POSTPARTUM PHASE

OUR CONTINUED RESPONSIBILTY

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From the desk of Dr. Rishma Dhillon Pai
FOGSI President 2017

Dear FOGSIANS,


Dr. Rishma Dhillon Pai

It gives me great pleasure to present to you the first FOGSI Focus of the year 2017. The subject 'Post –Partum Phase – Our continued responsibility' was chosen by me as a subject of extreme importance as many of us pay a lot of attention to our pregnant patients and attend meticulously to their delivery, however during the post partum phase, we often get lax. In this FOGSI Focus, we have addressed the common complications and problems, and have applied a multidisciplinary approach to the care of the post partum woman. We have expert inputs from psychiatrist, physical trainer, nutritionist, pediatrician and ofcourse obstetricians. This kind of integrated approach helps give best care to the patients.

The days and weeks after childbirth – the postnatal or postpartum period – is a crucial phase in the lives of mothers and newborn babies.

The postpartum period has been termed the "fourth stage of labor", and has three distinct but continuous phases as per Romano's description.

The initial or acute period involves the first 6–12 hours immediately after delivery. This is a time of rapid change with a risk for serious complications such as postpartum hemorrhage, uterine inversion, amniotic fluid embolism, and eclampsia.

The second phase is the subacute postpartum period, which lasts for 2–6 weeks. During this phase, the body is undergoing significant changes in terms of hemodynamics, genitourinary recovery, metabolism, and emotional status. These changes are quite slow and the patient can often perceive them herself. These may be ranging from perineal pain to peripartum cardiomyopathy or severe postpartum depression.

The third phase is the delayed postpartum period, which can last up to 6 months. Changes during this phase are extremely gradual and severe problems are rare. This is the time of restoration of muscle tone and connective tissue to the pre-pregnant state. A woman's body is not fully restored to pre-pregnant physiology until about 6 months post delivery.

Changes to the genitourinary system take a long time to completely recover and may never fully come back to the pre-pregnant state. Vaginal delivery may in many cases lead later on to stress urinary incontinence, incontinence of flatus or feces, uterine prolapse, cystocele, and rectocele. Of course these depend on the patients intrinsic collagen support, the size of the baby and the extent of perineal trauma occurring. A meta-analysis by Carroli compared restrictive to liberal use of episiotomy in 4850 women, and concluded that liberal use of episiotomies conferred no benefit.

Even Caesarean deliveries are not free of problems and complications. Bladder and ureteric injuries occur almost exclusively in caesarian births especially in repeat caesarean section. Even cesarean delivery does not definitely prevent postpartum anal incontinence.

Many women when they resume sexual activity after 2 or more months after delivery have some sexual complaints, though the discomfort is much lesser in patients with caesarian section.

During pregnancy most women do not realize what being mother will be like. The changes women undergo do not just include the physical changes that occur after delivery but social and psychological changes as well .Most women find the handling of a new baby quite difficult. Tiredness is a common problem. Many women feel alone or isolated as the husbands get back to work soon and they have to single handedly manage the baby. Women also feel a sense of loss- a loss of time, freedom or loss of control. Many women feel depressed and unable to cope. Having help and support obviously helps ease these problems and good knowledge and information about caring for a newborn baby helps women cope enjoy this wonderful phase of life.

Rishma Dhillon Pai

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Differential Diagnosis And Management

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Introduction

Childbed fever has been described since Hippocratic times as devastating and tragic; in the 18th and 19th centuries it was the leading cause of maternal mortality mainly due to peritonitis and septicemia. The incidence of postpartum fever in Western literature is approximately 4 to 8%, and as high as 10 to 12% in India. Postpartum fever, also known as puerperal fever or puerperal infection, is defined as a temperature rise above 38.0° C (100.4° F) maintained over 24 hours or recurring from the end of the first to the end of the tenth day after childbirth or abortion. The fever may occur on any two of the first 10 days postpartum, exclusive of the first 24 hours. Benign single-day fevers in the first 24 hours after vaginal delivery are usually low grade and resolve spontaneously; they are more common in primigravid patients. In the absence of proper follow-up, many cases of puerperal infection go undiagnosed.

Though fever is not an automatic indicator of puerperal infection, any fever within 10 days postpartum should be aggressively investigated and managed. Postpartum fever may be due to a wide range of entities occurring after child birth or during breast feeding. Endometritis, mastitis, wound and urinary tract infection and septic thrombophlebitis are the chief causes. This chapter discusses the common causes, their diagnosis and management.

Pathogens

Transmission of infecting organisms can be nosocomial (acquired in hospitals), exogenous due to unhygienic conditions and endogenous due to mixed flora present in the woman's own genital tract. Various pathogens cause postpartum fever; major pathogens shown in Table 1 are:

- Group A Streptococci (GAS), Streptococcus pyogenes
- Escherichia Coli
- Staphylococcus aureus
- Methicillin Resistant Staphylococcus Aureus (MRSA), Clostridium septicum and Morganella morganii.

Predisposing Factors[1]

General factors:

- Unhygienic conditions during labor and delivery
- Low socioeconomic status
- Poor nutrition
- Anemia
- Diabetes mellitus
- Obesity

- Preexisting genital or urinary tract infection
- Chronic conditions like congestive heart failure, chronic liver disease and systemic lupus erthyematosus.
- Immunosuppressant medication

Obstetric factors:

- Premature rupture of membranes
- Prolonged labor > 24 hours
- Repeated cervical examinations in labor
- Use of fetal scalp electrode in labor
- Obstetrical maneuvers
- Cesarean delivery
- Rescue cerclage
- Postpartum hemorrhage
- Retained products of conception
- Nipple trauma during breastfeeding
- GAS (Group A streptococcal) infection in close contact
- Urinary catheterization

Symptoms, Signs And Investigations

A careful history may help differentiate endometritis from other causes of postpartum fever, as seen in Table 2. Common symptoms associated with puerperal fever are:

- Fever and chills
- Flank pain, dysuria, and frequency of urine
- Redness and drainage of pus from the surgical incision or episiotomy site
- Cough, pleuritic chest pain or dyspnea, in cases of respiratory infection.
- Abdominal pain sometimes in absence of fever
- Foul-smelling lochia
- Tender engorged breasts[2]

The focus of the physical examination should be on identifying the source of fever. A complete physical examination, including pelvic and breast examination, is necessary. Findings may include the following:

- Patients with wound infections or episiotomy infections may have tenderness and discharge from the site
- Patients with mastitis may have very tender and engorged breasts; this is frequently unilateral
- Patients with pyelonephritis or urinary tract infections may have tenderness at the costovertebral angle and an elevated temperature
- Rales, consolidation, or rhonchi in pneumonia, are frequently detected in respiratory tract infections
- Patients with septic pelvic thrombosis, although rare, may have palpable pelvic veins
- Puerperal endometritis starts with uterine tenderness, a sign of uterine infection characterized by lower abdominal pain. Rigors, headache and anorexia are common. Pallor, tachycardia, and leucocytosis usually occur, and the uterus is soft, subinvoluted, and tender. Adnexal tenderness may be elicited with bimanual pelvic examination. Lochia may be diminished, foul-smelling or profuse.

Warning signs and symptoms which should prompt urgent referral to hospital:

- Fever more than 38° C
- Sustained tachycardia more than 90 beats /min
- Breathlessness- respiratory rate more than 20 beats /min
- Abdominal or chest pain
- Diarrhea or vomiting
- Uterine or renal angle tenderness

Investigations should be directed to ascertain the cause of fever and include complete blood count, urine analysis, electrolytes, and if indicated or suspected, urine, cervical, blood and wound cultures. Coagulation profile should be done in suspected cases of thrombosis and additional investigations may be carried out to rule out infectious causes of fever. Imaging in the form of pelvic ultrasonography is indicated for suspected retained products of conception, pelvic hematoma or abscess; CT or MRI are confirmatory and also help in diagnosing thrombosis.

Differential Diagnosis & Management

In decreasing order of frequency, the commonest causes of postpartum fever are endometritis, mastitis, retained products of conception, urinary tract infection, deep vein thrombosis, pulmonary embolism and septic pelvic phlebitis. Less common causes include breast abscess, cellulitis, tubo-ovarian abscess and pyelonephritis.

Endometritis

Postpartum endometritis occurs following 1 - 3% of births. It is the most common cause of postnatal morbidity between days 2 and 10. The vagina is colonized by a variety of organisms which cause genital tract infections (Table 1). Under poor aseptic conditions, there is increase in bacterial colonization which results in ascending infection. Local spread results in peritonitis and the possibility of pelvic abscess formation, peritonitis, septicemia and septic shock.

The majority of cases are polymicrobial. In severe cases the infection is almost always caused by group A streptococci. The single most important factor is the route of delivery. Incidence of endometritis increases after cesarean delivery, poor maternal nutrition, obesity, diabetes mellitus, internal fetal monitoring and general anesthesia. The diagnosis should be considered when a postpartum patient is febrile with malaise, abdominal pain or foul smelling lochia. In severe cases, blood culture, high vaginal swab and rarely, endometrial biopsy is performed.

Prevention of endometritis begins with educating the pregnant woman to report immediately if any rupture of membranes is detected or suspected. Other preventive measures include strict asepsis, vaginal cleansing with antiseptic prior to cesarean section and the use of better suture materials (polyglycolic acid is superior to and preferred over catgut).

Treatment is initiated on the assumption that infection is polymicrobial. Antibiotic choice should be guided by type and local source of infection. After initiating antibiotics, the patient's condition improves rapidly in 90% of cases within 48-72 hours. The Royal College of Obstetricians and Gynaecologists guideline for sepsis following pregnancy recommends IV piperacillin/ tazobactam along with clindamycin for severe infections. For moderate infections, co-amoxiclav, metronidazole and gentamycin may be used.

On the basis of a Cochrane review of 42 trials, combination therapy of gentamycin and clindamycin remains appropriate for treatment of endometritis.[3] IVIG is recommended for severe infections if other therapies have failed.[4]

Wound infection

Wound infection occurs in 2- 16% of women who have had a surgical intervention. This rate is related to factors such as the duration of labor, number of vaginal examinations, anemia and use of antibiotic prophylaxis. Examination of the wound will reveal swelling, tenderness, and discharge.

In all cases of wound discharge, a Gram stain and a culture with sensitivity testing should be performed. Debridement, drainage, dressing and resuturing along with appropriate antibiotics form the mainstay of treatment. An infection of the episiotomy site is suspected in patients with significant perineal pain and erythema. Treatment requires surgical excision of necrotic tissue, appropriate antibiotics, drainage and irrigation. The wound is then usually allowed to heal secondarily.

Mastitis

The most common organism is Staphylococcus aureus. It usually comes from the breastfeeding infant's mouth or throat. It may lead to breast abscess[5], necrotizing fasciitis and toxic shock syndrome.

Risk factors for mastitis include faulty feeding techniques leading to cracked or sore nipples, traumatic injuries to the breasts by the use of manual breast pumps or natal teeth. Also blocked milk ducts causing local milk stasis and overall poor maternal nutrition predispose to mastitis.

Clinical signs and symptoms include high grade fever, localized erythema and unilateral breast tenderness. Diagnosis can be effectively made by clinical examination alone and culture of the expressed breast milk can be attempted for microbiological isolation.

Management includes improving technique and continuing breast feeding. Adequate hydration, nutrition, cold compression and rest is recommended for the lactating mother.[6] Effective drainage of milk should be ensured either by feeding or manual expression to prevent stasis. Systemic antibiotics and analgesics are required to control the spread of infection and pain. Abscess may require surgical drainage.

Septic pelvic phlebitis

The risk of thrombosis increases because pregnancy is a hypercoagulable state. It is a rare cause of postpartum fever occurring in 1 in 2000 deliveries. The incidence increases to 1 to 2% among women with post- cesarean section endometritis. A suspicion of septic pelvic thrombosis should be considered when fever fails to respond to standard broad spectrum antibiotics. Patients may complain of flank and lower abdominal pain typically described as non-colicky and constant. The diagnosis is confirmed by CT scan or MRI of the pelvis. CT scan findings include enlargement of the vein involved, low density lumen within the vessel wall and sharp enhancement of the vessel wall. When using MRI, the thrombosed vessel will appear bright whereas normal blood flow looks dark.

The treatment is anticoagulation with low molecular weight heparin along with broad-spectrum antibiotics for 7-10 days covering gram positive, gram negative and anerobic organisms. Ampicillin and gentamycin with metronidazole is a common regimen. In case of small pelvic thrombosed vessel, enoxaparin (1mg/ kg) is administered for 1 week. Only in cases of right ovarian vein thrombosis, treatment with warfarin is recommended for 3 months. A follow up with pelvic MRI is recommended after 3 months. Surgical ligation of infected veins is done for patients who fail to respond to medical therapy.

Urinary tract infection

Gram negative bacterial infections are the most common cause of UTI. Dehydration during labor, repeated and indiscriminate catheterization and postpartum retention of urine contribute to UTI.

Urinary tract infection presents with increased frequency of urination and dysuria. The diagnosis is based on physical findings and a urine specimen containing greater than 10^5 colony forming U/mL. Escherichia coli accounts for majority of infections. Other Gram negative rods such as Klebsiella pneumoniae are also common.

In pregnancy and the puerperium, increased bladder volume and decreased bladder tone contribute to increased urinary stasis and ureterovesical reflux; more so in patients who have received epidural analgesia. Of all risk factors, catheterization contributes most to the incidence of urinary tract infections.

Acute pyelonephritis during the puerperium is diagnosed when the presence of bacteriuria is accompanied by systemic symptoms or signs such as fever, rigors, nausea, vomiting and abdominal pain. Early, aggressive treatment with appropriate antibiotics like trimethoprim – sulfamethaxazole, nitrofurantoin and fluoroquinolones is important. These antibiotics are considered safe for nursing infants. Trimethoprim –sulfamethaxazole and nitrofurantoin should be avoided in nursing mothers with G 6 PD deficiency. As fluroquinolones can cause pediatric cartilage and joint damage, it should not be first line therapy and breast feeding may be discontinued temporarily.[7]

Pelvic abscess
Pelvic abscess should be suspected if there is persistent spiking fever despite antibiotic coverage. An ultrasound examination or computed tomographic scan aids in formulating the diagnosis. The treatment of choice is surgical drainage.

Pneumonia
Severe hemoptysis and low peripheral white cell count may suggest staphylococcal necrotizing pneumonia. Identification is done by sputum culture.

Skin and soft tissue infections
Any injection site or intravenous line, and cesarean or episiotomy wounds should be checked.

Gastrocolitis
Diarrhea and vomiting can be present. Salmonella, C. difficile and campylobacter can be associated with early shock.[2]

Pharyngitis
It is mostly viral. Only 10 percent cases have a bacterial cause.

Other Causes
As with any patient with fever, other causes such as connective tissue disease, malignancy, viral infection, HIV infection or bacterial endocarditis should be ruled out if patient is unresponsive to standard therapy.

Sequelae
If postpartum infection is left untreated, sepsis can set in and lead to septic shock and mortality, or long-term complications like scarring and infertility.

Prevention
Aseptic precautions, advances in investigative tools and antibiotics have played a major role in reducing the incidence of postpartum fever. Antibiotics are the mainstay of treatment. It is recommended to follow standard guidelines referenced above, RCOG and WHO, which outline various antibiotics.[8] The current literature describes two main techniques for puerperal sepsis prevention. The first, hand hygiene, is the most important component of infection control. The second technique, intravaginal application of antiseptics such as iodine prior to cesarean section, has also been proposed for routine use.

Indication for prophylaxis to family

Close household contacts should be warned about the symptoms of GAS infection and should seek medical attention when symptoms develop. Prophylaxis would be administered with exposure to respiratory secretions.[9]

Conclusion

It is evident from the literature that various efforts have been made in reducing maternal mortality from postpartum fever. Postpartum infections are still an issue in developing countries like India. The principles of management include assessment of risk factors, a detailed history, a complete physical examination, appropriate laboratory tests and treatment of the cause. All pregnant and recently delivered patients should be educated about the signs and symptoms of genital tract infection and its prevention.[10]

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Table 1: Pathogens Causing Postpartum Fever

Type	Names
Gram-positive cocci	Staphylococcus, Streptococcus, (especially Group B streptococcus, Streptococcus pyogenes)
Gram-negative	E. coli, Chlamydia, Klebsiella, Gardenella, Proteus
Anerobes	Peptostreptoccus, Bacteroides
Others	Ureaplasma, Ureaplasma, Tuberculosis

Table 2: Clinical Features and Management of Postpartum Fever

Condition	Clinical Findings	Management
	Minimal signs	Cultures not necessary
Endometritis	Moderate fever	IV antibiotics to cover polymicrobial organisms clindamycin 900 mg 8 hourly, gentamicin 500 mg daily
	Uterine tenderness +	Add ampicillin 1-2 g IV 6 hourly if no response
Wound infection	Persistent spiking fever	Antibiotics for cellulitis
	Wound redness	Open and drain wound
	Wound drainage	Saline soaked packing twice a day, secondary closure
Mastitis	Unilateral erythema, edema, tenderness	Antibiotics, open and drain abscess if present
Urinary tract Infection	High fever, malaise Positive urine culture	Antibiotics as per urine culture sensitivity (cephalosporins 1 g)
	Costovertebral angle tenderness	Suspect pyelonephritis
Septic pelvic thrombophlebitis	Persistent wide fever swings despite antibiotics	Heparin for 7 - 10 days
	No changes or mild rales	Ambulation
	Mild to moderate fever	Breathing exercises

Getting back into shape after childbirth

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Obesity and overweight have become a global epidemic now. They are the fifth leading risk of deaths, resulting in around 2.8 million deaths of adults globally every year. India has more than 30 million obese people, and the number is increasing alarmingly. The problem is more acute among women than men. In urban India, more than 23% of women are either overweight or obese (Prusty, Gouda, 2015)[1].

The childbearing years are an important life stage for women that may result in substantial weight gain. Weight gain before, during, and after pregnancy may be a primary contributor to the future development of obesity in women during midlife and beyond. This in turn can increase the risk of diabetes, heart disease and hypertension (Gunderson, 2009)[2].

The Health Sciences Descriptor of Virtual Health Library states that postpartum or puerperium is "a period from delivery of the placenta until return of the reproductive organs to their normal non-pregnant morphologic state. In humans, the puerperium generally lasts for six to eight weeks". However, it is recommended to increase the definition of the postpartum period to one year, because many physiologic changes due to pregnancy remain up to one year after childbirth, such as the duration of breastfeeding (Adegboye, Linne, 2013)[3]

Postpartum Weight and Normal Weight Loss Patterns:
Post-partum weight retention is defined as the difference between the weight at sometime after delivery and weight prior to pregnancy. The greatest amount of weight loss occurs in the first three months postpartum and then continues at a slow and steady rate until six months postpartum. However the reported proportion of women retaining 5kg or more 6 to 12 months post-partum has ranged from 14% to 25% (Oken et al, 2007)[4].

Factors determining Post-Partum Weight Loss:
The first step towards aiding women to shed the gained pregnancy weight is to identify the factors that could be associated with post-partum weight change. These are:

1. Physical Activity and Exercise
2. Diet and Calorie intake
3. Social Support
4. Breastfeeding
5. Pre-pregnancy Weight and Gestational Weight Gain
6. Post-partum depression

1. Physical Activity, Exercise and Diet:

Poor diet and low physical activity are well known to contribute to obesity. Oken et al[4], conducted a prospective cohort study of 902 women to examine the associations of postpartum television viewing, walking, and trans fat intake with weight retention ≥5kg at 12 months postpartum. The results showed that television viewing and trans fat intake in the early postpartum period were directly associated, and walking inversely associated, with substantial weight retention at 1 year postpartum. Effects of these three behaviours were additive, as women who watched less than 2 hours of television, walked at least 30 minutes, and consumed below the median amount of trans fat daily had an estimated 77% reduced odds of retaining at least 5kg compared with women who reported none of the beneficial behaviours. Other studies that support the same are the Stockholm Pregnancy and Weight Study, in which women who retained more weight 1-year postpartum were less likely to report regular exercise, and more likely to report inconsistent meals and between-meal snacking.

Regular exercises in the postnatal period help:

1. To return to the pre-pregnant weight faster
2. Relieve back pain
3. Improve muscle tone
4. Reduce cramps & constipation
5. Increase energy levels helping to cope with demands of motherhood.
6. Endorphin release promotes a feeling of confidence & well being.

Exercise Prescription:

According to the American College of Obstetricians and Gynecologists (ACOG) guidelines 2015[5], exercise routines can be resumed gradually after pregnancy as soon as medically safe, generally 4 weeks after normal delivery and 6 weeks after a C-Section.

Immediately, post birth, the muscles are still under the influence of relaxin hormone. Hence exercises during that time should be aimed at getting the stretched muscles come back to their original form. Targeted toning exercises should be the focus, avoiding the strenuous ones completely.

- Walking is the easiest form of workout to set a regular routine. Moving on from slow paced initially & progressing to brisk walking gradually, at one's own comfort level.
- Deep breathing with abdominal contraction-Deep Breathing in a sitting posture expanding the belly, followed by a deep exhalation, crunching the belly.
- Kegel exercises-involving the contraction of the pelvic floor muscles, to be repeated frequently.

6- 8 weeks later, after a check up with the doctor, a more extensive program can be started.

F.I.T.T Prescription for exercise:

Frequency: 3-5 days per week

Intensity: Moderate-intensity exercise. This can be defined as follows:

HRmax	60%-80% of HRmax (HRmax= 220-age in years)
RPE	11-13 on 6 to 20 point scale (Fairly light to somewhat hard)
Dyspnoea Scale Index	+2 (Some difficulty in breathing, noticeable to the observer)
Talk Test	Can converse while exercising, breathing is rhythmical and comfortable

Time: Accumulate 150 minutes per week

Type: aerobic in nature that use large muscle groups, maintained continuously, and rhythmical in nature example brisk walking, cycling, swimming.

Those who have exercised in pregnancy, regain their form much faster, simply because their muscles are not allowed to lose tone excessively.

Apart from the aerobic exercises muscle strengthening should also be a part of the exercise program. Strength training involves working on the body's major muscle groups, such as the legs, arms, and hips. Examples include weight training using one's own body weight as in yoga, Pilates, sit-ups, and push-ups. These activities should be done in addition to your aerobic activity on at least 2 days a week.

Running or Jogging, Jumping & racket sports to be avoided up to 6 months. Post 8 to 12 months, higher intensity exercise can be undertaken. The F.I.T.T Prescription would then be as follows:

Frequency: 3 days per week

Intensity: Moderate to Vigorous-intensity exercise. This can be defined as follows:

HRmax	70%-90% of HRmax (HRmax= 220-age in years)
RPE	14-16 on 6 to 20 point scale (Somewhat hard to hard)
Dyspnoea Scale Index	+3 (client can continue to exercise, closer to hyperventilating and going anaerobic)

Time: 30-45 minutes

Type: Aerobic in nature that use large muscle groups, maintained continuously, and rhythmical in nature example running, skipping, jogging, cycling, swimming.

Precautions:

- Consult doctor immediately if there is backache, Pelvic heaviness or urine leaking during exercises.
- At all times they should be done under proper guidance & supervision from an expert.

Exercise and Breastfeeding:

According to the Joint SOGC/CSEP clinical practice guideline, 2003[6] exercise is not thought to have any adverse effects on breast milk volume or composition. Nor is it thought to affect a nursing infant's growth. However lactic acid has been shown to be increased in the breast milk of women exercising at vigorous intensity, but not in those exercising at moderate levels. Mothers who find their baby does not feed as well right after exercising may consider feeding the baby right before exercising (also to avoid exercise discomfort of engorged breast), postponing feeding until 1 hour after exercising, or expressing milk prior to exercising to be used after exercising. The growth of breastfeeding babies of exercising women is normal, even for the infants whose mothers are losing weight as part of their exercise regimen.

Dietary Recommendations:

From conception to exclusive breast feeding (first 6 months) the baby completely depends on mother's nutritional status. Twin factors of physical activity and active production of breast milk make additional demands for energy yielding foods, proteins and other nutrients.

According to the National Institute of Nutrition, Indian Council of Medical Research[7] women who are breastfeeding need about 500 calories more than a woman who is non-pregnant and non-lactating; that is a total of 2,500 to 2,700 calories per day depending on her physical activity.

Calcium is essential, during lactation, for proper formation of bones and teeth of the offspring and for secretion of breast milk rich in calcium and also to prevent osteoporosis in the mother.

Lactating women should not indiscriminately take any drugs without medical advice as some of them could be harmful to the baby.

Smoking and tobacco chewing and consumption of alcohol must be avoided. Wrong food beliefs and taboos should be discouraged.

The recommended diet for a lactating mother is tabulated as follows:

RECOMMENDED DIET FORA LACTATING WOMEN

Food group	Food stuff	Vegetarian	Calories (energy)	Protein mg/di	Non-Vegetarian	Calories energy	Protein mg/di 1
I	Rice ,wheat and millets	330 grams	1138	32.34	330 grams	1138	32.34
	Oil ghee, butter	30 grams	270	nil	30 grams	270	nil
	Sugar and jaggery	20 grams	78	nil	20 grams	78	nil
II	Milk and curd	500 grams	335	16	500 grams	335	16
	Pulses, dried beans	90 grams	357.75	20.14	60 grams	224	14.0
	Meat, fish, egg	---	nil	nil	30 grams or 1 egg	29.1	5.0
III	Fruits	200 grams	232	1.44	200 grams	232	1.44
	Greens leafy vegetables	350 grams	175	9.8	350 grams	175	9.8
	Other vegetables	130 grams	52	2.34	130 grams	52	2.34
	Roots and tubers	120 grams	116	1.8	120 grams	116	1.8
		Total calories = 2754		83.86	Total calories = 2649.1		82.38

Dietary Restriction and its Impact on Breastfeeding:

Since the growth rate of exclusively breastfed infants depends on the energy provided by maternal breast milk, it is paramount to assess the impact of the energy deficit created by diet and exercise on lactation performance. The findings of dietary intervention studies are controversial. While some studies suggested that a calorie-restricted diet had no impact on milk quantity and quality (Dusdieker 1994)[8], other research reported that well-nourished mothers who had consumed less than 1500 kcal/ day experienced a decrease in milk volume and put the growth rate of their babies at risk (Strode 1986)[9]. However these studies are observational and had a small sample size. Future trials will require much larger sample sizes to detect potential effects on milk volume, plasma prolactin concentration and infant length and weight gain.

2. Pre-pregnancy Weight and Gestational Weight Gain (GWG):

The1988 National Maternal and Infant Health Survey (NMIHS)[10] found that women who were overweight before pregnancy were more likely to experience substantial weight retention at 10 to 18 months postpartum than underweight and average weight groups. Gunderson and colleagues examined the impact of pregravid body size on the pattern of weight changes during the early postpartum (delivery to 6 weeks' postpartum) and long-term postpartum (from 6 weeks postpartum to a median 2 years) periods. Weight loss from delivery to 6 weeks' postpartum did not differ by pregravid BMI group, but high BMI groups were three to five times more likely to gain more than 2 kg in the long-term than the average BMI group.

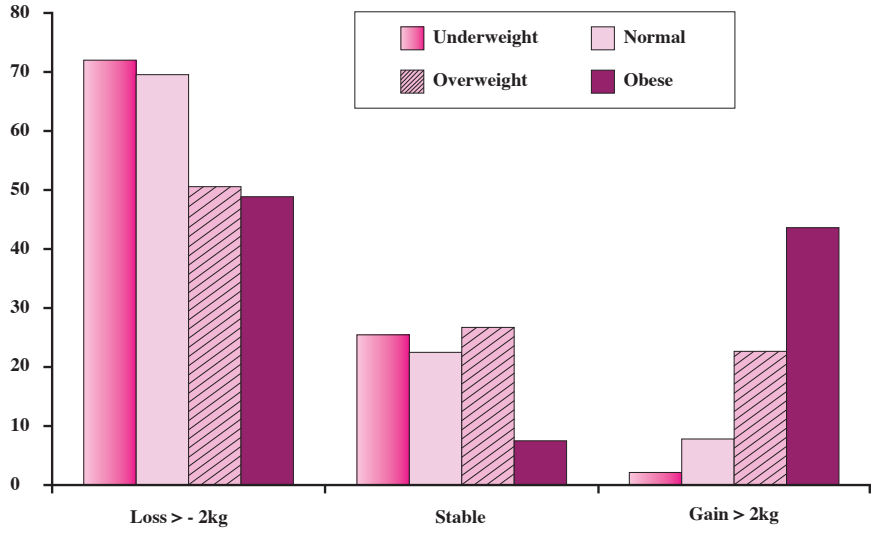

Fig. 1.
Percentage of women within categories of late (6 weeks to 2 years) postpartum weight change (gain>2kg, loss>2kg, and stable±2kg) according to pregravid BMI group. (From Gunderson EP, Abrams B, Selvin S. Does the pattern of postpartum weight change differ according to pregravid body size? Int J Obes Relat Metab Disord 2001;25:860; with permisiion.)

A large body of evidence suggests that a high Gestational Weight Gain (GWG) is a risk factor for high post-partum weight retention which in turn has contributed to the increasing prevalence of overweight and obesity in women (Nehring et al, 2011)[11]. The American Institute of Medicine (IOM)[12] revised the guidelines for GWG in 2009 and recommended the following:

Prepregnant BMI categories	According to IOM recommendations
<18.5	12.5 - 18 kg
18.5 - 24.9	11.5 - 16 kg
25 - 29.9	7-11.5 kg
>30.0	5 - 9 kg

Haugen et al[13] conducted a study on 56,101 women to evaluate if a GWG outside the IOM recommendation is associated with increased post-partum weight retention (PPWR) at 6 and 18 months. The results showed that a GWG > IOM rec. resulted in increased risk of PPWR > 2 kg in all weight classes, but most women attained their pre-pregnant weight class by 18 months post-partum.

As gestational weight gain is one of the strongest predictors for postpartum weight retention, it may be prudent to intervene healthy lifestyle changes during the antenatal period itself. Though the postpartum period is an important phase in women's lives with regard to weight retention, but engaging them during this busy period remains a challenge. The major barriers included a lack of time, maternal low energy levels, low priority of weight loss, overall low motivation and psychological concerns (Martin et al)[14].

Ostbye et al, 2009[15], based on the randomized control trial of 450 mothers called Active Mothers Postpartum wherein the objective was to promote a reduction in BMI through 24-months postpartum via sustainable lifestyle changes concluded that Home-based interventions telephone, or Internet/e-mail may be more feasible and successful in this population.

Thus educating them about healthy lifestyle changes from the antenatal period itself could be an important strategy to avoid postpartum weight retention and its associated health implications.

3. Breastfeeding (BF):

Theoretically, BF should promote weight loss due to the increased energy cost of lactation. Evidence, however, is limited and conflicting about whether women who breastfeed their infants lose more weight than do women who do not breastfeed (Baker et al, 2008)[16]. With this background Baker et al aimed to determine whether breastfeeding reduces postpartum weight retention (PPWR) in a population among which exclusive breastfeeding was common for 6 months and breastfeeding duration as more than one year. 33,535 women were examined at 6 months post-partum and 26846 were investigated at 18 months post-partum. The results breastfeeding was negatively associated with PPWR in all women but those in the heaviest category of pre-pregnancy BMI at 6 months and 18 months postpartum. The study predicted that if women exclusively breastfed for 6 months as recommended, PPWR could be eliminated by that time in women with GWG values of approximately 12 kg, and that the possibility of major weight gain (>5 kg) could be reduced in all but the heaviest women. Neville et al, 2014[17] conducted a systematic review on thirty-seven prospective studies and eight retrospective studies to study the role of breastfeeding in postpartum weight management. The majority of studies reported little or no association between BF and weight change or change in body composition, although this seemed to depend on the measurement time points and BF intensity. The review suggested that there is insufficient evidence to suggest that BF promotes greater postpartum weight loss compared with other methods of feeding. Given the multifactorial nature of postpartum weight change, it is difficult to establish what factors have the greatest influence on weight retention and what areas need to be targeted in preventative measures. BF should therefore be promoted for its health benefits for both mother and child, and should not be solely relied upon as a way for women to lose weight in the post-partum period.

4. Post-Partum Depression:

Postpartum depression is common, with prevalence estimates ranging between 10 and 15%. It is associated with substantial morbidity to both mother and infant, but whether an additional consequence includes weight retention and postpartum obesity merits further investigation. Because postpartum depression is a potentially modifiable condition, determining its relationship to weight retention after childbirth could provide information that might identify women at higher risk for weight-related problems and lead to the design of effective obesity prevention programs for young mothers (Herring et al, 2008)[18].

Herring et al, 2008[18], conducted a prospective cohort study of 850 women to examine the extent to which early postpartum depression is associated with weight retention 1 year after childbirth. The mothers reported depressive symptoms on the Edinburgh Postnatal Depression Scale (EPDS) at mid-pregnancy and 6 months postpartum. The results presented graphically as follows:

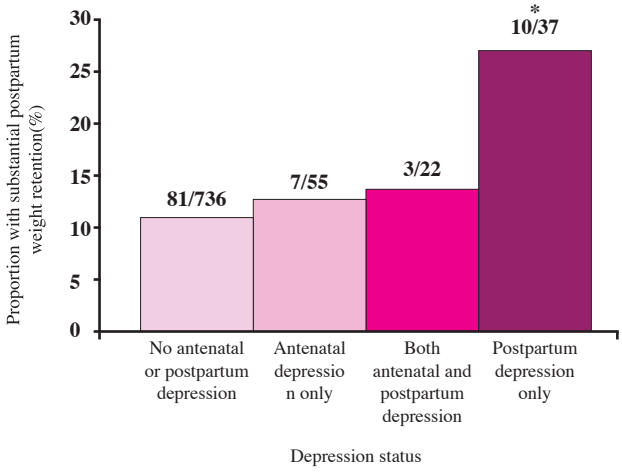

Figure 1

Proportion of women retaining at least 5 kg at 1 year postpartum according to depression status. *P=0.003 for the comparison between postpartum depression only and no antenatal or postpartum depression, via x2-test.

Thus new-onset postpartum depression was associated with more than a doubling of risk of retaining at least 5 kg in the first year post-partum.

Gunderson et al, 2007[19], based on his study on 940 mothers concluded that sleeping <5 hours/day at 6 months postpartum was strongly associated with retaining >5 kg at 1 year postpartum.

Thus interventions to manage depressive symptoms, stress and getting adequate hours of sleep may help to reduce excess weight retained postpartum and aid in the prevention of obesity among women. Also as mentioned earlier exercise through release of endorphins creates a feeling of well-being that helps to reduce anxiety and depression.

Conclusion:

The puerperal period may represent a critical window for long-term weight gain leading to overweight and obesity and its development is the result of a complex network of factors. The multiple physiological, psychological, and social changes taking place in the lives of new mothers should be viewed as an opportunity to make healthy lifestyle changes. However, building up suitable public health interventions that would fit seamlessly into their busy lives remains a challenge.

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Tips for successful Lactation

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Introduction

A healthy newborn is the expected outcome of every pregnancy. Role of the Maternity Service, to our mind, is not just safe child birth but also a healthy newborn who not only breathes properly but also feeds well. It is the responsibility of the Maternity Service, we believe, to look after the newborn from the time of birth till Lactation/ Breastfeeding is established.

Throughout the Animal Kingdom, mammals deliver their babies who instinctively find their mother and start suckling immediately after birth. Though Breastfeeding is the natural consequence of child birth, it is not instinctive knowledge especially for the human beings – breastfeeding needs to be learnt and taught. We call the animals 'sensible' because they breastfeed their young ones – the question is: are we?

The rates for Breastfeeding in India are:

Table 1

	Assam	Bihar	Madhya Pradesh	Maharashtra	World
Early Initiation within an hour of birth ……	64.4	34.9	34.5	57.5	45
Exclusive Breastfeeding till 6 months	63.5	53.5	58.2	56.5	43
Breastfeeding after a year are …….	49.9	30.7	38.1	43.3	74
Breastfeeding at 2 years of age					46

Source: NFHS – 4, 2015-16; From the first hour of life: Making the case for improved infant and young child feeding everywhere (UNICEF, 2016)

As you can see, compared to the global Standards, we fall short. The next question is: why are the national figures for Breastfeeding so abysmally poor? This is a difficult question to answer. Breastfeeding is not a single woman's job. In order to breastfeed, a woman needs help not only from her partner and the family but also from the Community, the health services and the Work Place. All this can't happen without the legislative support from a Government with a strong Political Will. Detailed discussion on this subject is material for another paper.

Stakeholders in makeing breast feeding more effective

From the first hour of life: Making the case for improved infant and young child feeding everywhere (UNICEF, 2016)

Since Breastfeeding is not a one-woman-job, successful lactation depends upon cohesive involvement of a lot many parameters/ factors. A lot of thought was given to this subject/ problem. 'Maternity Services' were identified as the single most important point of intervention and its role in promoting, protecting and supporting Breastfeeding defined. WHO and UNICEF defined the 'Ten steps to Successful Breastfeeding' in 1989 – a simple agenda where every step, individually, is important and counts, but 'all' the steps taken together make a huge impact or difference. Later on, this concept became the basis of the 'Baby Friendly Hospital Initiative' launched by the WHO and UNICEF in 1991 and revised in 2009.

'TIPS' for successful lactation

For Lactation to be successful, preparation should start not just during pregnancy, but much earlier. The strategy should be so designed that every woman will be able to make a conscious decision to Breastfeed her child. For this to happen, all the stakeholders should be actively involved, supported by strong Legislation. Media plays a very important role in shaping the public opinion in today's age.

In Adolescence/ PrePregnancy state

Sensitise young girls and boys towards Breastfeeding by conducting sensitization programs in high schools/ colleges.

Media should emphasize the positive side of Breastfeeding at every opportunity on a regular basis. Advertisement of the Infant Milk substitutes/ Formula Feeds should be banned. IMS Act should be strictly implemented and followed. In fact, public opinion should be so created that every time a baby is to be fed, people should think of Breast milk and not the Formula Feed from a bottle.

In The Antenatal Period

The mother-to-be should not only be convinced about the advantages of Breastfeeding but also should have made a conscious decision to Exclusively Breastfeed her child. This should be fully supported by not only by her partner but also the family and should be endorsed by the community.

The 'Maternity Service' where she chooses to deliver should adopt all the Baby-Friendly practices and adhere to the 'Ten Steps to Successful Breastfeeding'.

Box 1

10 STEPS TO SUCCESSFUL BREASTFEEDING

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding.

4. Help mothers initiate breastfeeding within a half-hour of birth.

5. Show mothers how to breastfed, and how to maintain lactation even if they should be separated from their Infants.

6. Give newborn infants no food or drink other than breast milk, unless medically indicated.

7. Practice rooming in allows mothers and infants to remain together 24 hours a day.

8. Encourage breast -feeding on demand.

9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Source: Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services, a joint WHO/UNICEF statement published by the World Health Organization

Antenatal counseling sessions (individual or group discussions/ meetings including the mother-in-law and the husband): where the concept of Breastfeeding is introduced laying stress on advantages of Breastmilk and disadvantages of formula feeds. Myths/ taboos are discussed and misconceptions about Breastfeeding refuted. (Picture 2)

Examination of the breasts antenatally, as a routine, is not advocated. This is shown to undermine the mother's confidence to breastfeed her child. Breasts should be examined only when the mother-to-be has specific complaints. The breasts soften after delivery and most women with Inverted/ Retracted nipples are able to breastfeed, albeit with some specialized help. For detailed discussion on the subject see the bibliography.

Breastfeeding Policy should be prominently displayed in the reception and areas where patients/ relations spend time

Pictures of mothers/ animals breastfeeding and reading material promoting Breastfeeding should also be displayed and distributed.

No material promoting Formula Feeds or advertisements of materials (pacifiers/ bottles etc) should ever be displayed on the premises.

In the Birthing Suite / the Intranatal Period

The labour should be well monitored and easy – a short properly managed labour with the help of Partogram has some bearing on Breastfeeding: a mother who is not scared, troubled or exhausted during labour is more conducive to Breastfeeding

Presence of a companion or personal Support during labour makes the labour easy and mother more comfortable to breastfeed

Adequate pain relief should be offered to all the parturients. Painless Labour with judicious use of Labour Analgesia keeps the mother in a better condition to breastfeed the baby. Epidural Anaesthesia may be offered if facilites are available. The Programmed Labour Protocol may be used in resource poor settings especially where Anaesthetists are not available. This does not affect either the mother's or the neonate's ability to breastfeed immediately after birth

Mode of delivery has no bearing on Breastfeeding, provided it is well managed – be it normal, instrumental (vacuum/ forceps) or Caesarean Section.

Initiation of breastfeeding by 'Breast Crawl' should be practiced in almost all births: normal/ Instrumental/ Caesarean. www.breastcrawl.org (Picture 3)

All routines like weighing the baby, giving injection Vit K, anthropologic measurements, wrapping the baby etc should be delayed till after the first feed. Baby bath in the first 24 hours should be discouraged.

In the Wards

After birth, the baby should not be kept away from the mother in a 'Nursery'. In fact, 'Bedding-in' rather than 'Rooming-in' should be practiced and adequate support should be provided not just antenatally but especially postnatally to help the mother breastfeed (role of the Mother Support Group).

Encourage Kangaroo Mother Care, even in normal newborns

Restrict the number of relations visiting the newborn

Avoid pre-lacteal feeds

Proactive or Cue-based Feeding should be practiced where the mother is encouraged to feed her baby at least 10 – 12 times in 24 hours for the first few days. Switch over to Demand feeding once lactation is established. Avoid unnecessary Supplementary or Top Feeds. Glucose/ Sugar solutions should never be fed to the baby

Teach mothers to recognize 'Early Feeding Cues' (Box2) and 'How to wake up a Sleepy Baby' (Box3) to practice Que-based feeding proactively.

Every mother should be practically taught how to hold the baby, how to position the baby on the breast and proper Attachment (Box 4, Figure 1). She should also be taught Manual Expression of the Breast before discharge from the maternity unit. (Box 5, Figure 2)

Lactation is established faster when the husband helps in breastfeeding and the family supports

Avoid the use of pacifiers, feeding bottles and routine use of non-medically indicated formula feeds

Mother-infant dyad is to be discharged preferably after Lactation is established and she is confident of managing the baby on her own.

In case of early discharge, the feeding position/ attachment/ latch is to be checked preferably by a Lactation Consultant and technique of Milk Expression taught.

Early discharges need to be strictly followed.

After Discharge

The dyad is called back after 24/ 48 hours to check the baby's weight and look for jaundice and the hydration status. Weight loss of more than 10% from baseline requires more intensive evaluation by a Neonatologist/ Paediatrician and possible intervention.

After discharge from the hospital/ maternity unit, contact with and active support from the Mother Support Group and the Community is vital and may go a long way in sustaining exclusive breastfeeding.

Maternity Leave for at least six months from the Workplace will ensure Exclusive Breastfeeding for the first six months and a Baby-Friendly work environment where flexible working hours and 'Breastfeeding breaks' are encouraged in specially designed 'Feeding Rooms'(concept of the already functional "Hirkani's Room" in Maharashtra) will encourage continued breastfeeding till two years of age.

Proper Contraceptive advice will prevent unplanned pregnancies, ensuring proper 'spacing' between two pregnancies – giving full nutritional advantage to both the babies and the mother, preventing deficiencies and diseases.

Conclusions:

It is the responsibility of the Maternity Service, headed by a Baby-Friendly Obstetrician, that a healthy baby after safe child birth not only breathes well but also feeds properly before discharge.

The onus for successful establishment of breastfeeding lies entirely on the Maternity Service.

Successful breastfeeding doesn't just happen. Since Breastfeeding is not instinctive knowledge, it needs to be taught and learnt. There has to be a structured program/ strategy for this to happen. A Maternity Service which adopts the BFHI practices and imbibes ALL the 'Ten Steps to Successful Breastfeeding' into its working is the key to Successful Lactation.

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Picture 2
Antenatal Group Counseling Session

Picture 3
Breast Crawl

Box 2

Early Feeding Cues

1. Sucking Movements
2. Sucking Sounds
3. Hand – to – mouth movements
4. Rapid eye movements
5. Soft cooing or sighing sounds
6. Restlessness
7. Crying – a late feeding cue which may interfere with effective breastfeeding

Source: BPNI, Maharashtra

Box 3

How to wake up a sleepy baby

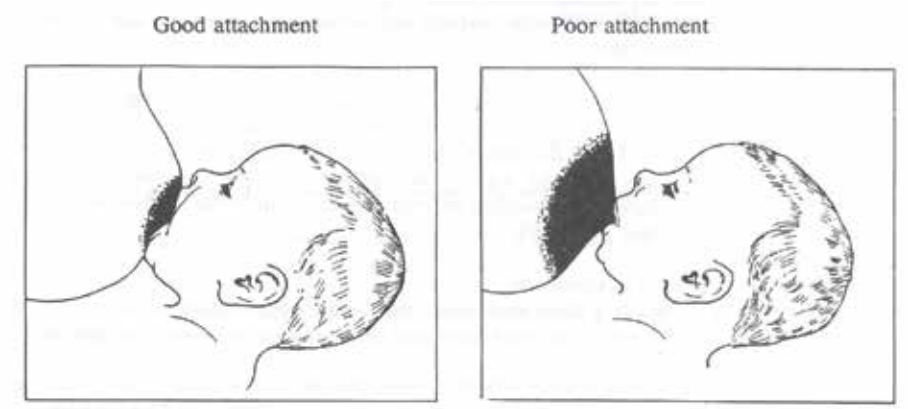
1. Remove the blanket
2. Remove the clothes
3. Change the diaper if wet
4. Place the infant skin-to-skin
5. Gently massage the infant's back, abdomen, arms and legs

Source: BPNI, Maharashtra

Box 4: Correct Breast feeding technique

Baby's Attachment	Baby's Position	Mother's Position
1) Maximum possible part of the areola in baby's mouth (Lower portion more)	1) Baby Turned towards the mother	1) Sitting comfortably with good back support
2) Baby's Mouth wide open	2) Good skin to skin contact between the baby and the mother	2) Holding breast in big 'C' grip of hand
3) Baby's Lower lip turned outward	3) Baby's Head & body in one line	3) brings the nipple in front of the baby's nose, Touches the nipple to the baby's upper lip and gives a mouthful of the breast to the baby as soon as it opens its mouth wide
4) Baby's Chin digs into the breast	4) Baby's Neck, back and buttocks well supported	4) Interacting with baby while feeding

Figure 1: Attachment

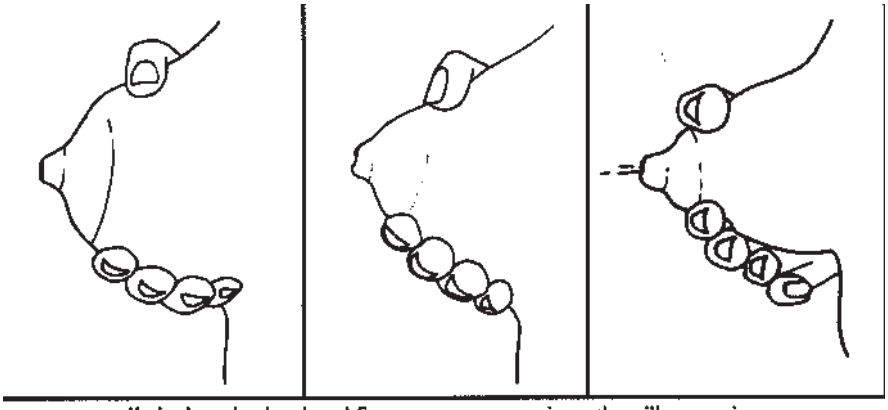


Source: BPNI, Maharashtra

Box 5, Figure 2: Expression of Milk

Technique of Expression of Milk

1. Relax the mother
2. Massage of the breast
3. To propel milk forward
4. Expression



Notice how the thumb and fingers rotate to press in on the milk reservoirs.

Mastitis and Breast Abscess

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Mastitis is an inflammation of the breast tissue, which may or may not be associated with a bacterial infection. In infective mastitis, Staphylococcus aureus is the most common pathogen. Less commonly, the pathogen may be a beta-hemolytic Streptococcus (such as Group A or Group B streptococcus) or Escherichia coli.

Breast abscess is a collection of pus in the breast, which may occur as a complication of mastitis.

Incidence

The reported incidence of mastitis varies from 10 to 20% in the first six months postpartum. 5-6 Most episodes of mastitis occur in the first eight weeks postpartum, but mastitis can occur at any time during breastfeeding. About 3% of women with mastitis will develop a breast abscess.

Risk factors

Risk factors for mastitis:

- Incomplete breast drainage due to:
  Poor positioning and attachment
  Missed feeds or long intervals between feeds
  Tongue-tie
- Restrictive clothing/external pressure on the breast
- Trauma to breasts or nipples
- Engorgement and/or chronic oversupply
- Unresolved blocked ducts or white spot on the nipple (blocked nipple pore)
- Rapid or abrupt weaning
- Stress, fatigue, overall poor health and nutrition
- Previous history of mastitis

Risk factors for breast abscess:

- Inadequately treated mastitis
- Abrupt weaning during an episode of acute mastitis

Management of mastitis

Diagnosis

The diagnosis of mastitis should be based on clinical symptoms and signs of inflammation. The following signs and symptoms may develop rapidly.

Breast

- Red, swollen and painful area in the affected breast
- Skin may appear shiny and tight with red streaks

General

- Flu-like symptoms: lethargy, headache, myalgia, nausea and anxiety
- Fever (temperature >38°C)

Investigations

Routine investigations are not necessary. Investigations should be initiated if:

- Mastitis is severe
- There is inadequate response to first line antibiotics or
- Hospital admission is required

Investigations for severe mastitis, not responding to first-line antibiotics or requiring admission should include:

- Breast milk culture and sensitivity: hand-expressed midstream clean catch sample into sterile container (i.e. a small quantity of the initially expressed milk is discarded to avoid contamination with skin flora)
- Complete blood count (CBC)
- C-reactive protein (CRP)

Other investigations to consider:

- Blood cultures should be considered if temperature > 38.5°C
- Diagnostic ultrasound if an abscess is suspected.

Treatment of mastitis

- Treatment should begin immediately
- Maintain breastfeeding; mastitis is not an indication for, nor an appropriate time to wean

Non-pharmacological treatment

Effective drainage of breastmilk by breastfeeding and/or expressing is essential to maintain adequate milk supply and to reduce the risk of breast abscess formation.

If presenting symptoms are mild and localised, the woman may consider enhancing breastmilk drainage:

- Physiological methods (e.g. expressing, massage and breastfeeding) to resolve the mastitis without the use of antibiotics
- Ensure correct positioning and attachment and frequent and effective milk removal
- Apply warmth to assist with let-down reflex and therefore milk flow and breast drainage
- Apply cold pack after feeds to reduce pain and oedema
- Avoid restrictive clothing/bra
- Refer to Lactation Consultant for appropriate feeding assessment and advice
- The woman will need rest, adequate fluids and good nutrition and practical domestic help if possible

Pharmacological treatment

Breastfeeding women are often reluctant to take medicines; women should be reassured that the medicines listed in this guideline are compatible with breastfeeding.

Analgesia

Paracetamol is considered safe to be used by breastfeeding mothers. It is usually the medicine of choice for short-term analgesia and anti-pyretic. Maximum paracetamol dose is 4g per 24 hours.

Non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen may be effective in reducing symptoms relating to inflammation. It can be safely used while breastfeeding as only small amounts of ibuprofen are excreted into breastmilk.

Antibiotics

If symptoms are not resolving within 12 to 24 hours with physiological methods or if presenting symptoms are moderate or severe, antibiotic treatment may be required (in conjunction with non-pharmacological measures). Oral antibiotics should be continued for at least 5 days. Improvement should be seen within 2 to 3 days of antibiotic treatment. If improvement is slow, milk should be collected for culture and sensitivity. Any baby whose mother is on antibiotic therapy should be monitored for systemic effects such as changes to the gastro-intestinal flora (with symptoms such as diarrhoea, vomiting and thrush) or skin rashes. Women who are very unwell and/or have signs of systemic sepsis may need to be admitted for intravenous (IV) antibiotics. IV antibiotics should be continued for at least 48 hours or until substantial clinical improvement is seen.

Flucloxacillin or dicloxacillin are the antibiotics of choice for mastitis. Both antibiotics are compatible with breastfeeding. Small amounts of flucloxacillin or dicloxacillin are excreted into breastmilk but the concentration is probably too low to have a significant effect on the breastfed infant.

First generation cephalosporins are also effective as first-line treatment for patients hypersensitive to penicillin (excluding immediate hypersensitivity) Small amounts of cephalexin are excreted into breastmilk but they are unlikely to have a therapeutic effect on the breastfed baby.

Clindamycin is recommended for women with immediate penicillin hypersensitivity.

Vancomycin is used as an alternative antibiotic for patients with serious allergy to penicillin and cephazolin. Only small amounts of vancomycin are excreted into breastmilk and it is poorly absorbed and unlikely to cause any serious adverse effects in the breastfed baby.

Lincomycin is used as an alternative antibiotic for patients with serious allergy to penicillin and cephazolin. Only small amounts of lincomycin are excreted into breastmilk and unlikely to cause any serious adverse effects in the breastfed baby.

Management of breast abscess

Diagnosis

In addition to the signs and symptoms of mastitis, there may be increased localised swelling, pain and tenderness at the site of the abscess. Women with an encapsulated abscess may present with no systemic symptoms but will present with a breast lump and usually describe a recent episode of mastitis. Clinical examination alone may not be sufficient to exclude or confirm an abscess. The diagnosis and location should be confirmed by diagnostic ultrasound.

Treatment

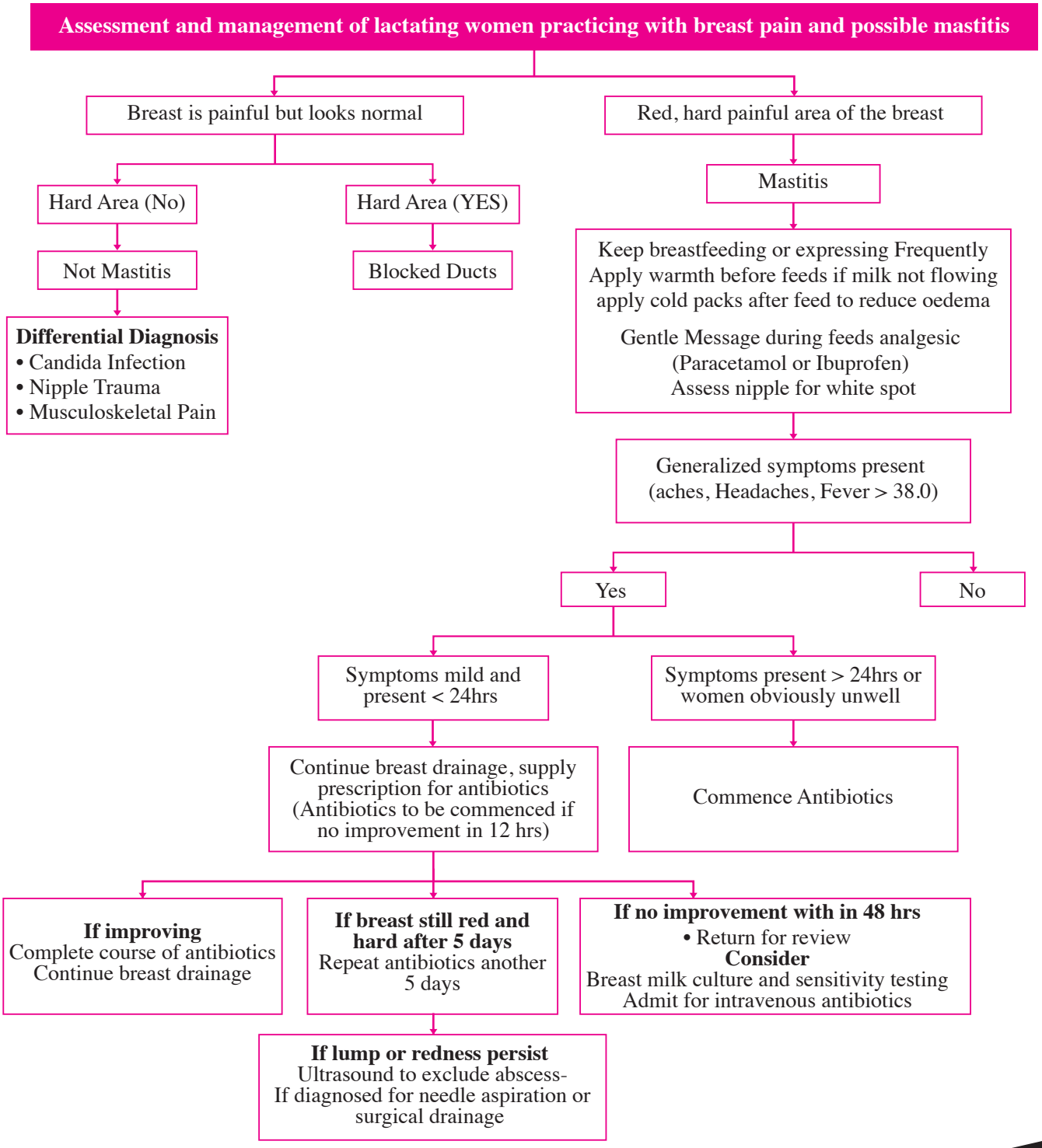
Women with a breast abscess need to be treated without delay .The preferred management is needle aspiration, however surgical drainage is required in some cases. Ensure breast milk and pus aspirate are collected for culture and sensitivity. Continuation of breastfeeding or breast milk expression is both safe and recommended. The presence of a breast abscess is not an indication for, nor an appropriate time to wean.

Management of breastfeeding following aspiration/surgical drainage

Management of breast abscess following aspiration/surgical drainage is as per management of mastitis. Positioning of the baby may need to be modified to avoid pressure on the aspiration/ incision site or interference with drain tube if in-situ. If the baby is unable to feed directly from the affected breast, the breast should be kept well drained by frequent and effective expressing until the mother is able to resume breastfeeding from that breast.

Breast milk leaking from the incision site is not uncommon and will not prevent healing.

Assessment and management of lactating women presenting with breast pain and possible mastitis' algorithm



Medical disorders and postpartum period

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Introduction:
There is a high neonatal and maternal morbidity and mortality in women with different medical disorders in pregnancy especially hypertensive disorders and diabetes.

The diagnosis and management of these disorders has been discussed in great detail many times. But, the considerations in postpartum period are often forgotten and that has increased the incidence of postpartum ill events. In this chapter, 3 main disorders namely, gestational diabetes mellitus (GDM), hypertensive disorders in pregnancy (Preeclampsia and Eclampsia) and hypothyroidism in pregnancy are discussed.

Gestational Diabetes Mellitus
Gestational diabetic women require follow-up. It should be noted that pregnancy appears to function as a provocative test and not as an independent risk factor for the future diabetes[1,2].

Future risk of diabetes:
A considerable proportion of gestational diabetic women may continue to have glucose intolerance. It is important that women with GDM be counseled with regard to their increased risk of developing permanent diabetes. The investigators who gave O'Sullivan and Mahan criteria have found that nearly 40% of former gestational diabetic women had developed diabetes by USPHS criteria within 20 years of their pregnancies[3]. Similar findings have been reported from Melbourne, Australia[4]. Coustan et al.[5] carried out a similar study on 350 former gestational diabetic subjects at 0-10 years after pregnancy. Diabetes or impaired glucose tolerance had developed in 6% of those tested at 0-2 years, 13% at 3-4 years, 15% at 5-6 years, and 30% at 7-10 years as shown below in table.

Postpartum care:
Immediate postpartum care in women with GDM is not different from women without GDM but these women are at high risk to develop Type 2 Diabetes mellitus in future. Maternal glucose levels usually return to normal after delivery.

Estimated Percent of Women with Gestational Diabetes Developing NIDDM or IGT After Pregnancy						
Fasting plasms glucose (mg/dl) during pregnancy	% at 2 years after pregnancy BMI before index pregnancy			% at 4 years after pregnancy BMI before index pregnancy		
	15	25	35	15	25	35
100	1.2	2.5	5.5	2.3	8.1	10.6
120	2.5	5.5	11.5	5.1	10.6	20.9
140	5.5	11.4	22.3	10.6	20.9	37.0

Risk of subsequent NIDDM or IGT (Impaired glucose tolerance) is calculated from a regression equation based on date from 350 former gestational diabetic women retested at 0-10 years after their index pregnancy with a 75-g 2-hours OGTT, using NDDG criteria.

{Taken from Coustan DR et al, AJOG, 1993}

Nevertheless, a FPG & 2 hour PPG is performed on the 3rd day of delivery at the place of delivery. For this reason, GDM cases are not discharged after 48 hours unlike other normal PNC cases.[6]

Postpartum GCT/GTT:
GTT at 6 weeks postpartum to evaluate glycemic status of woman, should be performed at 6 weeks postpartum. If found normal, it is repeated after 6 months and every year to determine whether the glucose tolerance has returned to normal or progressed.[7]

Cut offs for normal blood glucose values are:

Fasting plasma glucose: ≥ 126 mg/dl
75 g GCT 2 hour plasma glucose
Normal: < 140 mg/dl
Impaired Glucose tolerance: 140-199mg/dl
Diabetes: ≥ 200 mg/dl

Further advice:
Test normal: Counseling about lifestyle modifications, weight and exercise is to be done.
Test positive: Woman is advised to consult a physician. These women and their offspring are at increased risk of developing type II Diabetes mellitus in later life. They should be counseled for healthy lifestyle, particularly role of diet & exercise.

Pre-conception care & counseling:
Woman with history of GDM is to be counseled about pre pregnancy-
BMI estimation
Blood glucose estimation
Early consultation with obstetrician.

Hypothyroidism in pregnancy
Reduction in postpartum requirement of thyroxine:
After delivery, most hypothyroid women need a decrease in the thyroxine dosage they received during pregnancy.[8] So, dose of Thyroxine should be reduced to the patient's preconception dose. Additional TSH testing should be performed at approximately 6 weeks postpartum.[9]

Postpartum thyroiditis:
However, a recent study demonstrated that more than 50% of women with Hashimoto's thyroiditis experienced an increase in the pre gestational thyroid dose in the postpartum period, presumably due an exacerbation of autoimmune thyroid dysfunction postpartum Post-partum thyroiditis (PPT) may occur in 5-10% of women, but there are insufficient data to recommend screening of all women. PPT is an auto-immune disorder and the presence of anti-TPO antibodies increases the risk of disease.10 Women that are TPO antibody positive should have a TSH performed at 3 and 6 months post-partum.[8] PPT is often mild and transient. The disorder may present as hyperthyroidism followed by hypothyroidism and subsequent recovery of normal thyroid function.

As per national guidelines by Government of India[11]:

Women with TSH>10mIU/l :	Continue same doses of Thyroxine.
Women with TSH between 3-10mIU/l :	Thyroxine treatment to be discontinued.

Women diagnosed with hypothyroidism before pregnancy and on treatment to resume pre-pregnancy doses after delivery.

TSH is to be repeated 6 weeks postpartum and further treatment to be done accordingly.

Preeclampsia and eclampsia
The postpartum period is the time of greatest risk in women with preeclampsia (PE) and eclampsia. Continued surveillance and intervention is required. 75% of ICU admissions of obstetric patients occur in postpartum period & 66% of them are preeclampsia related.
If we the causes for being the postpartum period dangerous, they are:
• Persistent Hypertension
• Risk of convulsions
• Contracted intra-vascular volume-less tolerance to bleeding/PPH
• Subclinical DIC
• Sudden mobilization of interstitial fluid in IV compartment
• Sudden postpartum collapse
• Renal/Hepatic Dysfunction
• HELLP syndrome

Risk of Eclampsia[12]:
Early PE - 75% had antepartum eclampsia.
Late/Term PE – 75% had intrapartum or postpartum eclampsia.
Late postpartum eclampsia is a cause of concern especially as it can occur between > 48 hours and < 4 weeks of delivery. Incidence of such cases is reported as high as up to 56% in postpartum period.
Consider CT scan if -
• Repetitive seizures
• Late onset postpartum eclampsia
• Focal neurological deficits

Postpartum monitoring in HDP:
• Continuation of MgSO4 in Eclamptic /severe PE women for 24 hours post-delivery or past last convulsion.
• Continuation of anti-hypertensives

Persistent Severe Hypertension:
- It may be because of mobilization of interstitial fluid, redistribution in intravascular compartment.
- Furosemide may be indicated in such cases where pulmonary edema often results
- Persistent edema may warrant diuretics in small doses
- Persistent high blood pressure must be treated like chronic hypertension.

Antihypertensive therapy[13]:
- Anti-hypertensive medication should be continued after delivery as dictated by the blood pressure.
- It may be necessary to maintain treatment for up to 3 months
- Avoid alpha methyldopa in the postnatal period because of its adverse effect profile, particularly depression

Postpartum anti hypertensives:
Antihypertensive agents acceptable for use in breastfeeding include the following:
- Nifedipine XL
- Labetalol/atenolol
- Captopril / Enalapril
- Dose is required to be titrated periodically and may require up to 4-6wks.

Fluid management:
- Fluid restriction is advisable
- Total fluids should be limited to 80 ml/hour or 1 ml/kg/hour.
- If there is associated maternal haemorrhage, fluid balance is more difficult and fluid restriction is inappropriate.
- Don't use diuretics to induce forced diuresis
- Oliguria common in 24 hour postpartum
- Repeated fluid challenges may cause pulmonary edema

Thromboprophylaxis:
- Particularly following antenatal or postpartum immobilization
- LMWH should be given at least 6-12hrs after epidural catheter removal

Contraception:
- Barrier Methods or IUCD in postpartum period
- Even if woman is not breast feeding, COCs are not advised in women with hypertension.
- If woman has completed family, option of sterilization if blood pressure is under control, or Vasectomy is the best option.

Follow up[14]:
- PE is not a benign and resolvable condition and that it is a condition that unmasks an underlying propensity for later cardiovascular problems.
- There should be confirmation that end-organ dysfunction of preeclampsia has resolved to endorse earlier diagnosis of preeclampsia
- 30% patients had alternative diagnosis
- 70% multiparous patients had alternate diagnosis.
- Patients with underlying problems are more likely develop recurrence and renal complications

Pre conception counseling:

- Avoidance of adolescent pregnancies
- Pre-conception checkup in case of previous HDP
- Change of antihypertensive agents to labetalol or alpha methyldopa
- Nutritional corrections and weight corrections.

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"Postpartum Blues – Coping with Depression"

Cursing Motherhood: Postpartum Disorders

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Myra, a thirty four year old manager, came to see me with her husband. A well paying job, a supportive husband, a comfortable lifestyle and the cherry on the cake was the addition to their family- her two month old son Kiaan. On the surface this looked like the perfect family. But there were cracks, and Myra's husband looked worried. Following childbirth he had noticed his wife crying easily and sometimes incessantly and instead of spending time with the newborn, she would be holed up in their room, sitting in a corner with knees pulled up and staring at the wall for hours together. An extremely responsible woman otherwise, he was shocked and suspected that there was something odd in her behavior once when he walked into the house to see Kiaan wailing due to hunger and Myra in the other room. The final straw was her attempt to overdose herself with some pills. Luckily her husband caught her in the act. That very evening, both came down to my clinic to get some answers and possible treatment.

On enquiry, Myra complained of loss of interest in most activities, her appetite had reduced and sleep cycle was haywire not due to baby's schedule but due to constant over thinking and panicking about the future. She had also contemplated suicide as she felt she was going crazy. In her words, "I was so excited to be a mother. To hold my child, feed him, play with him, notice small little changes that happen o him while he is growing up each day. But I can't seem to bring myself to do all this. All I feel like doing is curl myself in to a ball and sleep. I am a bad mother who can't pick up her own child and be happy looking at him. The guilt is so much so that I have thoughts of jumping off my balcony and end this inner turmoil. I don't know what to do anymore".

Childbirth is expected to be a happy occasion for most mothers and even before the child is born there are dreams woven in the anticipation and eagerness. An addition in the family definitely brings about a lot of changes. The new mother experiences threefold change: physical, emotional as well as mental. It is expected that the new mother feels ecstatic when she holds her baby in her arms. But there are also women like Myra, who can't experience that happiness even if they want to.

Postpartum Depression (PPD) is suffering from depressive symptoms in the postpartum phase (2- 3 months post childbirth). Depression is a commonly observed mood disorder. People are aware of mood fluctuations which are a result of catastrophic events in life- death of a loved one, failed marriage or a relationship, losing a job, major changes in life etc. but surprisingly happy occasions can also lead to mood disorders. Diagnostic and Statistical Manual-5 mentions the estimated figure of women who experience major depressive episode as 3 to 6% during perinatal period. According to the research about 50% of postpartum episodes begin prior to delivery.

A recent survey conducted in Mumbai on 185 women revealed that depression during pregnancy was found to be 9.18% on an average on Beck Depression Inventory. The conclusion of the survey listed several factors

associated with depression: poor prenatal care, insufficient healthcare facilities, poor diet, health and physical complications during pregnancy (risky pregnancy), preterm delivery, history of miscarriage and still birth and most importantly elevated risk of PPD and suicide.[1]

To answer the question what causes PPD, there isn't a single causal factor. Most of the times hormonal changes (estrogens and progesterone) and emotional changes that accompany with the responsibilities of being a new mother might lead to mood fluctuations. A history of depression, bipolar mood disorders, anxiety disorder in the case of mother or in her family could also be triggering factors to PPD as presence of these disorders puts the mother at a higher risk.

In a study conducted in Goa, the researchers concluded that women, who belong to low-income class, who rarely seek any medical help, and in families where in gender bias exists, are at higher risk for postnatal depression. The statistics drawn from that study shows that depression was detected in 23% of the mothers post childbirth (6-8 weeks post birth) and more than one-half of the mothers remained ill at six months after delivery. Gender bias was a prominent cause of this depressed phase.[2] Another study conducted with rural women in South India revealed that birth of female, poverty and complications in pregnancy could predict high risk of PPD. Risk amongst the women in the study's sample was high (31.4%).[3]

PPD is very commonly overlooked as the notion of a mother being uncaring towards a newborn is frowned upon everywhere. But it exists and it needs our immediate attention. A happy mother is a happy child, and if the mother is unhappy, stressed, depressed, even these feelings and emotions percolate to the child. Mary Ainsworth's Strange Situation experiment wonderfully explained the attachment patterns that an infant develops which are reflected in our relationships in adulthood. A cold and unresponsive mother during infancy might be a contributing factor towards detached, ambivalent and insecure in relationships in adulthood. PPD is not only detrimental for a child's emotional development but also towards safety and security. There have been reports of cases wherein the mother and child both are found dead and the underlying cause in most of these cases was overwhelming emotions of the mother and depressed mood.

The assessment or screening of PPD is extremely important. This will only be possible when the screening process is adopted at the hospitals as well as private clinics. The obstetrics, gynecologists, general physician, family members especially the husband, all are the support system of the 'would be' mother. During her prenatal period if she shows any signs of being unhappy, lost in her thoughts, jumpy, anxious about the future, easily annoyed, immediate action needs to be taken. There are various screening tools available to assess PPD. These are most of the times self report questionnaires.[4]

During the screening process it will be clear as to whether it is PPD or other related disorders that makes it difficult for the mother to experience the joys of motherhood. There are other disorders such as "Postpartum Blues" and "Postpartum Psychosis" which lie on the continuum of Postpartum Psychiatric illness. In postpartum blues there are minor mood fluctuations which settle within two weeks post birth. Hormonal changes, physical and psychological changes, disturbances in sleep cycle etc. could lead to baby blues in about 50 to 85% of mothers.[5] The mothers experience incessant bouts of crying, irritability, labile emotional state, being distant from the child, experiencing major change in self and having a hard time accepting it, weight loss or weight gain, increased urinary sodium excretion. If these symptoms persist for more than 2 weeks, then there could be an escalation to either PPD or to a more crippling disorder: post partum psychosis.

Postpartum psychosis involves mother experiencing psychotic symptoms such as auditory hallucinations (often resulting in harming self or the child due to the voices heard), labile mood, disorganized behavior etc. This disorder is a rare occurrence yet detrimental to both mother and child. According to DSM-5, 1 in 1000 deliveries there is possibility of postpartum psychosis. Infanticide is also high in such cases as there is presence of auditory hallucinations to harm the baby or delusion that baby is possessed. The risk also increases if there has been history of depression during pregnancy, of bipolar disorder (especially bipolar I) in case of mother and in the family as well. Some reports reveal that an estimated 5% of mothers suffering from postpartum psychiatric illness commit suicide.[6]

The alarming question is why would they commit suicide?

Psychologically a woman goes through a lot of changes during and after pregnancy. Though most cope with these changes comfortably, there are those who are overwhelmed and breakdown emotionally. An underlying history of anxiety and depression also plays a major role in determining the risk factors. Suicide is the extreme step that one would take when things get extremely overwhelming.

The acceptance that PPD exists and is detrimental to both mother and child's health is still not very prevalent. In Indian families there is involvement of immediate as well as extended family to give tips and opinions regarding pregnancy to the would be/new mother. The sensitivity towards the emotional state of the mother is overlooked most of the times due to a preconceived notion of being happy during and after pregnancy. Role of mother in laws as well as woman's mother becomes very important, as they are more often primary caregivers of her. If they are able to gauge the signs and symptoms of something being off about the woman's mood, it could be brought to immediate notice to the gynecologist/obstetrician (Ob-Gyn). The Ob-Gyn can serve as an excellent support to the mother. They need to be vigilant not only about her physical health but also her mental wellbeing. They can begin by asking her direct questions: what is your sleep pattern like, are you eating well, how has your mood been lately/currently? As a doctor if you notice that she is not looking her usual self then do not hesitate to ask her few leading questions. One can also schedule a meeting separately with her and enquire about any disturbances in her mood, any reason for feeling sad, any suicidal thoughts or thoughts of harming the baby. If the answers are positive to such questions, they shouldn't dither to refer her to a mental health practitioner in order to help her and more importantly save a life. A mother and a child both are vulnerable post delivery and need at most care and nurture. In order to prevent the deterioration in the physical, emotional as well as mental well being of the mother, vigilance on the part of primary health care personnel as well as family members (as seen in case of Myra, her husband's observation)is essential. It could lead to early detection and faster recovery.

Once it is established that the mother suffers from PPD, how to cope with it becomes fundamental to know. There are many ways through which postpartum illness can be treated. To summarize in a nut shell adopting following steps can lower the possibility of losing out on a wonderful experience such as motherhood:

Step 1: Educating the mother as well as her family members about postpartum illnesses during the pregnancy itself. This could involve teaching them to look out for signs and symptoms, importance of good diet, sufficient sleep and exercise post child birth and also encouraging them to seek help if they suspect onset of any mood disturbance.

Step 2: Parent training program should be conducted regularly at OB-GYN's office so as to acquaint the new parents with the responsibilities of child birth, its effect of various areas of their lives as well as things to look out for during and after pregnancy so as to avoid any disturbances while the mother is recovering and bonding with the child.

Step 3: Post childbirth, using a screening tool to assess the psychological well being of the mother. This is done so that timely help can be provided to the mother if she is at risk.

Step 4: A combination of psychotherapy (usually Cognitive Behavior Therapy, Interpersonal Therapy) and pharmacotherapy (usually anti-depressants and Hormone therapy), family support and a positive environment works for most of the mothers suffering.

Step 5: Joining support group's prior and post delivery can help to alleviate the stress of motherhood. There is a sense of belongingness in the group of people where each one is going through her own struggle but they all meet at a common ground: being a mother.

Step 6: Follow up on mothers suffering from any of the above-mentioned postpartum psychiatric illnesses. This could be done by scheduling regular checkups at the doctors' clinic after 15-days/1 month or so depending on severity of the case. Telephonic or using web media can also be a substitute if mother and child can't make frequent visits to the doctor.

A counselor can help the mother form a bond with the child, encourage her to seek help and be vocal about what bothers her, or assisting her in dealing with any emotional upheaval. Involving spouse in sharing the responsibilities towards child, exercising, meditation, taking care of self (eating well, catching up on sleep, making time for self) are few other measures that can help. One of the aims of counseling is to make mother realize that the child has become a part of her life and that she hasn't lost the right to be herself.

A cutting edge treatment in psychiatry for depression called Repetitive Transcranial Magnetic Stimulation (rTMS) is non-invasive, much more effective and has produced positive results in terms of treating a patient. Many mothers who are reluctant to take medicines for depression, as they are concerned about exposing the newborn to the possible side effects can benefit from rTMS. In a study by Garcia et al,. (2010), revealed the effectiveness of rTMS on mothers with PPD within 2 weeks of treatment. rTMS also led to a significant improvement in maternal bonding.[7]

In the National Family Health Survey- 2 conducted in India reported that in certain states in India up to 65% mothers did not get satisfactory prenatal care.[8] Even today only 1 out of 3 women get proper healthcare facilities. What happens to the others? There is a dearth of awareness that PPD exists. Most old school people would refute the notion of being depressed during pregnancy or after delivery. But the statistics mentioned above begs to differ. Apart from awareness there is lack of adequate research done in this area of maternal healthcare. A two-fold plan needs to be put into action wherein there is availability of adequate means for primary healthcare and also research, which can then elicit awareness. Motherhood is a transition from being a daughter, sister, and wife to someone who is responsible to bring a new life into this world. And this transition is difficult in itself. Thus, mother's well being in every aspect becomes vital to the healthy development of the child.

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7

Post Partum Hemorrhage

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Introduction

The most important aspect about postpartum hemorrhage (PPH) is the acuteness of the event. The unpredictable nature, limitations in infrastructure and varying clinical scenarios mandate that effective strategies to prevent and treat PPH should be available at every care setting where deliveries are conducted. Postpartum hemorrhage which occurs immediately and up to 24 hours of delivery of the fetus is termed primary postpartum hemorrhage. About 1-2% of events occur after 24 hours of delivery and this is called secondary postpartum hemorrhage.

Definition

Traditionally, PPH has been defined as a quantity of blood loss (500 ml or 1000 ml) after delivery. However, in most recent times, this has been questioned on several fronts.

- The quantity of blood loss required to cause decompensation and clinical consequences is different based on their preexisting hemoglobin levels, weight and body surface area and whether other complicating events such as preeclampsia or sepsis coexist.
- Quantification is difficult and most clinicians notoriously underestimate blood loss.
- Steps need to be taken much before the designated blood loss has occurred to prevent rather than treat postpartum hemorrhage. This is important to limit morbidity and mortality. The features of increasing blood loss are outlined in Table 1.

How common is PPH?

Maternal mortality is currently estimated, to be between 291,000 and 340,000 deaths per year. In terms of maternal mortality rate, this would mean 200 to 250 maternal deaths per 100,000 births. Some believe that this is probably an underestimate since countries where 99% of these deaths occur are those which have poor infrastructure for care as well as reporting. PPH is the most common cause of maternal mortality and accounts for 35% of the maternal deaths worldwide. In some countries, more than 50% of maternal deaths are due to PPH.

Causes of PPH

The classic list of causes of PPH is grouped according to the 4Ts. This is outlined in Table 2. However, it is essential to understand that more than one mechanism may be in play in a given clinical situation. Common risk factors include prolonged labour, macrosomia, polyhydramnios, multiple pregnancy, chorioamnionitis, pre-eclampsia, previous caesarean section, previous PPH, coagulation disorders and instrumental deliveries. But often, PPH may occur without any risk factors in otherwise “low risk” deliveries.

Prevention of atonic PPH

Preventing PPH begins with the antenatal correction of anemia and of possibly correctable risk factors before the onset of labor. The Word Health Organization held a Technical Consultation on Prevention of Post partum Haemorrhage in 2006 and recommends the following:

- Active managements of third stage of labour should be performed by skilled attendants as there is the possible risk of uterine inversion with inappropriate cord traction.
- Active management of third stage of labour that should include administration of uterotonic soon after birth of the baby, delayed cord clamping, delivery of placenta by controlled cord traction followed by uterine massage.
- Oxytocin should be offered for prevention of PPH in preference to oral, sublingual or rectal misoprostol.
- In the absence of active management of the third stage of labour, an uterotonic drug (oxytocin or misoprostol) should be offered.

Though seemingly simple, the components of AMTSL are not always followed even by trained providers.

Management Protocol

The immediate priorities are resuscitation and identifying a potential cause of the hemorrhage. The subsequent management depends on the working diagnosis, condition of the patient and response to initial resuscitation.

Resuscitation and Stabilization

The basic principles of basic and advance adult life support are well established and should be followed by all clinical staff. Labour ward staff should be well versed with it. The first step should to be to call for help, especially to involve the senior staff and a multidisciplinary input. Due to the physiological changes in pregnancy and puerperium, some issues need consideration. These are highlighted in Table 3. Blood should be collected for baseline investigations (blood count, glucose, renal and liver function and coagulation profiles) and cross matching with the insertion of the intravenous cannula. The patient should be kept warm. The golden hour concept should be borne in mind. The probability of survival decreases sharply after the first one hour if the patient is not effectively resuscitated and treated. In situations where the woman requires transport to another center, the use of military antishock garments (MAST suit) is useful to maintain blood pressure and circulatory function.

Identifying a potential cause

In practice, a focused history and examination working towards the most likely causes should be started with the resuscitation efforts. The bare essentials are palpating the uterus for tone, tracing the cervix with sponge holders to look for a tear and exploring the genital tract for injuries. These should be done early in the course of events so that trauma can be identified and corrective steps taken early. There is usually a single prominent clinical feature to guide the working diagnosis and this should be followed clinically and with appropriate investigations. This is detailed in Table 4. There may be overlapping clinical features in these pathologies and the table is intended to be a working guide towards the next course of action. It is important to continuously reevaluate the clinical picture to assess and modify the diagnosis and for evolving complications. Continuous monitoring should include vital signs, level of consciousness, pulse, blood pressure, oxygen saturation, urine output, and CVP if a central line is established.

Subsequent Management

A simultaneous approach of resuscitation and treatment (medical and if required surgical) is mandatory. The drug therapy for PPH is described in Table 5. The protocol for managing massive PPH is outlined in Figure 1.

A few salient features are mentioned below:

Drugs
Tranexamic acid is being increasingly recognized as a useful agent in enhancing clot formation and retraction. It should be infused as a solution of 1 gram on Tranexamic acid in 100 ml normal saline over 10 minutes or as a slow push. Newer agents such as Factor VII may be of use in specific circumstances.

Blood and blood products
It is mandatory to cross match at least 4 units of packed cells and an equal number of fresh frozen plasma packs should be available. Currently it is believed that for every packed cell transfusion, there should be one fresh frozen administered.

Genital tract trauma and repair
When genital tract trauma is the cause of massive PPH, it is better to consider repairing it in the operation theatre under anesthesia rather than struggling with it in the labour ward. The fornices should be clearly visualized. If there is evidence of injury here, a possibility of a supralevator hematoma should be kept in mind. Cervical tears are best repaired with continuous locking sutures of chromic catgut or polyglactin No.1 or No.2 with the cervix held with atraumatic Allis forceps. Vaginal mucosa is likely to be fragile and easily bruised. If is in not amenable to being sutured, the vagina should be tightly packed for 12 to 24 hours.

Uterine balloon tamponade
This is a simple intervention that should be attempted early in the course of treatment. A number of devices can be used to achieve uterine tamponade. Devices such as the Bakri balloon are custom made for this purpose but are expensive and not widely available. Sangstaken Blakemore tubes, Foley's catheter, condom with rubber catheter are feasible alternatives. Uterine tamponade can be a useful treatment as well as a test to determine the need for further surgical management of atonic PPH.

Internal Iliac Artery Ligation and systematic devascularization
Devascularization should be carried out progressively from the uterine artery, followed by the ovarian artery and then internal iliac artery. Gynecologists should be familiar with the technique of internal iliac artery ligation. It should be taught to trainees in non-emergency situations to hone their skills. This intervention is likely to be helpful in placenta previa and hemorrhage from trauma to the upper genital tract rather than purely atonic PPH.

Uterine brace suturing
The original technique of B-Lynch sutures has been modified in numerous ways such as the Hayman's sutures and Cho's sutures. The rationale of these methods is to apply compression to the uterine walls to each other and arrest hemorrhage, encourage thrombus formation and sustain the effect of oxytocic agents.

Obstetric Hysterectomy
Perhaps the most critical aspect of performing an obstetric hysterectomy is the decision making. An objective approach is essential, balancing the need to save life versus the need to conserve the uterus for future child bearing. The anatomy of the parametrial tissue and cervix may be altered and the ureters are at risk of being devascularized or injured.

Uterine rupture
Urgent exploratory laparotomy is required when a uterine rupture is suspected or diagnosed. Repair of the uterine rent is feasible if it is a clean wound. If the rupture is ragged, edges are frayed or tissue is too friable for repair, a hysterectomy is a better option. The urinary bladder, parametrium and lower genital tract should also be examined and repaired if required.

Uterine inversion

Replacement of uterus should be attempted right away. Atropine should be injected before attempting visceral manipulation. Uterine relaxation is essential. This can be achieved with a subcutaneous dose of terbutaline (0.25 mg) or general anesthesia. The placenta should be separated if possible. Attempt manual replacement. The fundus, which inverts first, goes in last. Once the uterus is replaced, carboprost should be given for uterus to contract. If manual replacement does not work, the options are hydrostatic replacement (O'Sullivan) or surgical repair. Huntingdon's repair is by traction on the round ligaments with Allis forceps to pull up the inverted uterus. If this fails, Haultain's method is adopted i.e. vertically incising the posterior cervix to relieve the cervical constriction ring.

Interventional radiology and embolization

This is a very useful and possibly lifesaving adjunct to obstetric interventions in cases where bleeding persists after hysterectomy, there is abnormal vasculature in the pelvis such as an arteriovenous malformation or pseudoaneurysm, or as an adjunct in the management of women with abnormal placentation.

Post partum Collapse : Do's

- Have a well stocked emergency trolley in labor wards and operation theatres.
- Have a crash cart with defribirllator, endotracheal tubes, umbo bag and mask.
- Maintaining good records about the drugs and regular checking for date of expiry
- Check availability of personnel for emergencies
- List of emergency phone numbers in labour room, OT and at reception
- Call for help-contact senior obstetrician, anaesthetist, OT staff.
- Blood bank accessibility-have a list of blood banks with their phone numbers that are close to the hospital if there is no in-house facility.
- Cross match blood earlier rather than later and ask for minimum 4 units to be cross matched.
- Infuse liberally with crystalloids and transfuse (should not be old, cold or sold) earlier rather than later and more rather than less.
- Prefer regional anesthesia over general
- Documentation of events, inform relatives and keep them posted
- Availability of further care / transfer arrangements
- Debrief the couple, implications for the future.
- Regular practice of emergency drills and training for resuscitation

Post partum Collapse : Dont's

- Do not panic
- Do not attempt overzealous traction on umbilical cord in third stage of labour
- Do not delay in suturing of episiotomy or perineal tear post delivery
- In cases of massive PPH, do not delay in shifting to operation theater
- Do not ignore monitoring of vital signs of patient post delivery
- Do not delay in transfer to tertiary centre or ICU when resources are limited
- Do not play wait and watch. Fast and aggressive treatment will reduce the morbidity and mortality.

Conclusion

Post partum collapse is a feared complication. The management of these patients requires a team approach. Early recognition is the key to successful management. Use of protocols, practice drills and training in basic life support skills are pertinent in improving the outcome in these patients.

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Degree of Shock				
	Compensation	Mild	Moderate	Severe
Blood loss	500-1000 ml 10-15%	1000-1500 ml 15-25%	1500-2000 ml 25-35%	2000-300 ml 35-45%
Blood Pressure Change (systolic pressure)	none	Slight fall (80-100 mmHg)	marked fall (70-80 mmHg)	profound fall (50-70 mmHg)
Symptoms and Signs	palpitations dizzines tachycardia	weakness sweating tachycardia	reastlessness pallor oliguria	collapse air hunger anuria

Table 2. Causes of postpartum hemorrhage – 4Ts

Etiology	**Mechanisms**
Tone	Overdistension (twins, polyhydramnios, big baby) Exhaustion (prolonged labour, high parity) nfection, Uterine abnormality
Trauma	Previous uterine surgery, instrumental delivery, hematomas
Tissue	Abnormal placenta, uterine abnormalities, fibroids
Thrombin	APH, PIH, IUFD, amniotic fluid embolism

Table 3. Resuscitation protocols and issues for special consideration.

	General
Airway	Open airway Oxygen at 4 l/m Intubation
Breathing	Assess saturation, respiratory rate and air entry Supplement breathing efforts with bag and mask ventilation or intubation
Circulation	Large bore intravenous access (at least 18 G) Start with crystalloids or colloids until blood products are available
Drugs	Noradrenalin, deriphylline, dopamine
Exposure	Ensure an adequate examination to avoid missing pathology

Table 4. Assessment guide for postpartum hemorrhage.

Prominent Clinical Feature	**Likely cause**	**Key clinical features to look for**	**Immediate investigations**
Bleeding	Atonic postpartum hemorrhage	Atonic, flabby uterus Bleeding from other sites	CBC, Coagulation profile (full and bedside)
Bleeding	Traumatic postpartum hemorrhage	Well contracted uterus Hematomas (pelvic or perinneal), cervical tear on tracing the cervix	CBC, Coagulation profile (full and bedside), examination (and repair) under anesthesia in OT
Bleeding	Uterine rupture	History of a previous uterine scar Placenta recedes into the abdomen Palpable uterine rent	CBC, Coagulation profile (full and bedside), examination (and repair) under anesthesia in OT
Bleeding and mass at the perineum	Uterine inversion	Shock out of proportion to the bleeding Morbidly adherent placenta	Immediate correction. CBC, Coagulation profile (full and bedside), examination (and repair) under anesthesia in OT

Table 5. Drug Therapy for PPH.

Drug	Dosage	Side effects	Contraindications
Oxytocin	10 units IM 5 units IV bolus 20 units per liter IV infusion	Usually none. Nausea Water intoxication	Known hypersensitivity
Methylergonovine maleate	0.25 mg IM, can be repeated every 15 min to a maximum of 5 doses	Peripheral vasospasm Hypertension Nausea, vomiting	Hypertension Peripheral vascular disease Known hypersensitivity
Carboprost tromethamine	0.25 mg IM, can be repeated every 15 min to a maximum of 8 doses	Bronchospasm Flushing Diarrahea, vomiting	Bronchial asthma Active renal or hepatic disease
Misoprostol	600 micrograms orally or rectally Brochospasm is rare	Flushing, diarrhea, vomiting	Known hypersensitivity

Figure 1. Protocol for managing massive PPH

Massive PPH		
Get Help Senior obstetrician, OT staff, anesthetist	**Local Control** Bimanual compression Intrauterine tamponade Uterine packing Embolizationg if available	**BP and Coagulation** Resuscitation with crystalloids,
Surgical Intervention		
Repair of genital tract trauma	**Vessel ligation** Uterine artery-Ovarian vessel Internal iliac arterys	**B-Lynch brace suturing Obstetric Hysterectomy**
Post Hysterectomy bleeding		
Surgical Re exploration	**Abdominal Packing**	**Embolization**

8

Postpartum Family Planning (PPFP)

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Post partum family planning (PPFP) aims to prevent unintended pregnancy and closely spaced pregnancies after childbirth. Worldwide more than 9 out of 10 women want to avoid pregnancy for 2 years after having had a baby but 7 of them is not using contraception. Unfortunately these women receive little or no information on safe, easily available and effective contraceptives available. The postpartum period is a favourable time for initiating contraception as women who have recently delivered are highly motivated and hospital settings offers convenience for both patients and health care provider. Also studies show that women are more receptive to family planning services during both antenatal and immediate post partum period and have greater chance of accepting a modern contraceptive method.

- PPFP can save lives- prevent more than one third of maternal deaths. Also prevents 1 in 10 deaths among babies if couples space pregnancies more than 2 years apart.

- Closely spaced pregnancies within the first year post partum increases the risk of preterm birth, low birth weight and small for gestational age babies.

- Risk of child mortality is highest for very short birth to pregnancy intervals of less than 12 months.

- Return to fertility is variable and unpredictable.

- Pregnancy at intervals more than 59 months have high risk of pre eclampsia [2] and mortality risk is 2 times higher for adolescent pregnancies

Definition of postpartum contraception –
It is the initiation and use of family planning methods in the first six weeks after delivery to prevent unintended pregnancy particularly in the first 1-2 years after childbirth, when another pregnancy can be harmful to the mother or a breast feeding baby. The postpartum period has traditionally been understood as the first 6 weeks after birth of a child. However there is a need to focus on the extended postpartum period i.e. first 12 months after birth. The interventions and issues vary during the first 6 weeks up to 1 year after child birth.

When contraception should be provided:
Pregnancy can occur by 6 weeks if a woman does not exclusively breastfeed but it is best to provide a method by 4 weeks postpartum. Best practice is for the chosen method of contraception to be started before the women leaves the birthing facility.

If contraception is started at any time within first 4 weeks after delivery, there is no need to check for pregnancy. If a method is started after 4 weeks postpartum and she has started menstruating, an assessment of the risk of pregnancy should be made. It is reasonably certain that a woman who is not pregnant if she has no signs and symptoms of pregnancy and meets any one of the following WHO criteria:

- Is within 7 days of start of normal menses
- No coitus since start of last normal menstruation
- Fully or nearly fully breast feeding, is amenorrhoeic and is no more than 6 months postpartum.

If a women has had intercourse since the start of last menstruation, use of emergency contraception should be considered for prevention of unintended pregnancy.

Breastfeeding status of the women after childbirth	**Return of fertility**	**Additional factors(return to sexual activity and menses)**
Exclusive breast feeding Partial breastfeeding	6 months 4-6 weeks postpartum	• Approximately 40% women return to sexual activity with in first three months and by 10-12 months 90% have resumed sexual activity
Non breastfeeding	3 weeks postpartum	• With reducing exclusive breastfeeding, menses return and couples resume sexual activity. This 1-year postpartum is a period of high-yet-unperceived-risk of an unintended pregnancy

Return of fertility :
Return of fertility is unpredictable after childbirth and depends on the breastfeeding status of woman, return of menses and resuming sexual activity. Some breastfeeding women may experience amenorrhea even if they are not exclusively breastfeeding. Thus amenorrhea after childbirth is an unreliable indicator that a woman is protected against pregnancy.

Table: 1 Factors Related to Return of fertility and Risk of Pregnancy in the 1st year after Birth

Counselling for postpartum contraception :
Counselling is an essential component of postpartum family planning services to ensure that the clients make free, informed and well-considered choices about their own contraceptive needs. Effective counselling is one of the cornerstones for increasing the acceptance of family planning and addressing unmet need. A multi centric observational Indian study conducted by FOGSI evaluated the influence of 'Structured contraception counselling' on Indian women's selection of contraceptive methods and found that the counselling provides the health care provider an opportunity to understand the individual need of a contraceptive seeker and by this influence a women to opt for another contraceptive method rather than the one they had originally intended to use.[3]

Goal of postpartum counselling is :

• To help each women decide if she wants to use a contraceptive method

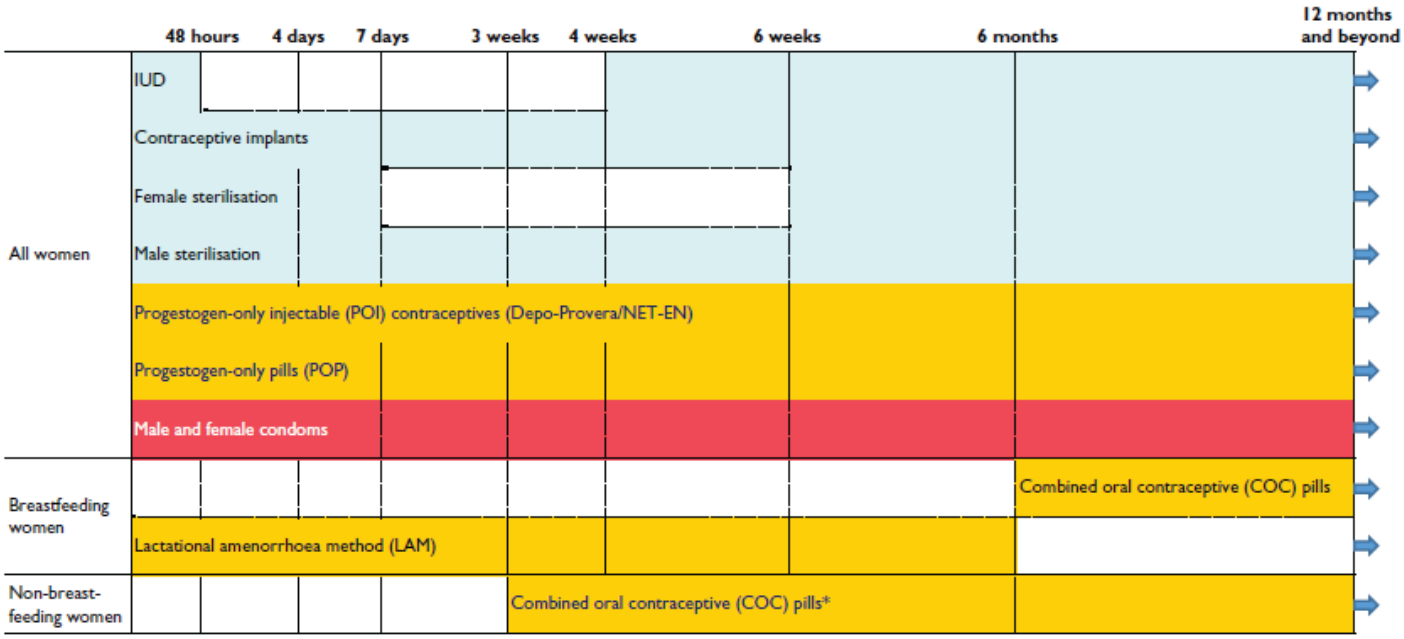
• If she wants contraception, to help her choose an appropriate method, taking into consideration whether or not she is breastfeeding

• To prepare her to use the method effectively.

Prior to more in depth counselling, a provider may encourage the women and their partners to consider issues such as :

• Whether they want more children, whether they are content with their current family size

• If they want more children, how long would they like to wait before having another child



*Unless there are other risk factors for venous thromboembolism (VTE), in which case only from 6 weeks onwards.

Postpartum contraception options: timing of method initiation for all women, for breastfeeding women and for non-breastfeeding women; adapted from WHO (2013) ***Programming Strategies for Postpartum Family Planning***

• Their satisfaction and successes and failures with contraceptive methods used previously

• Their plan regarding breast feeding

Post partum contraception options:

WHO 2013

(1) Intrauterine devices:

(a) **Copper IUD's:** prevents pregnancy for 5-10 years

(b) **LNG IUS:** Prevents pregnancy upto 7 years

(c) **Post partum IUD insertion:**

Postplacental : Immediately after delivery of placenta

Postpartum before discharge : within 48 hrs after delivery.

Trans cesarean insertion : during LSCS, insertion is via uterine incision

Post puerperal : 6 to 8 weeks after delivery

Rates of perforation and infection is similar or even lower than with interval insertion.
Does not interfere with breast feeding
Rates of IUD expulsion is slightly higher postpartum
Failure rate < 1/1000 users
No protection against STI's

(2) Implants:
- Effective for 3-5 years or more
- Failure rate of 1/1000 users
- No protection against STI's
- Return to fertility immediately after removal
- Does not interfere with lactation

(3) Sterilization: VSC (voluntary surgical contraception)
Female Male
Female sterilization :
- Preferred time for postpartum sterilization is usually after the woman recovers from delivery and the health and survival of the new born are more certain.
- The procedure is easier to perform within the first 48 hours of delivery because the size and location of uterus allow for better visualization of and access of the fallopian tubes. The procedure may also be performed up to 7 days postpartum.
- The procedure can also be done immediately following a caesarean section prior to closing the abdomen.
- Counselling for VSC requires the client's thorough understanding of the permanence of the method.
- Counselling should be done before and after childbirth and never during the stress of labour or delivery.

(4) Progesterone only pills:
- These are mini pill for daily consumption.
- Considered good method for breast feeding mothers, 6 or more weeks after delivery.
- Does not interfere with lactation, infant growth and development
- Recommendations to begin immediate postpartum since no adverse effects has been observed.
- No protection against STI's
- Failure rate 9/100users

(5) Progesterone only injections:
- Depo provera and norethisterone enanthate (NET-EN)
- Contraceptive action lasts for 8-12 weeks
- Repeat injections required- 4 or more times each year
- Failure rate 3/100 users
- Amenorrhoea- unpredictable
- Does not interfere with lactation
- No protection against STI's

(6) Non hormonal methods :
(a) Lactational amenorrhea method (LAM) :
- Time limited
- Cannot be used after the first 6 months post partum
- Requires exclusive or near exclusive breast feeding
- Failure rate around 2/100 users
- No protection against STI's

(b) Condom

- Safely used anyime
- Protection against STI's
- Failure rate 12/100 couples

(c) Diaphragm/ Cervical cap:

- Use should be delayed to 6 weeks post partum
- Failure rate 12/100 couples

(d) Spermicidal jelly

(7) Combined oral contraceptions:

- Less preferred choice as it interferes with breast milk and hence cannot be used by breast feeding women until baby is 6 months old.
- Women who are not breast feeding may start COC's 3 weeks post partum unless they have risk factors for VTE.
- Failure rate 9/100 users
- The US Centre for Disease Control and Prevention (CDC) have updates their guidelines in July 2011. They advise post partum women not to use COC's during the first 21 days because of high risk for VTE. In women who had other risk factors for VTE, COC's are avoided during the first 42 days.

Risk factors for VTE:

Age > 35 years
Previous VTE
Thrombophilia
Immobility
Transfusion at delivery
BMI > 30kg/m^2
PPH
Peripartum cardiomyopathy
Post LSCS
Preeclampsia
Smoking

(8) Least effective methods:

(a) Coitus interrruptus/ Withdrawal:
Failure rate 18/100 couples
No protection against infection
Does not interfere with breastfeeding

(b) Fertility awareness based (FAB)
Not recommended
High failure rates – 24/100
Does not interfere with breast feeding

Emergency contraception:

1) LNG IUS/ Copper IUD : Used anytime postpartum
2) COC's:
High doses
Avoided due to theoretic risk of VTE

Common/ important side effects of contraceptive methods and which women should not use:

1) IUD:
Perforation 1-2/1000
Expulsion 1 in 20 with interval insertion

Infection- no increase in risk
Ectopic pregnancy- no increase in risk

Bleeding patterns:
Copper IUD: Heavier periods
LNG IUS: Irregular spotting and bleeding

IUD to be avoided in case of:

PROM > 24 hours
PPH
Sepsis
AUB
Fibroid uterus

(2) Implants:

Bleeding pattern- Irregular bleeding , amenorrhoea
To be avoided in women with carcinoma breast

(3) POP:

Bleeding pattern- Irregular bleeding,amenorrhoea 1 in 10

(4) COC: to be avoided in patients with risk factors for VTE

In women with ART for HIV:

There are potential drug interactions between some ART drugs and hormonal contraceptions. However WHO has reviewed the data and concluded that the benefits of hormonal contraception outweigh the risks (2015 MEC Category 2)

"Post partum contraception is important for the health of mother and infant and education for both health care providers and women should focus on the range of contraception options and the safety of most of these methods during the post partum period"
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9

Postpartum IUCD

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Among all the countries of the developing world, India has the unique distinction of having the first National Family Planning programme since 1951. Since then, maternal mortality has decreased by two thirds; fertility has declined by two fifths, and life expectancy at birth has improved significantly. The successive five year plans have stressed the importance of the cafeteria approach, where in the clients are offered a choice of contraceptive methods, from which they make their choice. For the past several decades female sterilization has been the mainstay of family planning to limit the number of children.

The main concern of the National Family planning policy of February 2000 was to address the unmet needs of contraception by 2010. Enabling families to achieve their reproductive goals and reduction in infant mortality were the other concerns. Its final objective is to achieve population stabilization by 2045. This can only be achieved with complete cooperation of all the stake holders like central and state government, the non government organizations (NGO) and the private sectors.(1)

There has been a paradigm shift in the demographic and socioeconomic conditions of the country. There is a continuous effort to bring women to deliver in institutions. Couples no longer desire large families, women are getting educated, the age of first child bearing has been pushed to late twenties. Couples are looking at reversible long acting methods of contraception to space and to limit families. Female sterilization which has been the mainstay of the previous decade is no longer in favour. Remarriages after divorce and second marriages has changed the social scenario in favour of IUCD as effective method of spacing as well as long term method.

Analysis of NHFS 2 data shows that about one fifth of the births in India are unplanned. Of these 12 percent were mistimed and 9 percent were unwanted births. The main reason for seeking abortions is for spacing births. Though unmet needs for contraception existed for all age groups, it was higher in younger women than older women.(1)

One third of the maternal deaths and 10 percent of child mortality can be avoided when couples space pregnancies more than two years apart. It is the first year postpartum that Indian women are most susceptible to unwanted pregnancies. Postpartum family planning is the prevention of unintended and closely spaced pregnancies through the first twelve months following childbirth.(2)

Among other methods, postpartum IUCD is an effective way to tackle this unmet need of contraception. Although any intrauterine device can be used for postpartum contraception, Copper T 380 A which is widely available in institutions and private sectors is one of the most cost effective options available. It comes in regular and safe load varieties. The Copper T 380A is highly effective for 12 years though approved for use for 10 years. It is non-hormonal method that can be safely used by all women even during breast feeding. It requires only one time motivation and few follow ups. It has monofilament string that reduces chances of ascending infection. The contraceptive effect is immediate upon insertion, and there is immediate return to fertility once removed. Although effective for 12 years, CuT 380 A can also be used for shorter intervals. According to the World Health Organization Medical Eligibility Criteria, an IUCD can be inserted in the 48 hours postpartum, or after four weeks following a birth if that window of 48 hours is missed. According to a 2010 Cochrane review PPIUCDs were a safe and effective contraceptive method. Presently in India only 2 percent of current contraceptive users are using interval Coppet T for contraception. Because of increased accessibility to medical care during childbirths, PP IUCD can be offered to all women (3)

Ideally, postpartum insertion should take place within 10 minutes of placental delivery (immediate postplacental).with normal delivery or Cesarean section. Postpartum insertion can be done before hospital discharge (up to 48 hours after delivery), but it should not be done between 48 hours and about six weeks postpartum because of an increased risk of expulsion and perforation. Special training is required for immediate postplacental insertions and for insertion within the first 2 days.

Women in labor are not in the best situation to understand and consider their family planning options. Immediate postplacental insertion requires adequate antenatal counseling. Ideally, with cafeteria approach, all the choices of methods should be discussed during routine antenatal visits, from which clients can choose the most appropriate method at that point. Even after hospitalization, woman in the early stages of labor could receive counseling and decide to have a postplacental insertion. Also, a woman could decide after delivery to have an IUD inserted before leaving the hospital. Adequate counseling and informed consent are the two keys for successful implementation. Counseling should be done either before or once the emotional and physical stresses of labor have ended. Since postplacental insertion of the IUCD is the most convenient time and has the lowest rate of complications, service providers should make efforts to make this possible. This means adequate counseling for PPIUCD during antenatal visits should be offered to all women. (4)

There are no randomized controlled trials that directly compare immediate post-partum insertion with either delayed post-partum or interval insertion. Most studies showed no important differences between insertions done by hand or by instruments. Kelly's forceps is highly useful for successful fundal insertion. Plain ring forceps can also be used in its absence. The expulsion rates are highly variable. Copper T (CuT380A) is better than Lippes Loops and Progestasert for PPIUCD.(3) Adequate training of the provider for fundal placement has been associated with reduced expulsion rates. In places where ultrasonography is available, it can be used to train the providers for a good fundal placement. Handwashing is the single most important means of preventing the spread of infection and this applies to PP IUCD too. Aseptic technique is critical to prevent infection during postpartum insertion of IUCDs and its further complications.

Previously, concerns about the PPIUCD focused on high expulsion rates. Studies published in the nineties and early 2000 reported rates of about 9-13%.. However, lower expulsion rates have been reported more recently with improvements in insertion technique. Risk of expulsion is lower for insertions done within 10 minutes of delivery than for those done between 10 minutes and 48 hours. (5)

There has been no increase in IUD expulsions or perforations associated with active management of third stage of labour. The use of oxytocic agents and fundal massage does not increase the risk of IUD expulsion or perforation, even in the cases when IUD is inserted two to forty hours after expulsion of the placenta. Post placental insertion has lower risk of expulsion and perforation than postpartum insertion

Any patient who fits in the medical eligibility criteria for IUCD can be safely offered PP IUCD too. (6)
PPIUCDs are still emerging as a relatively new contraception choice in India, just like rediscovering the languishing innovation. This low use inspite of good knowledge about IUCDs is attributed to the lack of trained providers, poor quality of IUCD services, provider bias against IUCDs,and lack of awareness and misconceptions about the method among both clients and health care providers.While follow-up data on complications with PPIUCD insertions were available from international sources, given the scale at which PPIUCD services are being introduced in India, it was important to generate our own data on the post-insertion outcomes after the introduction of PPIUCD program. (2)

There can be some problems encountered after immediate PPIUCD insertion. Changes in menstrual bleeding patterns for one can be very distressing to the patient. If the symptoms are mild and consistent with postpartum uterine involution, reassurance goes a long way. If the bleeding is persistently heavy and prolonged or associated with clinical or laboratory signs consistent with severe anaemia, iron replacement therapy can be offered and removal considered with the patient's consent. Mild intermittent cramping may occur in the first few weeks after IUCD insertion but is generally masked by the usual cramping associated with uterine involution postpartum. (afterpains) Possible signs and symptoms of IUCD insertion like increased cramping or pain may or may not be associated with menstruation. The risk of upper genital infection among IUCD users is less than 1%.The risk is highest within the first 20 days after IUCD insertion. It is s related to either insertion technique (due to lack of proper infection prevention practices) or pre-existing infection rather than to the IUCD itself.

If the insertion is correct, strings will not be seen at the cervix at postpartum. Even in cesarean section, there is no need to push the strings into the cervix. The strings follow the lochia and can be seen at the cervix by about 6 weeks. In about 50 percent of the patients, strings will not be seen at the cervix. Hence one follow up at 6 weeks with the provider is mandatory. If at 6 weeks the strings are long, or the partner can feel strings, it can be trimmed. If the strings cannot be seen, ultrasonography can be done to reassure the patient about the placement of IUCD. (7)

There are some factors which will help the PPIUCD program performing well. Orientation of all staff (including paramedical) about the benefits and strengths of these services; ensuring high-quality training and post-training follow-up and emphasizing quality of services including infection prevention practices, training management and monitoring will go a long way in preventing complications. Strengthened positive counseling at all facility level by ensuring that all providers, including nurses, are trained in counseling skills are essential.. Required counseling materials like job aids and posters should be made available to all intervention sites. The audio-visual medium can be used to counsel patients. Improved follow-up by establishing a follow-up mechanism and regularly monitoring all clients will boost the programme.

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Neonatal Care What Every Obstetrician Should Know

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1. CARE OF NORMAL NEWBORN

This protocol should be extended to a normal neonate only, and not the high risk neonates. Normal neonate for the purpose of this protocol has been defined as follows:

- Birth weight greater than 2500 g and gestation of 37 weeks or more
- Birth weight between 10th to 90th percentiles as per intrauterine growth charts
- Absence of maternal illness or intra-partum event that may put a neonate at risk of illness (e.g. gestational diabetes, antepartum hemorrhage etc
- Normal Apgar scores with no need for resuscitation at birth
- No postnatal illness such as respiratory distress, sepsis, dyselectrolemia, hypoglycemia or polycythemia

Care at birth

Personnel and Equipment to be present at delivery:

One health provider (physician or nurse) trained in neonatal resuscitation must be physically available at time of birth of all infant irrespective of its risk status (high or low). *It is not good enough to have someone on call*.

If the delivery is anticipated to be high risk because of presence of risk factors identified before birth, more advanced neonatal resuscitation may be required. In these cases, 2 persons should be present solely to manage the baby. The goal should be to provide a 'resuscitation team', with specified leader and an identified role of each member. For multiple births, there should be separate teams.

The resuscitation corner must be physically located in the delivery room itself. The health professional designated to care for the baby at birth should check for the "*Resuscitation Preparedness*" at the birthing place well in time before the baby is delivered (Table 1). One may refer the 'Neonatal Resuscitation Programme' for details of resuscitation[1]

Table 1: Checklist for "*Resuscitation Preparedness*"

For Providing Warmth	Preheat the warmer by turning on manual mode for at least 20 minutes Make available at least 3 towels and blanket
Thermoregulation in small babies	Plastic Bag or plastic wrap.
For positioning	The shoulder rolls should be prepared and kept ready
For clearing airway	10 to 12F suction catheter attached to wall suction set at 80-100 mmHg Meconium aspirator
For ventilation	Check for the availability and the functioning of the self inflating bags Check for availability of all sizes of the masks 00, 0, and 1 8F feeding tube and 20 mL syringe
For oxygen delivery	Oxygen tubing or T piece resuscitator that can deliver the free flow oxygen Pulse oximeter Option for providing varying concentration of oxygen (blender, air, oxygen)
For intubation	Laryngoscope with blades of sizes 0 and 1 Endotracheal tubes, sizes- 2.5, 3.0, 3.5, 4.0
For medication	Access to 1:10,000 epinephrine and normal saline Supplies for administrating medications and placing emergency umbilical venous catheter Neonatal case record sheet for documentation
For Transportation	The transport incubator should be stationed in the birthing place for the transportation in all high risk deliveries

Time of Birth:
The attending physician/nurse should note the time of birth. It is important to call out the time of birth loudly; this helps in accurate recording of the time and alerts other personnel in case any help is needed.

Standard Precautions and asepsis at birth:
The personnel attending the delivery must exercise all the universal/standard precautions in all cases. All fluid products from the baby/ mother should be treated as potentially infectious. Gloves, masks and gowns should be worn when resuscitating the newborn. The protective eyewear or face shields should be worn during procedures that are likely to generate droplets of blood or other bodily fluids.
It is important to prevent infection at birth by observing five cleans[2]:
(1) Clean hands: appropriate hand-hygiene and wearing sterile gloves
(2) Clean surface: use clean and sterile towel to dry and cover the baby
(3) Clean cord: the umbilical cord should be cut with a clean and sterile blade/scissor
(4) Clean thread : The cord should be clamped with a clean and sterile clamp or tie
(5) Do not apply anything to the cord.

Prevention and management of hypothermia:
Immediately after birth the newborn is at maximum risk of hypothermia. This early hypothermia may have a detrimental effect on the health of the infant. Special care should be taken to prevent and manage hypothermia. It should be ensured that the delivery room is 25 - 28°C and free from draft of air. The Neonatologist should receive the baby directly (no middle person should be allowed) in a pre-warmed sterile linen sheet.

The infant should be dried thoroughly including the head and face areas. Any wet linen should not be allowed to remain in contact with the infant. The infant may be placed on the mothers abdomen immediately after the birth to ensure early skin-to-skin (STS) contact with the mother.[3] This will not only maintain the newborns temperature, but also promote early breastfeeding and decreases the pain and bleeding in the mother. The baby should be observed for the transition period and made wear the caps and socks.

Delayed clamping of umbilical cord:
Umbilical cord clamping must be delayed for nearly 1-2 minutes or once cord pulsations have ceased in order to allow transfer of additional amount of blood from placenta to the infant. This delayed cord clamping in term babies is associated with improved hematologic status, iron status and clinical anemia at 2 to 6 months. Even though, there was an increase in polycythemia among infants in whom late clamping was done, this appeared to be benign.[4] Providing additional placental blood to the preterm baby by either delaying cord clamping for 30 to 120 seconds, rather than early clamping, seems to be associated with less need for transfusion, better circulatory stability, less intraventricular haemorrhage (all grades) and lower risk for necrotising enterocolitis.[5]

Method of clamping of the umbilical cord: Umbilical cord should be clamped either with the help of a commercially available clamp or a clean, autoclaved thread or a sterile rubber band. The rubber band could be a better option than a thread, as once cord starts shriveling; the rubber band would still maintain its grip while the thread might loosen up. The length of cord left should 2-3 cm proximal and 2-3 cm distal to clamp/tie. Inspect the cord every 15-30 minutes for initial few hours after birth for early detection of any oozing from the cord.

Cleaning of baby:
The baby should be dried and cleaned at birth with a clean and sterile cloth. The cleaning should be gentle and should only wipe out the blood and the meconium and not be vigorous enough to remove the vernix caseosa (white greasy material on the skin). The vernix, protects skin of the infant and helps maintain temperature. This gets absorbed on its own after sometime. Currently there is no evidence of advantage of cleaning the baby with paraffin or any other emollient at birth and the same is not recommended.

Routine stomach wash:
Performing routine stomach wash in the babies to prevent gastritis (amniotic fluid or meconium) should not be performed. There are no studies that report the advantage of this ritual.

Care of the Eye:
At birth both the eyes of the neonates should be cleaned with separate swabs. The sterile water or the normal saline may be used for this purpose. The swipe to clean the eyes should be gentle and from the inner canthus area to the outer canthus. Currently, there is insufficient evidence to recommend the routine antibiotic prophylaxis for prevention of opthalmia neonatorum in Indian settings. The cleaning on a daily basis is not recommended as a routine.

Placement of identity band:
The birthing places with high birth rates should take utmost care to ensure the identity of the mother-baby dyad by an appropriate method as per the hospital policy. Each infant must have an identity band containing name of the mother, hospital registration number, gender and birth weight of the infant. Reliability of the foot prints for identification has not been investigated.

Recording of Apgar scores:
The Apgar scores should be recorded at 1 minutes and 5 minutes of birth. This score has a limited value in guiding for resuscitation and initial stabilization. The prediction of the subsequent outcomes by Apgar scores is also poor. However; Apgar scores may help deciding the need for nursery admission.

2. CARE OF BABY DURING THE INITIAL FEW HOURS AFTER BIRTH

Weight record of the Baby:
The baby should be weighed after stabilization and the temperature is documented to be normal. A sterile preheated sheet (or a single use paper towel) should be placed on 5 to 10 gm sensitivity weighing machine. Zeroing of the machine should be performed. The baby is then gently placed on the weighing machine and the weight recorded. Weighing of the baby is a complex skill and it requires adequate training of health providers.

Initiation of breastfeeds:
The breastfeeding should be initiated at the earliest time possible. The health provider should actively assist the mother to put the baby on breast irrespective of the mode of delivery. Breastfeeding counseling alone without any active proactive support is unlikely to result in high rates of successful breastfeeding. Time of initiation of the breastfeeding should be documented.

Vitamin K administration:
Vitamin K should be administered to all the babies (0.5 mg for babies less than 1000 grams and 1 mg for babies more than 1000 gms). It is preferable to administer the K1, however if not available the K3 may be administered. This should be administered as an IM injection using the 26 G (1/2 inch) needle and a 1 ml syringe on the anterolateral aspect of the thigh.

First Examination:
The baby should be thoroughly examined by the attending person from head to toe and the findings should be recorded in neonatal record sheet. It is very important to examine midline structures for malformations (e.g. cleft lip, neck masses, chest abnormality, omphalocele, meningocele, claocal abnormality etc). Special attention should be given to identify and document the anal opening. There is no need for routine passage of catheter in the stomach, nostrils and the rectum for detection of esophageal atresia, choanal atresia and ano-rectal malformation, respectively. The baby should be examined for presence of birth injuries in cases with difficult extraction. The axillary temperature of the baby should be recorded before the baby is shifted out from the birthing place.

Communication with the Family:
Before leaving the birthing place, the health professional should communicate with the mother and the family members. The following facts should be clearly told to the family: (1) gender of the baby (2) birth weight (3) well being of the baby. One should ensure that the family members and the mother get to witness the gender and the identity number of the baby.

Rooming in:
Under no circumstances a normal newborn should be separated from the mother. In the initial few hours of life, the baby is very active, and the closeness of the baby to the mother will facilitate the early breastfeeding and bonding. The studies have shown that any separation during these initial hours may have a significant adverse impact on various outcomes including successful breastfeeding in later stage of life.

3. CARE OF BABY BEYOND FEW HOURS AFTER BIRTH

Care of the cord:
The umbilical stump should be kept dry and devoid of any application. The nappy of the baby should be folded well below the stump to avoid any contamination.

Oil Massage:
The benefits of the oil application have been described for the low birth weight babies in the developed and the developing countries. However, a paucity of data still exists for the oil application and/ or massage in the term babies. Oil massage is a low cost traditional practice that is well ingrained into the Indian culture, with no reported adverse outcome. The same may be allowed in a gentle way and with clean hands. Care should be taken not to use oils with additives or the irritant oils (such as mustard oil) for this purpose.

Exclusive breastfeeds:
A proactive and a systematic approach should be followed to initiate, support and maintain breastfeeds. The various advantages of the breast feeds should be discussed with the mother to motivate her for breastfeeding. Availability of a dedicated lactation nurse or councilor would significantly increase the chances of successful breastfeeding.

Bath:
The routine dip baths should be avoided till the baby is in the hospital premises as this increases the risk of hypothermia. The sponging of the baby should be done once a day with clean water, as per the requirement. The dip bath may be undertaken once the cord has fallen and the baby is discharged from the hospital

Powder application:
Currently there is no evidence to suggest the regular use of any powder and the same should be avoided.

Position of sleep:
No Indian study has addressed the issue of relation of sleep position to occurrence of SIDS. There is substantial evidence in the literature from the developed countries of an association of prone position and the SIDs independent of the other variables. However, the converse, viz a reduced incidence of SIDS with supine position has also not been investigated and reported. None of the studies were conducted in the hospital or the facility setting. Considering the above all the healthy term newborns should be preferably is made to sleep on their backs.[6]

Vaccination:
All the infants must be offered the immunization at birth, before discharge, as per their state policy. Hepatitis B immunization at birth can prevent perinatal transmission of hepatitis B infection in majority of cases

Traditional practices that should be discouraged:
The application of Kajal/ surma in the eyes, putting oil in the ear or applying the cow-dung on cord must be strongly discouraged35.

Timing of discharge in a Normal Newborn:
Whenever possible the baby should undergo an observation period of 48 to 72 hrs in the health facility (for establishment of breastfeeding and observation for any morbidity including jaundice). However, an early discharge within 24 to 48 hrs may be considered for the non-primigravida mothers who have a history of successful breastfeeding.

The following criteria should be met in all the babies prior to discharge planning:
- The routine formal examination of the newborn has been performed and documented
- The newborn has received the immunization as per schedule
- The mother is confident and trained to take care of the neonate
- The newborn is not having a significant jaundice or any other illness requiring close observation by a health provider.
- The newborn is breastfeeding adequately. The adequacy of feeds can be determined by
  - -- Passage of urine 6 to 8 times every 24 hrs o Baby sleeping well for 2- 3 hrs after feeds
  - -- There is no excessive weight loss (normally babies do not lose more than 8 to 10% in initial 3 to 4 days)
- The mother has been counseled regarding routine newborn care and her queries are answered.
- Follow-up advice should be communicated to the mother of the baby. Babies, particularly born

to primigravida mothers should be called for follow up visit at 48 hrs of discharge if discharged before 48 hours. The breastfeeding and the jaundice in these babies should be evaluated.

4. ADVICE ON DISCHARGE: NORMAL NEWBORN

1. Exclusive Breastfeeds: All mothers should be advised to exclusively breastfeed the babies till 6 months of age. All the advantages of the breast milk, short term and long term should be discussed with the mother to facilitate a success.

2. Immunization: The mother should be explained the schedule of the immunization and the date of the next immunization should be mentioned on the discharge card.

3. The follow- date for the babies discharged early (within 48 hrs) for assessment of jaundice should be communicated to the parents.

4. The danger signs should be documented and mother should be educated to recognize the same and report early when they are recognized36,37,38,39:
   a. Difficulty in feeding
   b. Convulsions
   c. Lethargy (movement only when stimulated)
   d. Fast breathing (RR > 60/min)
   e. Severe chest in drawing
   f. Temperature of more than 37.5 deg C or below 35.5 deg C

The Young infant study published in Lancet 2008; 371;S135-147; evaluated 3177 children aged 0—6 days and 5712 infants aged 7—59 days for clinical signs and symptoms, and determined the specificity and sensitivity of each one in predicting a severe illness. The study reported that (a) history of difficulty feeding; (b), history of convulsions; (c), movement only when stimulated;(d) respiratory rate of 60 breaths per minute or more; (e) severe chest in drawing, temperature of 37·5°C or more or below 35·5°C, had the highest Sensitivity (85%) and specificity (75%) for severe illness.[7]

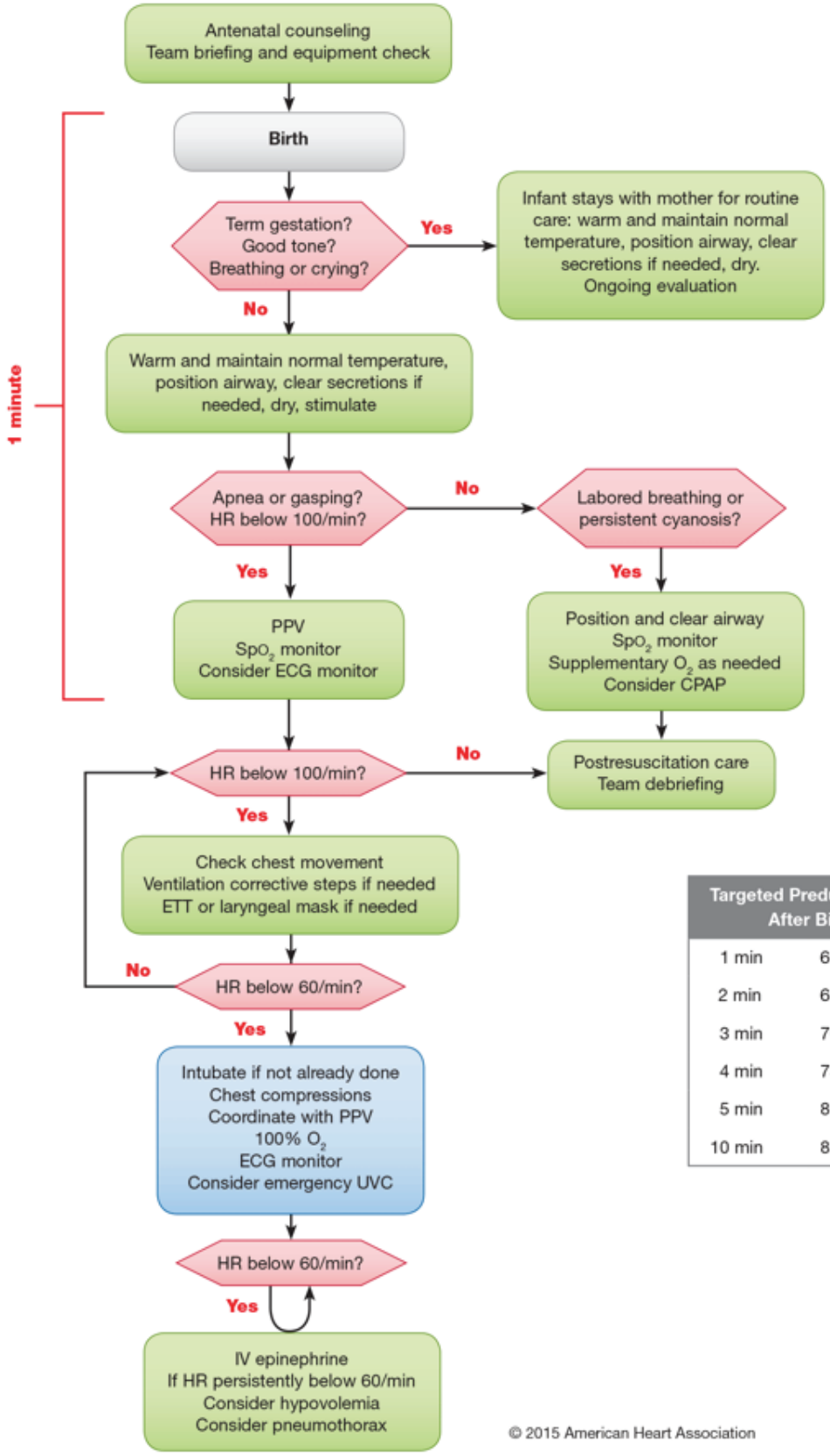
Cochrane review by Brown S et al looked at 7 studies (n=3435) looked at the early postnatal discharge from hospital for healthy mothers and term infants and the re-admission within 8 weeks. They found that the failure of breastfeeding was an important cause for the readmission. Hence, a review of cases discharged early at 2-3 days after discharge, may have a role in preventing readmission.[8]

5. NEWBORNS REQUIRED TO BE SHIFTED TO NICU:

- Any newborn with gestational age ≤ 35 weeks at birth
- Any newborn with birth weight ≤ 1800 grams at birth
- Requiring resuscitation at birth (Positive pressure ventilation)
- Having signs of respiratory distress
- Signs of hemodynamically instability
- Antenatally diagnosed anomalies or other congenital anomalies
- Severe neonatal Hyperbilirubinemia requiring phototherapy or exchange transfusion
- Feeding difficulty
- Newborns requiring surgical interventions

6. RESUCITATION GUIDELINE: 2015 AHA10

Neonatal Resuscitation Algorithm—2015 Update



Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

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9. AAP NRP guidelines 2015

Effects of Pregnancy and Childbirth on Perineum

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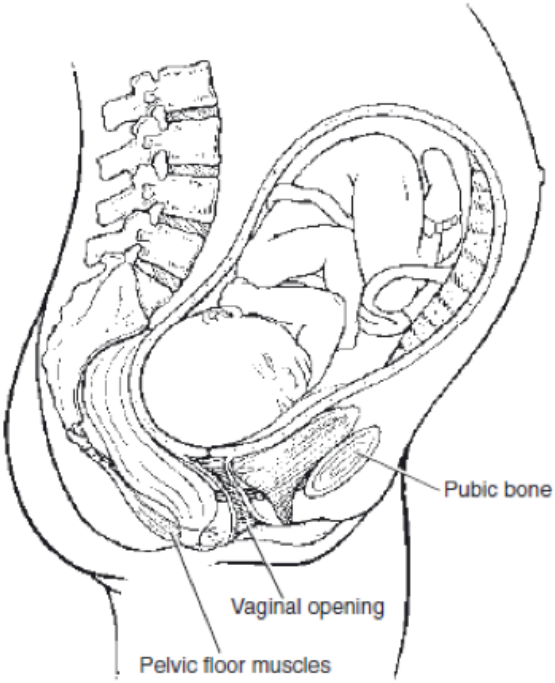
Introduction

Pelvic-perineal dysfunctions, are the most common disorders in women in the post-partum period. Urinary incontinence and genital prolapse, often associated, are the most important consequences of childbirth and are determined by specific alterations in the neurological and structure of musculo-fascial pelvic support. Causation is difficult to prove because symptom occur remote from delivery. Furthermore it is unclear whether changes are secondary to the method of childbirth or to the pregnancy itself. It has been demonstrated that pregnancy itself, by means of mechanical changes of pelvic statics and changes in hormones, can be a significant risk factor.

During pregnancy, the progressive increase in volume of the uterus, subject perineal structures to a major overload. During delivery, the foetus passes through the urogenital hiatus leading to growing pressure on the tissues, causing the stretching of the pelvic floor with possible muscle, connective tissue and/or nervous tissue damage.

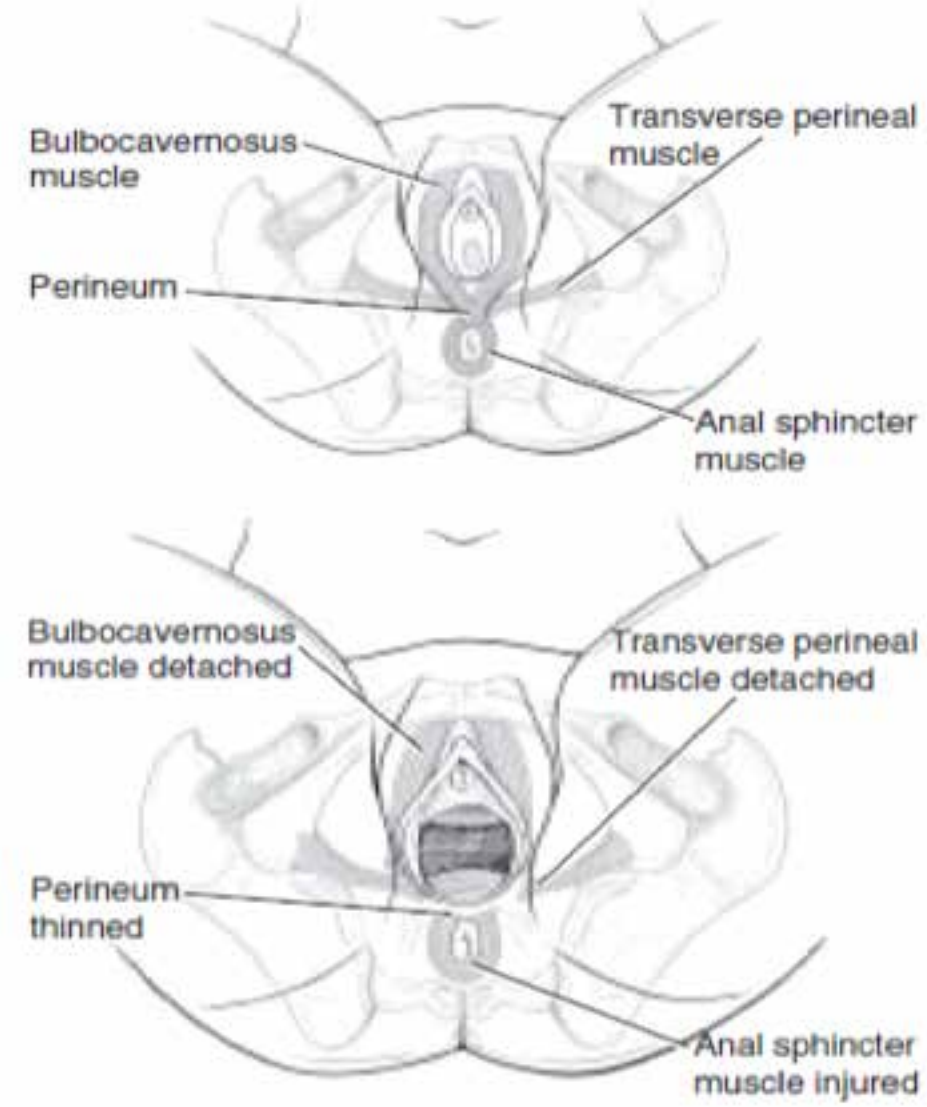


Pelvic organs and pelvic floor during pregnancy

In this article we aim to describe genitourinary post-partum changes with particular attention to the impact of pregnancy or childbirth on these changes.

Genital tract trauma and pelvic floor muscle injury

Pregnancy is associated with a decrease in perineal muscle strength and endurance compared with the previous state. The degree to which women improved or did not improve perineal muscle function after birth, was related to perineal trauma at delivery.



Perineal anatomy before and after childbirth

The order of best to worst performance, with respect to perineal muscle integrity was cesarean birth, intact perineum, first-degree perineal injury, second or third-degree perineal injury and episiotomy respectively1,2. Although all other perineal outcome groups increased muscle function by 6 months postpartum, women with an episiotomy had a mean net loss of perineal muscle performance after birth. Thus, routine use of episiotomy for the purpose of preserving perineal muscle function should be discarded[3].

Pregnancy and post-partum urinary incontinence

Hormonal and physical effects of pregnancy and childbirth are the major reasons of urinary incontinence, thus resulting in maternal morbidity. During pregnancy, mechanical and hormonal factors cause changes in renal physiology, most commonly resulting in frequency of voiding and stress incontinence. Other symptoms during pregnancy include urinary urgency, urge incontinence, incomplete emptying and slow stream.

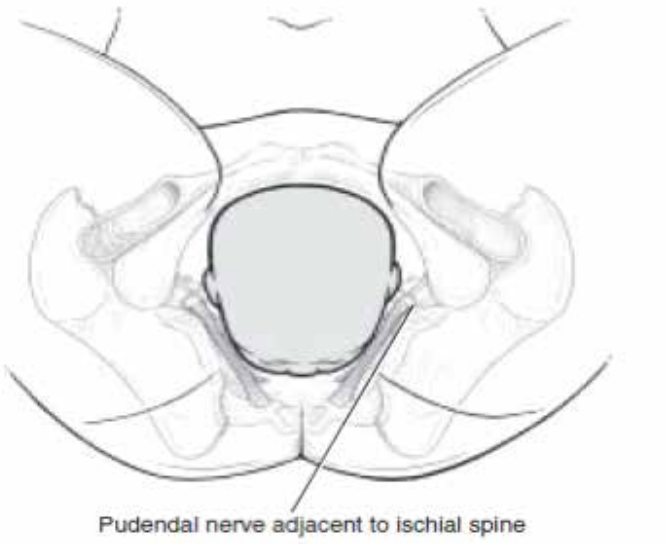
The increase in stress incontinence during pregnancy is argued to be the result of damage to the fascia, ligaments, pelvic floor muscles and nerves supporting and controlling the bladder neck and urethra. Vaginal delivery is linked to a high rate of incontinence in the postpartum period. In fact, the reported incidence of de novo incontinence after first vaginal birth is 21% with spontaneous birth and 36% with forceps delivery[4].

Many clinical studies have attempted to discover the particular obstetric event that causes the incontinence. The obvious suspects include large babies and "difficult deliveries" marked by lengthy pushing phases with or without instrumentation. No clear single event has been found to be responsible, suggesting that postpartum urinary incontinence arises from a multifactorial physiological insult. Most studies evaluating the incidence and impact of postpartum urinary incontinence compare women with any urinary incontinence with women with no incontinence, and do not include descriptions of the severity of incontinence. This omission underlines the importance of using reliable methods of obtaining information regarding functional outcomes[5].

Denervation injury

Pelvic floor neuropathy is a common repercussion of childbirth, less often recognized than vaginal and perineal injury. The pudendal nerve, arising from the S2-S4 nerve roots supply most of the anatomic structures maintaining pelvic support and continence. Compression and stretching of the pudendal nerve during childbirth appears to be a major risk factor associated with subsequent diminished levator muscle function.

Small maternal size, a large foetus, midforceps rotation, and foetal malposition may place the mother at risk for this nerve injury6. Injuries to the lumbosacral plexus during labour and delivery may be mild or severe. As a result of neuropathic changes, the sling-like components of levator ani may fail to reflexively contract and elevate sphincter pressure during a cough or sneeze.



Compression of pudendal nerve during labour

Many studies found that pudendal nerve terminal motor latency recovers after 2 months, whereas functional disturbance in the pelvic floor persists at least until 6 months[7].

Anal incontinence after childbirth

Incontinence of stool and flatus are frequent complications of childbirth. Anal incontinence after childbirth is more common than was previously believed. The reported frequency of incontinence of stool in primiparous women ranges from 2% to 6%. After severe perineal laceration the rate of anal incontinence climbs from 17% to 62%[8,9].

Anal incontinence is associated with forceps delivery and anal sphincter laceration. First vaginal birth, median episiotomy and forceps or vacuum delivery are strongly predictors of anal sphincter laceration, but not birth weight or length of the second stage of labour. Incontinence of stool was more frequent among women who delivered vaginally and had third- or fourth-degree perineal tears than among those who delivered vaginally and had no anal sphincter tears (7.8% vs 2.9%). Peschers et. al. in 1997 evaluated pelvic muscle strength by palpation, perineometry and perineal ultrasound before childbirth at 36 to 42 weeks of pregnancy, 3 to 8 days post-partum and 6 to 10 weeks post-partum. They concluded that pelvic floor muscle strength is impaired shortly after vaginal birth, but for most women returns within 2 months[10].

Prolapse

Pelvic organ prolapse is the herniation of pelvic organs through the vaginal opening. Pregnancy and vaginal delivery are the risk factors cited most commonly. Moreover, harder labours and big babies also contribute to pelvic floor weakening. Symptoms of prolapse may not show for years after an event such as childbirth, but when they appears are severe. Urinary incontinence associated with a cystocoele can be constant and embarrassing. A rectocele can cause constipation, inability to completely void the bowels, or an inability to hold gas or bowel movements and also sexual dysfunction.

Sexual dysfunction

Changes in sexual function are common in post-partum women. Many women express concern that pregnancy-induced changes in their body affect their postpartum sexual function. These fears are heightened when woman experience significant trauma during the birth process. Minor tears and lacerations, suturing, painful haemorrhoids, constipation and continued spotting are frequent occurrences, to which women respond differently. All these occurrences have the potential to negatively influence sexual activity. The effect of spontaneous birth on postpartum sexual function are related to genital trauma[11].

Trauma was categorized as either minor trauma (no trauma or first-degree perineal or other trauma that did not require sutures) or major trauma (second, third, or fourth-degree lacerations or any trauma that required suturing including episiotomy). Significant differences were demonstrated: women with major trauma reported less desire to be held, touched and stroked by their partner than women with minor trauma[12]. Reassuring these women that they will be able to return to satisfactory sexual relations despite their childbirth experiences should allay the anxiety of some future mothers.

Conclusion

Pregnancy and childbirth are the most important risk factors for urinary incontinence and genital prolapse in young women. In fact, post-partum pelvic and perineal changes are caused by many factors such as genetic alterations of connective tissue, obesity, ethnicity, chronic constipation and other events of chronic increase of intra-abdominal pressure, but has long been known that pregnancy and childbirth, are the most important risk factors. During vaginal birth, most women experience pelvic floor trauma and it can cause considerable damage to both muscle as well as nervous tissues.

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WHO Recommendations for Postnatal Care

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Introduction

The days and weeks after childbirth is a critical phase for mothers and newborns. This postnatal phase is the continued responsibility of us obstetricians but for many reasons it remains a neglected phase.

Women may give birth in different settings- tertiary hospitals, nursing homes or even home births. Facilities for the mother and baby differ in different settings. However some basic recommendations if they are followed will go a long way in improving maternal and neonatal outcome.

In 2013, WHO has published certain recommendations on postnatal care.

After a vaginal delivery, it is recommended that healthy mothers and neonates should remain in the health care facility for at least 24 hours. If birth is at home, the first postnatal contact should be as early as possible within 24 hours of birth. At least three additional postnatal contacts are recommended for all mothers and newborns, on day 3 (48–72 hours), between days 7–14 after birth, and six weeks after birth. It was observed that there was a significant increase in the risk of neonatal readmissions if discharge occurred within 24 hours of birth .Neonatal jaundice, dehydration and signs of congenital gastrointestinal and cardiac defects were the most common reasons for the excess neonatal readmissions.Before discharge, mother's bleeding should be controlled, mother and baby should not have signs of infection, and baby should be breastfeeding well.

The following signs should be assessed during each postnatal care contact and the newborn should be referred for further evaluation if any of the signs is present: stopped feeding well, history of convulsions, fast breathing (breathing rate ≥60 per minute), severe chest in-drawing, no spontaneous movement, fever (temperature ≥ 37.5°C), low body temperature (temperature <35.5°C), any jaundice in first 24 hours of life, or yellow palms and soles at any age. The family should be encouraged to seek health care early if they identify any of the above danger signs in-between postnatal care visits.

All babies should be exclusively breastfed from birth until 6 months of age. Mothers should be counselled and provided support for exclusive breastfeeding at each postnatal contact.

All postpartum women should have regular assessment of vaginal bleeding, uterine contraction, fundal height, temperature and heart rate (pulse) routinely during the first 24 hours starting from the first hour after birth. Blood pressure should be measured shortly after birth. If normal, the second blood pressure measurement should be taken within six hours. Urine void should be documented within six hours.

Women should be counselled on nutrition, hygiene, especially handwashing. Women should be counselled on birth spacing and family planning. Contraceptive options should be discussed, and contraceptive methods should be provided if requested. Women should be counselled on safer sex including use of condoms.

Daily chlorhexidine (7.1% chlorhexidine digluconate aqueous solution or gel, delivering 4% chlorhexidine) application to the umbilical cord stump during the first week of life is recommended for newborns who are born at home in settings with high neonatal mortality (30 or more neonatal deaths per 1000 live births). Clean, dry cord care is recommended for newborns born in health facilities, and at home in low neonatal mortality settings. Use of chlorhexidine in these situations may be considered only to replace application of a harmful traditional substance, such as cow dung, to the cord stump.

At 10–14 days after birth, all women should be asked about resolution of mild, transitory postpartum depression ("maternal blues"). If symptoms have not resolved, the woman's psychological well-being should continue to be assessed for postnatal depression, and if symptoms persist, evaluated. Women should be observed for any risks, signs and symptoms of domestic abuse.

Iron and folic acid supplementation should be provided for at least three months.

The use of antibiotics among women with a vaginal delivery and a third or fourth degree perineal tear is recommended for prevention of wound complications.

Reference:

WHO recommendations on Postnatal care of the mother and newborn
2013