Vol. 5, No. 2, April, 2013

COMPREHENSIVE BULLETIN ON SAFE MOTHERHOOD INITIATIVE

THEME : ANTENATAL CARE

INNOVATION TO IMPLEMENTATION

Safe Motherhood Committee - FOGSI

Editor : **Dr. Sadhana Gupta**
Chairperson
Safe Motherhood Committee (2011-2013)

Dr. Sadhana Gupta awarded Prestigious Kamala Hospet Padma Bhushan Award for work done to reduce maternal mortality, Safe motherhood bulletin was awarded Dr. D.C. Dutta award for best FOGSI focus publication

In coordination with public awareness committee chairman safe motherhood committee moderated panel on mass communication in AICOG 2013

Panel on mass communication in women's health Public awareness Committee FOGSI 17th January 2013

FOGSI – Office Bearers 2013

Dr. Hema Diwakar
President-2013

Dr. P K Shah
Imm. Past President

Dr. Suchitra N. Pandit
President Elect. 2014

Dr. Shantha Kumari
Vice-President, South Zone

Dr. Maninder Ahuja
Vice-President, North Zone

Dr. Alpesh Gandhi
Vice-President, West Zone

Dr. Ashwini Bhalerao Gandhi
Vice-President, West Zone

Dr. Jayant Rath
Vice-President, East Zone

Dr. Nozer Sheriar
Secretary General

Dr. Hrishikesh D. Pai
Deputy Secretary General

Dr. Jaydeep Tank
Treasurer

Dr. Madhuri Patel
Joint Treasurer

Dr. Vidya Bhat
Joint Secretary

FOGSI incorporated with Haryana National Rural Health mission on anemia management workshop on 19th February 2013- President Dr. Hema Diwaker sent Dr. Sadhana Gupta, Chairman Safe Motherhood Committee for representation from FOGSI. Role and right methodology for I/V iron sucrose was discussed in detail. Quarries and concerns of medical officers were well taken.

Safe motherhood & Family welfare committee FOGSI coordinated workshop on Contraception on 28th February 2013 in SAFOG conference. Besides Chairman of both committee Dr. Aloke Debdas, Dr. Hiralal Konner were few eminent faculties in workshop.

FOGSI – Office Bearers 2014

Dr. Suchitra N. Pandit
President Elect. 2014

Dr. Ritu Joshi
Vice-President, West Zone

Dr. Roza Oliyai
Vice-President, West Zone

Dr. Indrani Ganguli
Vice-President, North Zone

Dr. Gokul C. Das
Vice-President, East Zone

Dr. Sheela Mane
Vice-President, South Zone

Dr. Nozer Sheriar
Secretary General

Dr. Hrishikesh D. Pai
Deputy Secretary General

Co-ordinators

North Zone :	**Dr. Hema J Shobhane**	South Zone :	**Dr. Vijay Laxmi Sheshadri**
East Zone :	**Dr. Alka Pandey**	West Zone :	**Dr. Bharti Morrey**

Editor

Dr. Sadhana Gupta

Chairperson Safe Motherhood Committee – FOGSI (2011 – 2013)

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Joint Editor

Dr. Hema J. Shobhane

Consulting Obst. & Gyne.

M.L.B. Medical College, Jhansi

Safe motherhood committee member Dr. Alok Sharma organized cytology screening camp on 31.3.2013 in village Pul Bahal, Shimla women were screened.

On international Women's day West zone coordinator of Safe motherhood committee - Dr. Bharati Morey conducted public awareness program for routine cytological screening at Navi Mumbai.

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Helping mother survive - FOGSI JHIPEGO Project incepted by president Dr. Hema Diwakar launched in August 2012 at Bangalore

President's Message

Dear FOGSIan's,

Having worked in various capacities for more than 2 decades, in academic bodies like BSOG, KSOGA, FOGSI and ICOG I have faced challenges, gained experience and used the opportunities to learn further. Now I am all set to feel the weight of the crown of the president of FOGSI and **its my TIME WITH FOGSI.**

The time is ripe to fulfill my dream to concentrate on the ground realities to deliver standard care to all the Indian women. My Mantra of "Each one teach one" will be used for **TASK SHIFTING to the frontline healthcare workers –**

The task of spreading awareness

The task of booking every single antenatal patient

The task of motivating them for follow up

The task of offering the quality standards of care to the women who visit the health facilities.

The task of team building and capacity building to SAVE MOTHERS and SAVE the Generation Next.

With special problems in our country, like teenage pregnancy, coupled by high illiteracy and low awareness levels, malnutrition and poor institutional delivery rate, all contributing to the deaths of mothers in India, the **Federation of Obstetric & Gynaecological Societies of India (FOGSI),** the apex body of obstetricians and gynaecologists in the country, in association with the **Association of Obstetrics & Gynaecology Society of every state and obgyn society and NRHM,** will intensify a fast track initiative – **"Helping Mothers Survive" (HMS)** – aimed at reducing the **Maternal Mortality Ratio (MMR).** Under the HMS initiative, training for obstetricians, gynaecologists, and medical officers, primary health care centre staff and ANMs / Staff Nurses on safe delivery mechanisms will be carried out in a phased manner in various parts of India.

With flaming enthusiasm of FOGSIan's we have built a dynamic team of like minded members like Dr. Sadhana Gupta, who leads the Safe Motherhood Comittee. We hope to explore the individual talents, and we have prompted, prodded and promoted the youngsters to the centre stage in making them Champions to help mothers survive. Lets Innovate, Implement and IMPACT - and show the world what FOGSI can do to change the face of Womens health care in India.

Best wishes

Dr. Hema Divakar
President FOGSI

Vice-President's Message

Dear Friends,

Safe motherhood should be the basic right of all women of reproductive age. For safe motherhood experience, antenatal care should be the first and most essential recommendation. Routine Antenatal care should be offered and easily available to all pregnant women irrespective of her para status, age and socio economical class and whether it is a normal, high risk, precious or complicated pregnancy.

It gives us ample opportunities from case registration, vaccination to take nutritional and therapeutic care. We can warn her about the harmful effects of certain habits like smoking and can correct many misbelieve. We can explain and train her about the importance and role of exercise and positive thinking. It provides investigations and screening of both, mother and foetus. Thus it gives us an opportunity to identify high risk pregnancy, pregnancy with medical disorders and complications of pregnancy in time. We can counsel the pt and her relatives about it and we can also keep ourselves and our set up ready to tackle it when she comes with labour pain or with any complications.

If antenatal care is made mandatory to all pregnant women of our country, it will be of great help in reducing alarming high maternal mortality and morbidity of our country.

I am really impressed with the activities of Safe Motherhood committee of FOGSI. The committee is well-known for it's regular, popular and very useful publications and we are always eagerly waiting for it's next publication. I am fortunate that as a Vice president of FOGSI, this year I got an opportunity to work for the committee. I congratulate Dr. Sadhna Gupta, chairperson of the committee for her untiring efforts and activities with impact.

My best wishes to her and safe motherhood committee of FOGSI.

Dr. Alpesh Gandhi
Vice-President
FOGSI-2013

Safe motherhood committee organised wareness program for general practitioners on calcium deficiency in women on 16th March 2013

East Zone Yuva FOGSI, theme on Don't let Mother Die at Guwahati on 5-7 April 2013, HMS East Zone TOT Workshop, Scientific lectures and panel conducted by the chairperson Safe Motherhood Committee.

Congratulations to Dr. Sadhana Gupta and all members of Safe Mother Hood Committee for coming out with this 5th News letter of committee. Her passion to work for women of this country through FOGSI is well known and appreciated.

Coming events cast their shadows before! So what ever is going to happen to living things is decided in the womb of mother. There for care of woman during antenatal period is very important and critical. We have to keep abreast of all what is happening along with whatever is in future or in pipeline as research.

It is highly appreciated and innovative step to come forward with proper antenatal care oriented newsletter. This is one step forward in reducing maternal mortality also and at the same time making our future generations healthy.

Antenatal care has become a very specialized field with in Utero origin of adult diseases, but while moving ahead, always keep in mind old dogmas which are foot prints into sands of time, our basics of proper History and Proper step wise examination.

My congratulations again to Dr. Sadhana Gupta and her team, for compiling this issue of Newsletter with a very appropriate and needed contents and update. This stimulates all others also to come forward and work actively.

Wishing her all the best as chairperson Safe Motherhood committee and for all future endeavors also.

Dr. Maninder Ahuja
FICOG
Vice President, FOGSI 2013

Dear friends,

High maternal mortality in our country is due to so many factors. Teenage pregnancy, anaemia, illiteracy, lack of awareness and poor availability of health care facilities are some of the preventable causes. Although recent figures show that Maternal Mortality has reduced, every day about 800 women die of pregnancy related problems globally. So how do we achieve the expected Millennium Development Goal? This year the FOGSI theme is "FROM INNOVATION TO IMPLEMENTATION" and is meant to reduce the high maternal mortality in our country by launching of the FOGSI FAST TRACK INITIATIVE for Helping Mothers Survive. Dr Hema Divakar the FOGSI President is deeply committed for the success of this programme. Dr Sadhana Gupta and her team have been doing commendable work in this field and the 5th Safe Motherhood bulletin is now going to be published. It should be as informative as the earlier ones.

I send my best wishes for the same.

Dr. Jayant Rath
M.D; F.I.C.M.C.H.
Vice-President FOGSI (2013)

FOGSI to help reduce maternal mortality rate

STAFF REPORTER ■ BHOPAL

In an effort to curtail pregnancy-related deaths in Madhya Pradesh, the Federation of Obstetric and Gynaecological Societies of India (FOGSI), the apex body of obstetricians and gynaecologists in the country, will intensify a fast track initiative, 'Helping Mothers Survive' (HMS) with the active support of local gynaecologists and obstetricians.

Under the HMS initiative, training for obstetricians, gynaecologists, medical officers, primary health care centre staff, ANMs and staff nurses on safe delivery mechanisms will be ...

FOGSI President Dr. Hema Divakar, said, "The HMS fast track initiative is being rolled out nationwide with strong focus on states where Maternal Mortality Ratio (MMR) is high. Madhya Pradesh is one of the states where the average MMR is higher than the national average of 212/1, 00,000. This is a serious cause for concern as the human development indicators are poor in this region. Over the next five years, FOGSI will actively engage the local health delivery system to ensure that mothers survive going forward and the MMR reduces in the process."

"If we have to ...

... fessional bodies of FOGSI in Madhya Pradesh," Dr. Hema added.

Dr Hema Divakar also expressed her concern over the rising trends of Diabetes in Pregnancy (Gestational Diabetes Mellitus - GDM) in the country. The GDM, which was 2 per cent in 1982, had reached an alarming 16 per cent by 2002. "The awareness about GDM is extremely low in India, in both urban and rural centres. Indians ...

FOGSI to intensify 'Helping Mothers Survive' campaign in Madhya Pradesh

Business Reporter, Bhopal

In an effort to curtail pregnancy-related deaths in Madhya Pradesh, the Federation of Obstetric & Gynaecological Societies of India (FOGSI), the apex body of obstetricians and gynaecologists in the country will intensify a fast track initiative – "Helping Mothers Survive" (HMS) – ... support of ... gynaecologists and ...

... HMS initiative ... for obstetricians, gynaecologists, and ... officers, primary ... centre staff ... Staff Nurses ... delivery mechanisms will be carried out ... manner in ... of Madhya ...

Announcing the FOGSI initiative for Madhya Pradesh, FOGSI President Dr. Hema Divakar, said, "the HMS fast track initiative is being rolled out nationwide with strong focus on states where Maternal Mortality Ratio (MMR) is high. Madhya Pradesh is one of the states where the average MMR is higher than the national average of 212/1,00,000. This is a serious cause for concern as the human development indicators are poor in this region. Over the next five years, FOGSI will actively engage the local health delivery system to ensure that mothers survive going forward and the MMR reduces in the process."

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एफओजीएसआई मध्यप्रदेश में 'हेल्पिंग मदर्स सर्वाइव' अभियान को देगा गति

मध्य प्रदेश में गर्भावस्था संबंधित मौतों को कम करने के उद्देश्य से ऑब्स्टेट्रिक एण्ड गायनेकोलॉजिकल ... फेडरेशन ऑफ ऑब्स्टेट्रिक एण्ड गायनेकोलॉजिकल सोसायटीज़ ऑफ इन्डिया (एफओजीएसआई) स्थानीय ऑब्स्टेट्रिशियन्स और गायनेकोलॉजिस्ट्स के सक्रिय सहयोग से अपने फास्ट ट्रैक अभियान हेल्पिंग मदर्स सर्वाइव (एचएमएस) को तेज़ी से ...

फास्ट ट्रैक अभियान

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एफओजीएसआई हेल्पिंग मदर्स सर्वाइव अभियान को देगा गति

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अब नहीं जाएगी किसी जननी की जान

मध्य प्रदेश में गर्भावस्था संबंधित मौतों को कम करने के उद्देश्य से ऑब्स्टेट्रिशियन्स और गायनेकोलॉजिस्टों की एपेक्स बॉडी फेडरेशन ऑफ ऑब्स्टेट्रिक एण्ड गायनेकोलॉजिकल सोसायटीज़ ऑफ इन्डिया (एफओजीएसआई) स्थानीय ऑब्स्टेट्रिशियन्स और गायनेकोलॉजिस्टों के सक्रिय सहयोग से अपने फास्ट ट्रैक अभियान 'हेल्पिंग मदर्स सर्वाइव' (एचएमएस) को तेजी से आगे बढ़ाएगी।

* 'हेल्पिंग मदर्स सर्वाइव' अभियान को मिलेगी गति

* सुरक्षित प्रसव के लिए फास्ट ट्रैक अभियान

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जबलपुर (एनएफएस)। मध्यप्रदेश में गर्भावस्था संबंधित मौतों को कम करने के उद्देश्य से ऑब्स्टेट्रिशियन्स और गायनेकोलॉजिस्टों की एपेक्स बॉडी फेडरेशन ऑफ ऑब्स्टेट्रिक एण्ड गायनेकोलॉजिकल सोसायटीज़ ऑफ इन्डिया ...

हेल्पिंग मदर्स सर्वाइव बढ़ेगा तेजी से

सुरक्षित प्रसव (डिलीवरी) के लिए फास्ट ट्रैक अभियान

FOGSI initiative 'Helping Mothers Survive'

Staff Reporter

IN AN effort to curtail pregnancy-related deaths in Madhya Pradesh, the Federation of Obstetric & Gynaecological Societies of India (FOGSI) initiated a fast track initiative "Helping Mothers Survive" (HMS) with the active support of local gynaecologists and obstetri...

... care centre staff and ANMs/staff nurses on safe delivery mechanisms will be carried out in a phased manner in various parts of Madhya Pradesh, including Jabalpur.

Announcing the FOGSI initiative for Madhya Pradesh, FOGSI President Dr Hema Divakar, said, "The HMS fast track initiative is being rolled out nationwide with ...

... states where the average MMR is higher than the national average of 212 upon 1,00,000."

Dr Hema Divakar also expressed her concern over the rising trends of Diabetes in Pregnancy (Gestational Diabetes Mellitus-GDM) in the country. The GDM, which was 2 per cent in 1982, had reached an alarming 16 per cent by ...

... added. FOGSI was represented by Dr Hema Divakar, President FOGSI, at the 8th AMPOGS Annual Conference held in Jabalpur. AMPOGS - Association of Madhya Pradesh Obstetric & Gynaecological Societies, led by Dr. Shashi ... and Dr. Kavitha N. Singh, ... ized the two-day conference ...

... और कब्रिस्तान ... रहा है निर्माण

हाईकोर्ट ने जारी किया कंटेम्प नोटिस

दुश्मनी ऐसी कि ...

पुलिस ने मारा ...

Helping mother survive - ENPHATIC and extensive - FOGSI JHIPEGO campaign to helping mother survive in India.

Editor's Desk

It gives great pleasure to release fifth issue of safe motherhood bulletin on the occasion of Safe motherhood day-11th April, which is birth anniversary of Kasturba Gandhi, popularly known as Ba, symbolic of strength, independence, persistence and tenderness of Indian women.

This issue is focused on theme of antenatal care, which lays the foundation stone of good intra and post natal care and outcome. Antenatal care is mainly knowledge based and can be provided in all settings. Still 20-30% of women in our country are not able to receive antenatal care at all or minimum 3 visit. Provision of good quality, yet simple, affordable and accessible antenatal care for all pregnant women irrespective of socioeconomic cultural status should be our top priority. In today's hi tech world many dilemmas have emerged in field of antenatal care-like how many visits, how many investigations, what drug to prescribe and so on. We have tried to cover each aspect for clear directions in these grey zones and thank the authors like Dr. Aloke Debdas, Dr. Mandakini Pradhan, Dr. Uday Thanawala and others for their timely contribution.

Review articles by eminent personalities Dr. S. Arulkumaran, Dr. C. N. Purandare and Dr. Sanjay Gupte on comprehensive antenatal care with risk approach in diverse settings will cover the subject in depth and pleasurable to go through. I immensely thank them for their time and contribution in a very short time.

In India Speaks we have insight into Employees Security Insurance (ESI) organization, launched in India just few years after independence. These are innovative steps for medical care of families of labour working in factories and frequently remains unheard and unparsed. Dr. Sangeeta Gupta, from ESI family has shared the pride facts and working of ESI in her article.

I immensely thank all the readers for their appreciation and words of praise for the bulletin. The begging of Dr. D.C. Dutta prize for best FOGSI focus has given more sense of responsibility and further improvement. We seek your cooperation and contribution for the same.

Wish you a thoughtful & enjoyable reading,

Yours sincerely

Dr. Sadhana Gupta

No Woman can call herself free until she choose consciously whether she will or will not be a mother.

When motherhood becomes the fruit of a deep yearning, not the result of ignorance or accident, its children will become the foundation of a new race.

- Margaret Sanger

Antenatal Care in 21st Century

Dr. Sanjay Gupte
MD, DGO, FICOG, FRCOG

Dr. Gayatri Venkataraman
MD

The human race is amazing and is constantly changing; evolving, developing and so is birth which is an integral part of a human being.

Traditional method of giving birth at home

Many years ago, around the day and age of our great-great grandparents, birth was something which was handled at home with just a traditional birth attendant more popularly known as the Dai. This dais did not have any formal training or certification. They had learnt skills passed down from the mothers and grandmothers and attended births. They had their traditional methods of handling different situations such as a breech presentation or a uterus which refused to shrink post-delivery. They used a simple unsterilized knife to cut the umbilical cord.

Evolved process of giving birth

All this makes today's woman cringe with horror because she cannot imagine birth in these circumstances. She cannot imagine birth without her trained and certified obstetrician in the clean and sterile hospital settings. She cannot imagine the high mortality rates that would exist in these primitive circumstances. All this and more has helped birthing to evolve to what we see today.

Today, if a woman has a positive **home pregnancy test** in the first month of pregnancy, she immediately makes an appointment to see her obstetrician much to the surprise of her grandmother who wonders why she even needs a check-up before the seventh month of pregnancy.

As you all must be already aware, modern antenatal care has evolved into a highly specialized branch of Obstetrics. The focus of obstetrical care has changed from treating maternal and fetal diseases to predicting and preventing them.

The journey towards safe motherhood begins even before the antenatal clinic, at the preconceptional consultation. This makes us ponder as to how to alleviate the journey in order to add some more value to this very important arm of our clinical practice.

Highlighting some key objectives of Antenatal care

- To promote and maintain maternal health during pregnancy
- To remove anxiety and dread associated with delivery.
- To foresee complications and prevent them
- Detection of high risk cases and treatment with special attention
- Reduction of materno-fetal mortality and morbidity

Scheduling ante natal visits

Ante natal visits are scheduled and the general schedule which is followed worldwide is one visit per month till the seventh month. Subsequently, a visit every fortnight till the pregnancy enters the ninth month and in the last month a visit every week.

ANC Protocol

Clinical Check up as Scheduled

6-8 weeks	UPT for confirmationUSG for dating & viability First ANC lab profile: Haemogram, BSL (R) U TSH, urine routineHIV, HBsAg, Bl group, ICT if Rh negative, HbA1C if indicated Rubella IgM, Vit B12First antenatal counseling (diet, medicines, investigations, Dos & Don't's in pregnancy, alarming signs)
11-13 weeks	First trimester screening – for predicting trisomy 18,13, 21.(PAPP-A, free bHCG, USG for nasal bone, NT, CRL)OGCT
16-18 weeks	Triple test/ quadruple test, urine c/s

20-22 weeks	Anomaly scan, Blood reports- haemogram, OGCT, UTSH, Urine routine ICT if Rh negative Inj TT first dose Watch for second trimester fall in BP, anticipate PIH
24-26 weeks	Fetal 2D echo (if indicated)
28 weeks	ICT - if Rh negative & Inj Anti DInj TT 2nd dose
32 weeks	USG with colour DopplerInj Betnesol 2 doses SOS2nd antenatal counseling (breast feeding, delivery, C section, delivery kit, when to visit a doctor)
34-36 weeks	Haemogram, OGCT, UTSH, urine routine
38-39 weeks	USG with colour Doppler, NST- SOS
Uristix – three times throughout ANC check up on 1st visit, 24 weeks & at 32 weeks	

Importance of routinely check-ups – to ensure normalcy & risk tagging

The monthly visits are routine check-ups and involve checking fetal heart tones, checking weight and blood pressure, uterine size and ensuring that the mother does not have any complaints. These visits are extremely important as they help the doctor to keep a tract of the evolving pregnancy, anticipating complications & preventing or minimizing them by arresting it in the initial stage itself.

Importance of Ultrasound scans

The first ultrasound scan is done in between 6-8 weeks of pregnancy to assessgestational age by dates. For this the LMP (Last Menstrual Period) date which is taken into consideration but the date provided by the ultrasound is important to calculate the expected date of delivery.

The second scan is done between 11-13 weeks of pregnancy (first trimester screening) for NT, Nasal bone & CRL.

Triple Marker blood test

A woman will also undergo the Triple Marker blood test which tests the levels of pregnancy related hormones which is Alpha Feto Protein, hCG - human chorionic gonadotropin hormone (a hormone produced by the placenta), estriol - a hormone produced by the placenta, inhibin - a hormone produced by the placenta.

Abnormal levels of hormones could indicate the following

- Open neural tube defects (ONTD) such as spina bifida.
- Down syndrome.
- Other chromosomal abnormalities.
- Defects in the abdominal wall of the fetus.
- Twins - more than one fetus is making the protein.
- A miscalculated due date, as the levels vary throughout pregnancy.

This gives the family an option of whether it is viable to continue with the pregnancy or not.

An Anomaly scan or a 4D ultrasound

An Anomaly scan or a 4D ultrasound is suggested at approximately 20 **weeks of pregnancy.** This is a detailed scan which does a complete analysis of the fetus in utero and alerts the obstetrician of any malformations.

A glucose challenge test

A **glucose challenge test**, usually conducted in the 24 to 28 weeks of pregnancy, measures levels of sugar (glucose) in the mother's blood. Abnormal glucose levels may indicate gestational diabetes. A mother who develops gestational diabetes must have her glucose levels monitored and ensure that her diet is modified accordingly. This is essential for the overall health of the baby and the birth outcome. Babies who are born to mothers with gestational diabetes need special attention in the immediate postpartum period as their glucose levels are abnormally high. If left unattended it can pose major complications. However due to the ante-natal screening the attending doctors are aware and prepared.

For women who are over 35 years of age, more tests are prescribed to ensure the wellbeing of the fetus. However, these tests are invasive and carry a risk of miscarriage and should be done only if absolutely necessary.

A last ultrasound

As you approach full term, a last ultrasound is done to check the position of the baby, approximate baby weight, uteroplacental & feto placental circulation & position of placenta & cord, liquor. This helps the obstetrician to plan and be better prepared for the birth.

Routine visit to a dentist is a must

A routine visit to the dentist for cleanup of the gums is advised to every pregnant woman as various researches have shown that gum disease is linked to early labor. Oral hygiene is also important in keeping other routine illnesses at bay which reduces the use of antibiotics which are best avoided **during pregnancy**.

Other related blood tests

Other blood tests such as HIV, Thalassemia and Thyroid are also essential as they help us to avoid future complications.

All these procedures and check-ups ensure a lower mortality rate for mother and baby and help the family have a more relaxed pregnancy. It aids the family in being more secure in the knowledge that all is progressing well with their precious bundle of joy.

Concept of schematic risk assessment:

A structured scheme or protocol must be devised in order to manage a problem once identified up to delivery. The stepping stone towards optimizing antenatal care through strategic risk assessment and targeted treatment is importantly a pre conception counseling. Pre conception counseling offers to identify and mitigate maternal and potential fetal risk factors before pregnancy begins.

Marking out for additional care-Medical and Social History

- Cardiac disease, including hypertension, H/O operated cardiac condition
- Renal disease
- Endocrine disorder or diabetes requiring insulin, hypothyroidism
- Psychiatric disorder (on medication)
- Haematological disorder, including thromboembolic disease
- Epilepsy requiring anticonvulsant drugs
- Malignant disease
- Severe asthma
- Anaemia
- Chemical dependency
- HIV or HBV positive
- Auto-immune disorders
- Gross obesity or grossly underweight
- Economically challengedpatients
- Previous Obstetric History
- Recurrent miscarriage or midtrimester loss
- Grand multiparity
- Multiple pregnancies
- Severe pre-eclampsia
- Rhesus isoimmunisation or other significant blood group antibodies
- Uterine surgery including LSCS or cone biopsy, myomectomy
- Antenatal or postpartum hemorrhage on two occasions
- Retained placenta on 2+occasions
- IUGR
- Still birth or neonatal death
- Birth weight <2500g or>4500g
- Congenital abnormality
- Puerperal psychosis or postnatal depression.

Preeclampsia

- Preeclampsia is one condition which in spite of all progress in the medical field is on the rise.
- This trend is due to increasing risk factors like Obesity, Life style issues, Delayed child bearing & Increasing use of Assisted Reproductive Procedures
- Preeclampsia is defined by the new onset of hypertension (systolic BP > 140 mm of Hg or diastolic BP > 90 mm of Hg) accompanied by new onset proteinuria, defined as 300 mg or more per 24 hrs

Severe Pre Eclampsia

- SBP of 160 mm Hg or higher or DBP of 110 mm Hg or higher on 2 occasions at least 6 hours apart

- Proteinuria of more than 5 gm in a 24-hour collection or more than 3+ on 2 random urine samples collected at least 4 hours apart
- Pulmonary edema or cyanosis
- Oliguria (< 400 mL in 24h)
- Persistent headaches
- Epigastric pain and/or impaired liver function
- Thrombocytopenia
- Oligohydramnios, decreased fetal growth, or placental abruption

Clinical divisions of Preeclampsia

Clinically it is also divided as early onset PE (before 34 wks of gestation) & late onset PE (after 34 wks of gestation). This distinction is now held so important that there is a suspicion that these two are actually separate entities.

Early onset preeclampsia	Late onset preeclampsia
A fetal disorder that is typically associated with placental dysfunction	Maternal disorder, due to underlying maternal constitutional factors
Reduction in placental volume	Normal or larger placental volume
Intrauterine growth restriction	Normal fetal growth
Abnormal uterine & umbilical artery Doppler evaluation	Normal uterine & umbilical artery Doppler evaluation
Low birth weight	Normal birth weight
Adverse maternal & neonatal outcomes	More favorable maternal & neonatal outcomes

WHO recommendations

- Magnesium sulfate is recommended for the prevention of eclampsia in women with severe pre-eclampsia
- Magnesium sulfate is recommended for the treatment of women with eclampsia.

Diabetes in Pregnancy

Why Do We Worry About Managing DM in pregnancy

- Congenital anomalies
- Macrosomia
- Sudden still-birth
- Prematurity
- Pre- eclampsia
- Ketoacidosis

Preconceptional diagnosis is important.

Role of glycosylated hemoglobin

Screening tests for gestational diabetes

Dr. Seshiah's method (DIPSI test) –

One step procedure for screening and diagnosis of gestational diabetes mellitus

For Universal screening, a single GCT with a 75g of oral glucose load irrespective of prandial state. Women with 2 hr. PPG > 140 mg/dl diagnosed as GDM.

This method, recommended by WHO serves both as :

ONE STEP SCREENING & DIAGNOSTIC PROCEDURE EASY TO PERFORM BESIDES BEING ECONOMICAL

With 75 gm. OGCT

Plasma Glucose	In Pregnancy	Outside Pregnancy
2 hr. 200 mg/dl	Diabetes	Diabetes
2 hr. 140 mg/dl & GDM	199 mg/dl	IGT
2 hr. 120 mg/dl & 139 mg/dl	GGI	—
2 hr.< 120 mg/dl	Normal	Normal

Target plasma glucose levels in pregnancy

Glucose (Mg/dl)	Time
69-90	Before breakfast
60-105	Before lunch, supper, bedtime snack
≤120	After meals
> 60	2 am to 6 am

Thyroid disorders in Pregnancy

Thyroid screening

- Most common endocrine disorder in pregnancy next to diabetes.
- TSH : insights into the adequacy of T3 & T4 in peripheral tissues (pituitary)
- True normal range: 0.3-2.5U/L
- Gray zone :2.5- 4.0U/L
- > 4 U/L :early or mild hypothyroid disease

Subclinical Hypothyroidism

- ACOG recommends to screen hypothyroidism in pregnancy.
- Anti TPO antibodies are advised if the TSH ultra>2.5

Screening For Thyroid Dysfunction During Pregnancy

Recommendations

1. All pregnant females should be screened at 1st antenatal visit by measuring TSH levels (IIa/B).
2. For the following high risk groups, screening should also include anti-TPO antibodies (IIa/C);
   - Personal history of thyroid or other autoimmune disorders or a family history of thyroid disease
   - Women with goiter
   - Women with a history of miscarriage or preterm delivery
   - Women with Type 1 diabetes

Anemia in Pregnancy

- Anemia is a major direct & indirect cause of maternal mortality in India and world over.
- 70% pregnant women are found to be anemic in our country
- Anemia increases the vulnerability of a pregnant woman & is underlying cause in almost all the medical disorders of pregnancy

Investigations Necessary

- Estimate the degree of anemia & find the cause
- Detect the RBC morphology, chromatism, and type of anemia, malarial parasite, platelet adequacy, presence of any infection
- Sickling test and Hb electrophoresis may be necessary if suspicion of sickle cell or thalassemia.

Management of anemia

Role of IV Iron sucrose-No patient should go for delivery with Hb<10gm%

IUGR

- Exact dating for correct gestational age .
- Early first trimester ultrasound
- Regular clinical assessment by measuring fundal height in weeks and simphysio-fundal height in cm.
- Ultrasound to diagnose IUGR and types
- Colour Doppler studies in IUGR - prognostic value

Preterm labour

Risk factors

- Previous PTL
- Bleeding
- UTI
- Higher order pregnancy
- BMI < 20kg/m2
- Previous LBW
- Stress

Newer predictive tests

- Fibronectin
- Collascope
- Proteomics
- IGFBP

Prevention of Preterm Labor

- Cervical status assessment
- Cervical encirclage?

  Indications
  - History indicated: previous preterm painless deliveries.
  - Clinically indicated: short cervix on examination
  - USG indicative of short cervix- < 2.5 cm

Cervical encirclage is not advised in placenta previa, twins.

Infections

Rubella status:

Toxoplasma antibody titers (not a must)

..... Avidity test

Bacterial vaginitis

Urinary tract infection

..... asymptomatic bacteruria

Group B streptococcal infection.

Candidiasis .....diabetes

Trichomoniasis.

Screening for Down's syndrome

No Down syndrome should go undetected

1st trimester screening:

Nuchal thickness, free beta HCG and PAPP-A, nasal bone

2nd trimester screening:

AFP, estriol, beta HCG

Integrated screening

Sequential screening

Vaccination in pregnancy

Vaccine	Use in pregnancy	Comments
BCG*	No	
Cholera	No	Safety not determined
Hepatitis A	Yes, administer if indicated	Safety not determined
Hepatitis B	Yes, administer if indicated	
Influenza	Yes, administer if indicated	In some circumstances; consult a physician
Japanese encephalitis**	No	Safety not determined
Measles*	No***	
Meningococcal disease	Yes, administer if indicated	Only if significant risk of infection
Mumps*	No***	
Oral poliomyelitis vaccine	Yes, administer if indicated	
Inactivated poliomyelitis vaccine	Yes, administer if indicated	Normally avoided
Rabies	Yes, administer if indicated	
Rubella*	No***	
Tetanus/ diphtheria	Yes, administer if indicated	
Typhoid Ty21a		Safety not determined
Smallpox	No	
Varicella*	No	
Yellow fever*	Yes, administer if indicated	Avoid unless at high risk

Plans To Discuss With Patient

1st trimester :

- Counseling regarding life style, exercise and traveling.
- Dietary advice

2nd trimester :

- Counseling regarding labour, possibilities of LSCS, epidural analgesia.
- Need for blood requirement, place of delivery and financial issues.
- Facilities required.

3rd trimester:

- Possible labour complications & NICU admission
- Requirement of tertiary hospital care
- Information about last minute complications.
- Breast feeding & baby care

Schematic Approach To Prenatal Care

8-14 wks	• Confirm pregnancy • Check medical, family, social & past obstetric history
	• General physical examination • Pelvic examination if indicated • Investigations: urine alb & sugar, ultra TSH, haemogram, blood grouping and ICT if necessary, HIV, HBsAg, VDRL, rubella, PAP smear. • Dating USG • Offer 1st trimester screening and/or triple test, • Advice on diet, exercise, breast care, infant feeding, dental health, antenatal classes, family planning and maternity benefits. • Complete case notes. • Identify risk factor- actual & potential
16-24 wks	• Triple test, check all booking, • investigations, anomaly scan, confirm EDD, BP, fundal in cm, FHS, urine analysis. Colour Doppler study to detect early changes predictive of PIH • OGCT
28-32 wks	• Hemogram, ICT, discuss labour and parent-craft, DFMC • Repeat TSH & BSL as indicated

36 wks	• Growth and malpresentations, haemogram, ICT, GBS screening.
38 wks	• USG for growth, NST, pelvic assessment
40 wks	• discuss induction of labour

IAN DONALD (edition 1979)

..... gone are the days, I hope, of the hospital "cram clinic" which treated its patients like machine parts on an assembly line, being mainly concerned with the prevention of eclampsia, the correction of malpresentation and recognizing disproportion, if it could. The ability to see 60 patients in 65 minutes; giving the patient little more recognition than the status of an appendage of her gravid uterus and its contents.

Let us do away with such 'cram clinics' and modify and optimize this planned program of observation, education and medical management of pregnant women towards making pregnancy a safe and satisfying experience.

Annie Besant

- Born in 1847, married and questioned religious and social belief crushing independent soul of women.
- Authored books-Fruits of Philosophy advocating birth control
- Imprisoned for six months.
- Authored Laws of population
- Joined India freedom struggle

Risk approach in antenatal care - Practical implications

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Introduction

The aim of provision of antenatal care is to ascertain maternal and fetal well-being as well as undertake surveillance to detect those mothers or fetuses that may be at risk of adverse obstetric outcomes. Determination of risk is vital to ensure that timely action is taken to minimise maternal or perinatal morbidity and mortality. Action may be in the form of further specialised tests, medical management, expedited delivery or timely referral to another healthcare facility. Risk stratification into low and high risk pregnancies is also important from an administrative viewpoint in order to achieve optimum utilisation of available healthcare resources. In other words, low risk pregnancies will need minimal tests and interventions, while most of the resources could be utilised towards detection and management of high risk pregnancies.

Obstetrics is a unique medical specialty because it deals with two human lives at any given time – the fetus and the mother. There is nothing such as 'no risk' in the field - either low or high risk. And the level of risk can vary in the pregnancy over time. The nature and frequency of antenatal testing or interventions varies depending on whether the pregnancy is low or high risk.

Evidence based antenatal care and surveillance

Availability of a wide range of fetal and maternal tests (biochemical or ultrasound based) can often tempt obstetricians into performing multiple antenatal tests in a pregnancy without actual need or indication. For example it is common practice to perform an ultrasound scan towards term without any medical indication simply for reassuring the woman or the obstetrician that all is going well. The evidence however does not support the routine use of ultrasound scanning after 24 weeks gestation without medical indication[1]. In fact, out of a variety of antenatal fetal tests available, the use of many is controversial and they suffer from low sensitivity/poor predictive values for detection of fetal compromise. There are no absolute 'rights and wrongs' on the nature and frequency of antenatal testing and they depend on the hospital protocols, local population and resources available. But what is most important is that the practice of antenatal surveillance should be 'evidence based'. It is therefore important to recognise that all antenatal testing should be performed only when valid indications exist and not be considered a matter of routine practice, because they could inadvertently result in avoidable fetal or maternal harm from unnecessary intervention.

Evidence based medicine is defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients"[2,3]. The practice of evidence based medicine brings together the best research evidence with clinical expertise in context of individual patient's values and circumstances. Evidence based practice and risk stratification can prevent harm arising out of inappropriate interventions especially in uncomplicated pregnancies. Excellent evidence based guidelines are available from institutions like Royal College of Obstetricians and Gynaecologists in United Kingdom (RCOG - UK), National Institute for Health and Clinical Excellence (NICE - UK), Cochrane collaboration and many other national guidelines to inform safe and effective practice of modern obstetrics.

Risk based approach to antenatal care

In 2004, Kontopoulos and Vintzileos introduced the concept of condition specific antenatal fetal testing[4]. They argued that different pathophysiologic processes may place the fetus at risk of adverse outcomes and the efficacy of various tests to assess fetal well-being

depended on the underlying condition. Following categories of pathophysiologic processes that can cause fetal death or damage were proposed – 1) decreased uteroplacental blood flow in cases of hypertension and late IUGR, 2) decreased gas exchange at the trophoblastic membrane level in prolonged pregnancy, 3) metabolic processes in diabetes, 4) fetal sepsis in case of prolonged rupture of membranes or maternal infection, 5) fetal anemia eg. erythroblastosis fetalis, 6) fetal heart failure as is nonimmune hydrops or arrhythmias and 7) umbilical cord accidents; and the most useful tests recommended in each of these situations[4].

Which pregnancies are considered high risk? When and how do you monitor these pregnancies?

Following conditions may predispose a pregnancy to high risk of maternal or fetal compromise –

1) **Obstetric** – Intrauterine growth restriction (IUGR), prolonged pregnancy, previous stillbirth, decreased fetal movements, gestational hypertension, pre-eclampsia, gestational diabetes, discordant twins, obstetric cholestasis, fetal hydrops, Rh isoimmunisation, abnormal placentation, oligohydramnios, polyhydramnios.
2) **Medical** – Obesity, diabetes mellitus, chronichypertension, cardiac disease, epilepsy, hepatic/renal disease, thyroid disease, sepsis, systemic lupus erythematosus (SLE), thrombophilias and autoimmune disorders.

There is no evidence to support routine use of most antenatal fetal tests in low risk pregnancies and only fair evidence to justify their use in high risk pregnancies. Antenatal fetal testing for high risk pregnancies is usually commenced at 28 weeks and the subsequent frequency of tests depends on the indication, nature and results of the test. The availability and quality of neonatal care is a major determinant of the gestational age at which to begin antenatal surveillance. It is also important to remember that reliability of most antenatal tests depends upon accurate dating of the pregnancy which should ideally be achieved by first trimester ultrasound scan[1]. Modern obstetric practice utilises a combination of various tests including non-stress test (NST), biophysical profile (BPP), amniotic fluid volume estimation and Doppler studies to assess fetal well-being and decide optimal timing of delivery in high risk pregnancies.

Antenatal care for all pregnancies – (both low and high risk)

The principles of good antenatal care are – a) provision of information and support to the woman, b) advice or treatment for minor problems of pregnancy, c) screening for anomalies or medical disorders and d) referral or treatment of problems as necessary.

NICE recommends that midwife and general practitioner led models of care should be offered to women with an uncomplicated pregnancy. Routine involvement of obstetricians in the care of women with an uncomplicated pregnancy at scheduled times does not appear to improve perinatal outcomes compared with involving obstetricians when complications arise[1]. These findings have major implications especially for low resourced settings. They suggests that community midwifery or general practitioner led care with standardised visits for low risk pregnancies can be effective and be routinely offered to women with low risk pregnancies. Not only can such approach reduce the burden of workload on doctors and nurses in hospitals but also prevent unnecessary tests and interventions in uncomplicated pregnancies.

a) The first (booking) visit

The first antenatal clinic visit which is called the 'booking clinic' is very important for identifying women with risk factors. Such booking visit needs to be scheduled in the first trimester and should ideally occur by 10 weeks. It is also recommended that pregnant women should be offered an early ultrasound scan between 10 weeks and 13 weeks 6 days to determine gestational age and to detect multiple pregnancies[1].

History and risk based recommendations

A thorough history should be obtained at the initial visit including a review of pre-existing health or social issues and past obstetric problems. An assessment of risk factors for venous thromboembolism should be undertaken. Thromboprophylaxis with low molecular weight heparin should be considered for those considered at high risk based on the scoring as per

RCOG guidelines[5]. Women who are considered at high risk of pre-eclampsia (those with hypertensive disease during a previous pregnancy, chronic renal disease, autoimmune disease, SLE, anti-phospholipid syndrome, diabetes, chronic hypertension) should be advised to take 75 mg of aspirin daily from 12 weeks until the birth of the baby[6].

Diet and supplementation - Women should be provided information on the benefits of a healthy diet. The advice must be based on individual woman's circumstances however it should include the following if possible: five portions of fruit and vegetables a day and one portion of oily fish (for example, mackerel, sardines, pilchards, herring, trout or salmon) a week[7]. Cereals, spinach, beans, jaggery, meat, fish and poultry are excellent sources of iron and should be encouraged in the diet. Dietary advice should also include avoidance of raw or partially cooked eggs, meat and pate to avoid food borne infections.

To avoid the risk of neural tube defects, women should be recommended 400 micrograms daily folic acid throughout the first 12 weeks of pregnancy. Higher daily dose of folic acid (5 mg) is recommended for women with history of neural tube defects in past or family, diabetes, obesity and anticonvulsants therapy. Vitamin D supplementation (10 micrograms per day) should be offered to all women during pregnancy and while breastfeeding. Those at particular risk include women, who are obese, have limited skin exposure to sunlight or who are of South Asian, African, Caribbean or Middle Eastern descent[1]. Routine iron supplementation during pregnancy is not recommended in most Western countries and is initiated in women with haematological and biochemical evidence of iron deficiency anaemia. However in populations with known high prevalence of anaemia, routine supplementation with iron from early second trimester may prevent the mother from being anaemic towards the end of pregnancy and delivery. Any medications should be used in pregnancy only when the benefit to the mother is greater than the risk to the fetus.

Domestic violence and social issues - Pregnancy is a peculiar time when abuse or domestic violence may start or escalate, and this can have serious consequences for both mother and the fetus[7]. Every effort should be made at the initial and subsequent visits to enquire about domestic violence as part of the social history with a view to provide support or help if any such issue is discovered. NICE guidelines also recommend asking all pregnant women at their first contact about any past or current history of severe mental illness or treatment by a psychiatrist in order to provide specialist help or referral during pregnancy as necessary[1]. Women with complex social factors such as those who misuse substances or refugees should be supported appropriately. Pregnant women should avoid smoking or drinking because of their association with adverse pregnancy outcomes. However, women who choose to drink alcohol during pregnancy are advised not to drink more than 1-2 units, once or twice a week[1].

Clinical examination

Clinical examination at the first visit must include height, weight and blood pressure measurement. Those with significant symptoms or a known history of heart disease should also undergo cardiovascular examination and referral to an appropriate specialist as necessary.

Measurement of weight - at the initial examination is important for identifying women who are significantly under or overweight. Women with a body mass index (BMI) below 20 kg/m^2 are at high risk of IUGR or perinatal mortality and need dietary and/or psychiatric help for eating disorders[7]. Women with a BMI of 30 or more also have significant risks of adverse obstetric outcomes and need advice on diet and physical activity. Women with a BMI >35 should give birth in a consultant-led obstetric unit in hospital with appropriate multidisciplinary and neonatal support.

Hypertension - is diagnosed in early pregnancy if the blood pressure is >140/90 mmHg on two separate occasions at least 4 hours apart. Once diagnosed, an underlying cause (renal, endocrine, cardiovascular or collagen-vascular disease) should be ruled before labelling it as essential hypertension.

A speculum examination may be performed in cases with bleeding in early pregnancy or if cervical smear is required. Routine pelvic examination should be avoided.

Investigations and screening tests

Urine examination - Screening of midstream urine should be undertaken for asymptomatic bacteriuria or proteinuria in pregnancy.

Blood grouping and screening for haematological disorders – Blood grouping and Rh typing should be performed at the first antenatal visit. Women should be offered screening for anaemia at the booking visit, and at 28 and 36 weeks gestation. Women whose dietary iron intake is poor, benefit from iron supplements from early in pregnancy. It has been suggested that a dose of 200 mg ferrous sulphate on alternate day is as effective as once or twice daily dosing[7]. In the UK, it is recommended that all pregnant be offered sickle cell and thalassaemia screening as part of early antenatal care[1]. Screening for important red cell antibodies should be undertaken in all women early in pregnancy, and should be repeated in subsequent pregnancies even in those who are found to be Rh-D positive. NICE guidelines recommend that routine antenatal anti- D prophylaxis is offered to all non-sensitised pregnant women who are rhesus D-negative[1].

Screening for gestational diabetes - NICE recommends that at the booking appointment, risk factors for gestational diabetes should be determined, including: BMI above 30 kg/m^2, previous macrosomic baby weighing 4.5 kg or above, previous gestational diabetes, family history of diabetes (first-degree relative with diabetes, family origin with a high prevalence of diabetes, South Asian (specifically women whose country of family origin is India, Pakistan or Bangladesh), Black Caribbean and Middle Eastern (specifically women whose country of

family origin is Saudi Arabia, UAE, Iraq, Jordan, Syria, Oman, Qatar, Kuwait, Lebanon or Egypt)[1]. Early self-monitoring of blood glucose or a 2-hour 75 g oral glucose tolerance test (OGTT) should be offered at 16-18 weeks to test for gestational diabetes if the woman has had gestational diabetes previously, followed by OGTT at 28 weeks if the first test is normal.

An OGTT should be offered at 24-28 weeks if the woman has any other risk factor out of above mentioned[7].

Although there is a great deal of material published on alternative screening methods for pre-eclampsia, none of these has satisfactory sensitivity and specificity, and therefore they are not recommended[1].

Screening for infections – Screening should be offered for Rubella, Syphilis, Hepatitis B, and HIV. Up to 95% of fetal infections due to mother-to-child transmission can be prevented by passive and active immunisation. In case of HIV infection, there is robust evidence that mother-to-child transmission rates can be reduced from 26% to less than 2% with appropriate management.

Fetal anomaly screening - The screening tests offered in pregnancy are either ultrasound

scans or blood tests or a combination of both. Most developed countries have Down's syndrome screening programme in place starting from early pregnancy which usually combine nuchal scan findings with blood tests and maternal age to estimate the risk of having the syndrome and offer diagnostic tests. The UK National Screening Committee and NICE recommend a dating scan and an 18 to 20+6 weeks fetal structural anomaly ultrasound scan, for all pregnant women[1].

b) Subsequent antenatal visits

NICE recommends that for a woman who is nulliparous with an uncomplicated pregnancy, a schedule of 10 appointments should be adequate. For a woman who is parous with an uncomplicated pregnancy, a schedule of 7 appointments should be adequate[1].

At each antenatal visit weight should be measured in those women with BMI below 20 or above 30 to assess progress in weight management. Blood pressure must be measured and fetal growth assessed.

Symphysis-fundal height - The two clinical methods used to assess foetal growth are symphysis-fundal height (SFH) measurement and abdominal palpation. SFH measurements (in centimetres) give a more objective assessment of uterine size and serial measurements give an indication of the fetal growth rate. A discrepancy of 3 or more centimetres from the gestational age in weeks is considered abnormal between 24-34 weeks. Although the sensitivity of SFH is low, it is an useful tool requiring minimal equipment, training and time[8].

NICE guidelines recommend that SFH should be routinely measured from 24 weeks[1].

Blood pressure - should be measured and urinalysis for proteinuria should be undertaken routinely at each antenatal visit. More frequent blood pressure measurements should be considered for pregnant women who have high risk of developing pre-eclampsia. Blood pressure should ideally be measured in a sitting position with arm at the level of the heart and a correct size cuff. Hypertension in pregnancy is defined as two readings of 140/90 mmHg or more taken at least 4 hours apart, using Korotkoff V for the diastolic sound.

Screening for anaemia and atypical red cell alloantibodies should be routinely repeated at 28 weeks. Any deviation from the normal should prompt appropriate investigations and treatment. For Rh negative mothers, it is recommended in most obstetric units to administer two doses of anti-D, one at 28 and one at 34 weeks gestation (500 IU) with measurement of the anti-D titre just before administration, or to give a single dose of 1500 IU at 28 weeks gestation.

A check for fetal presentation may not be performed until 36 weeks gestation, as breech presentation is relatively common prior to this and the majority of these fetuses will undergo spontaneous version to cephalic by 36 weeks. If malpresentation is suspected at 36 weeks or beyond, it should be confirmed with scan and the woman can be referred to hospital for assessment. Possible management options including external cephalic version should be discussed.

Routine ultrasound in late pregnancy is not recommended[1] and serial biometry is only indicated in IUGR and twin pregnancies. Routine Doppler in pregnancy is also not recommended or supported by current evidence[9].

Antenatal care in high risk pregnancies

A review of detailed antenatal care strategy that is required for each high risk condition in pregnancy is beyond the scope of this article. However given below is a summary of additional tests and management options which are utilised in some of the common high risk pregnancies (Table 1). The frequency of antenatal visits and maternal/fetal testing increases in high risk pregnancies depending on the nature and severity of the underlying condition.

Prolonged pregnancy

Prolonged pregnancies are associated with increased fetal and maternal risks beyond 40 weeks gestation. Various factors have been suggested as possible causes for the increased risks including - progressive uteroplacental insufficiency, increased placental cell apoptosis, fetal adrenocortical insufficiency and oligohydramnios. The final routine antenatal visit at 41 weeks gestation is designated to discuss and arrange plans for induction of labour if the pregnant woman wishes. The importance of correct pregnancy dating cannot be overemphasised in this situation. Membrane sweeping in women at term increases the likelihood of spontaneous labour within 48 hours and birth within 1 week[8]. It is not associated with any increase in any major adverse maternal or fetal outcomes and should be offered to all women at term before formal induction of labour.

The management options for uncomplicated prolonged pregnancy include conservative (fetal testing awaiting onset of labour) versus elective induction of labour. As bulk of the current evidence favours a policy of elective induction after 41 weeks, NICE recommends that induction of labour should usually be offered to all women whose pregnancies continue beyond 41 weeks gestation[1]. For those women who wish to continue with testing – twice weekly non-stress test (NST) and amniotic fluid volume estimation is recommended. An amniotic fluid index (AFI) <5 cm or <2 cm depth of the largest vertical pool is abnormal. There is no evidence that daily fetal movement charts improve perinatal outcome and there is poor correlation between the Doppler findings and the fetal outcome in prolonged pregnancy[10]. Most guidelines including those from NICE and the American College of Obstetricians and Gynecologists (ACOG) recommend antepartum testing after 42 weeks gestation. Although there is no hard evidence demonstrating benefit from fetal testing before 42 weeks, it has been suggested that perinatal morbidity may start to increase as early as 40 weeks in some ethnic groups and therefore a policy of fetal testing from 40 to 41 weeks onwards is not unjustified.

Intrauterine growth restriction (IUGR)

IUGR carries a significant risk of antenatal and intrapartum asphyxia and intrauterine death. Growth

Table 1: Risk based antenatal surveillance for common high risk pregnancies

Condition	Recommended antenatal tests/ management	Areas of clinical uncertainty/ needing further research
Prolonged pregnancy	Dating ultrasound in first trimester. Twice weekly NST + AFI after 42 weeks.	Whether to start surveillance beyond 40 weeks instead of 42 weeks for some populations. No correlation between Doppler and perinatal outcomes.
Intrauterine growth restriction	Screening in antenatal clinic with abdominal palpation and measurement of SFH. Early IUGR – Anomaly scan, amniocentesis and/or cordocentesis to rule out abnormal karyotype or intrauterine infection. Serial ultrasound biometry for growth and estimated weight. Umbilical artery Doppler studies every 1-2 weeks. If normal – less frequent intervals. Venous Dopplers in advanced condition.	SFH has a poor sensitivity as screening method. Customised growth charts may not be available for use in every clinic.
Hypertension in pregnancy	Fetal movement count, NST and AFI weekly for women with mild pre-eclampsia and twice weekly or more frequently in severe pre-eclampsia. Fetal ultrasound and umbilical artery Doppler to monitor growth twice weekly to 2 wkly depending on severity. Mild hypertension without superimposed pre-eclampsia – not an indication for fetal surveillance.	No robust RCT proven evidence on the best regimes and type or frequency of surveillance. Daily NST may be needed in severe disease before decision to deliver.
Obstetric Cholestasis	Fetal growth, liquor volume, Doppler 1-2 weekly and NST twice weekly.	None of the tests help to predict sudden intrauterine death. No specific method of antenatal fetal monitoring is recommended.
Diabetes in pregnancy	Regular maternal blood glucose monitoring. Ultrasound 4 wkly until 32 wks, then 2 wkly to monitor growth. Doppler ultrasound - if vasculopathy present. Normal sugars with normal fetal growth and absence of polyhydramnios – minimal fetal surveillance.	Precise mechanisms responsible for excess risk of stillbirth largely unexplained.
Twin pregnancy	Identification of twinning and correct gestational dating by ultrasound in early pregnancy. NSTs may be started at gestational ages similar to those for singletons. Serial ultrasounds at 28, 32, 36 wks with adjunctive use of Doppler as necessary.	Robust RCT based evidence scanty.

Fetal sepsis	Amniocentesis to rule out intra-amniotic infection. Amniotic fluid assessment, NST and BPP.	
Fetal anemia	Ultrasound to rule out hydrops and fetal liver scan. Kleihaur test. Middle Cerebral Artery Doppler. Amniocentesis/Cordocentesis (>28 weeks of gestation). NST / BPP.	

restriction may be early onset or late onset. Early onset IUGR is usually diagnosed with an abnormal umbilical artery Doppler and is frequently associated with pre-eclampsia[11].

The screening for growth restricted babies usually starts in the antenatal clinic with abdominal palpation and objective measurement of SFH which prompt referral to the ultrasound studies. In the presence of extremely early severe fetal growth restriction, ultrasound examination should be performed to rule out fetal anomalies. Amniocentesis and/or cordocentesis may be considered to rule out abnormal karyotype or intrauterine infection[4]. In the absence of these pathologies, the most efficacious surveillance tool is Doppler assessment of feto-placental circulation[4]. Umbilical artery velocity changes in early cases may be supplemented by venous doppler in advanced cases. The resistance to flow on umbilical Doppler velocimetry appears to precede the fetal heart rate changes seen on an NST[12]. There is good evidence that umbilical Doppler ultrasound use in these pregnancies improves a number of obstetric care outcomes and reduces perinatal deaths[13].

Once IUGR is suspected, umbilical artery Doppler studies should be performed usually every 1-2 weeks to assess for deterioration; if normal, they can be extended to less frequent intervals. Patterns such as absent or reversed end diastolic umbilical velocities have been reported to be present on average 1 week before the acute deterioration[14].

Hypertension in pregnancy

Hypertension in pregnancy can pose major risks to maternal/fetal well-being and delivery remains the only definitive treatment[15]. The highest risk patients are those with severe pre-eclampsia, IUGR, associated medical complications such as diabetes, SLE, chronic renal disease or history of a prior stillbirth. Maternal blood pressure measurements and haematological parameters need to be frequently monitored as the severity of disorder increases. Gestational hypertension or mild hypertension without superimposed pre-eclampsia does not constitute an indication for fetal surveillance. But, with pre-eclampsia it is generally recommended that some form of antenatal surveillance is established. Weekly monitoring is recommended initially unless severity of condition dictates twice weekly follow ups. A combination of fetal movement counting, NST, BPP and umbilical artery Doppler - weekly for women with mild disease and twice weekly or more frequently for those with severe disease has been recommended to monitor the disease and assist in determining the optimal timing of delivery[15].

Diabetes in pregnancy

Diabetes mellitus can cause several complications for both mother and fetus during pregnancy and delivery including congenital malformations, hypertension, pre-eclampsia, macrosomia, polyhydramnios, intrauterine fetal death, difficult labour and shoulder dystocia[16-18]. Good metabolic control in the mother throughout pregnancy reduces the risk of these complications. The focus of antenatal management therefore lays on maternal glyacemic control through diet, exercise and/or insulin therapy with regular maternal glucose monitoring. If the maternal blood sugar levels are well controlled and there is normal fetal growth without polyhydramnios - minimal, if any, fetal surveillance is required[4]. However maternal hyperglycemia, polyhydramnios or fetal macrosomia increase the risk of fetal lactic acidemia[4]. Antenatal fetal surveillance in a diabetic pregnancy should therefore be concentrated on maternal glucose monitoring as there is strong evidence that the best way to prevent adverse outcomes is normal or close to normal blood sugar

levels in all stages of pregnancy.

Twin pregnancy

Multiple pregnancy presents considerable risks to the maternal and fetal well-being. Surveillance of twin gestation begins right in the first trimester with ultrasound identification of twinning and correct gestational dating[19]. Serial ultrasound biometry of twins with adjunctive use of Doppler is necessary to detect abnormal growth or discrepant growth between twins and abnormalities of placentation. Prevention of maternal anaemia and screening for pre-eclampsia and diabetes are important. Early determination of these conditions allows initiation of other well-being studies and consideration of treatment options at an early stage.

Summary

Stratification of pregnancies into low and high risk and subsequent antenatal management is vital for optimum utilisation of healthcare resources. It can ensure that adequate resources are directed towards detection and treatment of complicated pregnancies while avoiding unnecessary intervention and harm in uncomplicated pregnancies. Delayed child bearing, better medical care, advances in fertility services as well as global epidemics of obesity and diabetes are resulting in increasing numbers of high risk pregnancies. More high quality data from randomised controlled studies are needed to inform the best practice in many high risk pregnancies so as to ensure maternal as well as fetal well-being and avoid adverse outcomes. Presently, any testing should be performed only when indications are present and benefits outweigh the potential iatrogenic harm to the fetus or the mother.

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Organization of Antenatal care in Developing Countries

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Introduction

Over the last century, almost all countries have accepted the principles of antenatal care. Antenatal care is the effective means to prevent or treat a range of pregnancy complications resulting in reduction of maternal and perinatal mortality and morbidity. In 2008, Simkhada B et al[1] reported in their systematic review that pregnant women with high level of antenatal care used four times higher trained assistance at delivery compared to women with a low level of antenatal care. Similar results were also found for women delivering in a health facility rather than at home. Thus, it explains that antenatal care and safe delivery care are associated with reduction in maternal and perinatal mortality and morbidity. In industrialized countries, 98% of all pregnant women receive antenatal care and 94% give birth under the supervision of trained healthcare practitioners with timely access to appropriate emergency treatment in case of complications which have resulted in drastic reduction in maternal mortality[2]. However, in developing countries, millions of pregnant women are deprived of antenatal care either due to a bad socioeconomic background, lack of organized antenatal health care system or underutilization of these facilities resulting into high maternal mortality rates upto 90%. Haemorrhage, chronic anemia, hypertensive disorders, obstructed labour, unsafe abortions and infection are the main causes leading to maternal mortality and majority of them are preventable. In 2005, Zanconato G et at [3] reported that antenatal care in developing countries need a tailored model because these programmes are unsuccessful due to unsupervised and are being inappropriate to the specific situation. Further more educational and cultural factors along with persistent lack of resources in a global critical situation contributes to the poor results of antenatal care programme. Therefore, antenatal care programmes should be free of charge, planned and implemented within the community, cost effective and evidence based quality care. They should also include information regarding patient and family members, provide affordable treatment and warrant referral for complications.

Aims and objectives of antenatal care

Antenatal care includes regular and periodic examination and advice to a woman throughout pregnancy and delivery. The rationale for providing antenatal care to pregnant women are:

1. To screen for high risk factors for abnormal conditions or diseases
2. To prevent or to detect early symptom and signs of the disease and its complications.
3. To follow this detection with effective and timely intervention.
4. To ensure continued medical surveillance and prophylaxis.
5. To educate the mother about pregnancy and delivery
6. To discuss about the place, time and mode of delivery and care of newborn.
7. To motivate the couple about the need of family planning.

Pregnant woman is advised for antenatal care once in 4 weeks till 28 weeks of pregnancy, once in 2 weeks till 36 weeks of pregnancy and then once a week till the expected date of delivery. The WHO randomized trial of antenatal care and the WHO systematic review[4] indicated that a model of care that provided fewer antenatal visits without causing adverse consequences to the woman or fetus should be implemented in the developing countries. Hence, WHO recommends antenatal care visit in developing countries may be curtailed to at least four; 1st around 16 weeks of pregnancy; 2nd between 24-28 weeks of pregnancy; 3rd visit at 32 weeks and 4th visit at 36 weeks of pregnancy. Similarly, Munjanja SP et al[5] in their study of 15,994 pregnant women over a period of 2 years, in a randomized clinical trial, compared a new programme

of reduced antenatal care visits with that of the standard programme and concluded that antenatal care programme with fewer, more objectively oriented visits can be introduced without adverse effects on the main intermediate outcome pregnancy variables. Sometimes, the solution to certain problems require infrastructural changes rather than changes within the antenatal care.

India has an excellent infrastructural layout for the delivery of MCH services in the community through a network of subcenters, primary health centers, community health centers, district hospitals, state medical college hospitals, and other hospitals in the public and private sectors. However, the health pyramid does not function effectively because of limited resources, communication delays, a lack of commitment on the part of health professionals, and, above all, a lack of managerial skills, supervision, and political will. The allocation of financial resources for the delivery of health care continues to be meagre. Under the CSSM program, a massive expansion of MCH services has occurred at the sub-district and the district levels. The RCH program, aims at effective utilization of these facilities to ensure delivery of integrated services of assured quality through decentralized planning. MCH care has also been expanded in private sector. The health infrastructure comprises subcenters for a population of 5000, primary health centers (PHCs) for a population of 30,000, and a community health center for every 3-4 PHCs. There is a district hospital in each district capital. The most comprehensive among maternal and child health programs is the Child Survival and Safe Motherhood Program, under which maternal-child health services have been integrated since 1992 in order to achieve substantial improvements by the year 2000. The RCH Package consists of prevention and management of unwanted pregnancy; antenatal, delivery, and postpartum services; child survival services for newborns and infants; and management of reproductive tract infections and sexually transmitted diseases. The Integrated Child Development Services program was launched in 1975 and covers 70% of the country's community development blocks and 260 urban slum pockets. Its beneficiaries are children under 6 years of age, expectant and lactating mothers, and adolescent girls[6]. Federation of Obstetrical and gynaecological societies of India, under the Emergency Obstetrics Care project have trained more than 2000 M.B.B.S. doctors to perform caesarean section.

Antenatal care in developing countries i.e. in low resource settings

India contributes about 20% of births worldwide i.e. 27 million pregnancies/year and 23 million deliveries/ year. More than two decades after the Safe Motherhood campaigns launch in 1987 in India, half a million women continue to die from avoidable pregnancy-related causes every year and 3.45 million pregnant women per year develop complications, with maternal mortality rate of 212/100,000 live births. This is because majority of our population reside in rural areas where

1. Antenatal facilities are absent or are inadequate and hence, government should provide required facilities.
2. Under utilization of antenatal care facilities as the facilities are too distant or too expensive, illiteracy or ignorance, traditional and cultural beliefs and prejudices. Inexpensive, short term solutions to the above problems is for the government to train and use TBAs who are already in our midst and well versed with the masses and have also gained confidence of the masses.

During the 1st antenatal visit i.e. at registration, risk factors can be identified by history taking and clinical examination. Risk factors include haemorrhage, anemia and malnutrition, teenage pregnancy, chronic hypertension, pregnancy induced hypertension, pelvic contraction, prolonged pregnancy, past obstetric complication, tuberculosis, malaria, sepsis, cardiac disease, hepatic/ renal diseases, diabetes, epilepsy, intra uterine growth retardation, preterm labour, twin pregnancy, breech or abnormal lie, oligohydramnios, bad obstetric history, etc. Counseling and advice on what to do is the best option however, in developing countries these pregnant women are referred to referral centre for special care. Many of these complications can be prevented, detected, or treated during antenatal care visits with trained health workers. Clinical examination includes measurement of height, weight, blood pressure, pallor, jaundice and edema feet, breasts, systemic and obstetric examinations. Women with a body mass index (BMI) less than 20 kg/m are at high risk of IUGR or perinatal mortality and need dietary supplementation. Basic investigations offered to pregnant women are estimation of Hb, Blood group and Rh factor, Bl VDRL and urine for albumin and sugar and Level I and Level

II USG if possible at 18 weeks of pregnancy. Bl. sugar PP can be estimated preferably after 26 weeks pregnancy. Hb estimation should be repeated at 28th and 36th weeks of pregnancy and urine for albumin and sugar at each antenatal care visit should be done with dipstick method. Every pregnancy faces the risk of life but there is no reliable way to predict which women will develop these conditions. However, pregnant women with low risk can be delivered by Trained Birth Attendant.

In subsequent antenatal visits, any symptoms and signs of complications are looked for. Pallor, edema feet, measurement of Blood Pressure, and obstetric examination is done for the appropriate growth and lie of the fetus . After 36 weeks of pregnancy, fetus lie should be confirmed and pelvic assessment in primigravida should be done to rule out cephalo-pelvic disproportion as well as height less than 5 feet referred appropriately to the higher centre i. e. **Functional FRU** for comprehensive obstetric services ,**Functional 24x7 PHC** for basic obstetric services, **Functional** Sub Centre, district hospital and tertiary care centre for timely intervention.

The Janani Suraksha Yojana cash transfer programme in India, where women are paid a small amount to attend antenatal care and give birth in a recognised health care facility, has had a significant effect on antenatal attendance and subsequent levels of neonatal and perinatal mortality [7].

Antenatal Advice

Educate the pregnant woman regarding changes occurring during pregnancy and labour, the importance of regular check up, psychological support and to maintain and improve the health status of woman to the optimum till delivery by advising her regarding diet, drugs and hygiene.

Poor maternal nutrition status has been associated with poor maternal and fetal outcomes. Poor maternal outcomes include increased risk of maternal mortality, anemia, pregnancy induced hypertension (PIH) , third trimester bleeding, premature rupture of membranes, prolonged labor, postpartum hemorrhage and puerperal endometritis. The adverse major fetal birth outcomes are low birth weight (LBW), preterm birth and intrauterine growth retardation(IUGR) which are leading causes of neonatal deaths in absence of congenital malformations.[8] They are also associated with short and long term health problems (e.g. neurological disorders, learning disability, childhood psychiatric disorders, mental retardation) and chronic diseases in adult life[9]. Maternal nutritional deficiencies result from inadequate dietary intake of energy, proteins, essential fatty acids (especially omega 3 fatty acids), iron, folate and other micronutrients during pregnancy i.e. during rapid growth phases. Energy is the main nutritional determinant of pregnancy weight gain, however, it also depends on increase in basal metabolism during pregnancy, physical activity, the composition of accumulated maternal fetal tissue and deficiency of specific nutrients. Food and Agriculture Organization/World Health Organization (WHO) / United Nations University[9] recommend pregnant women to increase their energy intake by 85 kcal/ day, 285 kcal/ day, 475 kcal/day in first, second and third trimester of pregnancy, respectively. In rural India, higher maternal food intake along with restricted physical activity during later part of pregnancy were associated with increase birth weight.[10] WHO in their review of nationally representative survey from 1993 to 2005 reported 42% of pregnant women were anemic globally and of these 90% belonged to Africa and Asia[11]. In India, the prevalence of anemia is highest in the world. Indian diets usually have inadequate iron, folic acid, vitamin B12 due to low vegetable consumption and poor bioavailability from fibre phytate rich food[12]. Apart from dietary deficiency, malaria, hookworm and other helminthic infestations also require treatment to reduce anemia. Forty percent of maternal mortality in India is directly or indirectly related to anemia. Maternal mortality rate (MMR) increases 8-10 times when haemoglobin is less than 5 gm%. WHO recommends universal iron supplementation of 60 mg elemental iron with 250 µg folic acid for 6 months to all pregnant women and Government of India recommends 100 mg of elemental iron with 500 µg of folic acid in 2nd half of pregnancy for at least 100 days. The national family health survey-3 (NFHS-3) reports of declining fertility rate while increasing prevalence of anemia in women and children, since NFHS-2 in 1998-99. Synchronization of the ICDS and national rural health mission (NRHM), along with entrusting the responsibility of conducting NFHS to the planning commission, is the other possible solution to tackle the problems of rising anemia and malnutrition in the country [13].

Folate is an essential nutrient required for the fetal development as it is a cofactor for many essential

cellular reactions including DNA and RNA synthesis. A protective effect of folate against the development of neural tube defects (NTDs) have been well established by multiple clinical research studies in the past. The recommended intake of folic acid is 4 mg/ day for those with high risk and 0.4 mg/ day for others starting from preconceptional period. Folic acid intervention also prevents megaloblastic anemia, reduces level of homocysteine and hence, thrombosis resulting into reduction in LBW babies, IUGR and preterm labor. Low level of calcium can cause demineralization of mother's bones and teeth. Several studies have reported that calcium supplementation during pregnancy may reduce risk of PIH while others have reported that it does not reduce the incidence but reduces the severity, maternal morbidity and neonatal mortality. Other micronutrients like iodine, zinc, magnesium, vitamin A, vitamin B6, vitamin B12, vitamin C also play important role in improving the birth outcome.

Immunization in pregnancy for tetanus is routine in developing countries as it protects mother as well as neonates. In unprotected pregnant woman, 0.5 ml of tetanus toxoid is given intramuscularly at 6 weeks interval for two doses starting from 16 to 24 weeks of pregnancy. Woman who is immunized in past, the booster dose of 0.5ml of tetanus toxoid is given intramuscularly given in last trimester.

Conclusion

India contributes about 20% of births worldwide and has the highest proportion of children younger than 5 years. Attendance of antenatal care, delivery in a medical setting and having a skilled health worker at delivery improve maternal health. Goals of National Rural Health Mission are to reduce infant mortality rate (IMR) to 30/ 1000 live births and to reduce MMR 100/ 100,000 live births. Global progress towards MDG 4 and 5 depends significantly on improvement in maternal and child health indicators in India and antenatal care is the major indicator for improving maternal and child health care.

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Number of Visit in Antenatal Care

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Preventing problems for mothers and babies depends on an operational continuum of care with accessible, high quality care before and during pregnancy, childbirth, and the postnatal period. An important element in this continuum of care is effective Antenatal Care (ANC). The goal of the ANC package is to prepare for birth and parenthood as well as prevent, detect, alleviate, or manage the three types of health problems during pregnancy that affect mothers and babies :

- complications of pregnancy itself
- pre-existing conditions that worsen during pregnancy
- effects of unhealthy lifestyles.

Which ANC ?

While research has demonstrated the benefits of ANC through improved health of mothers and babies, the exact components of ANC and what to do at what time have been matters of debate. In recent years, there has been a shift in thinking from the high risk approach to focused ANC. The high risk approach intended to classify pregnant women as "low risk" or "high risk" based on predetermined criteria and involved many ANC visits. This approach was hard to implement effectively since many women had at least one risk factor, and not all developed complications; at the same time,

some low risk women did develop complications, particularly during childbirth. Focused or goal oriented ANC services provide specific evidence-based interventions for all women, carried out at certain critical times in the pregnancy.

How many visits?

A recent multi-country randomised control trial led by the WHO[1] and a systematic review[2] showed that essential interventions can be provided over four visits at specified intervals, at least for healthy women with no underlying medical problems.[3] The result of this review has prompted WHO to define a new model of ANC based on four goal-oriented visits.[1, 2, 4] This model has been further defined by what is done in each visit, and is often called ***focused antenatal care***. A recent study from southern Tanzania found that health workers spent an average of 46 minutes providing focused ANC to a first time client, and 36 minutes for a revisiting client. This was thirty minutes more on average than the current practice and poses challenges for service delivery.[5]

When?

For many of the essential interventions in ANC, it is crucial to have early identification of underlying conditions – for example, prevention of congenital syphilis, control of anaemia, and prevention of malaria complications. Hence the first ANC visit should be as early as possible in pregnancy, preferably in the first trimester. The last visit should be at around 37 weeks or near the expected date of birth to ensure that appropriate advice and care have been provided to prevent and manage problems such as multiple births, postmaturity and abnormal positions of the baby.

What?

The first assessment in ANC is to distinguish pregnant women who require standard care, such as the four-visit model, from those requiring special attention and more visits. Depending on the setting, approximately 25-30 percent of women will have specific risk factors which require more attention. These women need more than four visits. Table contains an overview of the interventions at each ANC visit based on the four-visit model as applied in focused ANC

Focused antenatal care (ANC): The four-visit

ANC model outlined in WHO clinical guidelines

GOALS	First visit 8-12 weeks	Second visit 24-26 weeks	Third visit 32 weeks	Fourth visit 36-38 weeks
	Confirm pregnancy and EDD, classify women for basic ANC (four visits) or more specialized care. Screen, treat and give preventive measures. Develop a birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH and anaemia. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancies. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancy, mal presentation. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.
ACTIVITIES				
History (ask, check records)	Assess significant symptoms. Take psychosocial, medical and obstetric history. Confirm pregnancy and calculate EDD. Classify all women (in some cases after test results)	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if Needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed
Examination (look, listen, feel)	Complete general, and obstetrical examination, BP	Anaemia, BP, fetal growth, and movements	Anaemia, BP, fetal growth, multiple pregnancy	Anaemia, BP, fetal growth and movements, multiple pregnancy, mal presentation
Screening and tests	Haemoglobin Syphilis HIV Proteinuria Blood/ Rh group *Bacteriuria*	Bacteriuria*	Bacteriuria*	Bacteriuriea*
Treatments	Syphilis Treat bacteriuria if indicated*	Antihelminthic** Treat bacteriuria if indicated*	Treat bacteriuria if indicated*	If breech, ECV or referral for ECV Treat bacteriuria if indicated*
Preventivemeasures	Tetanus toxoid Iron and folate+	Tetanus toxoid, Iron and folate	Iron and folate	Iron and folate
Health education, advice, and counselling	Self-care, alcohol and tobacco use, nutrition, safe sex, rest, birth and emergency plan	Birth and emergency plan, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice

* Additional intervention for use in referral centres but not recommended as routine for resource-limited settings

** Should not be given in first trimester, but if first visit occurs after 16 weeks, it can be given at first visit

\+ Should also be prescribed as treatment if anaemia is diagnosed

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Marie Stopes

- Marie Stopes – Authored 3 wonder books
  - Married life
  - Married love
  - Wise parenthood
- Strong scientific justification for birth control
- Marie Stopes clinic 17 March 1921, Birth control clinic
- **Historic moment of 20th century**

Screening for Medical Disorders During Antenatal Care

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The main purpose of antenatal care is to detect any disorder, which could be detrimental to either the mother or the fetus. Effective screening during the antenatal period is thus important. Only proper screening can pick up abnormalities which if corrected can prevent morbidities in the mother and the developing baby.

Physical examination

There are physical parameters to be monitored regularly during the antenatal period.

Weight /Height / BMI – Women not with a healthy BMI are at risk. Obesity is associated with Preeclampsia, Hypertension, GDM or Pre-existing Diabetes and all these should be watched out for. They are also operative risks, and at risk of DVT post delivery / surgery.

Excessive weight gain or sudden weight gain during pregnancy may be a sign of Preeclampsia, or abnormal sugars. Low weight gain may lead to a Low Birth Weight child.

Blood Pressure- Hypertension itself; and if associated with oedema and proteinuria (preeclampsia) can lead to eclampsia in the mother and IUGR or even IUFD of the foetus. Thus it should be meticulously taken and monitored at every visit. If found to be high the patient should be re- *evaluated after a period of rest.*

Cardiac Evaluation/ Respiratory system – Heart disease, at times, is picked up for the first time in a young woman by the obstetrician. Thus, every woman should be auscultated properly. Complains of breathlessness, and signs like pitting oedema should be looked for at every visit and if found its cause looked for before attributing it to a gravid uterus.

Blood Investigations

Blood Group- Knowing the blood group of the pregnant woman is a must. If she is Rh Negative, one needs to ascertain the partner's blood group and if he is Rh Positive- testing is required for ruling out Rh Isoimmunisation. Anti D titre would follow. A High titre would warrant a series of investigations like Foetal MCA Doppler to pick up signs of anaemia in the foetus. If found Anaemic, today we have intrauterine transfusions available at fetal medicine centres to preventing these foetuses developing hydrops.

Screening for Anaemia –

The most prevalent disorder is Iron deficiency anaemia is the most prevalent single nutrient deficiency in the world. Highest in population segments at peak rates of growth – infants, young children, pregnant women. Global prevalence – 30% but in developing nations like ours it ranges from – 40-80%.

Anemia poses a 5 fold increase in the overall risk of maternal death related to pregnancy and delivery. Anaemia is the major contributory or sole cause in 20-40% of maternal deaths. (1) Besides mortality, it leads to morbidity – like infections and poor quality of life. Iron deficiency and iron deficiency anaemia (IDA) during pregnancy also increase the risk of preterm birth and low birth weight. This is what we know and thus we treat. But what we generally miss is the effect of maternal anaemia on the foetus.

Infants born to anaemic mothers may not show low haemoglobin. But it does not mean there has been no intrauterine insult. An adequate supply of iron is essential for normal development of the foetus and newborn child. Iron is important for development of the foetal brain and cognitive abilities of the newborn. A basic principle of fetal/neonatal iron biology is that iron is prioritized to red cells at the expense of other tissues, including brain. When iron supply does not meet iron demand, the foetal brain may be at risk even if the infant is not anaemic. Maternal iron deficiency

can lead to long lasting developmental disadvantages with iron def in Infancy. (Lozoff et al 2001). It leads to defective myelination in iron deficiency, which results in slow transmission of nerve impulses throughout the brain in auditory and visual systems. (Pugh – 2000). Lower cord ferritin predicts poorer behavioural development, poor auditory comprehension, poor fine motor skills at 5 yrs. (2). In the light of these findings, we realize that all forms of anemia even the mild to moderate anemia's need to be aggressively treated and this would have an impact on the generation next.

What is the level of Haemoglobin considered normal? We in India say less than 11g%l is labelled as anemia. Many clinicians would not think of treating anyone aggressively until the Hb falls to 9g %. Let me put forward to you the Zurich university hospital Protocol-

Oral Fe is only started if haemoglobin levels are below 11 g%. Hb falls below 10g% or are below 10g% at time of diagnosis, parenteral Fe–sucrose is used primarily. Severe anaemia (haemoglobin <9 g %) or non-response to parenteral Fe after 2 weeks, recombinant erythropoietin is considered in combination.

This is how aggressive they are in managing Fe Def anaemia. May be we should be looking at raising our standard of care and use the parental Fe sucrose more aggressively to combat anaemia.

Screening for endocrine disorders in Pregnancy -

GDM

Gestational Diabetes is another medical disorder which not only affects the index pregnancy but has effect on the future health of the mother and the offspring, and thus should be screened for judiciously.

Gestational Diabetes is known to be associated with Polyhydramnios, Hypertension, Preeclampsia and Eclampsia, Abruption placenta, Pre term labor, operative delivery, and Post-partum uterine atony in the mother. The fetus also is affected – can become macrocosmic and have problems of metabolic problems hypoglycemia & hypocalcaemia in neonatal period.

But it does not stop there.

Up to 50% of women who develop GDM have a IGT / diabetes within 7 – 10 years of the pregnancy and it has also been shown that — Women with GDM have a 7.5-fold increased risk for the development of type 2 diabetes after delivery, which persists for their lifetime. (Laurie Barclay, MD; Charles Vega, MD, Lancet. 2009).

Besides this like in anemia the foetus is not spared of long term problems.

Gestational programming is a process whereby stimuli or stresses that occur at critical or sensitive periods of development, permanently change structure, physiology, and metabolism, which predispose individuals to disease in adult life. If the stimulus happens to be the glucose intolerance in pregnancy, [Gestational Diabetes Mellitus (GDM)] it predisposes the offspring and her mother to an increased risk of developing glucose intolerance in the future The intrauterine millieu, whether one of nutritional deprivation or one of nutritional plenty, results in changes in pancreatic development and peripheral response to insulin that may lead to adult – onset GDM and Type 2 DM. Type 2 DM may be programmed in fetal life, hence diabetes prevention will have to start in early life (in - utero) and continue in later life.

The aim should be to help the pregnant women to have infants born with weight appropriate for gestational age (AGA). Lifestyle modifications and drug interventions have proved to delay or postpone the development of overt diabetes in persons diagnosed to have pre-diabetes. This is a primary prevention strategy. Women with Gestational Diabetes Mellitus (GDM) are an ideal group for the primordial prevention of diabetes as they are at increased risk of developing diabetes Type 2 DM as are their children and intergenerational transfer occurs.

All this is possible if we screen for GDM effectively.

The incidence found in our country is around 12- 18 % in the pregnant population. This is far higher than the west which has a incidence of just 3- 4 %. Thus Selective screening as propergated by American Diabetic Association is not applicable to our population. Infect, now world over the thinking is changing towards universal screening. The International Diabetes Federation (IDF) new guidelines now say "Our guidelines not only talk about universal screening but almost assume that every woman has diabetes [and] doing the testing is to reassure her that she doesn't. So, it's a paradigm shift." (October 26, 2009

(Montreal, Quebec) — ((IDF 20th World Diabetes Congress).

So – Universally screen all antenatal patients for gestational diabetes.

When to screen?

Early screening – to pick up undiagnosed preexisting diabetes(HbA1c >6) and also in patients with High Risk factors.

Repeat at 24-28 weeks

Also around 32- 34 weeks

Which test ?

The American Diabetic Association recommends the 2 step test to screen. 50g glucose irrespective of fasting and then a one hour reading if it is more than 140 – do an OGTT with 100 gm glucose to confirm diabetes.

OGTT is a cumbersome test to perform with specific fasting before and 4 times the blood needs to be drawn. The other problems are which cut offs to follow- C&C or NDDG?? What to do if only one level abnormal? What if GCT positive and OGTT negative?

Also the ground reality is that it is not simple test to perform in all settings, especially the rural ones. Now even the IDF recommendation is that the screening test should be a 1-step [oral glucose tolerance] test, not a 2-step test, as currently recommended by the ADA.

The test now recommended by FOGSI and the GOI for screening in our country is the DIPSI (Diabetes in Pregnancy Study Group) test. To avoid multiple visits and multiple pricks and analysis of multiple samples, this simple test called the DIPSI test is established by Dr Seshiah and group in INDIA and has been validated and published and included in INDIAN GUIDELINES for GDM (2009).(3)

This test had been validated against the ADA and the IADPSG test also. The DIPSI test is giving a 75 gms glucose load to the woman irrespective of fasting and estimating a 2 hour blood glucose- if above 140mg/dl – labelling her a diabetic.

Advantages- Irrespective of fasting (suitable for all women when they walk in) /Does away the need to confirm by OGTT/ No need to remember many values! This is a single step test both for screening and diagnosis

Instructions to Patients -

You need not be empty stomach

Mix the entire content of packet of 75gms with ½ a glass of water and drink it at one time.

Next 2 hrs not to eat or drink anything

Exactly 2 hrs later, give the blood sample.

If the blood sugar level is >=140mg/dl please contact the doctor immediately.

Thyroid –

Incidence of thyroid disorders during pregnancy is around 10% of pregnancies (Mukopadhaya – 3.9%). Moreover since pregnancy may affect the course of thyroid disorder & the disorder can affect the course of pregnancy- it needs to be screened for.

Effect on Pregnancy - frequent spontaneous abortions, doubled still birth rate, increased incidence of preterm labour are some of the complications..

Effect on fetus – Thyroid has a important developmental effect on the fetal brain – and thyroid deficiency is known to lead to neurodevelopment delay in the off springs and often mental retardation in neonates Thyroid from mother important in early gestation for the fetus. Fetal thyroid is operational only after mid gestation. Development of fetal brain during second trimester corresponds to a phase during which supply of thyroid is both maternal and fetal. From third trimester onwards – thyroid hormone essentially fetal in origin.Severe maternal hypothyroid in second trimester will result in irreversible deficit; third trimester – less severe deficit. In a prospective study in 1999; investigating the neuropsychological development in children 7 – 9 yrs old; born to mothers with variable degree of thyroid deficiency during pregnancy found –

Study children had IQ scores 4 points below control population, in mothers left untreated – 7 points below. In treated – similar to controls. (4)

Should you screen all women for thyroid?

Initially a targeted screening in high risk group- *(History of thyroid disease / lobectomy ;H/o Family history of thyroid disorder; Women with thyroid antibodies (when known); Women with symptoms or clinical signs suggestive of thyroid dysfunction ;Diabetics;*

Other autoimmune disorders; History of miscarriage /preterm birth) were recommended for screening , but if such a screening is followed a recent study has shown with this 30% of cases will be missed .(5)

Screening with Thyroid function and Anti TPO antibodies - should be done in all women once pregnancy is confirmed. Approx 2-2.5% of women will show elevated TSH in pregnancy ;1% will have overt Hypothyroidism.

What value of TSH is normal in pregnancy?

TSH and HCG structurally similar thus "specificity spillover" causes lower levels of TSH in the first trimester as hCG activates the thyroid gland. There is a fall in TSH; T3 and T4 markedly increased in first half of gestation & plateau around 20 weeks (TBG).

A TSH of 2- 4 is considered normal in pregnancy.

A TSH > 4 µIU/ml , with a low T4 is diagnostic of Hypothyroidism . If T4 is normal it is termed subclinical hypothyroidism – treatment of this is recommended especially if the Anti TPO titres are high.

If TSH <0.1µIU/ml and fT4 > upper limit of normal a diagnosis of hyperthyroidism is made.

Infection screen during antenatal

HIV and Hepatitis B are two important infections to be ruled out. Both if present in the mother can be passed to the fetus, and if detected today we can take adequate steps to prevent this vertical transmission.

HIV – a combination of retroviral therapy+ LSCS for delivery + avoidance of breast feeding may prevent the baby from being infected.

HbsAg – Administration of immunoglobulin and a vaccination after birth will have a protective effect on the newborn.

Antenatal care involves the care of the mother and the unborn child. Effectively screening for the above disorders can prevent morbidity in the mother and the baby – the generation next.

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A ready reckoner of drugs contraindicated in pregnancy

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I – Drugs which has no scope of use in wanted pregnancy

- Norethistrone, Medroxyprogesterone, Levonorgestrel
- Danazol
- Oral Contraceptive Pills
- GnRH Agonists e g Buserelin, Naferlin, Goserelin, Triptorelin etc
- Oxytocics
- Mifepristone (Anti-Progesterone)
- Testosterone derivatives
- Anabolic steroids

If any of these has been used inadvertently-it must be stopped immediately, patient counseled and fetus investigated for anomaly.

II - Drugs 'absolutely contraindicated' in pregnancy

(FDA Category D and X drugs)

Analogues of Vitamin A

e g Retinoids–Etretrinate, Acitretin and Isotretinoin

These are used for Psoriasis, Severe nodular Acne etc

Pregnancy should be avoided *for two years after* a course of any of these drugs.

Actual Vitamin A – Even this should not be prescribed in dosage higher than its

RDA which is 5000 IU (William's Obstetrics, 2010)

- Antibiotic - Tetracycline (Bone & teeth problems)
- Antifungal-Oral : Griseofulvin, Itraconazole
- Anti-viral used for Influenza - Amantadine
- Anti-depressive – Lithium - risk of fetal cardiac anomaly
- Anti-Migraine - Ergotamine
- Anti-Androgen - Finasteride - used for Hirsutism
- Cytotoxic drugs – Tamoxifen, Methotrexate, Clclophosphamide
- Radioactive iodine for hyperthyroidism

III - Drugs 'relatively contraindicated' in pregnancy

These include mostly 'FDA Category C drugs' and are to be used after carefully Balancing their risks and benefits on each individual case - after documented thorough counseling.

Anti-inflammatory drugs

NSAIDs

Contra-indicated *in 3rd trimester only* because these may cause

PDA

Neonatal haemorrhage

Neonatal pulmonary hypertension

Ibuprofen, Diclofenec, Piroxicam, Naproxen, Aspirin, Mefenamic acid *(May cause* Oligohydramnios).

NSAIDs are Contra-indicated even in local ointment form in 3rd trimester because these get absorbed through skin.

Anti-epileptic

- Sodium valproate

  Can cause neural tube defect (NTD), orofacial defects and congenital malformation of heart
- Phenytoin, Carbamazepine – Fetal Hydantoin syndrome
- Phenobarbitone – Various clefts, anomalies of CVS and Urinary tract

  These cause Folic Acid deficiency – leading to **NTD** and other cleft defects

  So, oral Folic acid must be started from ***before*** conception while trying for pregnancy

Anti-hypertensive

- Angiotensin-converting enzyme (ACE) inhibitors (Can cause Multiple malformations)
- Beta blocker (Not to be given in1st & 2nd trimester – Ok in 3rd trimester but better avoided)
- Amlodipin

Anti-diabetic

- Chlopropamide, Sulphonylureas (Category C drug)

Antibiotics

- Ciprofloxacin (Arthropathy)
- Aminoglycosides (Ototoxic)
- Chloramphenicol ('Grey baby')
- Nitrofurantion (Not to be used near term-haemolytic anaemia etc)
- Vancomycin (Ototoxic)
- Metronidazole, Tinidazole (in 1st trimester for Trichomoniasis)
- Sulfamethoxazole/trimethoprim-Septran (in *3rd trimester)*
- Silver sulfadiazine (in *3rd trimester)*

Anti-coagulent

- Warfarin (Multiple birth defects)

Anti-thyroid

- Carbimazole (Scalp defect in fetus)
- Propylthiouracil (Fetal hypothyroidism, goiter)

Anti-fungal drugs

- Ketoconazole, Fluconazole, Terbinafine (Multiple bone defects)

Antihelminthic drugs

- Albendazole and Mebendazole (Embryotoxic & Teratogenic in rats)

Anti-Malarials

- Mefloquine
- Quinine

Anti-virals

- Amantadine (used for Influenza)

Anti depressive

- Lithium (risk of cardiac anomaly)

Anti-Migraine

Ergotamine (Oxytocic effect)

Anti-Minaralocorticoids

- Spironolactone (used for hirsutism) Can cause malformation of External Genitalia of Male fetus

Anti-Gout

- Colchicine (Embryo toxic, Chrosomal non-dysjunction. To be stopped 3 months pre-conception)

Anti-lipid (Cholesterol lowering) drugs

All Statins

Others

- Minoxidil (used for hair loss) Dapsone -Used for acne vulgaris (and Leprosy) Can cause Haemolysis to be avoided in 3rd trimester. -a Category C drug

NOTE

- If any of the above Category FDA C drug must be used – it should be used at the *lowest possible effective dose* and for the *minimum effective duration*.
- The above list is not a complete list
- Please refer to the following exhaustive web link - *http://www.motherisk.org, Reprotox.*

Further reading

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Screening for Congenital Anomalies and chromosomal disorders in routine Antenatal Care

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Congenital disorder is one of the leading causes of mortality & morbidity in the fetus and newborn. The magnitude of problem is particularly significant in the developing world where congenital disorders are common because of consanguineous marriage and high birth rate. In India, half a million children born annually have congenital malformations. In the absence of curative treatment the financial and social burden on the family and country is enormous. Herein lays the importance of detecting them in antenatal period.

Chromosomal abnormalities and congenital malformation are not synonymous. All congenital malformation may not be due to chromosomal abnormality and vice versa. The chapter will be dealing with the causes, screening and identification in antenatal period.

Congenital Anomalies

Definition : Congenital anomalies are also known as birth defects, congenital disorders or congenital malformations. Congenital anomalies can be defined as structural or functional anomalies, including metabolic disorders, which are present at the time of birth.

Causes and risk factors

Cause cannot be ascertained in approximately 50% of all congenital anomalies. However, some high risk factors associated with congenital anomalies are:

1. Socioeconomic factors

Although it may be an indirect determinant, congenital anomalies are more frequent among resource constrained families and countries. It is estimated that about 94% of serious birth defects occur in middle- and low-income countries, where mothers are more susceptible to macronutrient and micronutrient malnutrition and may have increased exposure to any agent or factor that induces or increases the incidence of abnormal prenatal development, particularly infection and alcohol.

2. Maternal age

Advanced maternal age increases the risk of some chromosomal abnormalities including Down syndrome.

3. Genetic factors

Consanguinity increases the prevalence of rare genetic congenital anomalies and nearly doubles the risk for neonatal and childhood death, intellectual disability and serious birth anomalies in first cousin unions. Some ethnic communities, e.g. Ashkenazi Jews or Finns, have comparatively high prevalence of rare genetic mutations, leading to a higher risk of congenital anomalies.

4. Infections

Maternal infections such as syphilis and rubella are a significant cause of birth defects.

5. Maternal nutritional status

Iodine deficiency, folate insufficiency, overweight, or conditions like diabetes mellitus are linked to some congenital anomalies. For example folate insufficiency increases the risk of having a baby with neural tube defects.

6. Environmental factors

Maternal exposure to pesticides, medicinal and recreational drugs, alcohol, tobacco, certain chemicals, high doses of vitamin A during the early pregnancy, and high doses of radiation increase the risk of having a baby with congenital anomalies. Working or living near or in waste sites, smelters, or mines may also be a risk factor.

Detection

Detection of congenital malformation or fetal chromosomal abnormalities includes screening and confirmation.

Antenatal screening for structural fetal malformation includes ultrasound examination of all pregnant women at 18-20 weeks of gestation (MTP Act of India allows medical termination of pregnancy only up to 20 weeks, hence it is essential to detect fetal malformation before that). Ultrasound examinations need to be done by competent person with adequate training/ experience in this field.

Preconception screening or antenatal screening is used to identify persons at risk for specific disorders or at risk for passing one on to their children. The strategy includes the use of past history, family histories, examination and carrier screening. For example past history of neural tube defect may put the women at higher risk of the same and should be looked for carefully. Similarly, family history of transfusion dependent anemia in infants indicates the family may be at risk of haemoglobinopathies and can be screened by doing Hb electrophoresis of both the couple. Examination of the women may indicate disorder like SLE which can have fetal affection. Routine screening for single gene disorder though not recommended universally; may be applicable in high risk community like beta thalassemia or cystic fibrosis.

Antenatal screening for chromosomal abnormality:

Many major chromosomal abnormalities are incompatible with life and hence results in spontaneous abortion in the first trimester. Chromosomal abnormalities with postnatal survival are trisomy 21 (Down syndrome), trisomy 18, trisomy 13, monosomy X (Turner syndrome) and Klinefelter syndrome (47, XXY). Trisomy 18 and trisomy 13 usually present with detectable abnormality in fetal life and hence are diagnosable by ultrasound examination. Turner syndrome and Klinefelter syndrome have hypogonadism in female and male respectively and are not screened or diagnosed except in situation like getting chromosomal analysis of the fetus done for indication like cystic hygroma or structural cardiac defect. Trisomy 21 is the commonest chromosomal abnormality with long postnatal survival with mental subnormality in the affected individual. Hence, the importance of its detection in antenatal period.

Screening for trisomy 21 or Down syndrome

Fetal aneuploidy risk can be evaluated on the basis of a combination of maternal age, prior family history, maternal serum biochemical tests and fetal ultrasound markers (Cuckle and Benn, 2010)[1]. Risk evaluation provides an opportunity to re-assure most women that their fetus is unlikely to be affected by a chromosomal disorder and also to reduce the number of unnecessary invasive procedures performed. Those women who are identified as being at high risk can receive counseling, additional testing and appropriate follow-up obstetric care.

The following table shows the various screening tests and its sensitivity in detecting trisomy 21 at 5% false positive rate.[2]

Table 1 : Performance of different methods of screening for trisomy 21

Method of screening	Detection rate (%)
MA	30
First trimester	
1. MA + fetal NT	75–80
2. MA + serum free β-hCG and PAPP-A	60–70
3. MA + NT + free β-hCG and PAPP-A (combined test)	85–95
Second trimester	
1. MA + serum AFP, hCG (double test)	55–60
2. MA + serum AFP, free β-hCG (double test)	60–65
3. MA + serum AFP, hCG, uE3 (triple test)	60–65
4. MA + serum AFP, free β-hCG, uE3 (triple test)	65–70
5. MA + serum AFP, hCG, uE3, inhibin A (quadruple test)	65–70
6. MA + serum AFP, free β-hCG, uE3, inhibin A (quadruple test)	70–75
MA + NT + PAPP-A (11–13 weeks) + quadruple test	90–94

MA, maternal age; NT, nuchal translucency; β-hCG, β-human chorionic gonadotrophin; PAPP-A, pregnancy-associated plasma protein-A.

As seen in this study, maternal age alone can detect 30% cases of Down syndrome and the best method of screening for Down syndrome is a combination of maternal age, nuchal translucency and serum screening in first trimester of pregnancy.

On the basis of both observational studies and intervention projects; the Board of the International Society for Prenatal Diagnosis, committee (Jan 2011) [3] recommends the following for women who wish to receive aneuploidy risk assessment:

1. **First trimester screening**

Ultrasound NT at 11–13 weeks combined with serum markers i.e. double marker tests at 10–13+6 weeks. If

the risk is more than procedure related risk i.e. usually 1%, then the women is counselled for CVS for confirmation of the fetal chromosomal pattern. If the risk is very low i.e. less than 1:1000, then she is followed up with routine antenatal check-up. A women with borderline risk i.e. risk between 1:100-1:1000, other first trimester sonographic marker are looked for and the risk is modified accordingly. The most widely used markers are absence of a fetal nasal bone (NB), tricuspid regurgitation (TCR) determined by pulse wave Doppler ultrasound and abnormal blood flow in the ductus venosus (DV).[4] The routine use of these markers can substantially increase detection, but good results are also obtained when this is done at specialist centers. The use of ultrasound needs to be consistent with fetal safety recommendations, i.e. with an ultrasound exposure that is as low as reasonably achievable (AIUM Practice Guideline, 2007).[5]

2. **Second trimester screening**: Four maternal serum markers (quadruple test) at 15–19 weeks is to be offered for women who first attend after 13 weeks 6 days.

Second trimester ultrasound can be used to modify risks for aneuploidy (sometimes referred to as the'anomaly scan' or 'genetic sonogram'). Findings with demonstrated utility include major malformations (MM), increased nuchal fold (NF) thickness, short femur or humerus length (FL or HL), echogenic intracardiac focus (EIF), pylectasis (P), echogenic bowel (EB) and ventriculomegaly (VM).[5]The final risk can accordingly be calculated and an invasive procedure i.e. amniocentesis for fetal chromosomal analysis is done only if the final risk is more than 1:100.

In most developed countries it is now a routine practice to provide a woman's personal risk for aneuploidy (screening) and to offer definitive diagnosis through amniocentesis or CVS if the risk exceeds a fixed cut-off.

Prevention

Preventive health measures administered through pre- and peri-conception and prenatal health care services decrease the frequency of certain congenital anomalies. It includes:

1. Improving the diet of women throughout their reproductive years, ensuring an adequate dietary intake of vitamins and minerals such as folic acid and iodine, and restricting harmful substances, particularly the abuse of alcohol.
2. Detecting type II diabetes and gestational diabetes and managing through counselling, weight management, diet and the administration of insulin when needed.
3. Administration of folic acid to women in reproductive age or those planning pregnancy i.e. "PREGNANCY PILL"
4. Improving vaccination coverage, especially with rubella virus, for children and women. This can be prevented through childhood vaccination. The rubella vaccine can also be given at least 6 month prior to pregnancy to women who are not already immune.
5. Avoiding exposure to hazardous drugs (ACE inhibitors, valproate etc) and environmental substances (e.g. heavy metals, pesticides, some medicinal drugs) during pregnancy.
6. Screening of all pregnant women for fetal aneuploidy risk and offering invasive testing to women at high risk.
7. Increasing and strengthening education of obstetricians and others involved in care of women in reproductive period.

Conclusion

Apart from the routine antenatal testing, the optional tests that can be offered to all pregnant women are screening tests for aneuploidy (serum marker and sonography), hemoglobinopathies and ultrasound examination at 18-20 weeks for diagnosis of structural malformation in the fetus.

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Management of Common Problems of Pregnancy

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Regular antenatal care is extremely important in pregnancy. Unexpected and severe ailments might arise in a pregnant women inspite of good antenatal care. Although the ailments are minor in many cases, they can be extremely disturbing, even hampering day to day activities in some women. The common problems experienced in pregnancy are

Nausea and Vomiting

It is a common complaint in 1st half of pregnancy. Nausea is the most common GI symptom of pregnancy. Nausea occurs in 80-85% of all pregnancies during 1st trimester, with vomiting occurring in 52% of the women.[1] Commences between 1st and 2nd missed menstrual period, continue up to 14 to 16 wks.It is commonly seen in multigravida and molar pregnancies. Although worsens during morning- thus erroneously termed 'morning sickness', they usually continue throughout the day. Only 11-18% of the women have nausea and vomiting only in the mornings. Etiology is not known; although rise in hCG has been implicated but data about its association are conflicting. Intractable vomiting causing dehydration, electrolyteand acid base imbalance, starvation ketosis and nutritional deficiencies is HYPEREMESIS GRAVIDARUM. Its incidence is 3.4/1000 deliveries and usually requires hospital admission.

Nausea and vomiting have a detrimental effect on women's life interfering with her day-to-day activities in spite of reassurance that nausea and vomiting do not have any harmful effects on pregnancy.Eating small meals at more frequent intervals but stopping short of satiation is valuable. Mild symptoms respond to vitamin B6, given along with doxylamine but some require phenothiazine and H1 receptor blocker antiemetic. Interventions that do not require prescription include ginger and acupressure.

P6 acupressure— The P6 (Neiguan) point is located on the volar surface of the forearm about three fingerbreadths proximal to the wrist. Three systematic reviews of RCTs on P6 acupressure for relief of nausea and vomiting each included four or more of seven RCTs were found.[2,4] Six of them showed a reduction in symptoms but seventh trial showed no differences between acupressure and no treatment.[4] More recent RCTs have also reported a reduction in symptoms of nausea and vomiting in women with acupressure wristbands and no treatment.[4,5,6,7] No evidence of increase in perinatal mortality, congenital anomalies or any other pregnancy outcome was noticed.

Antihistaminics (promethazine, prochlorperazine, metoclopramide) — In a meta-analysis of 12 RCTs that included a comparison of antiemetic's with placebo or no treatment, showed a reduction in nausea in the treated group(OR 0.17, 95% CI 0.13 to 0.21).[2] There was an increase in drowsiness in treated group (OR 2.19, 95% CI 1.09 to 4.37)[5], there was no increase in teratogenicity associated with antihistaminics (24 studies, n > 200000; OR 0.76, 95% CI 0.60 to 0.94). [8]

Phenothiazines—One systematic review of three RCTs (n=329) found a reduction in nausea and vomiting compared with a placebo(RR 0.31, 95% CI 0.24 to 0.42)[8] and no association between teratogenicity and phenothiazines was found.(Nine studies, n= 2948; RR 1.03, 95% CI 0.88 to 1.22).[8]

Pyridoxine(vitamin B6)—RCTs in two reviews that studied pyridoxine in doses 25-75mg upto three times a day, showed a reduction in nausea and ineffective in reducing vomiting(OR 0.91, 95% CI0.60 to 1.38). Associated toxicities in high doses have not yet been resolved and it is not recommended for use. The committee on Toxicity of Foods has recommended a safe upper limit of 10mg a day for pyridoxine in the UK.

Cyanocobalamin (vitamin B12) – Two RCTs assessed the effect of Vitamin B12 compared with placebo and

found a significant reduction in nausea and vomiting (RR o.49, 95% CI 0.28 to 0.86).[8] No studies were found to assess the safety of Vitamin B12 but it is thought to inhibit malformations associated with neural tube defects.

Summary – Ginger P6 acupressure and medication with anti-histamines reduce the frequency of nausea and vomiting in early pregnancy, although vitamin B6 is effective concerns are there about its dose related toxicities. Vitamin B12 is also effective but no data on its safety were found.

Recommendations – Nausea and vomiting in pregnancy resolves spontaneously within 14-16 weeks of gestation and they are not associated with poor pregnancy outcome. If the woman requests interventions in reducingsymptoms include A) Non Pharmacological — Ginger and P6 (wrist) acupressure B) Pharmacological – antihistamines.

Information about all forms self-help and non-pharmacological treatments should be made available for pregnant woman who have nausea and vomiting (good practice point)

Backache

The definition of backache is subjective due to the nature of this discomfort in pregnancy. It is seen in 70% of pregnant women. It increases with duration of gestation. Prior low back pain and obesity are risk factors. It is attributed to an altered posture due to the increasing weight in the womb and increased laxity of supporting muscles as a result of hormone relaxation. In three RCTs: water gymnastics compared with no intervention- had women taking less sick leave than women in no intervention group (OR 0.38, 95% CI 0.16 to 0.88), Ozzlo pillows compared with no intervention-were more effective in relieving backache at more than 36wks gestation(OR 0.35, 95% CI 0.20 to 0.62), and acupuncture compared with physiotherapy showed that 10 sessions of acupuncture relieved backache better than same number of physiotherapy sessions(OR 6.58. 95% CI 1.00 to 43.16).[13]

It can be reduced by having women squat rather than bend while reaching out for things, providing support with a pillow while sitting and avoiding high- heeled shoes. Severe back pain during pregnancy needs a thorough orthopedic checkup. Muscular spasm and tenderness, classified clinically as acute strain and fibrositis respond well to analgesics, heat and rest. Rare causes of low back ache in pregnancy- associated osteoporosis, disc diseases, vertebral osteoarthritis, and septic arthritis. Residual pain after 3yrs is seen in about 20% cases.

Recommendations—Women should be informed that exercising in water and massage therapy will help reduce backache.

Heartburns

It is described as burning sensation or discomfort felt behind the sternum or throat or both. One of the most common complaints caused due to reflux of gastric contents into the lower esophagus and increased frequency of regurgitation due upward displacement and compression of the stomach by the uterus, combined with relaxation of the lower esophagealsphincter (progesterone effect). It is not associated with increased adverse outcomes of pregnancy. It can be differentiated from epigastric pain in preeclampsia by checking blood pressure and urine for proteinuria. It increases with advancing gestational age with an incidence of 22% in 1st, 39% in 2nd and 72% in 3rd trimesters.

Symptoms are usually mild and relieved by life style modifications of frequent but smaller meals, reduction of high fat foods , gastric irritants like caffeine and avoidance of bending over or lying flat especially after meals, sleeping in propped up position.H2 receptor antagonists and PPI's can be used which reduce acid reflux. Antacids, which reduce and bind bile acids, may also be considered.

An RCT, comparing antacid with placebo showed a relief in 80% of women within 1hr.[9] Alginate preparations; reduce reflux by inhibiting regurgitation of gastric contents. One RCT compared alginate with magnesium trisilicate and both were found to relieve symptoms and no differences in the effects of each treatment were reported.[10] H2 receptor blockers, which reduce acid secretions and volume, can be used effectively, given twice daily, especially morning and afternoon as evidenced in two trials. No association of fetal malformations was found when used in 1st

trimester, but the manufacturers of ranitidine advise against its usage unless essential. A meta-analysis (five cohort study, n=593 infants) showed no association between PPI's and fetal malformations.[11] Nevertheless its manufacturers advise caution with its use in pregnancy owing to its toxicity shown in animal studies and does not advise its use unless there is no alternative.

Recommendations- Women who present with heart burn in pregnancy should be offered information regarding lifestyle and diet modifications (Good practice point). Antacids may be added to women whose symptoms do not get relieved with life and diet modifications.

Varicosities

It is caused by pooling of blood in the surface veins as a result of defective valves that would normally prevent blood draining back down the leg. They present as blue swollen veins on calves and inside legs, swollen feet and ankles, itching and general discomfort. Enlarged veins result generally from congenital predisposition and exaggerated by prolonged standing, pregnancy and advancing age. In pregnancy as it advances, femoral venous pressure increases. Symptoms vary from cosmetic blemishes, mild discomfort to severe discomfort that requires prolonged rest with elevated feet.

An RCT reviewed the efficacy of compression (class I and class III) stockings in preventing emergent varicose veins during pregnancy with no stockings among 42 women at less than 12wks of gestation. Both classes of compression failed to prevent the emergence of varicose veins but treated women had improved leg symptoms.[12] Treatment is limited to periodic rest with leg elevation, elastic stocking or both. Surgery is not advised during pregnancy. Vulvar varicosities may be aided by application of a foam rubber pad suspended across the vulva by a belt.

Recommendation—Women should be informed that varicose veins are a common symptom of pregnancy that will cause no harm and that compression stocking can improve the symptoms but will not prevent varicose veins from emerging.

Hemorrhoids

Hemorrhoids are swollen veins around the anus characterized by anorectal bleeding, anal pain and anal itching. It is caused due to increased venous pressure. More often, pregnancy causes an exacerbation or a recurrence of previous hemorrhoids. It occurs in about 8% of the pregnant women in last 3months of pregnancy. Treatment includes diet modifications, creams oral medications and surgical intervention. Pain and swelling usually relieved by topically applied anesthetics, warm soaks and stool softening agents. Thrombosis of external hemorrhoid can be treated by evacuation by incising the vein wall under topical anesthesia.

Recommendations- In the absence of evidence for effectiveness of treatments for hemorrhoids in pregnancy, women should be offered information about of diet modifications, with worsening symptoms standard cream should be prescribed.

Pica

It is the craving of pregnant women for strange foods. At times ice- pagophagia, starch- amylophagia, clay- geophagia may predominate. Prevalence is 4%. Severe iron deficiency anemia is considered a responsible factor, but not all women have iron deficiency anemia. Prevalence of iron deficiency anemia was 15% in women with pica compared with 6% in those without it.

Ptyalism

Some women are distressed with excessive salivation. Usually induced by starch intake but is unexplained in majority.

Sleeping and Fatigue

It is due to soporific effect of progesterone. Fatigue and nonresting sleep may be exaggerated by morning sickness. In late 2nd trimester, total nocturnal sleep duration is reduced and women usually have sleep disturbances. By end of 3rd trimester, nearly all women have reduced sleep efficiency as REM sleep is decreased. Daytime naps and mild sedatives at bedtime such as diphenhydramine are helpful.

Vaginal Discharge

Pregnant women commonly develop increased vaginal secretions, usually is not pathological. It is caused by increased mucus secretions by cervical glands due to hyperoestrogenemia. If the discharge has unpleasant odour, with itching or soreness, with pain on passing urine then women may have vulvo-vaginal infections like bacterial vaginosis, Trico monas vaginitis, candidiasis etc and has to be treated accordingly.

Trichomoniasis, caused by protozoan Trichomonasvaginalis, is characterized by greenish frothy discharge from vagina, pain during urination and is sexually transmitted disease. Two RCTs were located, used metronidazole for treatment, dose used in one trial (2g 48hrs apart and repeated after 2wks) er conducted in US was double the dose used in other trial in South Africa. Both studies showed high cure rates but showed higher risk for preterm labor.[13]

Vaginal candidiasis, caused by candida albicans is better treated with topical imidazoles than nystatinpessaries or placebo, according to a meta-analysis.[14]

Recommendations —Women must be informed that increase in vaginal discharge is a physiological change in pregnancy. If pathological discharge is diagnosed, then there will be an infective cause and must be investigated and treated accordingly. (Good practice point). A week course of topical Clotrimazole is an effective treatment and must be considered in vaginal candidiasis.

Constipation

Constipation is delay in the passage of food residue, associated with painful defection and abdominal discomfort. Etiology is poor dietary intake and rising levels of progesterone causing a reduction in gastric motility and increased gastric transit time. It appears to decrease with gestational age, with 39% at 14wks, 30% at 28weeks and 20% at 36weeks.

One systematic of t review of two RCTs (n=215) compared women with fibre supplements like wheat and barn supplements with placebo. Fibre supplements were more effective in increasing stool frequency (OR 0.18. 95% CI 0.05 to 0.67). When discomfort was not alleviated by fibre supplementation, stimulant laxatives were more effective than bulk forming laxatives (OR 0.30, 95% CI0.14 to 0.61). No evidence for effectiveness or safety of osmotic laxatives eg lactulose use in pregnancy.

Recommendation—Constipation can be prevented by eating foods that are high in fiber, such as Wheat, barn, whole meal breads, wholegrain cereals, fruit and vegetables, and pulses such as beans, drinking plenty of water and avoid iron supplements that can cause constipation or change to a different type.

Nail Changes

Fingernails may become soft and brittle but treatment is not necessary. Brown pigment stripe may extend the length of the nail called melonychia.

Increased Frequency of Micturition

Increased frequency of micturition is noticed at 6-8wks of pregnancy which subsides after 12wks due to resetting of osmoregulation causing increased water intake and polyuria. In late pregnancy, frequency of micturition once again reappears due to pressure on the bladder as the presenting part descends down the pelvis. Stress incontinence may be observed in late pregnancy due to urethral sphincter weakness. No treatment is required; however urinary tract infection and asymptomatic bacteruria have to be ruled out by urine examination for pus cells, dipstick for leucocyteesterase, culture and sensivity. Tab Nitrofurantoin 100mg bd given for 7days, will solve the issue.

Bleeding

Physiological cause of bleeding occurring near the time of expected menses is implantation bleeding.

Cervical lesions commonly bleed in early pregnancy, especially after intercourse. Cervical polyps and decidual reaction also tend to bleed in early gestation. Bleeding from these benign lesions is not accompanied by lower abdominal pain and low back ache. Other causes of bleeding in early pregnancy like threatened abortion, ectopic pregnancy, incomplete abortion, molar pregnancy must kept in mind.

Bleeding in later half of the pregnancy, placenta praevia and abruption placenta have be ruled out and dealt

accordingly.

Skin Changes

Abdominal wall- after mid pregnancy, reddish, slightly depressed streaks commonly appear on abdominal wall, breasts and thighs called striaegravidarum or stretch marks. In multiparous women, in addition to reddish striae of present pregnancy, glistening, silvery lines that represent cicatrices of previous striae are present. Incidence being 48% on abdomen, 25% on breasts and 25% on thighs. Strongest risk factors- weight gain during pregnancy, younger maternal age and family history.

Hyperpigmentation- seen in 90% of women, more in dark complexion women due to deposition of melanin into epidermal and dermal macrophages. Exact cause is unknown. Hyperpigmentation is more pronounced in naturally hyper pigmented areas such as areolae, perineum and umbilicus. The midline of abdominal wall- linea alba- becomes pigmented, assuming a brownish-black color to form linea-nigra.

Occasionally irregular brownish patches of varying size appear on the face and neck, giving rise to chloasma or melasmagravidarum or mask of pregnancy. There is enlargement of intermediate lobe of pituitary gland resulting in increased levels of melanocyte stimulating hormone by 8wks of gestation. Production of pro-opiomelanocortin has been demonstrated in placental extracts which is a source of alpha and beta-MSH. Neurotrophins and neuropeptides, some produced by trophoblastic ells, may play a role in skin and hair changes. UV rays exacerbate melasma by stimulating melanogenesis. Thus , the severity of pigmentation can be mitigated by avoiding excessive sun exposure and by using sunscreens. Although hyperpigmentation regress postpartum, dermal melanosis may persist up to 10yrs in a third of affected women. Oral contraceptives may aggravate melisma. If particularly disfiguring, hyperpigmentation can be treated with topical application of hydroxyquinone,tretinoin gel or cream, or azelaic cream.

Cramps

It is a sharp shooting pain usually in calf muscles or the ankle. Experienced usually in night. Etiology is not known but may be due to strain on the muscles because of the extra weight gained during pregnancy. Gentle exercises especially of the calf muscles and the ankle, helps increase blood flow and the incidence and severity of cramps. Vitamin E is treatment of choice but studies have not proved to be of use.

Hair Changes

During pregnancy, the anagen- hair growth phase is increased relative to telogen- resting hair phase. Estrogen prolonganagen, and androgens cause enlargement of follicles in responsive areas such as face. When these effects dissipate postpartum, hair shedding develops- telogen effluvium. Process is self-limiting, normal hair growth resumes in 6-12months.

Vascular Changes

Augmented cutaneous blood flow in pregnancy is due to a marked decrease in peripheral resistance(oestrgen causes widely dilated small blood vessels in superficial dermis). Spider haemangiomas is in most white pregnant women but only in 10% of black pregnant women. Palmar erythema is seen in two third of white women and one third of black women.

Pregnancy Gingivitis

Caused by growth of mucosal capillaries and fibroblasts under oestrogen influence and is a distressing condition. This swelling- epulis of pregnancy- is common in gum region and usually controlled by good dental hygiene. These lesions may appear on any mucosal or cutaneous surfaces and are termed as granuloma gravidarum. Treatment is not necessary.

Itching

It is considered a mild variant of intra hepatic cholestasis of pregnancy. Contributing factors include pregnancy hormones, genetics, dyslipidemia and environmental factors. No treatment is usually needed.

Breasts

In early weeks of pregnancy, women often have breast tenderness and parasthesia. After the first few months, a thick, yellow fluid–colostrum- can often be expressed from nipples by gentle massage. During the same months the areolae becomes broader and more deeply pigmented. Hypertrophic sebaceous glands called glands of Montgomery develop in later half of

pregnancy. Rarely, breast enlargement may become so pathologically extensive- referred to as –gigantomastila requiring surgical excision.

Carpal Tunnel Syndrome

Results from pressure on median nerve. Symptoms include burning, numdness or tingling sensation in the inner half of one or both hand, wrist pain and numbness extending into the forearm and sometimes the shoulder. Symptoms are bilateral in 80% of women and 10% have signs of nerve denegeration. It is usually self- limiting in most cases, only symptomatic treatment is needed. Occasionally surgical decompression and corticosteroid are needed.

Deep Vein Thrombosis

It is usually confined to lower extremities in pregnancy and on left side due to the compression of left iliac vein by right iliac artery and ovarian artery, both of which cross the vein only on the left side. Classical thrombosis involving the lower extremity is abrupt in onset, pain and oedema of the leg and thigh. Homan's sign- calf pain, either spontaneous or in response to squeezing or to stretch of Achilles tendon is a characteristic sign. Diagnosis is based on physical findings, contrast venography, Doppler ultrasound or by MRI. Anticoagulation is initiated with either unfractionated (bolus dose of 80units/kg, followed by continuous infusion of atleast 30,000IU for 24hrs, titrated to achieve activated partial thromboplastin time of 1.5-2.5 times control values. Intravenous anticoagulation should be maintained for 5-7days, after which treatment is converted to subcutaneous heparin 8hrly, anticoagulation is given throughout the pregnancy and for 6 weeks postpartum) or low molecular weight heparin (-enoxaparin, 40mg subcutaneously daily, continued for 6wks postpartum).

Symphysis Pubis Dysfunction

It is defined as collection of signs and symptoms of discomfort and pain in the pelvic area, including pain radiating to upper thighs and perineum. Incidence varies from 0.03% to 3%, of which 9% occurred in 1st trimester, 44% in 2nd trimester, 45% in 3rd trimester and 2% in labour or postnatal period.[16] No much literature is available on treatment but use of elbow crutches, pelvic support and analgesics have been suggested.

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Health from Womb to Tomb – Role of BMI

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Dyad of mother and child is important for healthy generations!

In the sixteenth, seventeenth and eighteenth centuries much emphasis was placed on the maternal diet since the mother was known to be the only source of nutrients for the foetus. (Ross and Cranney 1979)

Now we have two scenes from scarcity to adiposity.

In nineteenth century the idea that pregnant women should not overeat became a recurrent theme as overeating was believed to be a cause of large babies and as a consequence, more difficult labours and so when maternal mortality was extremely high and caesarian deliveries were a desperate attempt limitation of fetal size by restraining maternal food intake was an advice.

This formed the basis of first published study of diet and pregnancy (Prochownick 1901) and this showed that restricting food intake throughout pregnancy reduced the birth weights of males by 400gms and of females by 500gms and this also formed basis that maternal weight gain could be used as an indicator of maternal nutritional status and in turn influenced foetal growth. it was in 1970 that a comprehensive report entitled "Maternal Nutrition During the course of Pregnancy was published (NRC 1970a) which reviewed problems, practices and research bearing on the relations between nutrition and the course and outcome of pregnancy and provided **recommendations for weight gain** and intake of nutrients. After publication of this report a number of other studies showed that desirable weight gain during pregnancy varies as a function of **prepregnancy weight for height**

And there was evidence to show that in order to achieve proper foetal weight women with inadequate height and weight should gain more weight in pregnancy and overweight women should not gain much weight during pregnancy

What have changed now is increased obesity in 20 years: from being essentially non-existent to a prevalence of >25 % in almost all the countries.

Another emerging concept is in Utero origin of diseases. 'Barker hypothesis'(1995) after one of its leading proponents, states that adverse inûuences early in development, and particularly during intrauterine life, can result in permanent changes in physiology and metabolism, which result in increased disease risk in adulthood Links are well established between LBW and risk of diabetes, HT, and stroke later on in that person in adulthood. It is suggested that the fetus makes physiological adaptations in response to changes in its environment to prepare itself for postnatal life. These changes may include epigenetic modiûcation of gene expression.

Prepregnancy BMI Criteria and how much weight gain is allowed has been set by NHLBI

BMI <18.5 is underweight, normal is 18.5-24.9 , overweight is 25- 29.9 and obese is BMI of 30 plus.

Recommendations for weight gain during pregnancy are 12.5-18kg for low BMI, 11.5-16 kg for normal BMI, 7-11 Kg. for High BMI and for obese just 6 kg but weight loss during pregnancy is not advised.

Low BMI women have higher risk of preterm labours and low birth weight babies and high BMI women have more risk of developing GDM, macrosomia, delivery complications and more risk of LSCS.

Babies born to both extremes have risk neonatal complications and more risk of metabolic syndromes later on so Therefore prepregnant management of diet and nutrition and exercise and continuing them throughout pregnancy are very important for health of generations.

So take care of BMI is first indicator of health status of all women

Quiz on Antenatal care

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Q1. According to WHO how many ANC visits are recommended for a healthy pregnant women?

a. 9 b. 6
c.4 d. 5

Q2. A primigravida with 2 months amenorrhoea comes to you for advice as she has X-ray chest one week back on advice of physician. Which of the following is the most appropriate advice to her?

a. MTP as X-ray is teratogenic.
b. CVS to rule out anomaly.
c. Folinic acid supplementation.
d. Reassurance as one X-ray is not harmful to her fetus.

Q3. The advantages of first trimester USG are all EXCEPT-

a. Structural fetal anomalies can be diagnosed.
b. An-embryonic pregnancy can be ruled out.
c. Ectopic pregnancy can be diagnosed.
d. Multiple gestation can be diagnosed.

Q4. CRL at 7 to 10 weeks is accurate in dating by how many days/weeks?

a. +/- 11 days b. +/- 5 days
c. +/- 14 days d. +/- 3 weeks

Q5. Which of the following base line investigations are recommended in first trimester of pregnancy?

a. Hb%, proteinuria, LFT, HIV, HepatitisB, VDRL, blood group.
b. Hb%, proteinuria, RFT, HepatitisB, blood group, VDRL, bacteriuria.
c. Hb%, TLC, DLC, VDRL, RFT, blood sugar, platelet count, bacteriuria.
d. Hb%, proteinuria, bacteriuria, bloodgroup, VDRL, Hepatitis B, HIV.

Q6. According to American Diabetes Association 2012, which of the following test is recommended for screening of GDM between 24-28 weeks of gestation?

a. 75 gm OGTT as one step procedure.
b. 100 gm OGTT as one step procedure
c. 50 gm GST as two step procedure.
d. 75 gm GST with one sample 2 hours post prandial.

Q7. Which of the component of TORCH is tested in an antenatal case where status is not already known?

a. Toxoplasma b. Rubella
c. CMV d. HSV 2

Q8. Following statements are given with respect to Folic acid supplementation & prevention of NTD in pregnancy. Which option has all the correct statements?

1. More than half of the neural tube defect can be prevented by folic acid supplementation in periconceptional period.
2. The dose of folic acid for preventing NTD is 400 µg perday.
3. Closure of neural tube occurs by 22-28 days of conception.
4. Folic acid supplementation may not reduce the risk of NTD in patients on valproic acid.
5. Folic acid supplementation may not reduce the risk of NTD in overt diabetics.

a. 1,2 & 5 b. 1 & 2
c. 1,2 & 3 d. All statements are correct.

Q9. Following statementsare given with respect to iron supplementation in pregnant women. Which one is notcorrect?

a. Daily iron requirement is 27 mg of ferrous iron in women who have normal Hb level.
b. Withholding iron supplementation in first trimester avoids the risk of aggravating nausea & vomiting.
c. WHO studies at reducing the prevalence of

anemia in pregnancy showed good compliance in ANC.

d. Increased demand of iron during pregnancy is due to expanding maternal blood volume & fetal transfer.

Q10. A 35 year old G2P1+0 with H/O hypertensive disorder of pregnancy in previous pregnancy is now 10 weeks pregnant. Which preventive measure has been found to be most helpful in reducing the incidence of the same in current pregnancy?

a. Supplementation diet with Calcium, magnesium, & zinc.
b. Heparin or LMWH treatment.
c. Supplementation with fish oil.
d. Low dose aspirin therapy.
e. Protein or salt restriction.

Q11. Which of the following antiretroviral drug is linked with NTD?

a. Didanosine
b. Efavirenz
c. Stavudine
d. Zidovudine

Q12. Fish is a very good source of omega 3 fatty acid in a pregnant woman but may have a potentially harmful element in it. Which one is this?

a. Manganese
b. Magnesium
c. Molybdenum
d. Mercury

Q13. You are investigating a case of infertility in a 30 year old female. Since she happened to be Rubella non-immune you advised her for Rubella vaccine. In the same cycle she missed her period & her pregnancy test came positive. The most appropriate advice to her will be-

a. MTP as this fetus is likely to have CRS.
b. CVS to confirm fetal infection.
c. Reassurance & continue pregnancy.
d. Amniocentesis at 16 weeks to detect virus.

Q14. Following statements are given in relation to prolong pregnancy. Find the option with all correct statements.

1. There is 2/3 fold rise in incidence of prolonged pregnancy, if there is positive history on maternal side.
2. Multiparas are more prone to develop prolonged pregnancy than primigravida.
3. As the luteal phase remain constant and only follicular phase varies in duration, therefore if the cycle length is more than 28 days you have to add extra days into EDD.
4. When there has been both a first and second trimester ultrasound, gestational age should be determined by the later ultrasound.
5. Prolonged gestation complicates 5% to 10% of all pregnancies and confers increased risk to both the fetus and mother.

a. 1,3 & 5
b. 1,2,4 & 5
c. 2,3 & 5
d. All are correct.

Q15. Following is the presentation of a child exposed to some infection or medicine in antenatal period. Match them correctly-

Clinical Condition		Factor responsible	
1	Triad of Gregg	a	CMV infection
2	Intracranial calcification	b	Methimazole
3	Aplasia cutis congenital	c	Lithium
4	Chondrodysplasia punctate	d	Rubella infection
5	Pulmonary hypoplasia	e	Warfarin
6	Congenital goiter	f	ACE inhibitors

a. 1-d,2-a,3-c,4-b,5-f,6-e
b. 1-a,2-d,3-c,4-b,5-f,6-e
c. 1-d,2-a,3-b,4-e,5-f,6-c.
d. 1-a,2-e,3-b,4-f,5-c,6-d

Q16. Following informations are given in relation to Down's syndrome screening & diagnosis in antenatal period. Match them correctly-

Column A		Column B	
1	Diagnosis of Down' syndrome	a	hCG, AFP, μE3
2	The combined test	b	CVS at 11 weeks of GA
3	The quadruple test	c	FASTER trial
4	Triple test	d	hCG, AFP, μE3, inhibin A
5	NT measurement	e	NT, hCG, PAPP-A
6	Integrated test	f	12-13 weeks

a. 1-a, 2-b, 3-c, 4-d, 5-e, 6-f
b. 1-f, 2-e, 3-d, 4-c, 5-b, 6-a
c. 1-f, 2-d, 3-b, 4-c, 5-e, 6-a
d. 1-b, 2-e, 3-d, 4-a, 5-f, 6-c

Quiz on Antenatal care

Answers with explanations where ever required

Ans. **1c.** WHO recommends at least 4 visits :

1st = 8-12 weeks

2nd = 24-26weeks

3rd = 32 weeks

4th = 36-38 weeks

Ans. **2d**. Women should be counseled that under most circumstances, diagnostic radiography during pregnancy is safe, and that radiation exposure from a single diagnostic imaging procedure has not been associated with an increase in fetal anomalies or pregnancy loss.

Ref. : ACOG Committee on Obstetric Practice. ACOG committee opinion no. 299: guidelines for diagnostic imaging during pregnancy. *Obstet Gynecol*. 2004;104(3):647–651

Ans. **3a.** Anomaly scan is done between 18-20 weeks of gestation as by that time all fetal organs to be scanned are well developed. (www.nice.org.uk/CG070FullGuideline)

Ans. **4b.**

Ans. **5d**. WHO does not recommend *Hepatitis B* in base line antenatal investigation but *NICE 2008* does.

Ans. **6a.**

Ref. : ADA. III. Detection and Diagnosis of GDM. *Diabetes Care* 2012;35(suppl1):S15

Ans. **7b.**

Ref. : Prenatal care, pg no 194,William Obstetrics,23rd Edition

Ans. **8d.** All are correct about folic acid supplementation in pregnancy.

Ref. : Prenatal care, pg no 205, Prenatal diagnosis & therapy, pg no 288, William Obstetrics, 23rd Edition

Ans. 9c. The commonest cause of anemia in pregnancy is iron deficiency anemia. Poor compliance in ANC is commonest cause of iron deficiency.

Ans. **10d.**

Ref. : The Cochrane Library 2007, Issue 4

Ans.**11b.** There are case reports of NTD when fetus is exposed to Efavirenz very early in gestation (5-6 weeks).

Ans.**12d.** Though Fish is an excellent source of protein & omega 3 fatty acid nearly all of them contain trace amount of mercury. Fish consumption during pregnancy should be limited to 6 ounces per week.

Ans.**13c.** Though Rubella vaccine is contraindicated in pregnancy if accidently given pregnancy may be continued. CRS with vaccine is not reported.

Ans.**14a.** Prolong pregnancy is more common in primigravida. First trimester scan is more reliable in calculating EDD than second trimester scan.

Ans.**15c.** 1-d,2-a,3-b,4-e,5-f,6-c.

Ref. : 18th Progress in Obstetrics & Gynecology by John Studd.

High Risk Pregnancy by James,4th Edition

Ans. **16d. d.1-b,2-e,3-d,4-a,5-f,6-c**

Ref. : 23rd Recent Advances In Obstetrics And Gynaecology by John Bonnar, William Dunlap

ESI Hospital – A Long Journey

Dr Sangeeta Gupta
Consultant & HOD

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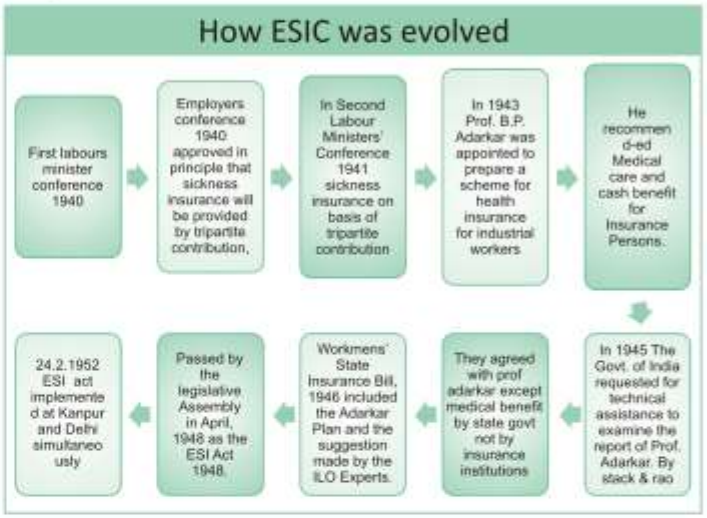
Associate Professor

Employees State Insurance Corporation (ESIC) has ushered in a sort of revolution in the field of Health care, and ESI Scheme has been a boon for the entire workforce, spread across the length and breadth of our vast nation. ESIC has long and rich experience in providing healthcare. ESIC is scaling new heights and spreading its wings. Today, the Corporation is covering almost 5.00 lakhs establishments having 143 lakhs Insured Persons and about 560 lakhs ESI beneficiaries. ESI has strengthened its healthcare service network, so that Insured Persons can avail world-class medical facilities. Modernization and upgrading of all Hospitals is being done in a phased manner, to bring them at par with private corporate hospitals. Under the medical benefits as per ESI act, medical care in the form of medical treatment and attendance to IPS and their families in respect of medical, surgical and obstetric treatment is provided reasonably. Full medical care is provided to an Insured person and his family members from the day he enters insurable employment. There is no ceiling on expenditure on the treatment of an Insured Person or his family member. Medical care is also provided to retired and permanently disabled insured persons and their spouses on payment of a token annual premium of Rs. 120/-.

Medical care is administered through a network of ESI Hospitals/Dispensaries, diagnostic centers as well as through tie up arrangements.ESI has a strong infrastructure of 144Hospitals, 1471 Dispensaries and 800 tie up hospitals across the country. The bed strength of ESI hospitals range from 50 to 1000 beds. As per ESI norms all hospitals are well equipped with proper infrastructure and adequate trained medical and paramedical staff. As on 31/3/2012 there are 24.88 lakhs insured women.In obstetric comprehensive care antenatal ,intranatal and postnatal care including family planning services is provided by the networking of all ESI dispensaries, hospitals and tertiary care hospitals. ESIC is also building Super Specialty Hospitals under its own umbrella.



Based upon the suggestions of Stack and Rao scheme, the Govt. of India modified the Adarkar Scheme and published a "Unified Scheme of Social Security" to cover Health Insurance, Maternity Benefit and Employment Injury. The scheme emerged finally in the form of Workmen's State Insurance Bill 1946.

Employees State Insurance Act, 1948 The Bill as amended on the recommendations of the Select Committee was passed as ESI Bill and became an Act on receiving the consent of Governor-General on 19/4/1948.

The Objective of the act : To provide for certain benefits to employees in case of sickness, maternity and injury during employment and to make provision for certain other matters in relation thereto.

At the national level, the Scheme is administered by a statutory body called, the Employees' State Insurance Corporation set up under the ESI Act, 1948. This corporate body comprises members representing Employees, Employers, Central and State Governments, Medical Profession and Parliament. There is a Medical Benefit Council with greater representation to Medical

Profession, which advises the Corporation on matters relating to medical care.

The purpose of the Employee State Insurance Act is to provide benefits as detailed in the Act particularly in section 46, to the insured persons or their dependants.

The following benefits are provided under section 46.

1. Sickness benefit
2. Maternity benefit
3. Disablement benefit
4. Dependents benefit
5. Medical benefit
6. Funeral expenses
7. Unemployment Allowances

The beneficiaries are the insured person, his/her family member's and his/her dependents.

Birth of ESIC

Cashless medical facilities are also being provided through tie-up arrangements with reputed private as well as other Government Hospitals.

The implementation of IT Roll out Plan named "PROJECT PANCHDEEP" for comprehensive IT enablement in all ESIC establishments has helped to link health care services all over India.

Nearly, 2000 locations in all parts of the country have been networked and smart cards, named as "Pehchan Card" are being issued to all the IPs and their family. This enables them to avail ESI services and facilities 'anywhere-anytime' in the country.

Medical Care services provided are

1. *Preventive Services :*
   - Immunisation of paediatric population
   - Maternal and Child health
   - Family Welfare Services
2. *Promotive Services :*
   - Health education
   - Health check-up camps within and outside the hospitals.
3. *Curative Services :*
   - Dispensary care
   - Hospital care
   - Maternity care
   - Supportive services including all diagnostic facilities
   - Drugs and dressings
   - Surgical procedures
   - Dental care
   - Prosthesis and other appliances
4. *Rehabilitative Services*
   - Physical Rehabilitation
   - Economic Rehabilitation
   - Provision of artificial aids

(take care of social and psychological rehabilitation as well as economic one)

The following issues are given utmost importance i.e:-

- Domiciliary treatment
- Outpatient & Emergency care
- Ambulance services/ conveyance
- Supply of drugs and dressings
- All diagnostic facilities
- Tie-up arrangements for speciality/superspeciality services
- Family Welfare Services
- HIV/AIDS control services
- Medical Certificates
- ISM
- Organised occupational health services
- Artificial appliances
- Outreach programmes

Delivery of Medical Care

- The Direct system functions through a network of dispensaries (1451), hospitals (144) and annexes (43). A total of about 3000 panel doctors are engaged in providing medical services trough indirect system.
- Four Zonal Occupational Diseases Centres have been set up to provide necessary facilities for early

detection and diagnosis of occupational diseases.

- Model Hospital in each state provides referral services for Secondary Medical Care

Aims And Objectives of Model Hospitals

— Provision of secondary medical care services to beneficiaries in catchment area and to the patients referred from other hospital in the state as per norms and standards of ESIC.

— Out-patient services along with outreach programmes.

— Training of staff working in the hospital so that they are up-to-date about advancement in their respective specialties.

— Cost effective services through regular monitoring of services.

The Corporation has now entered the field of Medical Education. This, besides catering to the needs of quality medical and para-medical HR requirements of the Corporation, would also enhance the overall healthcare scenario in the country.

ESI Model Hospital, Basaidarapur, the premier Institute of ESI Corporation is an ISO 9001-2008 (OQS) certified and rated as "H-2" Category by ICRA – a Credit Rating Agency. It is situated in the prime location of west Delhi and spread over an area of 31 acres of land. The complex has got the hospital and the residential colony for the ESI employees.

The hospital was commissioned on 1st December 1971 with bed strength of 150. Soon it was felt that these beds were insufficient to cater the needs of the increasing number of beneficiaries, new beds were added from time to time by increasing the bed strength400 by December 1976. A new wing was commissioned during the year 1993 resulting in addition of 200 more beds to make it a 600 bedded multi-disciplinary hospital that also included an Occupational Disease Centre for states of north zone of India like Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir and Uttrakhand. It also serves as a referral centre for other ESI Hospitals of Delhi and NCR.

The hospital caters to about 8 to 9 lakhs insured persons with 36 lakhs beneficiaries of NCR and provides secondary level of medical care and tertiary level of medical care to some extent.

Postgraduate training and teaching started in this hospital in 2004 for DNB (Diplomate of National Board) courses. In addition, the hospital has been associated with IGNOU as a study centre for a post graduate training in the field of Hospital and Health Administration for many years.

Post graduate Institute of Medical Sciences and Research has been established in 2009 and has the MCI permission to start PG courses.

The Department of Obstetrics and Gynecologyis one of the busiest departments of the hospital with maximum number of indoor patients throughout the year.It caters to all emergency patients attending the hospital Gynae casualty irrespective of their entitlements.Ours is a model hospital and tertiary care centre wherein high risk patients referred from neighbouring ESI hospitals of Delhi and NCR are treated under expert care. The department is self contained and all Obst & Gynae surgeries are performed routinely.

The department is keeping pace with new developments in the field of reproductive and child health. To achieve the mission of safe motherhood and to upgrade the knowledge and skill regarding safe motherhood, the department regularly organizes CME'S and workshops for all the doctors of ESI hospitals, dispensaries and diagnostic centre .The department has organized Precongress workshop on "Maternal mortality" of 11th World Congress & 19th Indian Conference on "Reproductive and Child Health which was attended by 150 delegates and was appreciated at National level. The faculty has delivered oration on "Minimizing Maternal Mortality" at National and State level. The department is working hard to decrease the maternal mortality. There are 6000 deliveries annually and out of which 35% are high risk cases. In the department maternal death audits are conducted regularly. There are standard operating protocols for management of obstetric emergencies which are strictly followed as a result there has been a significant decline in maternal mortality at hospital level in last few years. Lessons learnt from our experiences of managing morbidly adherent placenta has been recently published online. The research project on near

miss as per 'WHO near miss criteria' is being carried out in the department.

The faculty of the department is actively participating in conducting 'safe motherhood workshops' all over Delhi and NCR.

Recent Developments in ESESIC has indeed achieved many milestones. The ESIC has a vision of providing

Social Security Cover to all the workers in the lower wage bracket in the

organized sector within next five to ten years. Certain amendments in the ESI Act have been done to bring in more people under its umbrella. Now factories or establishments having 10 or more employees are also covered and the wage-ceiling limit has also been increased from '10,000/- to '15,000/-per month.

Action Taken By ESI Corporation for Improvement of Medical Services

- Annual action plans
- Revolving fund
- Occupational Diseases Centers
- Propagation of ISM services
- Training and CME programmes
- Tie-up arrangements for super specialty tests and treatment
- Decentralisation and delegations
- Rate contract for Medicines
- Annual Maintenance Contracts
- HIV/AIDS control programme
- Grievances Redressal
- Computerisation
- PG Courses / Medical Colleges.

ESIC is established as a brand symbolizing excellence in service. It hopes to become a shining example to follow for all the service delivery organizations in the public sector. The staff and the officers of the Corporation are a determined team for making this Social Security Organization one of the best in the world.

"ESIC-CHINTA SE MUKTI"

Margret Sanger

- Born in 1879, educated as nurse
- Founder of birth control movement in America
- Wrote various books and published newspaper in favor of birth control
- President of International Planned Parenthood Federation
- Promoted research and commercial production of oral contraceptive pills

Forthcoming issue ...

Dear Readers and FOGSIAN friends,

It is our pleasure to communicate that forthcoming issues of safe motherhood bulletin are on following topics -

1. **Infections in pregnancy**
2. **Safe obstetric practice**

We request your contribution in form of articles, atypical case situation and quiz.

Besides for column India Speaks and project please share your experiences and projects.

Please mail your societies activities in field of safe motherhood for publication. mailing address **dr_sadhanag@yahoo.com**

Hearty thanks
Dr. Sadhana Gupta
Chairperson Safe Motherhood Committee
FOGSI (2011-2013)

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for their contribution in Safe Motherhood Bulletin.

Safe Motherhood Day
11th April

INNOVATION TO IMPLEMENTATION

लड़की - लड़का एक समान, पढ़े लिखे और पावें ज्ञान।

विवाह हो सही उम्र पर, खुशियाँ रहें हमेंशा घर पर।

माँ बनने से पहले अच्छा स्वास्थ्य, सभी का हो यही उद्देश्य।

पूरा पोषण - पूरा ध्यान, शिशु होवे स्वस्थ बुद्धिमान।

सही समय पर हो सारी जाँच, पहुँचे स्वास्थ्य कर्मी के पास।

सुरक्षित प्रसव सुरक्षित स्वास्थय, सबसे जरूरी यह सवाल।

शिशु व माँ का पूरा पोषण, हो हर घर में यह नियम।

छोटा परिवार - सुखी परिवार, युग युग का है यह संदेश।

FOGSI - Safe Motherhood Committee