Physiological Changes during Pregnancy

Physiological Changes during Pregnancy

☆ Fertilization:

1. *What?*

   Union of mature ovum and spermatozoon

2. *Where?*

   Ampullary part of the fallopian tube

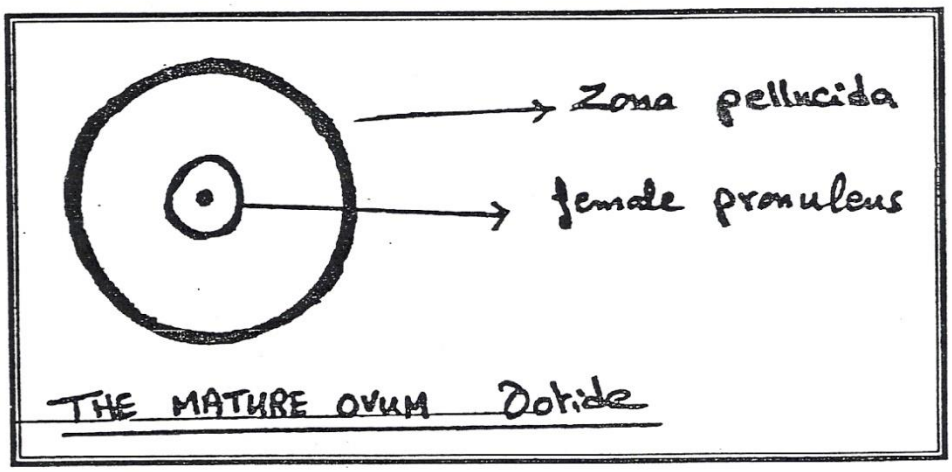
3. *When?*

   14 days before the next period

A. Requisites for Fertilization

1. Presence of healthy recently – 12- 24 hours – ovulated mature ovum.

   The mature ovum is called an ootide.



2. Presence of enough number of normal, viable, motile and mature sperms

   The mature sperm has a head, middle piece or neck and a wiggle tail.

3. Normal vagina, cervix and uterus. Specifically normal vaginal secretions

4. At least one normal patent fallopian tube with health function
5. Normal intercourse around the time of ovulation

B. Fertilization Process:

1. The ovum survives for only **36 hours**, while the sperm lives for no more than **48 hours**.
2. The ovaries produce only one ovum per month, but as much as 50 million to 60 million sperm are deposited in the posterior fornix when the coitus takes place.
3. The sperm travel all the way through the cervical canal to the uterine cavity, then enters into the tube to reach the ampullary part of it, which is the place of conception. The sperms move through this long journey by virtue of their tails.
4. Zygosis takes place between the two nuclei of the ovum and the spermatozoa to form the zygote.

C. Sex Determination

1. When a sperm with a (y) sex chromosome fertilize an ovum with a (x) sex chromosome, the zygote will have a (yx) chromosome, i.e., a male.
2. When a sperm with a (x) sex chromosome fertilize an ovum with a (x) sex chromosome, the zygote will have a (xx) chromosome, i.e., a female.

D. Development of the Fertilized Ovum

After fertilization, the zygote starts to divide into 2, 4, 8, 16, and 32 and sp on cells. Then a solid mass of cells informed its called *morula.*

☆ Implantation

It is the process by which the blastula is embedded within the thickness of the endometrium of the uterus.

Once the implantation tacks place, the trophoblast grows rapidly all over the ovum-forming finger –like projection – called chorionic villi – that covers the completely fertilized ovum by 4-5 weeks. It is now completely embedded in the thick endometrium.

☆ The Placenta

It is the discoid organ about 20-22 cm. in diameter and 2-3 cm. in the thickness. It weighs about 500 gm.

It has two different surfaces:

1. ***Fetal surface:***
   - Smooth
   - Shinny
   - Covered with amnion, which is reflected on the cord
   - At its center, the umbilical cord is inserted
2. ***Maternal surface:***
   - Rough.
   - Spongy
   - Dull red in color
   - Composed of 15-20 cotyledons

☙ *Functions of the Placenta:*

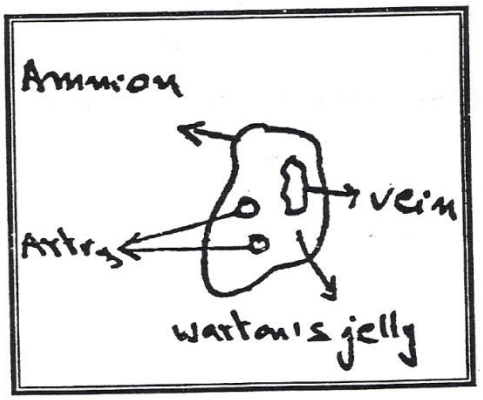
1. Respiratory function
2. Nutritional function
3. Excretory function
4. Endocrine function
5. Barrier between maternal and fetal blood

☆ The Umbilical Cord

A cord connects the fetus with the placenta. It is soft, tortuous, and 50-60 cm. in length and about one cm. in thickness.

It is composed of:

1. Covering amnion
2. Warton's jelly
3. Two arteries that carry venous blood from the baby to the placenta
4. One vein that carries oxygenated blood from the placenta to the baby.



- *Cord abnormalities:*
  1. Being too long
  2. Being too short

☆ Amniotic Fluid

It is 500-1000 turbid that its main consistency is water (99%), some urea, sugar and hormones.

- *Amniotic fluid's functions:*
  1. Prevent adhesion of the fetal parts.
  2. Allow free movement for the fetus.
  3. Protect the fetus from impaction.
  4. Receive the fetus's waste.
  5. Helps the baby to stand uterine contraction during labor
  6. Washes the genital tract during labor
  7. Keeps right temperature during labor.
  8. Bag of water dilates the cervix.

☆ Physiology of Pregnancy

Pregnancy is a normal physiological process that affects all the body systems. It is a stressful time requiring many adaptations to the body changes in all systems.

I. Reproductive Organs

A. Uterus:

1. Growth is due to hypertrophy and hyperplasia of existing muscle cells and connective tissue.
2. Fundal height measurement landmarks

Uterus	*Non-Pregnant*	*Pregnant "At term"*
• *Length*	6.5 cm	32 cm
• *Width*	4 cm	24 cm
• *Depth*	2.5 cm	22 cm
• *Weight*	50 gm	1000 gm

B. Cervix:

1. Increase vascularity
2. Edema, hyperplasia, thickening of mucous lining, and increased mucus production, formation of mucous plug by the end of the second month
3. Become shorter, thicker and more elastic.

C. Vagina:

1. Acidic ph (4-6)
2. Leucorrhea – nonirritating

D. Ovaries:

1. Ovum production cases
2. Corpus luteum persists; produce hormones to week 10-12 until placenta (take over).

II. Cardiovascular System:

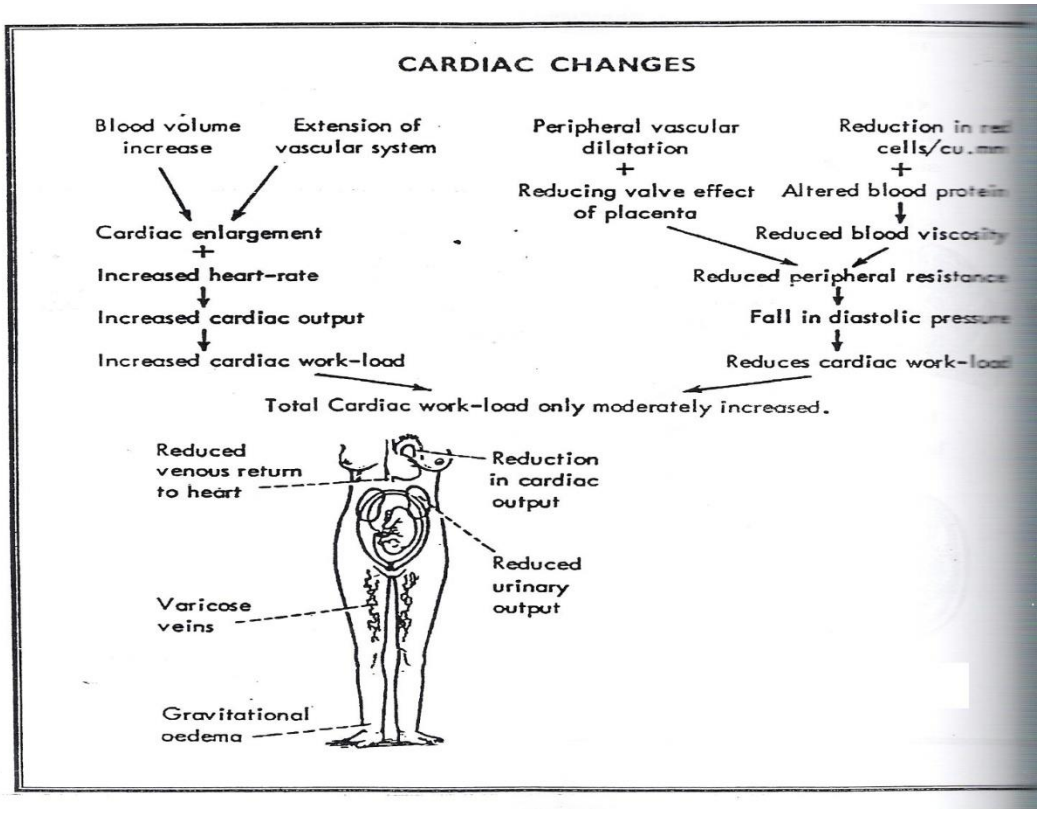
A. Physiological changes:

1. Heart displaced upwards increases by 20-30%
2. Circulation;
    i. Cardiac volume increased by 20-30%
    ii. During labor, cardiac output increases by 20-30%
    iii. Hemoglobin & hematocrit values remain between 10-14 gm & 35-42% normal drop is 10% during second trimester.
    iv. Blood pressure should remain stable with drop in second trimester.
    v. Heart rate often increases 10-15 beats/min at term.
    vi. Compression of pelvic veins leads to stasis of blood in lower extremities, which leads to varicose veins incase if there is tendency.
    vii. Compression of inferior vena cava when supine bradycardia reduced cardiac output, faintness, sweating, nausea (supine hypotension). Fetal response; marked bradycardia due to hypoxia secondary to decreased placenta diffusion

B. Health teaching to relieve V.V. & edema:

1. Elevate lower extremities frequently.

2. Apply supportive hose.
3. Avoid excess intake of sodium.
4. Assume side lying position at rest.
5. Learn signs and symptoms of preeclampsia- eclampsia.



III. Respiratory System

A. Physiological changes:

1. Increased tidal, vital capacity, respiratory reserve, oxygen consumption, production of carbon dioxide
2. Uterine enlargement prevents maximum lung expansion in third trimester.
3. Nasal stuffiness due to estrogen- induced edema.

B. Health teaching in relation to dyspnea:

1. Sit and stand with good posture.
2. When resting assume semi- flower's position
3. Avoid over distention of the stomach.

IV. Urinary System

A. Physiological changes:

1. Relaxation of smooth muscle results in conditions that can persist 4-6 weeks after birth.
2. Dilatation of urethras
3. Decreased bladder tone
4. Increase potential for urinary stasis and infection (urinary tract infection {UTI})
5. Stress incontinence in the third trimester.

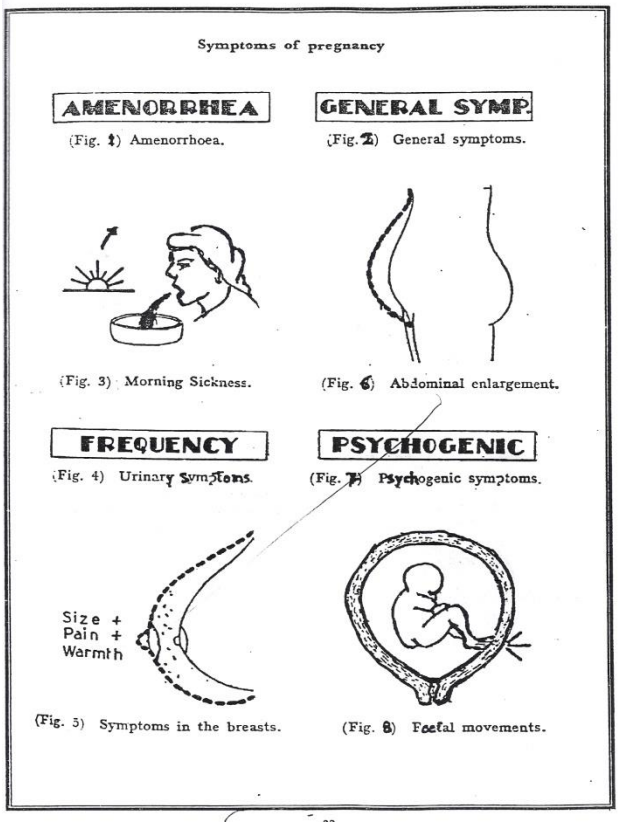
B. Health teaching:

1. Void with urge to prevent bladder distention.
2. Learn sing and symptoms of UTI; *"dysurea, fever and positive lab results"*.
3. Increase fluid intake to 3000 ml/day.
4. Perform Kegel's exercises to reduce incontinence.
5. Some herbs can help as well as parsley and peach juice.
6. Avoid smoking.

V. Gastrointestinal System

A. Physiological changes:

1. General decrease in smooth muscle tone and motility due to the action of progesterone
2. Intestine; slow peristalsis, increase water re-absorption in bowel
3. Gallbladder; decrease emptying
4. Stomach:
   i. Gastric emptying time is delayed
   ii. Gastric secretion of HCL and pepsin decreases.
5. Cardiac sphincter relaxes
6. Increasing size of the uterus and displacement of intera-abdomenal organs



B. *Health teaching:*

1. *Nausea and vomiting:*
   i. Avoid fatty food; increase carbohydrates.
   ii. Eat small, frequent meals.
   iii. Eat dry unsalted crackers in A.M.
   iv. Decrease liquids with meals.
   v. Avoid odors that predispose to nausea.
2. *Constipation and flatulence:*
   i. Increase fluid
   ii. Maintain exercise regimen.
   iii. Add fibers to diet.
   iv. Avoid mineral oil laxatives, as they might lead to abortion during early pregnancy.
   v. Avoid gas- producing foods
3. *Heartburn and indigestion:*
   i. Eliminate fatty or spicy food.
   ii. Eat small frequent meals
   iii. Eat slowly.
   iv. Avoid gastric irritant.

v. Perform "flying exercises"
vi. Avoid laying flat.
vii. Take antacids without sodium or phosphorus; and avoid sodium bicarbonate.
viii. Skip milk or eat yogurt with heartburn.

4. *Hemorrhoids:*

i. Increase fluid and fibers intake.
ii. Maintain exercise regimen.
iii. Avoid constipation and straining to defecate.
iv. Take warm sit baths.
v. Apply witch hazel pads.
vi. Elevate hips and legs frequently.
vii. Use hemorrhoidal ointments only with advice of health care provider.

VI. Musculoskeletal System:

Progesterone, estrogen, and relaxin, induces the relaxation of joints, cartilage, and ligaments.

- ***Health teaching:***

1. Good body alignment- trunk pelvis under; tighten abdominal muscles.
2. Pelvic – rock exercises.
3. Wear low – heeled, sturdy shoes.
4. Advise against tight- fitting clothing interfering with circulatory return in legs.

☆ Sings & Symptoms of Pregnancy:

A. Presumptive symptoms- subjective experiences:

1. Amenorrhea
2. Breast tenderness, enlargement
3. Morning sickness
4. Urinary frequency
5. Fatigue
6. Constipation

B. Presumptive sings:

1. Striae gravidarum, linea nigra, chloasma

2. Increased basal body temperature (BBD)

C. Positive signs:

1. Fetal heart tone
2. Examiner visualizes and feels the fetal examination.
3. Sonographic examination when the fetal head is sufficiently development for accurate diagnosis.

☆ Minor Discomfort during Pregnancy:

Discomfort	***Causes***	***Possible Relief***
1. Nausea & Vomiting	Hormonal, psychological	a. Avoid smelling or eating food that trigger nausea b. If morning sickness occurs, eat plain crackers, dry toast, or other dry carbohydrates before getting out of bed c. Keep hard candy on the bedside d. Rise slowly from a lying or sitting position to avoid nausea e. Eat a small meal every 2-3 hours f. Avoid fatty or highly seasoned food g. Eat a bedtime snack high in protein, such as cheese and crackers h. If you wake up at night to urinate, drink a sweet beverage such as apple juice i. Consult your doctor if vomiting occurs for more than once daily or if it continues beyond the 16th week

Comparison between Morning Sickness & Hyperemesis Gravidarum

	Moring Sickness	***Hyperemesis Gravidarum***
Time	– Starts in the morning, and ends by the 12th week	– Happens throughout the day, and throughout the entire length of pregnancy

Treatment	– No medication	– Requires hospitalization
Content of Vomit	– Mainly stomach juice	– Stomach juices & food particles
Complication	– No complication on mother or fetus	– Serious complications on fetus & mother if not controlled

2. *Urine frequency & urgency*	In early pregnancy, it is hormones, later it is due to engagement of the head center of the pelvis & the reduction of the available space.	a. Restrict the intake of fluid at night (the daily intake should not be less than 8 glasses) b. Void every 2-3 hours during the day to reduce urgency and minimize the risk of urine retention, which may lead to infection c. Consult your doctor if signs & symptoms of UTI arise, such as pain, burning sensation or blood in the urine d. Perform Kegel's exercise (tighten the muscles used to control urine flow) in sets of 10 times a day to maintain tone & control over urination
3. *Breast tenderness or tingling*	Change of the hormones	Wear a well-fitting bra
4. *Fatigue*	Change of the physiology of the body	a. Rest periodically during the day b. Allow more time of sleeping at night
5. *Increased vaginal discharge*	Change of hormones	a. Clean the perineum daily b. Wear cotton-crotch underwear, which allows air circulation c. Keep skin dry & avoid douching which can lead to infection
6. *Nasal stiffness or bleeding*	Due to vasodilatation of the arteries & veins	Use a cool air vaporizer, especially while sleeping
7. *Heartburn*	Progesterone	a. Eat smaller meals at shorter intervals

		b. Avoid fried or spicy food c. Avoid lying down immediately after eating d. Maintain adequate fluid intake (6-8) glasses daily, 30 minutes after meals. e. Avoid citrus juices f. Avoid sodium bicarbonate because it disturbs the sodium-potassium balance g. Use an antacid as recommended by your nurse or doctor.
8. Ankle edema & Varicose veins	Progesterone	a. Avoid sitting or standing for long periods b. Avoid grater knee-tights or other restrictive bands around your legs. c. Avoid crossing your legs. d. Wear supportive or elastic stockings. e. Exercise regularly to promote blood flow in your legs f. Elevate your feet and legs whenever possible. g. Support your entire leg rather than simply propping up your feet. h. Lie down with your feet elevated several times daily.

Comparison between Pathological & Physiological Edema

Pathological Edema	***Physiological Edema***
A. History of Kidney Disease: – Heart disease – Kidney disease – Nutritional disease – Hormone treatment	*A. Changes in Hormone during Pregnancy:* – Vaticose venines – Increase venous pressure – Increase capillary permeability
B. Physical Examination: Pitting edema all day and night, and is not relieved by rest	*B. Physical Examination:* Pitting edema at the evening or after long periods of standing and

		relived by rest and elevation of the leg
C. Urine Examination: Presence of albumin of proteins and ketone bodies in urine		*C. Urine Examination:* Absence of albumin and proteins in the urine
9. Enlarged veins in the groin	Hormones	a. Support your perineum with two sanitary pads worn inside your underpants. b. When elevating your legs, elevate your pelvis as well to avoid pooling of blood in the pelvic region.
10. Hemorrhoids	Due to constipation	a. Avoid straining when having a bowel movement. b. Use ice packs, warm soaks, & topical ointments & anesthetics. c. Fat food high in fiber to avoid constipation d. Maintain adequate fluid intake (6-8 glasses daily, preferably water). e. Insert hemorrhoids & lie on one side with your knee drown up for several minutes. f. Consult your doctor if hemorrhoid feels hard or painful or if rectal bleeding develops).
11. Constipation	Progesterone causes relaxation & decreased peristaltic movement	a. Increase fluid intake to more than eight glasses daily, preferably water. b. Increase dietary fibers by eating more fruits & vegetables. c. Eat prunes, which are natural laxatives. d. Exercise daily. e. Take time for regular bowel movement.
12. Backache	Hormones softens the	a. Use proper body mechanics & good posture.

	ligaments to a degree that some support is needed	b. Perform exercises aimed at restoring body alignment. c. Use leg muscles instead of back muscles when lifting objects. d. Avoid lifting heavy objects. e. Lie on a bed or lounge chair to rest back muscles.
13. Leg cramps	Maybe due to ischemia or resulting from change in the pH or electrolyte balance	a. Stretch the calf muscle by handing up, pressing your foot firmly on the ground & straightening your knee. b. When lying face down, ask someone to press down on the back of your knee & flex your foot from the ankle toward your chin. c. Use a warm towel or leg massage to relieve discomfort. d. Reduce milk intake as suggested by the doctor.
14. Faintness	Later in pregnancy the mother feels faint while lying on her back	a. Avoid sudden changes in position (lying to sitting position for example). b. Avoid standing for long periods. c. Avoids crowds d. Lie on one side rather than on your back. e. When feeling faint, sit down and place your head between your knees.
15. Shortness of breath "dyspnea"	Because of the pressure of the uterus on the diaphragm	a. Use proper posture while standing. b. Use pillows to support your back when sitting. c. Stretch your abdomen when standing with your hands over your head and breathe deeply.

16. Insomnia	Hormones affecting the nervous system	a. Lie on your left side with pillows supporting your back, under your abdomen & between your legs. b. Have a warm, caffeine-free drink and a backrub. c. Perform relaxation techniques. d. Attempt to alleviate distracting discomforts, such as lower back pain.

Ante Natal Care

☆ Objective of Antenatal Care

1. Maintain good physical and emotional health during pregnancy by reducing the incidence of complications through early detection, prompt correction of any deviation from normal.
2. Provide health education.
3. Prepare women for childbirth, puerperium, and lactation.
4. Insure the delivery of a viable, mature & healthy baby as an outcome of pregnancy.
5. Orient the women with the setting and staff who will attend her labor and delivery.

6. Help the mother and her family to adjust to pregnancy physical and psychological change.

☆ Schedule of Ante-Natal Visits

It usually starts at the end of the second missed period, and goes as following:

1. *Once a month during the first six months of pregnancy (4-5 visits)*
2. *Every 2 weeks during the 7th and 8th months of pregnancy (4 visits)*
3. *Once a week during the ninth month of pregnancy (4 visits)*

Totaling *14 visits* during the entire pregnancy. However, the WHO suggested that four antenatal visits are adequate in developing countries while MOH in K.S.A. has recommended 5 antenatal visits for adequate antenatal care. In 24 weeks gestation.

Apart from the schedule, the woman should be instructed to come at once whenever she experiences any of the following *Danger Signals or Warning Signs:*

1. Sever persistent frontal headache.
2. Visual disturbances (blurring of vision)
3. Persistent vomiting
4. Swelling of the face (puffiness of the eyes)
5. Swelling of hands (fingers)
6. Epigastric pain
7. Uterine contraction
8. Cessation of fetal movements
9. Sudden escape of fluid from the vagina
10. Dysuria
11. Vaginal spotting/bleeding
12. Chills and fever.

☆ Ante-Natal Care

A. History Taken:

1. Age of Menarche
2. Rhythm of the Menstrual Cycle

3. Duration and Amount of Blood Loss
4. Associated Pain or Dysmenorrhea
5. Date and Nature of the Last Menstrual Period (L.M.P.):

   We add 7 to the days and 9 to the months, and the resulting date will be the expected date of delivery- within two weeks before or two weeks after as shown in the following example:

	Day	*Month*	*Year*
If the last menstrual period started	15	3 (March)	2010
Add	7	9	
The expected date of delivery will be:	22	12 (December)	2010

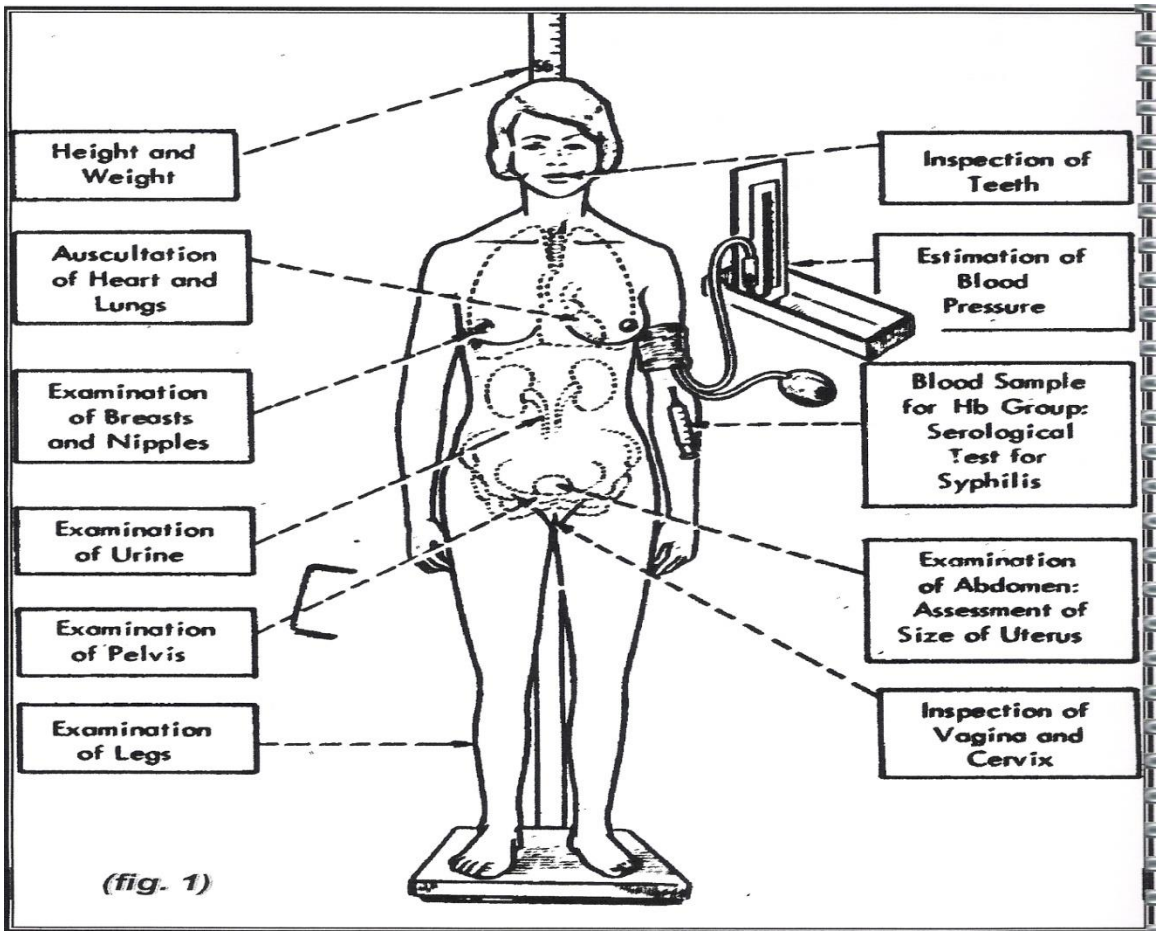
6. Contraceptive history
7. Medical history
8. Social history;
   - *i. Life style habits*
   - *ii. Social support / marital status*
   - *iii. Employment / occupation*

B. General examination:

A complete physical examination should be performed on every pregnant woman during the initial visit. It includes:

1. Measurement of:
   - *i. B.P.*
   - *ii. Vital Signs*
   - *iii. Height*
   - *iv. Weight*
2. Examination of the thyroid
3. Auscultation of maternal heart rate
4. Observation of anemia in:
   - *i. Conjunctiva*
   - *ii. M. M. of inner lips*
   - *iii. Nails*
5. Observation of edema all over the body

6. Observation of abnormalities in gait or walk



C. Investigation:

Test	***Discussion***
Initial laboratory tests - Routine	
1. Complete blood count	To determine hematologic status; to rule out anemia
2. Urinalysis and urine culture and sensitivity	To evaluate for LM and renal function

3. *Blood group, Rh*	To determine blood type, Rh status and risk of isoimmunization
4. *Antibody screen*	To detect maternal antibodies, which may damage the fetus or make procurement of compatible blood for transfusion more difficult, the antibody screen is usually negative anti-l and anti-Lewis are seen in approximately 1% of patients and are of no consequence to the fetus
5. *Serologic test for syphilis (RPR, VDRD)*	To detect previous/current infection; if positive, specific treponemal test
6. *Hepatitis B surface antigen*	To detect carrier status or active disease; if positive, further testing is indicated
7. *Rubella titer*	Approximately 85% of mothers have evidence of prior infection, if patient is seronegative, special precautions are needed to avoid infection, which severely affects the fetus, vaccination is required postpartum
8. *Cervical cytology (Pap smear)*	To screen for cervical dysplasia/ cancer
9. *Cervical culture for Neisseria gonorrhea*	To screen for infection; both causes neonatal and Chlamydia trachomatis conjunctivitis, association with premature labor and postpartum endometritis
10. *Hemoglobin electrophoresis*	To detect sickle-cell trait (HbSA) associated with higher risk for UTI and sickle-cell disease (HbSS), at risk of multiple fetal and maternal complications

11. *HIV titer by ELISA; Western blot if HIV+ by ELISA*	Should be offered to all patients at risk (multiple sexual partners, drug use, or sexual contact with drug users), may be offered to all patients at physician discretion
12. *Glucose screening (usually 1-hour Glucola)*	To screen for glucose intolerance risk patients, usually at 28 week low-risk patient
Subsequent assessment	
13. *MSAFP at 15 to 18 weeks (usually with hCG, estriol)*	Elevated levels seen with neural tube defects, gastroschisis and omphalocele; low levels, associated with Down syndrome
14. *Hematocrit at 25 to 28 weeks*	To rule out anemia
15. *Glucose screening (usually 1-hour Glucola) at 24 to 28 weeks*	To screen for glucose intolerance

D. Health Education:

It should be *planned* according to the following:

1. Woman's needs
2. Woman's educational level
3. Woman's sociocultural affiliation
4. Weeks of gestation
5. Time available

Health education first trimester (1-3 months)	
Traveling	a. Traveling can be especially tiring in the first 14 weeks and the last 4 weeks of pregnancy. Avoid it in the first trimester if there is a history of abortion b. if traveling by car, frequent stops should be provided with opportunity and using the rest room c. using seat belt, it should be worn for comfort under the abdomen and not too tight against the neck and abdomen

Sexual intercourse	a. sexual intercourse in moderation usually does no harm b. stress that sexual intercourse is contraindicated once the membranes are ruptured or if bleeding is present c. avoid intercourse if there is a history of abortion or premature labor
Drugs	a. The first trimester is particular, susceptible time b. Ingestion of drugs at any time during pregnancy holds the risk of potential fetal damage c. Drugs have tetrogenic effects on the fetus, causing anomalies as bone and limb deformities, deafness, cardiac defects, prematurely and metabolic abnormalities d. Avoid the use of self medications and prescribed medication, drugs with suspected toxicity should be avoided e. When doctors prescribe a drug for necessary conditions, it should be used at a small dose and for the shortest time
Caffeine	a. Pregnant women in taking common sources of caffeine including coffee, tea, colas and chocolate should use good judgment in moderating or limiting their caffeine intake b. Consuming the same daily caffeine intake as before pregnancy results in a much higher blood pressure level c. Caffeine causes an increased production of Adrenaline and the cease of noradrenalin production. These hormones constrict peripheral blood vessels, including those of the uterus, this can result in a temporary decrease in the oxygen available to the fetus
Smoking	a. Women who smoke, should stop smoking during pregnancy, or if they cannot, then smoking must at least be reduced

	b. Decreasing smoking during pregnancy will result in a better fetal outcome c. The specific mechanism by which smoking affects the fetus is not known. However, smoking appears to decrease placental blood flow and plasma volume d. Smoking may interfere with maternal absorption or metabolism of calcium, vitamins A, B1, B6, B12 and vitamin C e. Mothers who smoke are in an increased risk of spontaneous abortion, placenta previa, low birth weight, anemic babies, and babies addicted to cigarettes
Next visit	a. Regular visits during pregnancy to provide continued monitoring of maternal and fetal status b. In the 1st trimester, visits should be every 4 weeks for the first 28 weeks of gestation c. Do not forget the date of the next visit
Warning signs & symptoms	*Women should always report any of the following signs and symptoms to the doctor in the first trimester:* a. Persistent nausea or fainting b. Pain in the abdomen and in the back c. Persistent loss of appetite d. Painful, burning sensation upon urination e. Dizziness
Health education during the second trimester (4-6 months)	
Nutrition	a. Good nutrition is essential during the whole pregnancy b. The quality of food is more important than the quantity c. A pregnant woman should be provided with all essential nutrients, while avoiding gaining weight d. Selecting food with high nutritive value and avoiding junk food
Hygiene	a. Daily hygiene routine is maintained

	b. Sweat glands are more active and frequent baths are necessary c. If there is an increase in vaginal discharge, then local cleansing is essential d. Avoid douching unless advised by a doctor
Dental care	a. Dental examination is necessary early in pregnancy b. Regular visits to the dentist as ordered c. An adequate diet and care of the gum d. Consult a doctor before any dental works is done
Breast care	a. Clean daily with warm water, avoiding soap, which causes dryness and cracking of the nipple and areolar area b. Rub the nipples gently and apply cold cream for dryness c. If the nipples are flat or inverted, grasp gently with a soft cloth and pull outwards for a few seconds several times a day
Clothing	a. Clothing in the second trimester should be practical, attractive & non constricting b. Avoid stocking with elastic tops c. Low heeled shoes are more practical than high heels d. A well fitting bra is recommended
Vaccination	a. All women at childbearing age need to be fully aware of the risks of receiving specific immunizations if pregnancy is possible b. Tetanus vaccine 1st and 2nd dose, in the 2nd trimester, with 1 month between each
Next visit	Pregnant women in the second trimester should have return visit every 2 weeks until they complete 36 weeks of gestation
Warning signs & symptom	a. Vaginal bleeding b. Severe continuous headache c. Swelling of the face and hands d. Disturbance in vision e. Chills and fever over 37.8°C f. Dizziness

	g. Increase weight gain h. Increase blood pressure
Health Education during the third trimester (7-9 months)	
Traveling	a. Traveling in general is not usually contraindicated during pregnancy b. Traveling should be usually avoided if there is a history of bleeding or pregnancy induced hypertension or if multiple births are anticipated c. The woman in the last six weeks of her pregnancy should consult her doctor if planning to travel d. Mothers must make sure that there are hospitals or emergency centers in the place to which she is traveling
Sexual intercourse	Women in the third trimester should avoid sexual intercourse during the last 6 – 8 weeks of pregnancy to prevent complication such as infection or premature rupture of membranes and premature labor
Exercise	Walking is very important during the last trimester of pregnancy
Signs & symptoms of labor	a. The onset of labor is signed by one or more of the following symptoms: *i. The irregular contractions of pregnancy giving way to regular uterine contractions every 15 – 20 min.* *ii. the "show"; a small amount of blood mixed with mucus is passed* *iii. the membranes may rupture* b. The mother should be asked to go to the hospital any times she feels one or more of these symptoms
Place of delivery	a. When the mother gets in labor, she should be admitted to the hospital b. Avoid staying at home if the mother feels the symptoms of labor to prevent complications
Vaccination	a. The important topic that is interrelated with traveling, is that of immunization &

	vaccination for protection of the pregnant woman b. Virus vaccinations are contraindicated (measles, mumps, and rubella)
Warning signs & symptoms	a. Vaginal bleeding b. Edema c. Severe headache d. Visual disturbance e. Absence of fetal movement f. Vaginal discharge & changing in normality (color, amount, odor and itching)
Nutrition	a. In the 3rd trimester iron or folic acid intake is important as well as calcium intake (milk & milk products) b. Adequate intake of fluid to prevent dehydration c. Increase fiber diet d. Avoid fluids containing sodium bicarbonate
Next visit	a. During the 3rd trimester visits should be every week until onset of labor b. The mother should go to the hospital if she shows or feels any warning signs and symptoms, and she must know the difference between (false and true) signs and symptoms of labor

	False Labor Pain	*True Labor Pain*
Site	Abdomen	Abdomen, back & maybe upper thigh
Walking	It will be gone	It will increase
Enema	It will be gone	It will increase
Discharge	No discharge	Show
Cervical dilatation	No dilatation	There is dilatation
Pattern of pain	Irregular	Starts irregular & becomes regular

E. Return visit:

During the subsequent – return – antenatal visit, the following is usually done:

1. A quick history about what had happened since the last visit
2. Vital signs & B.P. measurements
3. Weighing
4. Breast examination
5. Abdominal examination
6. Looking for edema
7. Urine analysis for Albanian & sugar
8. Blood testing if necessary
9. Immunization, if indicated
10. Fetal assessment by auscultation of F.H.T. or sonography or NST accordingly
11. Health education, accordingly
12. Attendance to woman's complaints

☆ Nutrition during Pregnancy:

The pregnant woman should be advised about the importance of adequate nutrition during pregnancy:

1. Maintenance of health of pregnant woman and her developing fetus
2. Formation of fetal bones and blood
3. Reduction of minor disorders of pregnancy
4. Combating infections and avoidance of anemia
5. Giving physical strength and vitality during labor
6. Ensuring a good supply of breast milk

Some pregnant women need particular attention to nutrition during pregnancy:

1. Women under 17 years of age
2. Those with rapid successive pregnancies
3. Women with limited weight gain during pregnancy
4. Over weight pregnant women

5. Women with low incomes or who are unsupported may need help with budgeting and with making sensible stoics.
6. Intake of certain groups of foods due to religious, philosophical or cultural reasons
7. Women who have misleading confusing and conflicting nutritional information

Before giving health education on nutrition during pregnancy, the following factors that affect the choice of food should be kept in mind:

1. Methods of cooking quantities and qualities of food
2. Climate, food available and customs
3. Traditions and geographical locations
4. Religion, race, intelligence and education
5. Social and economic status and price of food
6. Likes, dislikes and medical conditions
7. Responsible person for food purchasing and preparation

During giving health education on nutrition, the following factors should be considered:

1. Each pregnant woman as an individual has a unique attitudes and beliefs towards emotional response to food, cultural meaning of food and knowledge about nutrition.
2. Creating a positive attitude toward nutrition requires patience understanding and respect for woman's nutritional pattern and behavior.
3. Avoid using technical terms as proteins, carbohydrates, etc.
4. Add to woman's diet rather than take away from it.

- ***Adequate nutritional needs of pregnant woman:***

A. *Calories (2500/day):*

1. The caloric requirement is the same as in the non-pregnant state.
2. During pregnancy, increased metabolism is compensated for by decreased activity.

3. Excess calories lead to fat deposition and obesity and predispose to PET.

B. *Proteins (85 gm/ day):*

1. *Protein is required for:*
    i. Growth of genital tract
    ii. Development of fetus and placenta
    iii. Mammary growth and satisfactory lactation
    iv. Increased blood volume
2. *Sources of protein are:*
    i. Animal sources; includes: lean meat, fish, eggs, chicken and rabbit
    ii. Plant sources; include: peas, bean, lentils, potatoes, and whole-wheat bread
3. *Insufficient protein in diet leads to:*
    i. Fetal prematurity
    ii. Maternal anemia and preeclampsia

C. *Carbohydrate (300 – 400 gm/daily):*

1. Carbohydrates are required to supply heat and energy
2. *Sources of carbohydrates are* bread, potatoes, rice, macaroni, sugar and jam
3. High sugar intake is avoided and starches are taken instead because they are aborted more slowly

D. *Fats (90 m):*

1. Fats are needed to supply heat, energy, and vitamins as well
2. *Sources of fats are* butter, cheese, cream, fat meat, and margarine

E. *Calcium (1.5 gm/day):*

1. *Calcium is needed for:*
    i. Formation of bones and teeth
    ii. Ossification of fetal skeleton
    iii. Blood clotting and neuromuscular action
2. *Sources of calcium are* milk, cheese, yogurt, calcium carbonate tablets, whole-wheat bread and leafy green vegetables
3. *Insufficient calcium in diet leads to:*
    i. Fetal rickets and dental caries

ii. Maternal PET, osteoporosis, tetany uterine inertia, osteomalacia, nervousness, muscle cramps and bone pain

F. *Iron (30 mg/day):*
   1. *Iron is required for:*
      i. Fetal blood formation
      ii. Maintenance of maternal hemoglobin level
      iii. Lactation
   2. *Iron sources are:*
      i. *Animal source is,* red meat especially liver and kidneys
      ii. *Plant source is,* green vegetables, potatoes, red fruits, cereals, and whole-wheat bread

G. *Iodine:*
   1. Iodine is essential for normal thyroid function
   2. *Sources of iodine are,* cod-liver oil and sea fish such as herrings

H. *Phosphorus:*
   1. It is essential for the formation of fetal bones and teeth
   2. *Sources are,* meat, milk, cheese, and green vegetables

I. *Folic acid (1 mg/day):*
   1. Folic acid is needed for blood cell development in bone marrow
   2. *Sources of folic acid include,* liver, kidneys, and dark green vegetables

J. *Vitamin A (750 mg/day):*
   1. *It is essential for:*
      i. Fetal bone growth and bone formation
      ii. Reproduction and lactation
      iii. Healthy skin and vision
   2. *Sources are,* butter, milk, cream, egg yolk, fish liver oil and green vegetables

K. *Vitamin B1 & B2 (2.4 mg):*
   1. *Vitamin B1* controls nerve function, digestion and carbohydrates metabolism
   2. *Vitamin B2* is essential for fetal growth, proper vision and lactation

3. *Sources are*, yeast, cheese, whole-wheat bread, beans, spinach and meat such as liver and kidney

L. *Vitamin C (100 mg/day):*

1. *It is essential for:*
    i. Growth of fetal bones and teeth
    ii. Formation of fetal blood
    iii. Absorption of fetal blood
    iv. Absorption of iron
    v. Prevention of scurvy
2. *Sources are,* green vegetable, tomatoes, strawberries, and citrus fruits such as orange and lime

M. *Vitamin D (10 mg/day):*

1. *It is essential for:*
    i. Proper embedding of embryonic growth
    ii. Prevention of abortion
2. *Sources are,* milk, eggs, meat, green vegetables, wheat germ and whole-wheat flour

N. *Vitamin K:*

1. It is needed for prothrombin formation necessary for coagulation of blood and prevention of hemorrhage
2. *Sources are*, hog's liver, green vegetables, carrots and tomatoes

O. *Fiber content of diet:*

1. It helps in prevention of constipation
2. *High fiber foods includes* whole-wheat bread, cereals, pulses, fruits and vegetables

P. *Fluids:*

Increase fluid intake to 8 – 10 glasses of water/day.

Labor & Delivery

☆ Normal Labor:

A. Definition:

Labor is a series of events by which the fetus and placenta are expelled from the woman's uterus. Delivery refers to the actual delivery of the infant.

B. Characteristics of Normal Labor:

1. The fetus is born at full term (completed 37 weeks).
2. The fetus is living.
3. The fetal presentation is vertex.
4. The process of labor is completed spontaneously.
5. The process of labor is completed through the natural passages.
6. The time of labor does not exceed 24 hours.

C. Factors Affecting the Process of Labor:

1. *Passengers;* Fetus, placenta, membranes, umbilical cord, blood & amniotic fluid
2. *Passages;* Pelvis, pelvic floor, uterus, cervix, vagina & vulva
3. *Powers;*
    i. *Primary powers;* contraction & retraction of the uterine muscles
    ii. *Secondary powers;* refers to the power of the abdominal muscles and diaphragm, in the form of bearing down effort, which is voluntary and partly involuntary, or reflex.

D. Stages of Labor:

The process of labor is divided into four distinct stages;

1. *First stage (dilating stages);* begins with the first true uterine contractions and ends with complete dilatation of the cervix.
2. *Second stage (expulsive stage);* begins with complete dilatation of the cervix and ends with delivery of the infant.