

## Review Article

# Preconception care: an Indian context

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## ABSTRACT

Sustainable Development Goal -3 is to ensure healthy lives and promote well-being for all ages. To achieve this goal by 2030; targets are to reduce the global maternal mortality ratio to less than 70 per 100,000 live births and end preventable deaths of new-born and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 deaths to at least as low as 25 per 1,000 live births by 2030. Neonatal mortality in India varies by states, but it was reported to be 29 per 1000 live births in the year 2012. India New-born Action Plan (INAP) has stated to achieve neonatal mortality to a single digit by the year 2030. Continuum of care for neonatal survival begins from preconception and continues up to postpartum care. In India, National health programmes exist for adolescent health, safe motherhood and new-born care. However, the crucial period of preconception remains neglected. Strategic interventions targeted towards preconception care include adolescent reproductive health and family planning, nutrition interventions, counselling and birth preparedness. The major challenges faced by India are; compliance towards care from the target population, lack of awareness, delivery of care with inefficient program monitoring and evaluation.

**Keywords:** Continuum of care, Neonatal survival, Preconception care

## INTRODUCTION

Millennium Development Goal-4 (MDG-4) stated the reduction by two-third of the mortality among children aged less than five years till 2015.<sup>1</sup> While under-five mortality has reduced in recent years due to improvement in infant and child survival, however lack of progress despite of increased efforts in reducing neonatal mortality is causing stagnation.<sup>2</sup> In the year 2015, introduction of United Nations Sustainable Development Goal-3 (Ensure healthy lives and promote well-being for all at all ages) targeted to reduce the global maternal mortality ratio to less than 70 per 100,000 live births and end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 deaths to at least as low as 25 per 1,000 live births by 2030. Of all the child deaths in India, nearly half are

neonatal deaths i.e. death during the first month of life.<sup>3</sup> Of the four million neonatal deaths that occur globally every year, 98% primarily occur in developing countries.<sup>1,4</sup>

## NEONATAL MORTALITY IN INDIA

In India, approximately one million neonates die each year, contributing to one-fourth of the global burden.<sup>5</sup> Overall neonatal mortality in India varies by state, but it was reported to be 29 per 1000 live births in the year 2012.<sup>1,6</sup>

According to National Family Health Survey (NFHS-3), neonatal mortality rates in rural areas are higher by 50% than in urban areas.<sup>7</sup> India's target of under-five mortality is 38 deaths per 1000 live births by 2015.<sup>8</sup> However, achievement of this MDG will particularly depend on

reduction in neonatal mortality and accelerated progress is required in some of the states to reduce neonatal mortality.<sup>8</sup> In September 2014, India Newborn Action

Plan (INAP) has stated to achieve neonatal mortality to a single digit by the year 2030.<sup>6</sup>

**Table 1: Interventions of National health mission focusing on newborns.**

Programme (year)	Objective	Status
Janani Suraksha Yojana (JSY) (2005) Integrated	Safe motherhood intervention to increase institutional delivery through demand-side financing and conditional cash transfer	-Implemented in all States and Union Territories (UTs) -Special focus on Low-Performing States
Integrated Management of Neonatal and Childhood Illnesses (IMNCI) at the community level and F-IMNCI at health facilities (2007)	Standard case management of major causes of neonatal and childhood morbidity and mortality	-Operationalized in more than 500 districts - 5.9 lakh health and other functionaries, including physicians, nurses, and ASHAs trained under IMNCI - 26,800 medical officers and specialists placed at the CHCs/FRUs trained under F-IMNCI
Navjaat Shishu Suraksha Karyakram(NSSK) (2009)	Basic newborn care and resuscitation training programme	-1.3 lakh health providers trained to date
Janani Shishu Suraksha Karyakram (JSSK) (2011)	Zero out-of-pocket expenditure for maternal and infant health services through free healthcare and referral transport entitlements	-Implemented in all States and UTs - Assured service package benefits extended to sick children up to age one
Facility Based Newborn Care (FBNC) (2011)	Newborn care facilities at various levels of public health services that includes Newborn Care Corners (NBCCs) at all points of childbirth to provide immediate care; Newborn Stabilization Units (NBSUs) at CHC/FRUs for management of selected conditions and to stabilize sick newborns before referral to higher centers; and Special Newborn Care Units (SNCUs) at district/sub-district hospitals to care for sick newborns (all types of care except assisted ventilation and major surgeries)	- 14,135 NBCCs established at delivery points to provide essential newborn care - 1,810 NBSUs established at CHCs/FRUs - 548 SNCUs established at district/sub-district hospitals or medical colleges - More than 6,300 personnel provided FBNC training - Online reporting system adapted and scaled up in seven states with 245 SNCUs made online and more than 2.5 lakh newborns registered in the data base.
Home Based Newborn Care (HBNC) (2011)	Provision of essential newborn care to all newborns, special care of preterm and low-birth-weight newborns; early detection of illness followed by referral; and support to family for adoption of healthy practices by ASHA worker	-Implemented in all States and UTs - Most of the ASHAs trained in newborn care - ASHAs visited more than 12 lakh newborn in 2013
Rashtriya Bal Swasthya Karyakram (RBSK) (2013)	Screening of children with birth defects, diseases, deficiencies, and developmental delays (including disabilities)	-All children, ages 0 to 18 years targeted -More than 8 crore children screened and more than 10 lakh children identified for tertiary care in 2013

## CAUSES OF NEONATAL DEATHS

Indian Council of Medical Research reported that infections (32.8%), birth asphyxia (22.3%) and prematurity (16.8%) are the common causes of neonatal deaths.<sup>3</sup> Preterm delivery, low birth weight and hypothermia are the major contributing factors in many deaths.<sup>2</sup> The risk factors for neonatal mortality in the preconception period are age at marriage, age at first

pregnancy, birth spacing (use of contraceptive pills), multiple births, lack of adequate nutrition and micronutrient supplementation, self-medication, history of infectious conditions as well as chronic conditions, maternal stature and psychological illness.<sup>9,10</sup>

The pregnancy risk factors for neonatal mortality are maternal nutrition, incomplete immunization, infectious conditions, pre-eclampsia, gestational diabetes, aseptic conditions, preterm labor, improper labor surveillance

and unhygienic delivery practices, hypothermia, birth asphyxia, low birth weight, improper feeding practices and pneumonia. Targeted intervention at each of the above mentioned stage reduces neonatal mortality.<sup>11</sup> However, in India, many of the interventions have been towards reducing pregnancy risk factors, but none targeted towards preconception care.<sup>12</sup> Perhaps evidence shows the need of interventions towards preconception care.

## NEO-NATAL SURVIVAL

According to the Lancet Neonatal Survival Series on Evidence based cost effective interventions, the continuum of care for neonatal survival begins from preconception and continues up to post-partum care.<sup>11</sup>

The continuum of care for neonatal health refers to the continuity of individual care. It is necessary throughout the lifecycle (adolescent, preconception, pregnancy, childbirth and post-natal). It provides the conceptual framework for targeted interventions.<sup>13</sup> However, in the present scenario of India, programmes like ARSH (Adolescent Reproductive and Sexual Health), Janani Suraksha Yojana, ante natal services, Navjaat Shishu Suraksha Karyakram, Facility Based Newborn Care, Integrated Management of Neonatal and Childhood Illnesses (IMNCI) at the community level exist for adolescent health, safe motherhood and newborn care respectively. But the crucial period of preconception remains neglected, thereby creating a gap in the interventions provided throughout the continuum of care.

**Table 2: Intervention for pregnancy risk factors that would reduce cause-specific neonatal mortality.**

Period	Intervention package (Main elements)	Reduction: all cause neonatal mortality
Antenatal/ Intrapartum/Postnatal	Family care: clean home delivery, thermal care, breast feeding promotion	10-50%
Antenatal	Antenatal care: physical exam, tetanus toxoid, detection and treatment of syphilis and pre-eclampsia.	10-20%
	Malaria (intermittent presumptive treatment)	10-30%
	Detection and treatment of asymptomatic bacteriuria.	Incidence of prematurity or low birth weight: 20-55%
Intrapartum	Skilled maternal and immediate neonatal care.	Skilled birth care:20-30%; resuscitation:5-20%
	Emergency obstetric care: management of complications-obstructed labor, hemorrhage, hypertension, infection.	10-15%
	Antibiotics for preterm premature rupture of membranes. Antenatal corticosteroids for preterm labor.	Incidence of infections:15-45% 25-50%
Post-natal	Extra care for low birth weight infants: extra warmth, hygiene, feeding.	20-40%
	Case management for pneumonia.	10-35%
	Emergency neonatal care: Management of serious illness (infections, asphyxia, prematurity, jaundice)	15-50%

## KEY INITIATIVES TAKEN BY GOVERNMENT OF INDIA TO ADDRESS PREGNANCY RISK FACTORS

In India, majority of programmes are targeted towards reducing pregnancy risk factors and reducing neonatal mortality. The Government of India<sup>5</sup> has launched various initiatives to improve neonatal health (Table 1). 'Janani Suraksha Yojana' has been implemented to increase institutional delivery and provide skilled new born care at birth. Under Reproductive and Child Health, quality antenatal care and Integrated Management of Neonatal and Childhood illness (IMNCI) has been initiated. The government, with the help of UNICEF has set up Special Care Newborn Units (SCNUs) for managing sick newborns. Further, Newborn Stabilization

Units (NBSUs) have been set up at first referral points and community health centers to provide care to referred sick new born. New Born Care Corners (NBCBs) have been set up to commence resuscitation, infection control and breast feeding within the labor room.<sup>5</sup> Navjaat Shishu Suraksha Karyakram (NSSK) has been initiated to provide interventions at the time of birth such as, prevention of hypothermia, infections, early initiation of breast feeding and basic newborn resuscitation.<sup>14</sup>

## PRECONCEPTION CARE

Preconception care (PCC) is defined as "any preventive, promotive or curative health care intervention provided to women of childbearing age in the period before (at least 2 years) and between consecutive pregnancies, to improve health related outcomes for women (regardless of their

pregnancy status), newborns and children up to 5 years of age<sup>9</sup>. It is a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management.<sup>12</sup>

## HISTORY OF PCC

The concept of pre-pregnancy care was first stated in the year 1979, which mainly focused on child care. The comprehensive package included elements such as inter-conceptional care, prenatal, perinatal, child health care, services for disabled children and adolescent services.<sup>15</sup> Preconception care generally refers to the women's health status and risks before the first pregnancy and her health status shortly before any conception while inter-conceptional care refers to health status between pregnancies, birth spacing and subsequent conceptions. In the year 1985, Institute of Medicine (IOM) published 'Preventing Low Birth Weight' and stated that various

risk factors are present before pregnancy that results in low birth weight but these factors are overlooked. It highlighted the importance of risk identification, counseling and risk reduction; health education related to pregnancy outcome, particularly low birth weight. The IOM committee also recommended that family planning services and reproductive education for school children should be made an integral part of preconception initiatives. In 1989, the Expert Panel on the Content of Prenatal Care made few recommendations and referred preconception care as "opportunistic care" which would include risk assessment, health promotion, and intervention and follow up. In 1993, the March of Dimes Birth Defects Foundation published 'Toward Improving the Outcome of Pregnancy: The 90s and Beyond' introducing the concept of 'reproductive awareness' as the health promotion strategy to improve pregnancy outcomes. Thus, comprehensive package of integrated services was advocated rather than categorical programs.<sup>15</sup>

**Table 3: Preconception risk factors, effect on birth outcomes and effect of preconception interventions.**

Preconception risk factors	Effect on birth outcomes	Effect of intervention
Advanced maternal age	Increased risk of perinatal death by 44% and preterm birth by 29%. Increased risk of down's syndrome	No evidence
Teenage pregnancy	50% increased risk of still births and preterm births	Educational and vocational support, sex education, medical care, sports and arts, free STI testing and condoms reduced the incidence by 50%
Iron and folate deficiency Multi vitamin deficiency	Folate deficiency associated with neural tube defects. Iron deficiency anemia associated with increased risk of fetal growth.	Folate supplementation reduced risk of NTDs-occurrent by 16-44% and recurrent by 72-76%. Multivitamin supplementation reduced the risk of limb defects (19-76%), congenital tract defects (18-65%) and preeclampsia (27%).
Underweight	Increased risk of preterm birth by 32%	Balanced protein energy supplementation: increased birth weight
Overweight	Increased risk of preeclampsia and GDM	No evidence
Diabetes	Increased risk of congenital malformations and still births	Screening and management 70% reduction congenital malformations
Chronic hypertension	Increased risk of preterm birth.	-
Sexually transmitted infection and HIV	Increased risk of abortions, premature births and congenital infections.	Mass treatment with antibiotics -22% reduction in prevalence. Behavioral/counseling- 35% decrease in STI incidence.
Rubella and HBV	Congenital anomalies, LBW and prematurity	No evidence
Medication use	Weight loss drugs- Increased risk of congenital anomalies. Contraceptives- Increased rate of down syndrome	No evidence
Smoking	Preterm deaths and sudden infant death syndrome	Health education- reduces infant deaths by 5%
Pesticide exposure	Increased risk of NTDs, limb anomalies, fetal death and pregnancy complications (Spontaneous abortions)	No evidence



## ROLE OF PRECONCEPTION CARE IN NEO NATAL SURVIVAL

Poor nutritional status of women is related to poor growth of fetus. National Family Health Survey-3 has reported that maternal nutritional status is the most important determinant of low birth weight of newborn.<sup>7</sup> Low Body mass index, underweight and iron deficiency anemia is significantly associated with low birth weight and fetal growth retardation. Chronic conditions such as hypertension and diabetes increases the risk of low birth weight and fetal growth retardation. Hepatitis B virus infection and sexually transmitted infections like TORCHs (toxoplasmosis, rubella, cytomegalovirus, herpes simplex and syphilis) in women before pregnancy increases incidence of low birth weight, preterm birth and pregnancy losses. Exposure to teratogens such as pesticide, drugs, tobacco smoking, mishri, radiation, some chemical etc. can affect the organogenesis of fetal development leading to low birth weight and preterm birth. A systematic review by Dean et al in 2012 reports large body of evidence showing the impact preconception interventions on maternal and infant outcome (Table 3).

## PRECONCEPTION CARE IN INDIA

Keeping in view the animosity of maternal deaths and neonatal deaths in India and the evidence based effect of preconception intervention; it becomes necessary to extend the maternal care package in the preconception period as well. However, in LMIC like India extending the package would be a both financial and logistic challenge. A senior official from Thailand's Ministry of Public Health said in a South East Asian expert group consultation on preconception care (New Delhi, India, August 2014): "A programmatic goal of screening, providing prophylactic medication and treating all pregnant women for anemia is very different from a programmatic goal of ensuring that all women of reproductive age are anemia free, is very different in scale, complexity and cost. I would not know where to begin."

Perhaps, Ministry of Health and Family Welfare in September 2014 launched India Newborn Action Plan<sup>6</sup>, which has proposed six pillars of intervention packages such as Pre-conception and antenatal care; Care during labor and child birth; Immediate newborn care; Care of healthy newborn; Care of small and sick newborn; and Care beyond newborn survival. Strategic interventions targeted towards preconception care include Adolescent reproductive health and Family planning, Nutrition related interventions, Counselling and birth preparedness and prevention against malaria. The major challenges faced by India are; compliance towards care from the target population, lack of awareness, impeccable delivery of care and program monitoring and evaluation.

However, in India, late identification of pregnancy limits the target population to adolescent girls and newly married nulliparous women. Impeccable service delivery

is to be looked on as providing extended interventional maternal package requires continuous monitoring and evaluation as to huge amount of finances are involved. On the other hand, studies conducted in high income countries suggest that preconception care programmes are effective and result in cost savings. Though delivering these services require huge amount of resources, the costs are nullified by the averted complications.<sup>16,17</sup> We have achieved a global consensus that preconception care is important as it addresses both maternal care and neonatal care.

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