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Hormones orchestrate female breasts looks & functions! Humans must appreciate what they do!

Abstract

The breasts of an adult woman are milk- producing, tear-shaped glands. Their development is a complex process extending from the earliest stages of embryogenesis to beyond menopause, driven by intrinsic genetic information, regulated by complex and tightly controlled hormonal mechanisms, and is affected by external events.

Hormonal changes in the breasts are completely normal processes that women experience throughout their reproductive stage, due to constant transformations related to fluctuations in hormones like estrogen, progesterone and Prolactin, which regulate multiple functions of the female reproductive system. While Estrogens are responsible for the growth of the breast ducts and stimulating cell proliferation, during the first half of the cycle, Progesterone acts in the second phase of the cycle, favoring the development of the breast alveoli. Prolactin & growth hormone are also involved in this complex process, leading to changes in both the size and sensitivity of the glands.

Preoccupation with body image is observed in adolescents and young women in India. Most of them peer review each other or report confidentially with a senior health professional. Most of such reports are apprehensions of negative attitudes towards self. Therefore, it is important for schools & colleges to provide guidance to students on issues like breast size, long hair, eye colors, facial contours etc., and self-belief as they have a significant impact on mental health.

Materials and methods: This article is based on one-on-one discussions with about 50 MPH scholars over a period or 3 years (2018-2022) in a public sector University and clarifying many misunderstandings and interactions for facilitating not getting worried much.

Outcomes: Despite the common cultural hesitation of young girls and women seeking a male doctor's opinion, half of the MPH scholar (n-50) consulted this author. In all 3 batches about 10 girls and 2 women were advised hormonal intervention and responded well for breast tenderness, and rest counselled for fibrocystic breasts (4) and cyclic myalgia (9).

Keywords: breasts, hormonal control of breasts development, estrogen, progesterone, prolactin

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Introduction

Normal breast development is a complex process extending from the earliest stages of embryogenesis to beyond menopause, driven by intrinsic genetic information, regulated by complex and tightly controlled hormonal mechanisms, and is affected by external events. Schematically, breast development is separated into prenatal, perinatal, peripubertal, adult and postmenopausal stages. Complete breast maturation does not occur until pregnancy and lactation, and thus the breast never evolves completely in nulliparous woman. Many breast diseases, benign and malignant, including breast cancer, are better explained through the spectrum of normal or abnormal breast development.[1]

The external anatomy of the breasts consists of the nipple, areola, skin, and internal anatomy includes lobes, lobules, ducts and fatty tissue. It consists of parenchyma and stroma, originating from ectodermal and mesodermal elements, respectively. They house the mammary gland that produces & delivers milk through an extensive tree-like network of branched ducts.[2]

The breast of an adult woman is a milk- producing, tear-shaped gland. It is supported by and attached to the front of the chest wall on either side of the sternum by ligaments. Positioned over the pectoral muscles of the chest wall and attached to the chest wall by fibrous strands called Cooper's ligaments. The breast is a mass of glandular, fatty, fibrous tissues and contains no muscle tissue. A layer of fat surrounds the gland and extends throughout the breast, giving the breast a soft consistency. Its composition consists of milk glands (lobules) that produce milk, ducts that transport milk from the lobules to the nipple. Nipple & Areola is connective tissue that surrounds the lobules and ducts fat.[1,2]

Hormonal changes in the breasts are completely normal processes that women experience throughout their reproductive stage. Their body undergoes constant transformations related to fluctuations in hormones like estrogen, progesterone and Prolactin, which regulate multiple functions of the female reproductive system. Estrogens are the main hormones responsible for breast development. During the first half of the cycle, they cause the growth of the breast ducts and stimulate cell proliferation. Progesterone acts in the second phase of the cycle, favoring the development of the breast alveoli. Prolactin & growth hormone are also involved in this complex process, leading to changes in both the size and sensitivity of the glands.[3]

Preoccupation with body image is observed in adolescents and young women in India. Most of them peer reviewing or reporting confidentially with a senior health professional. Most of such reports are apprehensions of negative attitudes towards self. Therefore, it is important for schools & colleges to provide guidance to students on

issues like breast size, long hair, eye colors, facial contours etc., and self-belief as they have a significant impact on mental health.[4–6]

This article is based on one-on-one discussions with about 50 MPH scholars over a period or 3 years (2018-2022) in a public sector University and clarifying many misunderstandings and facilitating not getting worried much.

Case reports

MPH scholars Breast Tenderness reported to the author over 3 years 10/40 unmarried girls and 2/7 married women with no children and 1/3 married women with children. Basic demographic characteristics of these girls were

a) Aged 21-23 yrs

b) Complaints of backache, swollen feet,

c) Headache throbbing type of pain for 4 to 5 days.

d) they said that symptoms came before 5 to 8 days prior to the menses

e) Mental general before menses: Irritability+++, trifles at menses before, Anxiety & Crying. Half of them reported that they have never done anything according to their wishes since childhood, and they were forced to do things.

History of presenting complaints

Complaints started since menarche. Most had taken allopathic medicines like antispasmodic and painkillers Menstrual history:

A. Menarche at 11-14 years of age,

B. Cycle duration: 2-4/28-30 days

C. Character of blood : profuse dark and clotted

D. Family history: Mother's had menarche at least 1-2 years earlier than half of them, one third didn't know and rest said at their age only.

On general examinations, all had their: BP, and Pulse, Systemic examination CVS, CNS and RS were normal. 10% of the girls (N=5 OW and 2O) were either overweight or obese. Among the mental health most were irritable during menses, half had anxiety before and during menses one quarter had headache and one third had Backache. Over period of 3-4 months observation the author was guessing who had periods and counselled them.

Evaluation of psychosocial functioning and health-related quality of life in 50 young women (21 to 31 years), breast asymmetry was 60%. In all scholars, the breasts differed by at least one bra cup size. Similar evaluations were performed in a group of girls[4] without breast asymmetry, and in girls with macromastia.[3] About 40% of girls with breast asymmetry had tuberous breast deformity. Several aspects of mental health and well-being were lower for girls with breasts asymmetrically, compared to those with "normal" breasts. After adjustment for differences in body weight, breast asymmetry was associated with significantly lower scores for emotional well-being and self-esteem. The differences were like those in girls with macromastia. Breast asymmetry was also associated with "borderline" issues in social functional and eating behaviors and attitudes. "These findings suggest that young women suffering from breast asymmetry have poorer emotional well-being & lower self-esteem than their female peers.[5]

Unique cases needing pharmacotherapy for PMS

Two scholars (N=6) in each batch complained of Premenstrual Syndrome, who complained of Psychological symptoms: Irritability, depression, crying/tearfulness, anxiety, tension, mood swings, lack of concentration, confusion, forgetfulness, unsociableness, restlessness, temper outbursts/anger, sadness/blues, loneliness starting 23- days prior to monthly menstrual periods and last for 5-8 days. Their trouble some physical symptoms included: Headache/migraine, breast tenderness, mastalgia, severe back pain, abdominal cramps, bloating and swelling of the abdomen and pelvis, Weight gain only among 2), pedal oedema,[3] Increased appetite, food cravings, leading to going out of the hostel at odd hours breaking the rules.[1] While 90% of female scholars were impacted by mild to acute premenstrual symptoms, these six girls encountered PMS, and one of them experienced premenstrual dysphoric disorder, a severe type of premenstrual syndrome, characterized by cyclical mood alterations leading to clinically marked distress, as well as functional impairment. The diagnosis, of these six women was based experiencing similar symptoms at the same intensity near the end of each cycle for years. All of them were unable to maintain normal activities during the periods. Two of them often missed the classes on first day every cycle due to intensity of the pain. Their Premenstrual breast pain was associated with fibrocystic breast changes. Treatment for specific symptoms like 2 of them were on selective serotonin reuptake inhibitors, another 4 combined oral estrogen-progestin contraceptives.

Case reports 2: A bride-to-be's concern

A few months before her wedding, a young woman aged 25 years visited my clinic in January 2025. She was polite, softly spoken but I could sense the hesitation in her voice. Her concern wasn't unusual, but it was deeply personal. "Doctor, my breasts have never looked the same. One side is smaller, and it shows." She had lived with breast asymmetry all her life, but with her wedding approaching, it had started to affect her confidence in a big way.

During our consultation, I also noticed something important her chest wall had a slight inward depression, a condition known as pectus excavatum. We (I and Gynecologist friend) decided to do a full medical evaluation before proceeding.

After a detailed clinical & radiological assessment, we found:

a) The right breast was smaller in both volume and projection.

b) CT scan revealed mild emphysematous changes in her right upper lung

c) The chest wall deformity exaggerated the appearance of unevenness

d) We conducted a thorough pulmonology consultation and PFT (Pulmonary Function Test) were normal.

After careful planning, with a plastic surgeon we opted a combination technique to achieve the best possible symmetry:

A. Right breast – Silicone implant (220 cc) for volume enhancement

B. Left breast – Fat grafting (150 cc) for subtle contour correction. These were done under thoracic epidural anesthesia instead of general anesthesia for a safer and smoother recovery. She was hospitalized for just 2 days and followed up for the next 2 weeks.

This combination not only corrected the size asymmetry but also smoothened the chest contour caused by the pectus excavatum. Six weeks later, she came for her final review glowing and excited about

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her wedding and said with a shy smile, "for the first time, I can wear what I want and feel confident."

Discussions

Breast development follows predictable stages from childhood through adulthood, influenced primarily by hormonal changes during puberty. It is a natural, complex process governed by hormonal shifts and genetic factors. It typically begins in early childhood but becomes most noticeable during puberty.[1] From infancy to adulthood, breast tissue undergoes distinct phases, which are categorized using the Tanner Scale, a standard method for assessing physical maturation. Each stage reflects changes in size, shape, and underlying tissue structure (Figure 1) (Table 1).[1]

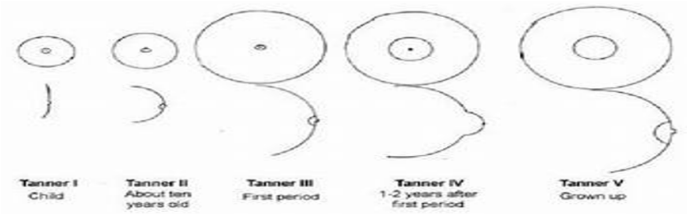

Figure 1 Breast development stages by age.

Table 1 Detailed tanner scale table

Tanner stage	Description	Typical age range
Stage 1	No visible breast development; pre-pubertal chest flatness.	0 – ~8 years
Stage 2	Breast budding: small mound forms with enlarged areola.	8 – 13 years
Stage 3	Further enlargement without separation of contour; ducts grow.	12 – 15 years
Stage 4	Nipple/areola forms secondary mound above breast contour.	13 – 17 years
Stage 5	Mature adult breasts: areola returns to contour level with nipple protruding.	17+ years (early adulthood)

Detailed tanner scale table: Breast development stages by age

Initial breast development

Human breast tissue begins to develop in the 6th week of fetal life, along the lines of the armpits and extends to the groin called the milk ridge. By the 9th week of fetal life, it regresses to the chest area, leaving two breast buds on the upper half of the chest. In females, columns of cells grow inward from each breast bud, becoming separate sweat glands with ducts leading to the nipple. Both male and female infants have very small breasts and experience some nipple discharge during the first few days after birth.

At birth, the breasts of men and women are the same and are not well developed much. In early puberty, the areola becomes a prominent bud, and breasts begin to fill out. In late puberty, glandular tissue and fat increase in the breast, and the areola becomes flat.

Male breasts are composed of fat, with some glandular tissue, with areolas and nipples. On the other hand, Female breasts have similar structures, but, in addition, contain glandular tissue (lobes, lobules) acini, ducts, Cooper's ligaments, and Montgomery's glands.

Early childhood to pre-puberty (Ages 0-8)

In infancy and early childhood, breast tissue is minimal and generally flat. Both boys and girls have small amounts of glandular tissue beneath the nipples due to maternal hormones transferred during pregnancy and breastfeeding, which fades within the first year. Between ages 2 and 8, breast tissue remains dormant with almost no visible development. The chest area appears flat with no significant glandular growth. At this stage, subtle internal changes begin as the body prepares for puberty without signs of budding.

Onset of puberty – thelarche (Ages 8-13)

Thelarche marks the very first sign of puberty in girls—breast budding. Around ages 8 to 13, small lumps called breast buds form under one or both nipples due to increased estrogen production stimulating glandular tissue growth. Breast buds feel like small, firm nodules beneath the nipple area & represent Tanner Stage 2. This phase can last several months to a few years as breasts gradually enlarge & change shape. During this time, girls notice tenderness or slight swelling in their breasts, indicating hormonal activity ramping up, triggering further development.

Breast growth progression (Ages 13-17)

Breasts enter a rapid growth phase spanning Tanner Stages 3 & 4. Between ages 13 to 17, glandular tissue expands significantly, fatty tissue accumulates underneath skin layers, making breasts rounder and fuller. The nipple and areola also begin to change shape, often enlarging & darkening in color due to increased blood flow & pigmentation changes influenced by hormones like estrogen & progesterone. This period is highly variable; some girls experience fast growth within months while others develop more gradually over several years. Breasts grow unevenly during this stage but even out overtime.

Maturity achieved (Ages 18+)

By late adolescence or early adulthood (around age 18+), breasts reach Tanner Stage 5—the mature adult form. At this point, breast size stabilizes though minor fluctuations can occur due to menstrual cycles, pregnancy, weight changes, or hormonal shifts. Mature breasts have fully developed lobules (milk-producing glands), ducts (channels transporting milk), fatty tissue for shape and volume, as well as connective tissue supporting structure. While most females reach full breast maturity by their late teens or early twenties, some continue subtle development into their mid-twenties depending on genetics, nutrition & health factors.[1,2,7]

Hormonal drivers behind breast development stages by age

Hormones orchestrate every step of breast growth from childhood through adulthood. Estrogen leads the charge by stimulating ductal growth and fat deposition in breast tissue. Progesterone supports lobule formation especially after ovulation begins during puberty. Growth hormone also plays an important role by promoting overall body growth including breast size increase during adolescence. The hypothalamus signals the pituitary gland to release follicle-stimulating hormone (FSH) and luteinizing hormone (LH). These hormones prompt ovaries to produce estrogen & progesterone—triggering secondary sexual characteristics like breast development.

During puberty

Estrogen causes ductal elongation and fat accumulation, Progesterone encourages lobule maturation, Prolactin, is involved in

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lactation much later, rises slightly during puberty supporting glandular growth. This intricate hormonal interplay ensures gradual, yet steady breast formation aligned with overall physical maturation.[3,8]

Common variations in breast development timing

While there's a typical age range for each stage of breast development, individual timing varies widely due to genetics, nutrition, health conditions, and environmental factors.

Breasts & body image

Adolescent and Young college girls are a potent population group vulnerable to body image disturbances. Growth and other developmental changes build consciousness towards one's appearance and these trends are evident in concerns reported by both males and females. Body image disturbances are very potent in hampering development across gender-feelings of shame, embarrassment, loneliness, & low self-esteem when confronted with a negative image.[5,6,9,10]

Body image refers to the perceptions and feelings an individual has about their physical appearance. It encompasses how we view ourselves and how we believe others perceive us. For young people, body image can be particularly volatile, influenced by various factors, including physical development, social comparisons, and external societal pressures. This concept is especially pronounced among adolescents' girls, who often face fluctuating self-esteem and identity challenges during critical developmental stages. Friends and family's comments on body images can reinforce unrealistic perceptions of being perfect. These pressures can profoundly impact an adolescent's self-esteem and self-confidence, potentially leading to anxiety, depression, and changes in daily functioning.

Overall, Indian women experience and discuss their bodies in terms of physical features they liked and disliked. Three themes that comprised body image experiences of Indian women- (a) Beautiful, thin and fair- three social imperatives for women, (b) Internalization and (c) Body image management. Each of these impacted women negatively and contributed to greater body monitoring, increased indulgence in unhealthy behaviors and heightened body dissatisfaction.

Breast size, appearance, and changes over time

The factors that influence a woman's breast size include- Volume of breast tissue, Family history, Age, Weight loss or gain, History of pregnancies, lactation, thickness & elasticity of the breast skin, degree of estrogen and progesterone hormonal influences on the breast and Menopause.

Asymmetry in breast cause of concern to many

A woman's breasts are rarely symmetrical, usually, one breast is slightly larger or smaller, higher or lower, or shaped differently than the other. The size and characteristics of the nipple also vary greater from one woman to another. In some women, the nipples are constantly erect and in others, they will only become erect when stimulated by cold or touch. Some women also have inverted nipples, which are not a cause for concern unless the condition is a new change. Since there are hair follicles around the nipple, hair on the breast is not uncommon. The color of the nipple is determined by the thinness and pigmentation of its skin. The nipple and areola contain specialized muscle fibers that respond to stimulation to make the nipple erect. The areola also houses the Montgomery's gland that appears as tiny, raised bumps on the surface of the areola, which helps lubricate the areola. When the nipple is stimulated, the muscle fibers will contract, the areola will pucker, and the nipples become hard.[7,10,11]

Breast shape and appearance concerns

Undergo several changes as a woman ages. In young women, the breast skin stretches & expands as the breasts grow, creating a round appearance. Young women tend to have denser breasts due to more glandular tissue than older women.

Histology of breasts

Histology Terminal ductal lobular unit is comprised of the extralobular terminal duct, intralobular terminal duct and ductal sinus. Cellular components are comprised of epithelial cells, myoepithelial cells, and the basement membrane. The glandular tissues of the breast house the lobules and the ducts. Toward the nipple, each duct widens to form a sac called ampulla. During lactation, the bulbs on the ends of the lobules produce milk. Once milk is produced, it is transferred through the ducts to the nipple.

Vasculature

Arteries carry oxygen rich blood from the heart to the chest wall, and the breasts and veins take de-oxygenated blood back to the heart. The axillary artery extends from the armpit and supplies the outer half of the breast with blood. The internal mammary artery extends down from neck and supplies the inner portion of the breast. Perforating branch of internal thoracic vein & Perforating branch of posterior intercostal vein, Tributaries of axillary vein are Venous Drains.

Nervous structure

Sympathetic nerves which reach via 2nd to 6th intercostal nerves Overlying skin supplied anterior & lateral branch of 4th 5th 6th intercostal nerves

Lymphatic drainage

Lymphatic drainage_is divided into 6 groups: – axillary(lateral) vein group – external mammary group (anterior or pectoral) along lower border of pectoralis minor and in relation with lateral thoracic vessels – scapular group (posterior or subscapular) along subscapular vessels – central group – apical/sub clavicular – interpectoral (Rotter's node). There are three levels of Lymphatic Drainage -Level I – lymph node located lateral to pectoralis minor (lateral axillary, external mammary, subscapular) Level II – Deep to pectoralis minor (central and interpectoral) and Level III – Medial to or above pectoralis minor (sub clavicular).

Lymph nodes consist of:

I. Axillary group
II. Pectoral group
III. Brachial group
IV. Subscapular group
V. Central group
VI. Apical group

Cycle of tenderness (COT)

During each menstrual cycle, breast tissue tends to swell from changes in the body's levels of estrogen and progesterone. The milk glands and ducts enlarge, and in turn, the breasts retain water. Therefore, during menstruation, breasts temporarily feel swollen, painful, tender, or lumpy.

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Fibrocystic breast (FCB)

FCB is a common benign breast condition related to the menstrual cycle. Some women with fibrocystic breasts experience cysts, lumpiness, areas of thickening, tenderness, or breast pain. Symptoms of fibrocystic change subside after menopause but will prolong if hormone replacement therapy is given.

Breast changes after marriage

After marriage, many women notice various changes in their bodies that can be surprising. Hormonal shifts can affect your menstrual cycle, weight, and even their skin. Many women experience emotional changes after marriage due to a new partnership, demanding adjustments in self-esteem and overall mental health. These changes are part of adapting to a new life and can include anything from irregular periods to changes in how you feel physically and emotionally. Marriage can lead to significant changes in girls' hormonal levels, often produces more oxytocin, which strengthens emotional bonds and increase feelings of happiness. Some women may encounter shifts in stress levels, mental health, and how they feel about relationship. The closeness & affection shared with her partner lead to increased production of "happy hormones" oxytocin & dopamine, contribute to feelings of happiness, love, & overall satisfaction in relationships, leading to weight gain if she is enjoying holiday feasts. After marriage, many women notice changes in their intimacy and reproductive health, related to sexual health, pregnancy, and fertility.

Sexual health post-marriage

After getting married, women notice shifts in their sexual health, including increased secretions and changes in vaginal discharge. These physical changes can enhance intimacy, making experiences fulfilling. One may also experience new sensations or increased sensitivity. Some women may have cramps during or after intimacy, especially if hormonal changes occur. Body changes, such as breast size, affect her sexual confidence.

Pregnancy and fertility:

Marriage often brings thoughts to start a family. If the couple is trying for a baby, her menstrual cycle can become irregular due to stress or lifestyle adjustments. Personality changes like some may feel more secure and confident, while others may struggle with self-doubt. These changes can affect woman's menstrual cycle, potentially leading to irregular periods or changes in bleeding patterns. Increased levels of endorphins and serotonin can provide a sense of well-being, but hormonal imbalances may also result in mood swings or other emotional changes.

Body & breast composition and appearance

Physical changes in women's bodies do occur. Many women report a change in breast size after marriage, accompanied by increased levels of estrogen, providing a fuller appearance. She might also notice changes in her hip size or body composition, due to lifestyle adjustments after marriage, including changes in diet and exercise habits. Weight gain can become more common, driven by both physical and emotional factors.

Pregnancy and breastfeeding & breast sizes

Pregnancy and breastfeeding are major factors that contribute to changes in breast size. Since breasts are composed of both glandular tissue and fat, any significant change in body weight can affect the appearance and size of the breasts. Some women may notice a slight increase in size if they gain weight, while others may experience a decrease in size if they lose weight.

Normal development of the mammary glands

The development of the mammary glands is a dynamic process that extends from puberty to menopause. This development is not linear but presents periods of increased activity related to specific hormonal events.[11]

Common symptoms of hormonal changes

A. **Premenstrual breast tenderness**: Premenstrual breast tenderness affects approximately 70% of women of reproductive age. It typically appears during the second half of the menstrual cycle. It is characterized by pain, tension, and increased sensitivity to touch. These symptoms usually resolve with the onset of menstruation.

B. **Changes in texture and density:** During the luteal phase of the cycle, many women notice that their breasts feel denser or more granular to the touch. These changes are completely normal and reflect temporary growth in glandular tissue.

C. **Breast swelling and pain**: Breast swelling occurs from fluid retention and increased (Figure 2).

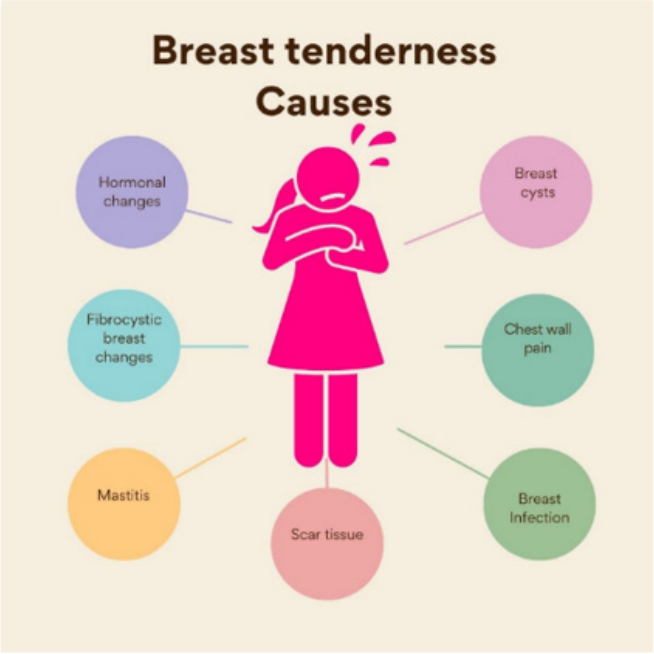

Figure 2 Breast tenderness causes.

Conditions related to hormonal changes

Fibrocystic breasts

Fibrocystic breasts represent a normal variation of breast tissue characterized by cysts and fibrous tissue. It affects up to 50% of premenopausal women.

Cyclic mastalgia

Cyclic mastalgia refers to breast pain related to the menstrual cycle. It accounts for about 75% of all cases of breast pain. This causes bras to feel tighter during certain days of the cycle.

Relationship between hormonal fluctuations and breast tenderness

Breast tenderness, often described as soreness or discomfort, is one of the most common and normal changes women experience throughout their lives. This sensation is primarily driven by hormonal fluctuations—especially changes in estrogen and progesterone levels—that occur during the menstrual cycle, pregnancy, breastfeeding, and menopause.[9]

Premenstrual breast tenderness

During the menstrual cycle, estrogen stimulates the growth of breast duct cells, while progesterone encourages the development of milk glands. These hormonal surges cause the breast tissue to swell and retain fluid, leading to a feeling of fullness, heaviness, or tenderness. About 80% of Indian women report some degree of breast tenderness in the luteal phase (i.e. two weeks before menstruation starts) This premenstrual breast tenderness is typically bilateral and symmetrical, meaning it affects both breasts equally and resolves once menstruation begins.

One must consult

a) If tenderness is persistent and does not follow your menstrual cycle

b) If it is accompanied by lumps, nipple discharge, or skin changes and

c) If it is severe & interferes with daily activities.[10]

Breast tenderness & PMS

Breast tenderness and swelling are associated with premenstrual symptoms but are not well described in healthy women. In a 1-year prospective observational study which enrolled based on two consecutive normal-length and normally ovulatory cycles by Quantitative Basal Temperature© analysis. 53 Women ages 20–41 recorded their daily breast experiences in the Menstrual Cycle Diary© across an average of 13.6 cycles. In all 720 cycles, the median breast tenderness was 1.4 (on a 0–4 scale, range 0.0–3.0), in cycles with a mean length of 28.1 days (95% CI 27.5–28.8). Comparison of breast tenderness and breast size (changes from usual) parameters between all normally ovulatory cycles and all ovulatory disturbed cycles in the whole cohort showed significantly higher levels in normally ovulatory (luteal length ≥10 days) in both Breast Tenderness Score [intensity X duration in days; 6.0 (range 1.0–14.0) vs. 3.0 (0.0–11.0) (P=.005)] and breast size [4.0 (2.0–4.0) vs. 4.0 (0.0–4.0) (P=.034]). Breast tenderness (intensity, duration, and Breast Tenderness Score), did not differ between normally ovulatory cycles and cycles with ovulatory disturbances [12]. This study demonstrated that in all ovulatory cycles, the timing of breast tenderness increased in parallel with breast swelling; the maximum for both was in the late luteal phase.[9,12,13]

Pregnancy triggered breast tenderness

Pregnancy triggers significant hormonal changes that cause breast tenderness. Elevated levels of estrogen, progesterone, and prolactin prepare the breasts for milk production, often making them feel swollen, sensitive, or even painful. This tenderness usually starts early in pregnancy and can persist through the first trimester. These changes are a natural part of the body's preparation for nurturing a baby.

Breastfeeding related breast tenderness

During puerperal or nursing period the release of oxytocin causes milk ejection, which sometimes lead to temporary breast discomfort or tenderness. Though normal, persistent or severe pain might indicate issues such as mastitis or blocked milk ducts, which require medical attention.

Menopause related Breast Tenderness

During Menopause estrogen levels decline, breast tissue often becomes less dense and fattier. Some women experience tenderness or sensitivity during transitional phase, although it tends to be less common than during reproductive years.

It's important for every girl to monitor breast health and understand one's body's unique patterns. Keeping a symptom diary can help her and her healthcare provider distinguish normal hormonal tenderness from potential warning signs.

Breast size satisfaction survey

The Breast Size Satisfaction Survey (BSSS) from a collaborative research project involving 104 scientists working across 61 research sites in 40 nations reported that nearly half of (47.5 %) of participants desired larger breasts than they currently had, 23.2 % desired smaller breasts, and 29.3 % were satisfied with their current breast size. Nations differed with a small effect size in the proportions of participants desiring larger breasts (lowest: Pakistan, highest: China), desiring smaller breasts (lowest: Colombia, highest: Pakistan). Research has demonstrated preferences for medium and large breasts and a tendency to associate positive attributes with larger breasts. Males perceive a medium breast size, more favorable, whereas females were generally not influenced by breast size.[5]

In contemporary cultural imagery, "female breasts are not celebrated or scrutinized for what they do, but for how they are supposed to look". In addition to de-coupling breasts for their child-feeding functional purposes, contemporary popular culture also ties large breasts to conceptions of womanhood, have become a defining characteristic of femininity. Some non-Western communities construe large breasts as problematic, either because they are perceived as a cause of disease or being large-breasted is associated with hypersexuality and narcissism.

Breast cancer & fatty diet or dense breasts

The relationship between breast cancer (BC) and total dietary & types of fat is well-established. Breast density is not just a risk factor for developing breast cancer, but also for having it go undetected until it is more advanced. Breast density refers to the proportions of glandular and connective tissue compared to fatty tissue in the breast, as seen on a mammogram. Dense breasts have more glandular and fibrous tissue and less fat. On a mammogram, both dense tissue and tumors appear white, making it harder to detect abnormalities in women with dense breasts. This masking effect can lead to cancers being missed during routine screening.[10]

These results indicate that breast size dissatisfaction is a global public health concern linked to women's psychological and physical well-being.[14]

Conclusion

Biological, environmental, and cultural aspects influence breast morphology. The factors that influence a woman's breast size include-Volume of breast tissue, Family history, Age, Weight loss or gain, History of pregnancies, lactation, thickness & elasticity of the breast skin, degree of estrogen and progesterone hormonal influences on the breast and Menopause.

Estrogen and progesterone are crucial for breast development, governing growth patterns during puberty and pregnancy. Prolactin

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further supports tissue growth, while insulin contributes to breast size by influencing fat storage.

Breast size and shape undergo significant transformations throughout different life stages, notably during puberty, the menstrual cycle, pregnancy, and menopause. Factors such as diet, exercise, and exposure to endocrine disruptors can alter hormonal balance, impacting breast health and size. In contemporary cultural imagery, "female breasts are not celebrated or scrutinized for what they do, but for how they are supposed to look". Instead of de-coupling breasts for their child-feeding functional purposes, contemporary popular culture ties large breasts to womanhood, and defines as characteristic of femininity. Research indicates that breast size dissatisfaction and asymmetry are a global public health concern linked to women's psychological and physical well-being.

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Conflict of interest

The autor declares that conflicts of interest do not exist.

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