug treatment for malaria.
- Levothyroxine tablets.
- Tab Metformin, Inj Insulin.
- Antihypertensive medicines, Inj MgSO4.
- Inj Dexamethasone.
- Antiretroviral medicines : Tab TLE, Nevirapine syrup.
- Aspirin tablets 75 mg.
- 75 g glucose packets, glucometer.
- Eclampsia kit, Hammer for knee jerk testing.
- IV fluids, IV sets, IV cannulae, Injection syringes, needles.
- Contraceptives.
- Posters, IEC material: Pre-conception care, prenatal care, FP methods.

Laboratory tests facility

- Hemoglobin, Uristick, UPT kits, HIV whole blood finger prick testing kit, Blood group & Rh typing, VDRL, solubility test.
- Reference laboratory for OGTT, TSH, T3, T4, glycated hemoglobin, indirect Coomb's test.
- Serum creatinine, SGOT/SGPT, Hematology including platelet count.
- Reference centre for obstetric USG.

7.2 Approximate budget for implementation of the pre-conception program in four aspirational districts – Nandurbar, Gadchiroli, Washim and Osmanabad of Maharashtra.

The budget for the implementation of the pre-conception care includes the cost of training all the staff in the district, printing of BCC materials and registers and incentives to be given to ASHAs for line listing and behaviour change communication among the eligible women planning their pregnancies. The budget for laboratory testing, medicines like IFA tablets, folic acid tablets etc., is not included in the budget as these costs will be met from the regular budget of the health department.

Table 1. Approximate budget for implementation of the pre-conception program in four aspirational districts of Maharashtra.

Sr. No.	Particulars	Unit	Unit Cost	Total Amount Rs.
1	Honorarium to District Level Trainer	80	Rs. 400 per day X 2 days	64,000
2	Daily Allowance (DA) for Medical Officer	617	Rs. 200 per day X 2 days	246,800
3	DA for ANMs/ LHVs/ Sns	2472	Rs. 125 per day X 2 days	618,000
4	DA for ASHAs	5900	Rs. 150 per day X 1 days	885,000
5	TA to District Trainers and Participants	3169	Per participants 500/- (as per actual)	1,584,500
6	TA to DCM/BCM/Facilitators	190	Rs. 200/- per ASHA (as per actual)	38,000
7	Tea, Breakfast & Meals to participants, trainers	3169	Per participants 200/- X 2 days	1,267,600
8	Stationery (Pen, Folder, Pad)	3169	Per participants 100/-	316,900
9	Printing of guidelines	3169	Rs. 200/- per booklet	633,800
10	TA to Health Worker male/MPW & Health Assistant	1370	Per participants 500/- (as per actual)	685,000
11	DA to Health Worker male/MPW & Health Assistant	1370	Rs. 125 per day X 1 days	171,250
	Printing of IEC materials and Registers			
12	Printing of Healthcare Manual	310000	Rs. 40 per	12,400,000
13	Printing of registers & stationery etc.	1025	Rs. 200 per sub center	205,000
14	Printing of Flipchart for IEC	7256	Rs. 90 per	653,040
15	Provision of Video Clips	12042	Rs. 200 per dvd	2,408,400
	Contingency (Overhead Expenditure)			500,000
Total budget for 4 districts (Rs.)				**22,677,290**
Total budget for 1 district= total population of four districts: 5574997 (Census 2011), population in one district: 1393749				**5669322**

7.3. Diet chart

FOR INDIVIDUALS WITH LOW BMI

TIMINGS	FOOD ITEMS
7.00-8.00 am	1 cup tea
Breakfast: 8.30-9.00 am	1 cup milk, and vegetable paratha with curd or multigrain pancake (thalipeeth) and chutney or Idli-sambar or 1 bowl upma or Semolina porridge (Rava kheer) or 1 bowl poha and 1 bowl curd And 1 bowl boiled sprouts or egg omelet or egg bhurji And 1 fruit (apple, banana, guava, orange, sweet lime, papaya)
Lunch: 1.00-2.00 pm	2 chapatis or 1 ½ Indian bread (of jowar or bajra or ragi) And 1 bowl dal or sprouts curry (usal) or chicken or mutton And 1 bowl vegetable and 1 bowl rice and 1 bowl curd
Evening snacks: 4.00-5.00 pm	Groundnut laddu or chikki or Amaranth (Rajgira) laddu or jaggery and roasted gram dal And 1 cup milk or tea and 1-2 bananas
Dinner: 8.00-9.00 pm	2 chapatis or 1 ½ Indian bread (of jowar or bajara or ragi) And 1 bowl dal or sprouts curry (usal) or chicken or mutton And 1 bowl vegetable and 1 bowl rice or Khichadi And 1 bowl curd

Note: Use more of the following food items in your meal.

- Egg, mutton, fish, chicken, sprouts, pulses, soya bean.
- Milk and milk products- yogurt/ curd, paneer, buttermilk, cream, etc.
- Dry fruits, soya nutrela, roasted groundnuts, fruits, apple, banana, dates.
- Leafy vegetables: spinach, fenugreek, dill leaves, amaranth, colocasia leaves, green sorrel, coriander etc.

FOR INDIVIDUALS WITH HIGH BMI

TIMINGS	FOOD ITEMS
Early morning: 7.00-8.00 am	1 glass water 1 cup tea/ coffee (reduced sugar quantity)
Breakfast: 8.30-9.00 am	1 cup milk, And 1 bowl upama or 1 bowl dalia or 1 small size multigrain pancake (thalipeeth) or vegetable paratha with curd or 1 chapati and 1 bowl vegetable
Lunch: 1.00-2.00 pm	1 chapati without oil or 1 medium size Indian bread (of jowar or bajara or ragi) And 1 bowl dal or sprouts curry (usal) and 1 bowl vegetable and 1 glass buttermilk and 1 bowl salad (cucumber, carrot, radish, cabbage, beetroot, tomato, onion etc.)
Evening snacks: 4.00-5.00 pm	1 cup tea
Dinner: 8.00-9.00 pm	1 chapati without oil or 1 medium size Indian bread (of jowar or bajara or ragi) And 1 bowl dal and 1 bowl vegetable and 1 bowl salad (cucumber, carrot, radish, cabbage, beetroot, tomato, onion etc.) And 1 glass buttermilk

Note: Use following food items more in your meal

- Eat thrice in a day in smaller quantities and at fixed timings.
- Avoid sedentary work and do hard work.
- Avoid tea, coffee, sweets and oily products, chocolates, bakery products like khari, toast, biscuits etc.
- Exercise like cycling, skipping, swimming etc.
- Walk for at least 45 min. daily for 5 days in a week.

7.4. Draft messages for posters for use for behavior change communication among women and men for use in health and ICDS facilities.

Healthy Parents Healthy Child Initiative: Health Check-up Before Planning Pregnancy

Poster 1

Do you know, many women do not plan their pregnancy and do not have any health check-up before getting pregnant?

Do you know many women may not be medically fit to have pregnancy without problems?

The following conditions increase the risk of ill health of a pregnant woman and her baby:

- If women get pregnant before 19 years of age.
- If she conceives within 2 years of previous pregnancy.
- If she is exposed to tobacco or alcohol.
- If she is too thin and is underweight.
- If she is anemic.
- If she is suffering from infection of reproductive organs.
- If she has diseases like diabetes; heart disease; hypertension, kidney disease; epilepsy; thyroid disorders, abnormal hemoglobin.

Remember, the risks to pregnant woman and her baby can be reduced by taking appropriate care for these conditions before pregnancy.

Plan your pregnancy for a healthy mother and a healthy child
Visit the nearest health center for health checkup and advice.

Healthy Parents Healthy Child Initiative: Have an Ideal Body weight before pregnancy

Poster 2

Do you know that one out of 4 women is underweight and another one is overweight?

Do you know that being too thin or too fat can have harmful effects on the health of a pregnant woman and her baby?

All that you need to do is to visit the nearest health center, get your height and weight recorded and know whether you are underweight or overweight by looking at your body mass index (BMI).

Plan your pregnancy when your BMI is normal, between 18.5 and 22.9 Kg/M^2.

Get help from your health care provider for having normal weight before you get pregnant.

Table 2 below gives you tips to have normal weight.

Table 2. Optimizing weight before pregnancy

Underweight: BMI < 18.5	Overweight/ Obese: BMI ≥ 23
1. Have four to five high-calorie healthy meals containing whole grains, cereals like rice, wheat flour, dal, fruit, vegetables including green leafy vegetables, milk, and healthy unsaturated oils like vegetable oils (Soybean oil, Canola oil, Sunflower oil, Peanut oil, Sesame oil), milk and milk products, fish, chicken, mutton and eggs whenever possible. 2. Monitor BMI regularly. 3. Defer pregnancy till BMI is above 18.5. If no improvement, consult the Medical Officer.	1. Have a healthy eating plan. 2. Reduce quantity of food, limit junk food, sugar, oils and fats. 3. Increase physical activity, and reduce sedentary time. 4. Defer pregnancy till you lose about 5-6 kg of weight. 5. Get examined by Medical Officer.

Healthy Parents Healthy Child Initiative: Stop Tobacco, Alcohol and Have a Healthy Baby

Poster 3

Do you know that exposure to tobacco, alcohol and illicit drugs during pregnancy can harm your baby?

Tobacco in any form is harmful. Smoking by mother and exposure to tobacco smoke when others smoke around the woman is harmful (passive smoking). Application of dried/roasted tobacco powder application to gums and teeth (misri) is also harmful.

Effects of exposure to tobacco during pregnancy:

- Baby is likely to be born preterm or low birth weight.
- The risk of birth defects, like cleft lip or cleft palate is increased
- Risk of miscarriage, stillbirth or sudden death of infant is increased.

Hence all tobacco consumption should be avoided throughout pregnancy.

Effects of Alcohol during pregnancy:

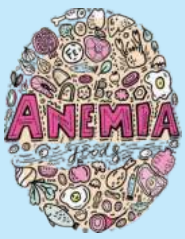
- Babies can have birth defects, facial abnormalities, small head size, mental retardation.
- Mental health problems, low IQ.
- Behavioral problems such as hyperactive behavior, severe tantrums, irritability.
- Speech and language delays.

These disorders are completely preventable if a woman does not drink alcohol during pregnancy.

All that you need to do is that if you are in the habit of using tobacco in any form or drinking alcohol you need to stop it before getting pregnant, to have a healthy baby.

Healthy Parents Healthy Child Initiative: Correct Anemia Before Pregnancy

Poster 4



Anemia is low hemoglobin levels in blood. A woman having hemoglobin less than 12 g/dl is anemic.

Deficient intake of nutritious food containing adequate amounts of proteins, iron and vitamins leads to anemia.

If an anemic woman gets pregnant, her blood hemoglobin drops further during pregnancy aggravating anemia.

Anemia during pregnancy increases the risk to the life of a pregnant woman and her baby is likely to be low birth weight.

For having a healthy baby, you should have hemoglobin level of 12 g/dl before getting pregnant.

HAVE YOU CHECKED YOUR BLOOD HEMOGLOBIN LEVELS?

Please visit the nearest health center and get your hemoglobin tested on a drop of blood.

If your hemoglobin is below 12 g your ANM will provide you iron-folic acid (IFA) tablets for 3 months after which she will test your hemoglobin again. She will explain how to take tablets. She will also give you a deworming medicine which you need to repeat once in 6 months. You need to eat food having good amounts of proteins, iron and vitamins.

If your Hb is 12 or more you need to take one IFA tablet every week and one tablet of deworming medicine once in 6 months to stay free of anemia.

Have hemoglobin levels of 12 g before you plan your pregnancy and have a healthy baby.

Healthy Parents Healthy Child Initiative: Get Treatment for Reproductive Tract Infections

Poster 5

Women often get infections in their reproductive organs, which are called as reproductive tract infections or RTIs.

Most such infections cause preterm birth, low birth weight and premature rupture of membranes leading to neonatal infections.

Some infections can cause stillbirth or neonatal death. Baby may suffer from pneumonia, eye infection (conjunctivitis) or rash on the body.

Most infections can be detected and cured by taking medicines from a doctor.

Do you have any of the following symptoms?

- Vaginal discharge, vulval itching, difficult or frequent urination.
- Lower abdominal pain.
- Ulcer, warts, painful vesicles or other lesions on private parts.
- Swelling in groin region.

All you need to do is to report any of the above symptoms to your healthcare provider.
Visit the doctor along with your husband, get examined and take complete treatment as advised.
Protect your baby from infections.

Healthy Parents Healthy Child Initiative: Have a Health Check-up before pregnancy

Poster 6

Some diseases like diabetes, heart disease, hypertension, kidney disease, epilepsy, thyroid disorders have adverse effects on maternal health and pregnancy outcome. Some of the conditions may not produce any symptoms and can remain undetected.

Detecting and treating such diseases before pregnancy can improve the chances of successful pregnancy.

Did you have a health check-up done by a doctor before?

Do you have any diagnosed condition for which you are regularly taking some medicines?

Visit the doctor once and get your health check-up done. Tell the doctor about the health problems you have and any medicines that you are taking.

Get your height, weight, blood pressure recorded, complete physical examination done, and some blood tests done as advised by the doctor.

If you have any health problem, get treatment as advised by your doctor and know when you are fit to have a baby.

Check whether you are medically fit to have a pregnancy.

Healthy Parents Healthy Child Initiative: Start Folic Acid Tablets before conception

Poster 7

Congratulations for visiting the pre-conception care clinic.

- You are above 20 years of age.
- You do not have any health problem.
- Your body weight and BMI are normal.
- Your blood hemoglobin is 12 g/dl.
- You and your husband are prepared to become parents.

Tell your intentions to your healthcare provider.

Remember to start folic acid tablets at least 3 months before you get pregnant and continue the tablets during first 3 months of pregnancy. This will prevent many types of birth defects in your baby.

Remember to report to the clinic if you miss your menstrual period.

Get pregnancy confirmed and register for antenatal care.

Have a healthy baby!

Healthy Parents Healthy Child Initiative: Use contraception to Defer Pregnancy

Poster 8

Congratulations for visiting the pre-conception Health clinic.

Defer pregnancy if you are not fit to have pregnancy now or you are not prepared now to take care of your baby

- If you are below 19 years of age.
- If your previous child is less than 2 years of age.
- You are underweight or overweight and trying to normalize your weight.
- If you are under treatment for anemia.
- If you have any chronic medical condition for which you are under evaluation and treatment.

Visit your healthcare provider.

- Discuss the various options for avoiding pregnancy.
- Choose one option after getting information about available methods.
- Know more about the method selected.
- Start using the method.

Keep visiting the pre-conception health clinic every month to monitor your health until you are declared fit to go for pregnancy.

When you decide to have pregnancy, remember to start folic acid tablets before discontinuing contraception use.

Have a healthy baby!

Healthy Parents Healthy Child Initiative: Health of Your Husband

Poster 9

Do you know that the health of a man before his wife gets pregnant is also important to have a healthy child?

- Tobacco, alcohol and certain drugs (e.g. marijuana, cocaine) can have a toxic effect on the sperm.
- Many medicines have toxic effects on the sperm.
- Exposure to radiation, heat, pollutants, lead, mercury, pesticides and other occupational chemicals can affect sperm quality.
- Stress has adverse effect on semen quality
- Reproductive tract infections can be transmitted through sexual contact, infect the wife and can infect the fetus during pregnancy with adverse pregnancy outcome.
- Obesity and health conditions such as diabetes can have an adverse effect on pregnancy outcome.
- Stress has an adverse effect on semen quality.
- Uncontrolled spell of anger, physical abuse and violence with a woman during pregnancy can have serious complications endangering the life of the woman and her baby.

Be a responsible husband

- Both partners should visit the nearest health center for health checkup and advice.
- Achieve good health and prepare yourself for responsible parenthood.

7.5. A. Pre-conception, Antenatal Intervention Register

YEAR 20____ - 20____

PRECONCEPTION, ANTENATAL INTERVENTION REGISTER

District _____

Municipal council _____ Block _____

Village/ Ward _____ Subcentre _____

P.H.C./ Health Post _____

Hospital _____

मुलगी वाचवा!

मुलगी वाचवा, देश वाचवा

State Family Welfare Bureau, Pune – 411001

7.5. Format for recording the information of eligible aspiring women during the first two visits to VHSND for pre-conception care (indicators 1 to 57) and then quarterly follow-up (indicators 58-83)

District .....

Municipal Corporation/council ..... Block .....

Village/ Ward ..... Subcenter .....P.H.C./ Health Post.....

Hospital .....

Format for recording the information of eligible aspiring women during the first two visits to VHSND for pre-conception care (PCC) (indicators 1 to 57)									
1	2	3	4			5			6
Sr. no.	Woman's RCH ID No.	PCC registration date	Woman's details			Husband's details			Complete address (village/ small settlement) with pin code and mobile no.
			Name	Current age (complete years)	Age at marriage (complete years)	Name	Current age (complete years)	Age at marriage (complete yeas)	

Format for recording the information of eligible aspiring women during the first two visits to VHSND for pre-conception care (indicators 1 to 57)																
7	8	9	10		11		12		13	14	15	16	17	18	19	20	21
Religion	Caste 1. SC/ 2. ST/ 3. Other backward castes 4. General	1. APL/ 2. BPL	Total born children		Total born children		Age of last live child		Referral in case of infertility to FRU/ DH 1. Yes 2. No	Missed the last menstrual period 1. Yes 2. No	If missed period, do a Urine Pregnancy test 1. UPT positive (Provide ANC care) 2. UPT negative positive (Provide ANC care) 2. UPT negative	Use of toilet 1. Yes/ 2. No	*Hand washing at important times 1. Yes/ 2. No	** Tobacco consumption by woman 1. Yes/ 2. No	** Tobacco consumption by Husband 1. Yes/ 2. No	Alcohol consumption by woman 1. Yes/ 2. No	Alcohol consumption by husband 1. Yes/ 2. No

(Note:-* Important times means after defecation, urination, after washing child's stools/urine, before preparing meals, before feeding baby, before breastfeeding. If answer to all these questions is affirmative, write "yes", else "no". **Any form of Cigarette, Bidi, Tobacco, Gutkha, Mishri, Nus (Tapkir)).

Format for recording the information of eligible aspiring women during the first two visits to VHSND for pre-conception care (indicators 1 to 57)															
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Weight in kg	Height in cm	BMI	Hemoglobin g/dl	Blood pressure		Blood group	Husbands blood group, if woman's blood Rh factor is negative 1. Yes 2. No	Sickle cell anemia- Solubility test result 1. Positive 2. Negative	If solubility test was positive, was electrophoresis done? Result 1. Positive 2. Negative	Random Blood Sugar Level (BSL) by Glucometer (mg/dl)	If BSL more than 140, Oral Glucose Tolerance (OGT) Test 1. Positive 2. Negative	HIV test result 1. Positive 2. Negative	If positive, treatment 1. Yes 2. No	If woman is positive, husband's HIV test result 1. Positive 2. Negative	If positive, treatment starts 1. Yes/ 2. No
				Systolic	Diastolic										

Format for recording the information of eligible aspiring women during the first two visits to VHSND for pre-conception care (indicators 1 to 57)																			
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
VDRL Test result 1. Positive 2. Negative	If positive, treat–ment 1. Yes/ 2. No	If woman is positive, husband's VDRL 1. Positive 2. Negative	If posi+tive, treat-ment 1. Yes/ 2. No	RTI/ STI symptoms 1. Yes/ 2. No	Treatment if RTI / STI symptoms 1. Yes 2. No	If woman is shows STI signs, husband's examination result 1. Positive 2. Negative	Husband's treatment if women suffering from STI 1. Yes 2. No	TSH test result (write the number in IU	If TSH result more than 10 IU, was Levothyroxine given? Yes/ No	Non communicable disease diagnosed (1. Diabetes, 2. Hypertension, 3. Hypothyroidism, 4. Heart disease 5. Tuberculosis, 6. Epilepsy	Was treatment started for diagnosed condition (1 Yes; 2. No)	Albendazole tablet (Once in six months) given 1. Yes 2. No	*IFA tablet 1. Weekly, 2. Daily, 3. as per advice	FA tablets started 1. Yes 2. No	MR vaccine given? 1. Yes 2. No	Contraceptive used by woman (1. Oral contraceptive pills; 2. Injection Antara (DMPA) 3. Intrauterine Device;)	Contraceptive (condom) used by husband	Counselling based on the risk factor present. 1. Yes 2. No	Has the woman agreed to postpone pregnancy till the risk factor is reduced. 1. Yes 2. No

(Note: - * If no anemia 1- give tablet weekly, if anemia 2- daily tablet)

Format for recording the information of eligible aspiring women during the quarterly follow up visits after first two monthly visits to VHSND) for pre-conception care (indicators 58 to 83)

58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
RTI/ STI_ syndromes of woman 1. Yes 2. No	RTI/ STI syndromic Treatment of woman if positive 1. Yes 2. No	STI syndromes of the husband 1. Yes 2. No	STI syndromic Treatment for husband 1. Yes 2. No	Tobacco consumption of woman 1. Yes 2. No	Tobacco consumption of husband 1. Yes 2. No	Alcohol consumption of woman 1. Yes 2. No	Alcohol consumption of husband 1. Yes 2. No	Weight in Kg for the woman	Height in Cm of the woman	BMI of the woman	Haemoglobin (g/dl)	Blood pressure Systolic	Blood pressure-Diastolic	Blood Sugar Level (BSL)_ Random by Glucometer (to be tested only if random BSL was more than 140 g/dl in the baseline	Non communicable disease diagnosed (1. Diabetes, 2. Hypertension, 3. Hypothyroidism, 4. Heart disease 5. Tuberculosis, 6. Epilepsy	Treatment (write the medicines)	Deworming received Albendazole (once every six months) 1. Yes 2. No	Iron and Folic Acid 1. Weekly 2. Daily 3. As Prescribed 4. Not given	FA 1. Yes 2. No	Counselling based on the risk factor present. 1. Yes 2. No	Has the woman agreed to postpone pregnancy till the risk factor is reduced. 1. Yes 2. No	Contraceptive used by woman (1. Oral contraceptive pills; 2. Ijnection Antara (DMPA) 3. Intrauterine Device;)	Contraceptive (condom) used by husband 1. Yes 2. No	Missed the last menstrual period 1. Yes 2. No	If missed period, do a Urine Pregnancy test 1. UPT positive (Provide ANC care) 2. UPT negative (continue PCC)

Prepared in 2018

For further information, please contact:

State Family Welfare Bureau, Department of Public Health,
Raj Bahadur Mill Road, Naidu Hospital Compound, Pune - 411 001.

United Nations Children's Fund
215 Atrium, Andheri - Kurla Road, Hanuman Nagar,
Andheri (East), Mumbai - 400 059.

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