

Physiological & psychological changes & common discomforts of pregnancy

Objectives:

- ❖ *At the end of this class the student will be able to:*
- ✓ Identify the physiological changes that occur during pregnancy.
- ✓ Recognize normal psychological and developmental adaptation to pregnancy.
- ✓ Describe the most common discomforts that occur during pregnancy.

Common discomforts of pregnancy

First Trimester	<ul style="list-style-type: none"> - Breasts changes, pain, tingling, and tenderness. - Urgency and frequency of urination. - Languor and malaise. - Nausea and vomiting “ morning sickness”. - Ptyalism. - gingivitis and epulis. - Nasal stiffness, epistaxis. - Leukorrhea. - Psychosocial dynamics as mood swing, mixed feeling.
Second Trimester	<ul style="list-style-type: none"> - Constipation - Flatulence with bloating and belching. - Varicose veins. - Leukorrhea. - Headaches. - Carpal Tunnel Syndrome. - Periodic numbness. - Round ligament pain. - Joint pain, backache, and pelvic pressure; hyper- mobility of joints.

Third Trimester	<ul style="list-style-type: none"> - Shortness of breathing and Dyspnea. - Insomnia. - Psychosocial Responses as mood swing, mixed feelings, and increased anxiety. - Urinary frequency and urgency. - Perinial discomforts and pressure. - Braxton hicks contractions. - Leg cramps. - Ankle edema
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1st: Reproductive System :

- *Uterus*

* size:

- *Increased vascularity and dilation of blood vessels.*
- ***Hyperplasia.***
- ***hypertrophy.***
- ***Decidua “endometrium during pregnancy”.***

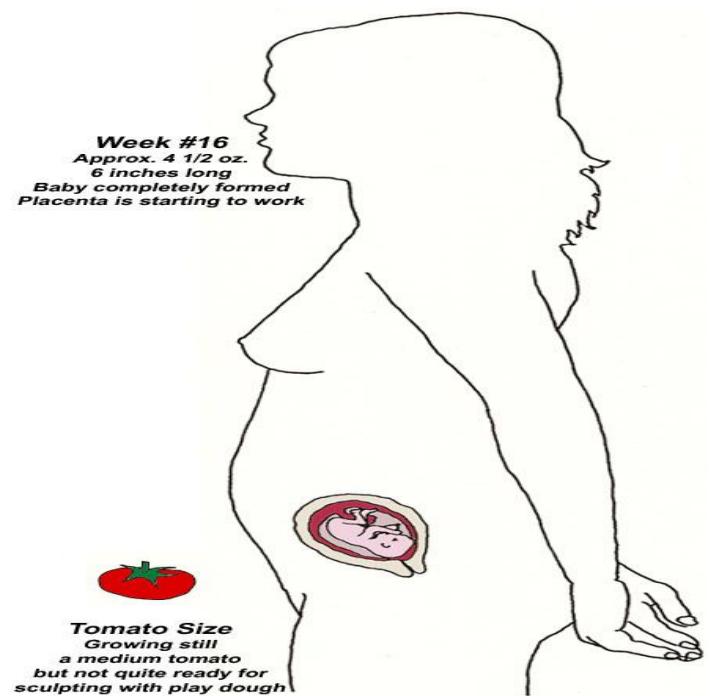
By 7 or 8 weeks of gestation , the uterus become as the size of a large hen's egg or a grape size.



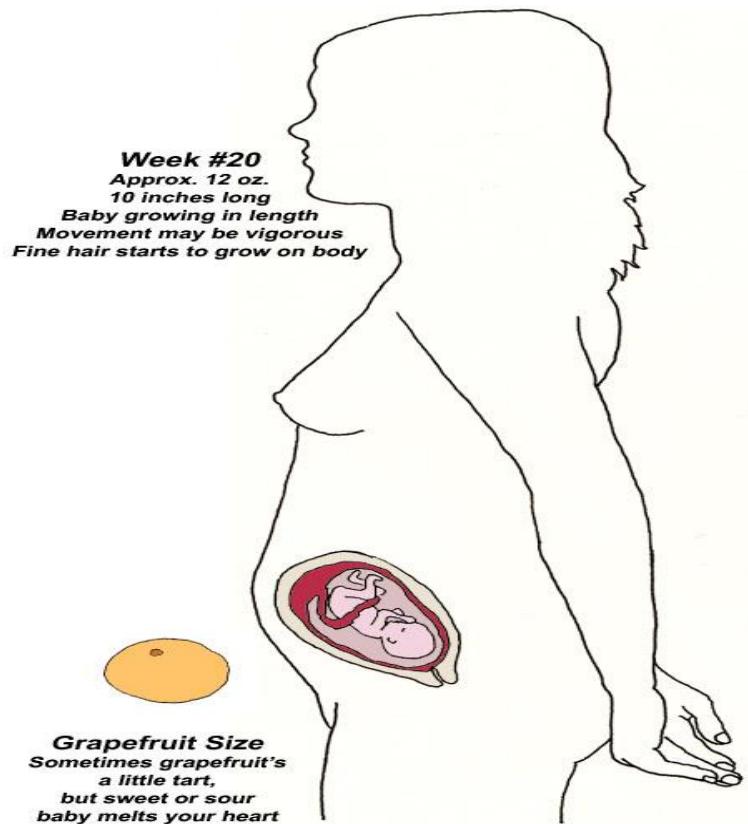
By 12 weeks of gestation , the uterus become as the size of a plum.



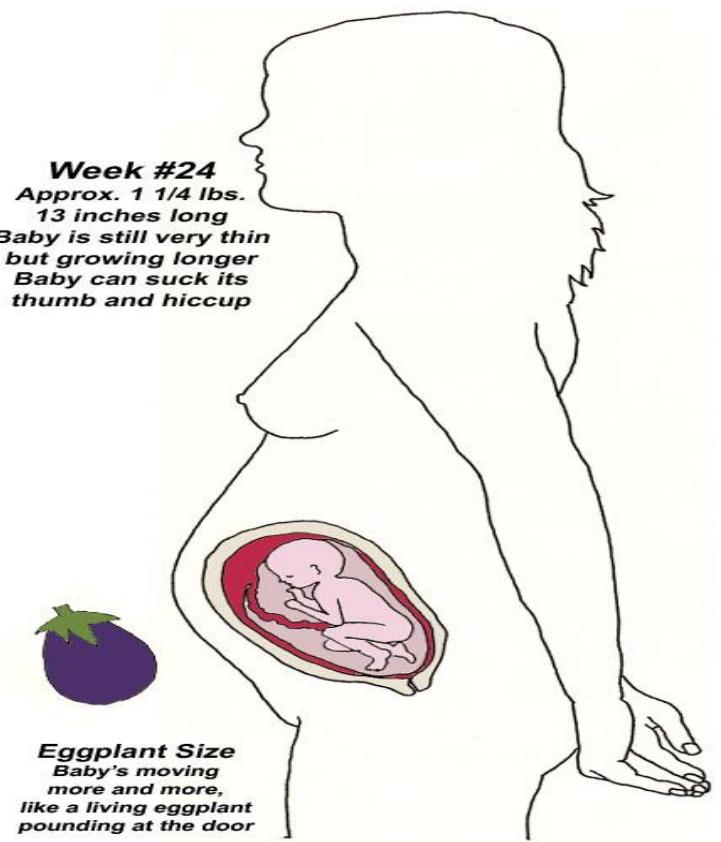
By 16 weeks of gestation , the uterus become as the size of a Tomato



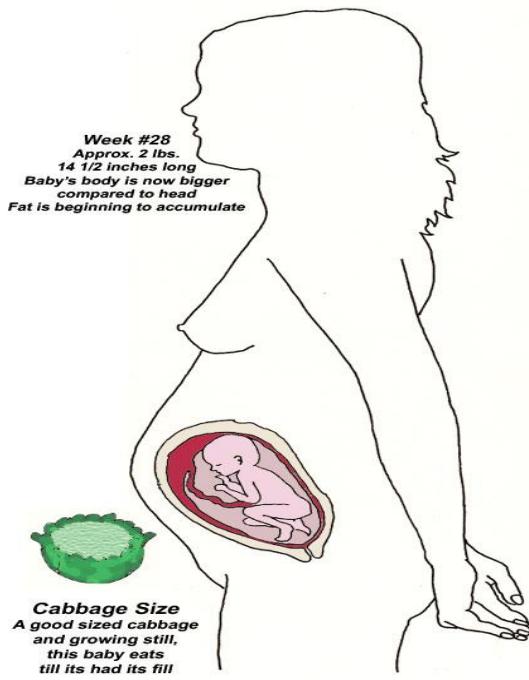
By 20 weeks of gestation , the uterus become as the size of a grapefruit.



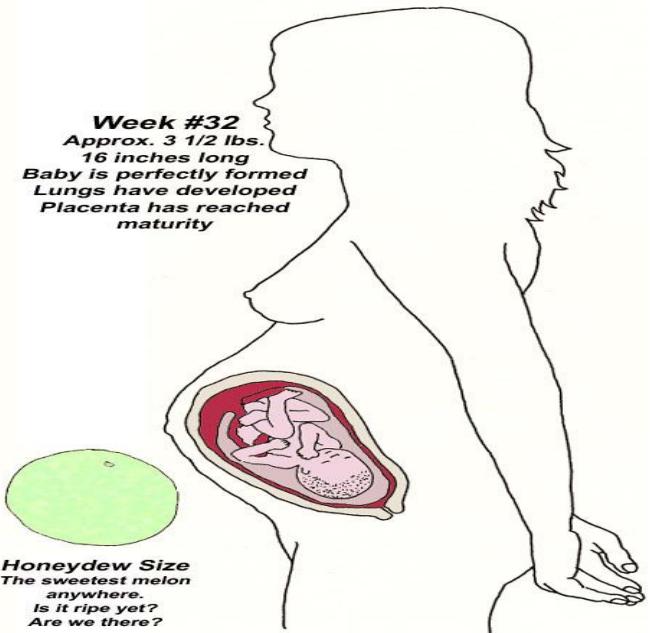
By 24 weeks of gestation , the uterus become as the size of a Eggplant.



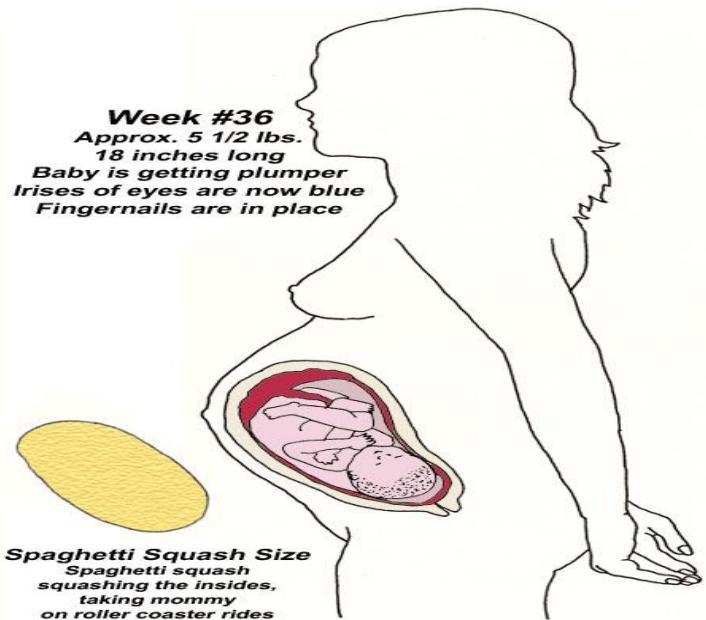
By 28 weeks of gestation , the uterus become as the size of a Cabbage.



By 32 weeks of gestation , the uterus become as the size of a honeydew.



By 36 weeks of gestation , the uterus become as the size of a Spaghetti Squash.



By 40 weeks of gestation , the uterus become as the size of a watermelon.



* Shape of uterus

- At conception an upside down pear.
- Second trimester spherical or globular.

- Third trimester larger, more ovoid, rises out of the pelvis into the abdominal cavity.

*** position:**

- At 12 and 14 weeks palpated above symphysis pubis.
- At 22 and 24 weeks level of umbilicus.
- At term 36 - 37 weeks xiphoid process.
- At 38 – 40 weeks fundal height drops as fetus descends and engage in the pelvis."lightenning".

Uterus rotates to the right as it elevates, but the extensive hypertrophy of the round ligaments keeps the uterus in the midline.

Hegar sign softening and compressibility of the lower uterine segment (uterine isthmus). At 6 weeks.

***Contractility:**

- *Braxton Hicks Contractions* (after 16 weeks) are irregular, painless, and occur intermittently throughout pregnancy.

▪ **Uteroplacental blood flow**

* Maternal blood flow to the uterus increases rapidly as the uterus increase in size.

* one sixth of the total maternal blood flow is within the uterine vascular system.

The rate of blood flow through the uterus averages **500ml/minute**.

* **Uterine soufflé:** blood sound in the uterine arteries, is synchronous with the maternal pulse.

* **Funic soufflé:** blood sound in the umbilical Vessels, is synchronous with the fetal heart rate.

▪ **Cervical changes**

- **Goodell sign:** softening of the cervical tip. (6 week).

- **Velvety appearance.**

- **Friability:** increased and may cause slight bleeding after coitus with deep penetration or after vaginal examination.

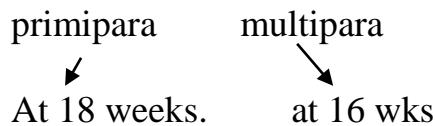
- **Squamocolumnar junction** (site for obtaining cells for cervical cancer screening) become located away from the cervix.

“ 3% of all cervical cancer are diagnosed during pregnancy

▪ Fetus – related changes

- Ballottement sign : passive movement of the unengaged fetus. (16-18 weeks).

- Quickening: the first recognition of the fetal movement or *feeling life*.



■ Vagina and Vulva

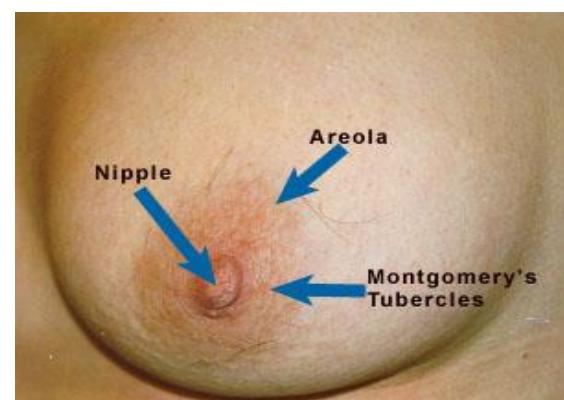
- Vagina mucosa becomes thickened, connective tissue loosen, smooth muscle hypertrophy, and vagina vault lengthen.

- Chadwick sign : violet bluish color of the vaginal mucosa and crevix.(6-8 week).

- Leukorrhea: a white or slightly gray mucoid discharge with a faint musty odor.

In response to cervical stimulation by estrogen and progesterone.

Whitish color because of the exfoliated vaginal epithelial cells caused by the hyperplasia of normal pregnancy. it is never pruritic or blood stained.



Increased estrogen levels lactobacillus acidophilus action on glycogen in the vaginal epithelium increased production of lactic acid.

* Increased in **vaginal sensitivity** lead to a high degree of sexual interest and arousal especially during second trimester.

* Edema and varicosities of the vulva.

* External structure of perineum are enlarged.

* Labia Majora :

Nullipara : Approximate and obscure the **vaginal introitus** .

Multipara: separate and gape after childbirth , perineal or vaginal injury.

Breasts :

* Fullness, heightened sensitivity, tingling, and heaviness of the breasts in the early weeks of gestation.

* **Nipples and areola** become more pigmented, secondary pinkish areola develop, nipples become more erectile.

* **Montgomery's tubercles** : hypertrophy of the sebaceous glands embedded in the primary areola.

* Blood vessels become visible as an intertwining blue network beneath the surface of the skin.

* Venous congestion especially in primigravidae.

* Striae gravidarum appear at outer aspects of the breasts.

* Growth of the mammary glands → progressive breast enlargement at the second and third trimester.

* **Colostrum** : creamy, white to yellowish- to orange pre-milk fluid.

Expressed from the nipples as early as 16 weeks of gestation.

Discomfort	Self-care education
<i>Breasts changes as pain , tingling, and tenderness.</i>	<ul style="list-style-type: none"> - Supportive nonrestrictive cotton bra with pads. - Wash with warm water ,Keep them dry. avoid soap. - Interfere with sexual expression but temporary.
<i>Leukorrhea</i>	<ul style="list-style-type: none"> - not preventable. - do not douche. - wear perineal pads. - hygienic practices. - <u>warning signs</u> as pruritus, foul odor, change in character or color.
<i>Perineal discomfort and pressure.</i>	<ul style="list-style-type: none"> - Rest, relaxation, and good posture. - Contact health care provider if pain is present.

<i>Braxton Hicks contraction</i>	<ul style="list-style-type: none">- Reassurance that this is to facilitate uterine blood flow so promote O₂ delivery to fetus.- Rest.- Change of position.- Breathing technique if contraction is effleurage.
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Related discomforts

2nd : Cardiovascular System :

- slight cardiac enlargement due to increased blood volume (1500 ml or 40% -50%) and cardiac output (1.5L/min to 6.5-7L/min or 30%-50%).
- Heart is elevated upward and rotated forward to the left.
- The point of maximum impulse is upward and laterally about 1-1.5 laterally.
- At 14-20 weeks of gestation , the pulse increased about 10-15 beat/minute.
- palpitation may occur.
- Cardiac rhythm may be disturbed.

Blood pressure

both systolic and diastolic blood pressure decrease up to 20 weeks of gestation (5-10mmhg), after that maternal blood pressure gradually increase and return to 1st.trimester level at term.

* supine hypotensive syndrome:

women who lie flat on their backs during the second half of pregnancy compression of the venacava, decrease in systolic blood pressure >30mmhg, reflexive bradycardia, cardiac output is reduced by half, so women fells faint.

Uterus enlargement compression of the iliac veins and inferior venacava increased venous pressure and reduced blood flow in the legs, which will lead to dependent edema, varicose veins in the legs and vulva and hemorrhoids at the latter part of term pregnancy.

Blood volume and composition

Blood volume increase 1500ml or 40%-50% at 10wks 1000ml plasma 450ml RBC accelerated production of RBCs and increase in RBCs mass 20%-30%.

Decrease in normal hemoglobin values ($>11\text{mg/dl}$) and hematocrit values ($>33\text{mg/dl}$) **physiologic anemia** which is most noticeable during the second trimester.

Total WBCs increased during the second trimester and peaks during third trimester especially the granulocytes.

▪ Cardiac output

It increase about 30%-50% at 32 wks, then it decline a 20% at 40 wks. cardiac output in late pregnancy is higher when the women is in the lateral recumbent position rather than in the supine position.

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Related discomforts

Discomfort	Self-care education
<i>Palpitation</i>	<ul style="list-style-type: none">- not preventable .- contact primary health care provider if accompanied with cardiac decompensation.

<i>Supine hypotension and bradycardia</i>	- Side-lying position or semi-setting position with knees slightly flexed .
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3rd. Respiratory System:

Maternal oxygen requirements increase 15%-20% in response to the acceleration in the metabolic rate, the need to add to the tissue mass in the uterus and Breasts and the fetus requirements of oxygen and a way to eliminate carbon dioxide.

Ligaments of the rib cage relax which increased chest expansion.

Transverse diameter of the thoracic cage increased 2cm and the circumference increases 6cm. Costal angle increased. Lower rib cage appears to flare out.

The diaphragm is displaced by as much as 4cm during pregnancy.

Thoracic (costal) breathing replaces abdominal breathing.

4th. Renal System : Changes in renal structure during pregnancy related to hormonal activity as estrogen and progesterone, pressure from enlarging uterus, and increased blood volume. At 10 weeks gestation, renal pelvis and ureters dilate.

Smooth muscle wall of the ureters develop to hyperplasia, hypertrophy, and muscle tone relaxation. **So ureters elongate, tortuous, and form single or double curves.** Because of these changes , a large volume of urine is held in the pelvis and ureters, so urine flow is slowed which leads to urinary stasis or stagnation. This is an excellent media for the growth of microorganism also the urine of the pregnant women contains more nutrients as glucose, and elevated PH more alkaline which makes **pregnant women more susceptible to UTI.**

- **fluid and electrolyte balance**

* physiologic edema or dependent edema (is the pooling of fluid in lower legs which may decrease renal blood flow and glomerular filtration rate. No treatment is needed. In pregnancy ; tubular reabsorption of glucose is impaired so glucosuria occurs.

In non-pregnant women the blood glucose level is around 160-180mg/dl before glucose is spilled into the urine, while during pregnancy glucosuria occur when maternal glucose level is less than 160mg/dl.

glucosuria in normal pregnancy may be +2. proteinuria doesn't occur in normal pregnancy. +1 protein or less than 300mg/24hours are acceptable during pregnancy.

Related discomforts

Discomfort	Self-care education
<i>Urgency and frequency of urination</i>	<ul style="list-style-type: none"> - empty bladder regularly. - perform kegel exercise: They strengthen the muscles that keep the urethra by squeezing the muscles you use to stop the flow of urine and holding them for 10 seconds. Do this 10-20 times in a row at least three times a day. - Limit fluid intake before bed time. - wear perineal pads. - report pain or burning sensation to primary health care provider. - Avoid diuretics as coffee, tea and colas that contain caffeine can make you urinate more frequently.

5th. Integumentary system :

hyper-pigmentation (such as darkening of nipples, areolae, axillae and vulva at 16 weeks) occurred as a result of increased anterior pituitary melanotropin hormone during pregnancy.

* melasma or chlasma (mask of pregnancy) is a brownish hyper-pigmentation of skin over cheeks , nose and forehead. Appears 50-70% in pregnant women. It begins at 16 weeks and increased gradually until term.

* **linea nigra** is a pigmented line extending from the symphysis pubis to the top of the fundus in midline.

In primigavide it is begin to appear at 3rd month while in multigravida it begin earlier than 3rd month.

- **Striae Gravidarum or stretch mark** is seen over lower abdomen . appear in 50-90% of pregnant women during second half of pregnancy. it is caused by action of adreno-corticosteroids. Striae reflects separation of the underlying connective or collagen tissue of the skin. It occurs most frequently over areas as abdomen, thigh, and breasts. It may cause a sensation of itching.

In multipara women's , the striae line is silvery line or purplish line, while in primipara it is a pinkish line.

* **Palmar Erythema** is pinkish – red , diffuse mottling or well-defined blotches ;which is seen over the palmer surfaces of the hands in about 60% of pregnant women's.

*** dermatologic conditions unique to pregnancy:**

- pruritis

- gum hypertrophy as **epulis** (gingival granuloma gravidarum) is a red , raised nodule on the gums that bleeds easily. It develop at third month and continues to enlarge as pregnancy progress.

- nail growth may be accelerated.

- **thinning and softening of the nails** may occur.

- **oily skin** and **acne vulgaris** may occur during pregnancy.

- for some women **skin may become clear and more radiant.**

- **Hirsutism** (excessive growth of hair or growth of hair in unusual places is commonly reported

- **increased perspiration** may occur due to increased blood supply to the skin.

- women **feel hotter** during pregnancy possibly related to a progesterone induced increase in body temperature and the increased BMR.

6th. Musculoskeletal System :

alterations in women's body posture and the way she walks.

The women's center of gravity shifts forward.

An increase in the normal lumbosacral curve (lordosis) develops and a compensatory curvature of the cervicodorsal region (exaggerated anterior flexion of the head) to help her maintain her balance.

Aching , numbness and weakness of the upper extremities may occur.

"Waddling gait of the pregnant women" the proud walk of pregnancy" is well known.

Musculoskeletal discomforts occurs especially in older women or those with back disorder.

Slight relaxation and increased mobility of the pelvic joint are normal during pregnancy; which permits enlargement of pelvic dimensions to facilitate labor and birth.

Stretching and loosening of abdominal muscles , as a result during the third trimester, the rectus abdominal muscles may separate "diastasis recti abdominis". To allow the abdominal contents to protrude at the midline so the **umbilicus flattens and protruded**.

Discomfort	Self-care education
<i>Backache, joint pain, pelvic pressure, hyper-mobility of joints.</i>	<ul style="list-style-type: none">- maintain good posture and body mechanics.- Exercising but avoid fatigue.- Wear low-heeled shoes.- Abdominal support may be useful.- Sleep on firm mattress.- Avoid lifting heavy objects.- Keep objects you need close by so you don't have to bend or stretch to pick them up.- Avoid standing for long periods of time, if possible.- Sit in chairs with good back support. Tuck a small pillow behind your lower back for extra support while sitting.- A heating pad, warm water bottle or cold compress can help ease backache.

7th. Neurological System :

Compression of the pelvic nerves or vascular stasis. Carpal tunnel syndrome during the last trimester ; which characterized by paresthesia, and pain in the hand radiating to the elbow.

Acroesthesia (numbness and tingling of the hands).

Tension headache is common when anxiety and uncertainty complicates pregnancy.

Light headedness , faintness and even syncope are common during early pregnancy.

Neuromuscular problems such as muscle cramps or tetany.

Discomfort	Self-care education
<i>Leg Cramps</i>	<ul style="list-style-type: none"> -Eat calcium-rich foods, such as milk and milk products, fish and citrus fruits. your doctor may prescribe calcium supplements along with vitamin D. -Don't wear high heeled shoes. -Massage the affected calf or foot and walk around for sometime once the pain has reduced.

8th. Gastrointestinal System :

* **Appetite:**

Early in pregnancy 4-6 weeks some women have nausea with or without vomiting "morning sickness" and it is usually subsiding at the end of the first trimester of pregnancy.

At the end of the second trimester , the appetite increased as a result of increased metabolic needs. changes in the sense of taste lead to cravings and changes in dietary intake.

*** Pica "nonfood cravings"** as for ice, clay and laundry starch ; which is low in nutritional value.

Women with pica have been found to have lower hemoglobin level.

* **Mouth:**

Gums becomes hyperemic , spongy , swollen and bleed easily.

* **Epulis.**

*** Ptyalism** "excessive salivation" due to the decrease in unconscious swallowing by the women when nauseated or from stimulation of the salivary glands by eating starch.

* **Esophagus, Stomach and Intestine:**

*** Hiatal hernia** may occur at the seventh or eighth month of pregnancy in about 15%-20% of pregnant women ; which caused from upward displacement of stomach. it occurs more in older, obese or multipara women's.

Decreased secretion of hydrochloric acid ; therefore peptic ulcer formation or flare up of existing peptic ulcer is uncommon during pregnancy.

*** Heart burn :** increased progesterone level causes decrease tone and motility of smooth muscles resulting in esophageal regurgitation , slower emptying time of the stomach.

Iron is absorbed more readily from the small intestine in response to increased needs during pregnancy.

* **Constipation** : increased progesterone level (loss of muscle tone and decrease peristalsis) result in an increase in water absorption.

It also may be result from hypo-peristalsis "sluggishness of the bowel", food choices, lack of fluids, iron supplementation, decreased activity level, abdominal distention by the pregnant uterus, and displacement and compression of the intestine.

Related discomforts

Discomfort	Self-care education
<i>Morning Sickness</i> <i>“nausea with or without vomiting”</i>	<ul style="list-style-type: none">- Avoid empty or overload stomach.- Maintain good posture.- Give stomach ample room.- Stop smoking.- Eat dry carbohydrate on awakening.- Remain in bed until feeling subsides.- Alternate dry carbohydrate with fluids such as hot herbal , milk or clear coffee.- Eat five to six small meals per day.- Avoid fried, odorous, spicy, greasy or gas forming foods.- Get plenty of fresh air.- Avoid eating fatty foods or foods that are hard to digest.- It is not preventable .- Satisfy cravings is acceptable unless it interferes with well balanced diet .- Report unusual craving to health care provider.
<i>Food cravings</i>	<ul style="list-style-type: none">- Limit or avoid gas producing foods , or fatty foods .- Avoid large meals instead eat smaller meals (five or six small meals).
<i>Heart burn or</i>	

<i>pyrosis</i>	<ul style="list-style-type: none"> - Maintain good posture. - Sip milk or hot herbal drink for temporary relieve. - Health care provider may prescribe antacid between meals. - Drink less while eating: avoid drinking large amounts of fluids with your meals. Drink your fluids between meals instead. - Avoid bending or lying down right after eating. Sit up, do light housework, or take a walk until your body has had a chance to digest. Be sure to eat your last meal of the day several hours before bedtime. - Wear loose clothing: tight clothing can increase the pressure on your stomach and abdomen.
<i>Constipation</i>	<ul style="list-style-type: none"> - Drink six glasses of water each day . - Include roughage or fiber-rich diet . - Exercise moderately. - Use relaxation technique and deep breathing. - Do not take stool softener, laxatives, mineral oils, other drugs or enemas without counseling your health care provider. - Maintain regular schedule for bowel movements.

Weight changes during pregnancy

Continuing weight increase in pregnancy is considered to be a favorable indicator of maternal adaptation and fetal growth

- 4.0 kg in first 20 weeks.
- 8.5 kg in second 20 weeks.
- 12.5 kg approximate the total weight gain.

Disposition of weight gain in pregnancy

Breasts	0.4kg
Fat	3.5kg
Placenta	0.6kg
Fetus	3.4kg

Amniotic fluid	0.6kg
Uterus	1.0kg
Blood volume	1.5kg
Extracellular fluid	1.5kg
Total	12.5kg

Adaptation to Pregnancy

“ Pregnancy affects all family members , and each family member must adapt to the pregnancy and interpret its meaning in light of his or her needs within a cultural environment influenced by societal trends.....so the NURSE must be prepared to support single parent families, reconstituted families , dual-career families and alternative families as well as traditional families in the childbirth experience. “

Maternal Adaptation

a. Accepting the pregnancy:

it is a cognitive restructuring process. (Mercer 1995).

- some women may feel **DISMAYED** especially if the pregnancy is not intended, **BUT** non-acceptance of pregnancy should not equated with the rejection of child; because this may dislike being pregnant but feel love for the child to be born.
- Other women's may feel **HAPPY** and **PLEASED** about their pregnancy ; view it as biological fulfillment and a part of their life plan so they have high self-esteem and confidence about her , her child and family outcomes.

* Self concept :

Women's move gradually from being self-contained and independent to being committed to a lifelong concern for another human being .

* Emotional Liability:

it is a rapid unpredictable mood changes as swings in emotions, increased sensitivity to others , increased irritability, or explosions of tears , anger, feeling of great joy and cheerfulness .

It may be related to hormonal influences , finances and lifestyle changes, or changes in physical contours and body functions.

*** Body image :**

As obvious changes of abdomen as bulging , thickening of waist and enlargement of breasts. It is usually occurred in the second trimester.

It is also influenced by values and personality traits.

*** Ambivalence :**

is a conflicting feelings during pregnancy.

it is a normal response as women prepare her self for a new role.

*** guilty feelings :**

It occurs when a new baby born with a defect ; his mother may look back at the times she did not want this pregnancy or ambivalence feelings. So NURSE role here is to assure the mother that her feelings were not responsible for the problem.

b. Identify the mother role:

How dose the pregnant women define the mother role , motherhood; what is her perception regarding this point.

*** It depends on :**

1. The time when she is being mothered as a child.
2. Perception of what constitute the feminine role.
3. Practice role of mothers she know.
4. High motivation to become a parent.

c. Reordering personal relation ship:

“pregnant women relationship with her mother”; in which its important component is

- Mothers availability(past and present times).
- Her reactions to her daughters pregnancy.

If the mother is not pleased about her daughters pregnancy , daughter will have doubt about her self-worth and concerns about how others will accept her child. But if the mother is supportive ; daughter will discuss her pregnancy, labor, feelings of joy or ambivalence. This will increase daughters self-confidence and sense of autonomy

- Respect her daughters autonomy.

- Willingness to reminisce about her early childhood or mothers childbirth experience ; this will make her feels that she is loved and wanted.

Establishing relationship with fetus:

“attachment” is feeling of being tied by affection or love. It occurs during prenatal period.

* Three phases:

1. Women accepts the biological fact of pregnancy.

“ I’ am pregnant “

- women incorporates the idea of a child in to her body and self-image.
- Child is viewed as a part of herself , not a separate and unique person.

2. Women accepts the growing fetus as distinct from herself.

“ am going to have a baby”

- This phase usually accomplished by the fifth month of pregnancy.
- Beginning of mother-child relationship involves caring and responsibility.
- Ultrasound and quickening may confirm the reality of fetus.

3. Women prepare realistically for birth and parenting of the child.

“ am going to be a mother”

* Family members may interact a great deal with the unborn child by talking to the fetus and stroking the mother abdomen especially when the fetus shift position.

e. Preparing for childbirth:

by reading books , viewing films, attending prenatal classes or talking to another women

pregnant women may experience feeling of ANXIETY concerning about a safe passage for herself and her baby during childbirth process, FEAR from pain of childbirth or what behaviors is appropriate during childbirth process and whether caregiver will accept them and their actions.

Prenatal care

Definitions

- It is a planed examination and observation for the woman from conception till the birth .

Or

- Antenatal care refers to the care that is given to an expected mother from time of conception is confirmed until the beginning of labor
- The purposes of prenatal care are to
 - Establish a baseline of present health
 - Determine gestational age
 - Monitor fetal development
 - Identify the woman at risk for complications
 - Minimize the risk of possible complications
 - Provide time for education, which will relieve fear and anxiety

Principles of Antenatal care

- **Do assess the following**
- Risk factors
- Detailed history
- Self medication
- Diet
- Exercise
- Antenatal visits
- Pathology tests
- Common discomforts

Why prenatal care is important

- Can decrease risk of pre-term babies or abortions
- Can decrease mortality rates (ectopic pregnancy, hypertension, embolism, infection, hemorrhage are the main causes of death during pregnancy)

The first prenatal visit

- Establish a baseline data.
- Explain why specific data are related to pregnancy
- Discuss weight changes and physical changes during pregnancy
- Urine analysis
- Establish communication in a private, quite setting
- Confirm pregnancy: assess for signs of pregnancy

Ante-natal visits

- Visits are usually monthly to 28 weeks
- Every Two weeks from 29 to 36 weeks
- Weekly from 36 to delivery.

- Each visit should involve checks on maternal and fetal well-being.
- **In each visit you do the following**
- **Check BP**
- **Weigh the woman**
- **Check urine for (protein, acetone, and glucose)**
- **Height of the uterus**

Self medications

- **Abdomen is palpated using leopold's maneuvers**
- Vitamin A>2500 I.U. daily (>2 capsules) may cause birth defects;
- Advise the woman to minimize chemical and infection exposure in general - which includes occupational exposure.

Antenatal documentation

- Weight gain (12-15 kg in total, with 3kgs in first 20 weeks)
- BP (a diastolic pressure>90, from first visit is significant)
- Urinalysis (watch for protein, glucose, and UTIs)
- Fetal movements
- Uterine size in accordance with dates and ultrasound
- Fetal lie, presentation, and engagement, especially after 36 we