Subfertility

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Subfertility is defined as the involuntary failure of a couple conceive after 12 months of unprotected intercourse. However, previous old definitions considered 24 months of unprotected intercourse.

Fecundability is the probability of being pregnant in a single menstrual cycle, and fecundity is the probability of achieving a live birth within a single cycle.
subfertility in a couple may be

primary in couples that have never conceived together

secondary in couples that have previously conceived together

There is of course a cumulative increase in pregnancy rates over time as couples try for conception. Within 6 months 70% of couples will have conceived, after 12 months 80% and after 24 months 90% of couples will achieve a pregnancy
factor affecting fertility

1- The most important factor affecting fertility is female age, which is related to a decline in the quality and quantity of eggs (tends to fall sharply over the age of 36, with a further dip after the age of 40.)

2- But tends to fall in men over the age of 50, while frequency of intercourse tends to fall in men over the age of 40.

3- Both frequency and timing of intercourse

Eggs are thought to be fertilizable for about 12–24 hours postovulation
sperm can survive in the female reproductive tract for up to 72 hours
Ovulation usually occurs about 14 days prior to menstruation, with the luteal phase being relatively stable at this length
factor affecting fertility

External factors may influence the chance of conception

1- smoking can decrease the quality and quantity of eggs and sperm.

2- alcohol and caffeine

3- Body mass index (BMI)

4- Stress can have a direct influence on the hypothalamic–pituitary–ovarian (HPO) axis, interfering with regular ovulation and reducing libido and frequency of intercourse.
Causes of subfertility

1. male factor, 30%
2. female factor, 30%
3. unexplained, 25%
4. both male and female, 15%
Figure 7.2 Causes of subfertility.
Female subfertility

1- Ovulatory disorders,
2- tubal damage and
3- uterine disorders
4- others

(diabetes, epilepsy, thyroid disorders and bowel disease, Cigarette smoking, age >37, malnutrition/obesity or underweight, no previous pregnancy)
Ovulatory disorders, rise due to defect in hypothalamus, pituitary or the ovary. The commonest cause of problems with ovulation is **polycystic ovary syndrome** (PCOS).

PCOS causes subfertility in up to 75% of women. = (HA-IR-AN SYNDROM)
hyperandrogenism (HA) . insulin resistance (IR) and acanthosis nigricans (AN)

1. What is Polycystic Ovarian Syndrome (PCOS)?

Is a syndrome of ovarian dysfunction along with the cardinal features of hyperandrogenism and polycystic ovary morphology.

2. What causes PCOS?

Genetics
Environment[]
Polycystic ovaries develop when the ovaries are stimulated to produce excessive amounts of androgenic hormones, in particular testosterone, by either one or a combination of the following (almost certainly combined with genetic susceptibility):[29]

1- the release of excessive luteinizing hormone (LH) by the anterior pituitary gland[43]

2- through high levels of insulin in the blood (hyperinsulinaemia) in women whose ovaries are sensitive to this stimulus

A majority of women with PCOS have insulin resistance and/or are obese

Hyperinsulinemia increases GnRH pulse frequency, LH over FSH dominance, increased ovarian androgen production, decreased follicular maturation, and decreased SHBG binding

Adipose tissue possesses aromatase, an enzyme that converts androstenedione to estrone and testosterone to estradiol. The excess of adipose tissue in obese women creates the paradox of having both excess androgens (which are responsible for hirsutism and virilization) and estrogens (which inhibits FSH via negative feedback)
How can I tell if I have PCOS?

Because their bodies are producing more male hormones, women with PCOS tend to have irregular menstrual cycles (heavy period), or even stop menstruating altogether.

They also tend to grow more facial and body hair in patterns and places similar to male hair growth, and may also have ongoing issues with acne. At the same time, women with PCOS may experience thinning hair on their scalp, similar to male pattern baldness.

Weight gain also appears to be a factor in PCOS. Women with PCOS may find it difficult to manage their weight.

Pelvic pain, difficulty getting pregnant, patches of thick darker velvety skin
diagnosis of PCOS;

HISTORY, physical exam, ultrasound, and/or blood testing (SHBG).

diagnose PCOS;

Based on the Rotterdam criteria, which requires two of the following three finding;

1) oligo/anovulation,
2) hyperandrogenism (clinically or biochemically)
3) polycystic ovaries on ultrasound\(^5\) \((>= 12\text{ peripheral cyst})\)
Differential diagnosis

1- hypothyroidism,
2- congenital adrenal hyperplasia (21-hydroxylase deficiency),
3- Cushing's syndrome,
4- hyperprolactinemia,
5- androgen secreting neoplasms,
6- other pituitary or adrenal disorders, should be investigated
Management

• The primary treatments for PCOS include: lifestyle changes (DIET) and medications.\textsuperscript{[75]}

• Goals of treatment may be considered under four categories:
  • Lowering of insulin resistance levels
  • Restoration of fertility
  • Treatment of hirsutism or acne
  • Restoration of regular menstruation, and prevention of endometrial hyperplasia and endometrial cancer
infertility:
   Clomiphene
   Metformin

Irregular bleeding:
   Progestin
   OCPs

Hirsutism:
   OCPs
Premature ovarian failure (POF) is the loss of function of the ovaries before age 40.\[^2\]

A commonly cited triad for the diagnosis is amenorrhea, hypergonadotropism, and hypoestrogenism.

If it has a genetic cause, it may be called gonadal dysgenesis.\[^3\]

Acquired from damage by viruses and toxin, pelvic surgery, irradiation, autoimmune.
Tubal problems
Impaird oocyte pick up mechanism by fimbriae or damaged tubal epithelium.

Tubal damage:

1- pelvic inflammatory disease (PID), pelvic infection

2- endometriosis.

3- Previous pelvic or abdominal surgery can result in postoperative scar tissue or adhesions

STD’s:

Chlamydial infections
Gonocci
uterine disorders

Uterine factors such as fibroids can interfere with fertility, but their impact depends on their size and location. There is good evidence that submucosal fibroids have a direct impact on embryo implantation and intramural fibroids may reduce fertility if they are large (>5 cm).

Subserosal fibroids have very little impact if present in isolation. Endometrial polyps can reduce the chance of implantation, although this tends not to be absolute.

Endometrial scarring (Asherman’s syndrome) from surgery or infection can be associated with lighter periods and a significantly reduced chance of conception.
Male factor

Male factor Compromised sperm number or quality is an important contributor to subfertility.

There is some evidence that sperm counts are falling, and there are various theories that try to explain this, including environmental and dietary issues.

Spermatogonial cells that produce the sperm can be damaged by inflammation (orchitis) or the epididymis that stores mature sperm can also be damaged.

Certain iatrogenic influences such as pelvic radiotherapy or surgery for undescended or torted testes can reduce sperm production or damage or block the male reproductive tract.

Medical conditions such as diabetes and certain occupations involving contact with chemicals or radiation are associated with male factor subfertility. Occasionally, sperm production may be normal but there are erectile difficulties or problems with ejaculation.
Genetic causes of male factor infertility include aneuploidy of sex chromosomes (Klinefelter XXY most commonly) or structural abnormalities of the autosomes, such as inversions, deletions or balanced translocations. Microdeletions of the azoospermic factor (AZF) regions of the Y chromosome are associated with low sperm counts and motility.

Semen quality is a measure of the ability of semen to accomplish fertilization. Thus, it is a measure of fertility in a man. It is the sperm in the semen that is of importance. Semen quality involves both sperm quantity and quality. Decreased semen quality is a major factor of male infertility.
### WHO criteria for Semen Analysis

<table>
<thead>
<tr>
<th>Semen Analysis</th>
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<tbody>
<tr>
<td>Volume</td>
<td>2–5 ml</td>
</tr>
<tr>
<td>Liquefaction time</td>
<td>Within 30 minutes</td>
</tr>
<tr>
<td>Sperm Concentration</td>
<td>20 Million/ml</td>
</tr>
<tr>
<td>Sperm Motility</td>
<td>&gt;50% progressive motility</td>
</tr>
<tr>
<td>Sperm Morphology</td>
<td>&gt;30% normal forms</td>
</tr>
<tr>
<td>White Blood Cells</td>
<td>&lt;1 million/ml</td>
</tr>
<tr>
<td>WHO classification of Semen Variables</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------------------------</td>
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</tr>
<tr>
<td>Normozoospermia</td>
<td>Normal ejaculate</td>
</tr>
<tr>
<td>Oligozoospermia</td>
<td>Sperm concentration fewer than 20x10^6/ml.</td>
</tr>
<tr>
<td>Asthenozoospermia</td>
<td>Less than the normal value for motility.</td>
</tr>
<tr>
<td>Teratozoospermia</td>
<td>Fewer than 30% spermatozoa with normal morphology</td>
</tr>
<tr>
<td>Oligoasthenoterato–zoospermia</td>
<td>Signifies disturbance of all three variables.</td>
</tr>
<tr>
<td>Azoospermia</td>
<td>No spermatozoa in the ejaculate</td>
</tr>
<tr>
<td>Aspermia</td>
<td>No ejaculate</td>
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Unexplained Subfertility

- In these cases abnormalities are likely to be present but not detected by current methods.

- Egg is not released at the optimum time for fertilization, that it may not enter the fallopian tube, sperm may not be able to reach the egg, fertilization may fail to occur, transport of the zygote may be disturbed, or implantation fails.

- It is increasingly recognized that egg quality is of critical importance and women of advanced maternal age have eggs of reduced capacity for normal and successful fertilization.
THANK U