CHAPTER - V

REPRODUCTIVE PERFORMANCES
IN MALE INFERTILITY
Childlessness may result from recurrent abortion and still birth but the commonest cause is a failure to conceive, it is latter part of the problem which forms the subject of this chapter.

Fertility as a relative rather than an absolute state, and comparatively few individuals are sterile or fully fertile. The infertility can affect either the male or the female partner in a marriage. The fertility of marriage is the sum of the fertilities of both the partners. The low fertility in one can to some extent be balanced by high fertility in the other, whereas the low fertility in both partners may result in sterility. This explains why some couples fail to reproduce, yet, when they separate, and each takes a new partner or male, they both proceed to have children.

Childlessness is generally a tragedy to the married woman and she is often blamed but 40 per cent of the husbands concerned can be seen by semen analysis to have been to some degree either infertile or subfertile. In only 40 per cent however, is the male
partner entirely responsible. It is therefore desirable to treat male infertility or subfertility under separate headings.

The history of treatment of male infertility is a recent one. Since time immemorial the wife has always been blamed for infertility. Failure to find sperms in a post-coital test by Menon op.cit. Hunter in 1913 raised the possibility that the husband could also be responsible for infertility. Since then, the available statistics from various infertile clinics show that the husband is equally responsible for infertility, totally, or partially in 40-50 per cent of infertile couple, Menon et al. 1983. This realisation also gives an idea of the magnitude of the problem. A study of various aspects of male infertility thus becomes mandatory. Hence sterility in husband is believed to be responsible for the infertility of approximately one-half of all the childless marriages. The cause is usually defective development of germinal epithelium in the seminiferous tubules, with oligospermia or azoospermia, but may also follow hypogonadism due to any of the causes written above. Antibodies to sperm may explain a small number of cases, as sperm when following unilateral blockage of the vas deferens, may induce antibody formation and constitute to sterility.

An abnormality in male can be defined in a third
of couples presenting with infertility. Often a seminal analysis with abnormal results is the reason for referral since it is now most common practice for gynaecologists to obtain a specimen of semen from the male partner during initial assessment of sterility problem. Indeed one cannot stress too strongly that the couple and not the individual presents the problem. Although at later stages on full investigations it could be concluded either the male or the female is imparted with the abnormality. Not very frequently however, the incidence of sterility could be detected in both also.

It has been said that it is possible to estimate the age of the man by the gross and microscopic examination of his prostate, Brainerd et al. 1962. By the end of the fourth decade changes can be detected. This change may be divided into presenile and senile periods. In the presenile period, from the age of forty to sixty years, variations of the same nature can be detected in different parts. In the senile period over the age of sixty years, most of the organs become diffusely involved.

Two stages are evident in the development of the reproductive system, whether it being in a male or female, the first being the maturation of different gonads into testis or ovaries, as the case may be, and secondly the development of the genital ducts and external genitalia along the male and female lines. The develop-
ment of gonads is alike until the second month of gestation, but the subsequent event finally depends on the sex chromosomes.

During the later part of foetal life the testis descends from the posterior abdominal wall through the iliac fossa and inguinal canal to reach the scrotum at or shortly after the birth. They are composed of two most distinct elements; the seminiferous tubules and the interstitial or leyding cells. On the basis of these two elements the testis primarily performs two distinct functions, the production of spermatozoa and the elaboration of hormones, the former happens in the seminiferous tubules and the latter are synthesized principally by leyding cells.

It takes approximately 70 days for the stem cell to develop into mature spermatozoa. This process is controlled by follicle stimulating hormone and testosterone formed by both leyding cells and sertoli cells. Millions of these small seminiferous tubules are believed to be nutrient in the function of spermatogenesis, Weatherall et al. 1983.

AETIOLOGICAL FACTORS

There is a wide range of etiological factors that can be the cause of infertility in men.
1. **Congenital anomalies**

   (i) Cryptorchidism bilateral undescended testis in adults is unvariably associated with sterility, intra-abdominal testis retain their ability to produce androgens but are unable to produce sperms, due to intra-abdominal heat.

   (ii) Extreme degrees of epispadias and hypopadias are associated with sterility due to failure to deposit semen high up in vagina.

   (iii) Bilateral congenital absence of vas deferens, congenital hypoplasia and multiple cystic disease of epididymis cause obstructive azoospermia.

2. **Trauma**

   During surgery for hernia or hydrocele, vas deferens, epididymis or their blood vessels get injured. Vas-ecotomy performed for family planning causes secondary sterility.

3. **Physical Agents**

   (i) **Heat**: Various experimental evidence supports the clinical observations that heat can depress spermatogenesis. Hyperpyrexia due to various infections brings about temporary depression of the sperm count, wearing tight underwears particularly the traditional, 'langot' raises
the temperature of scrotum causing subfertility.

(ii) Radiation: Radiations, like X-rays, effects testis specially in the process spermatogenesis adversely.

4. Chemical Agents

Certain drugs like Nitrofurantoin, anti-cancer drugs and antidepressants are known to depress spermatogenesis.

5. Injections

(i) Mumps in adult life can affect spermatogenesis adversely. In extreme cases it can produce azoospermia or necrozoospermia.

(ii) Gonococcal may produce obstructions in genital tract, it may also be responsible for pus cells in the semen, hypomotility of sperms, increased viscosity and oligozoospermia.

(iii) Tuberculosis of the genital tract often involves the prostate and seminal vesicle. It also produces multiple obstructions in the epididymis and vas deferens. These lesions are bilateral and are responsible for severe oligozoospermia or azoospermia.
(iv) **Small pox** is the commonest cause of obstructive azoospermia in our country, and accounts for 40 per cent of these obstructions which is often located at epididymis.

(v) **Syphilis** does not produce sterility in men except in the tertiary stage when syphilitic orchitis results.

(vi) **Filariasis**: Spermatogenesis is adversely affected in the late stages of filarial involvement of testis and scrotum, surgery fail to bring about improvement in semen quality.

6. **Endocrine disorders**

(i) **Pituitary**: In pituitary hypogonadism, the testes are small and atropic, yet many men remain potent.

(ii) **Thyroid**: marked thyroid dysfunction can bring adverse affect in spermatogenesis.

(iii) **Adrenal**: A small percentage of men suffering from oligozoospermia have sub-clinical adreno-genital syndrome.

7. **Genetic disorders**

Genetic disorders have been dealt separately in a Chapter VII.
8. **Nutritional deficiencies**

Extreme deficiencies of Vitamin A and E have been shown to cause sterility. Excessive alcoholism consumption is related to decrease in libido and oligozoospermia, secondary to liver damage.

9. **Vascular pathology**

Torsion of the testis generally leads to testicular atrophy.

There is always a cause for infertility and the frequency with which this is found depends to some extent on the thoroughness of the search. In many cases, however, several adverse factors are operative and if these are distributed between partners it may become possible for better perspectives. About 50 per cent of subfertile males can be revealed of complications by examination of the genitalia, while, in others it can only be revealed by semen analysis.

During the semen analysis done in hospitals and clinics the total sperm count is not of too great importance. The significance of the number of epithelial cells and leukocytes present in it is of relevance, although absolute criteria of male fertility cannot be obtained with the semen evaluation, yet the following standards are to be considered. Of all the characteristics of semen which can be studied, the essential ones
are (1) Volume of fluid; (2) Number of spermatozoa; 
(3) Motility of spermatozoa; (4) Morphology of spermato-
zoa, Jeffcoate 1983 (Table 5.1).

Immature forms of spermatozoa are ranked as 
morphologically abnormal. Any one of the specimen is 
assessed by considering these feature in relation to 
each other, Jeffcoate 1983.

Semen analysis supplies considerably useful 
information. A properly performed semen normally covers 
following features; Menon et al. 1983.

(i) **Volume**: It varies from 2 to 5 ml in a normal 
person. Less than 2 ml decreases the concentration 
of sperms, and if the volume exceeds 5 ml, hyper-
spermia, then the sperm density in the semen decreases.

(ii) **Viscosity**: Excessive viscosity can be due to 
presence of infection, lack of amylase or some 
unknown factor.

(iii) **Sperm count**: Average sperm count in a good 
specimen varies from 60 million to 15 million.

(iv) **Motility**: At least 50 per cent of sperms should 
be motile when examined within first 2 hours after 
ejaculation. It is expressed in grades ranging 
from 0 to 4. Grades 1, 2, 3, 4 denote poor, fair, 
good and excellent motility respectively.
### Table 5.1

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Good fertility</th>
<th>Moderate fertility</th>
<th>Low fertility</th>
<th>Very low fertility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of fluid (ml)</td>
<td>2 - 5</td>
<td>1 - 2</td>
<td>0.5 - 1</td>
<td>&lt; 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; 8.0</td>
<td></td>
</tr>
<tr>
<td>Number of sperm per ce</td>
<td>&gt;60 million</td>
<td>&gt;30 million</td>
<td>&lt;30 million</td>
<td>&lt;10 million</td>
</tr>
<tr>
<td>Motility at 6-8 hours (per cent)</td>
<td>&gt;40</td>
<td>&gt;30</td>
<td>&lt;30</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Normal morphology of the head, body and tail (per cent)</td>
<td>80</td>
<td>50</td>
<td>&lt;50</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

Sir Norman Jeffcoate 1983.
(v) **Abnormal factors**: Every semen sample contains varying percentage of abnormal sperms. If the percentage exceeds 50 per cent, conception becomes difficult.

(vi) **Fructose**: Fructose is secreted exclusively by seminal vesicles. Thus absence of fructose in the semen denotes congenital hypoplasia or pathological destruction of the seminal vesicles, bilateral absence of the vas deferens or ejaculatory duct obstruction.

(vii) **Pus cells**: Presence of pus cells in the semen indicates infection in the genital tract.

(viii) **Precursor cells**: Precursor cells (spermatids) often gets exfoliated in seminiferous tubules and appear like semen. Menon et al. 1983.

**Abnormality in the Male Individuals on the Basis of Semen Analysis**

Males who are ascertained to be infertile on the basis of their abnormal semen analysis are as follows:

**Azoospermia** lack of spermatozoas in the semen or in another words the spermatozoas are totally absent.

**Oligozoospermia**: less than average number of sperms, which ranges from an occasional sperm to 60 million sperms per ml.
Oligospermia small amount of sperms present in the ejaculation, a density usually below 40 million/cc, or low volume of semen, less than 2 ml.

Asthenospermia is reduction of vitality of spermatozoas or poor motility of sperms.

Necrozoospermia: All sperms are dead on ejaculation.

Haemospermia: Presence of blood in the semen.

Impotence: Inability of perform intercourse.

Infertility: Inability to procreate.

The terms infertile and impotent are not synonymous. Majority of men who are infertile are potent.

It becomes quite obvious from the above descriptions that males suffering from azoospermia are unable to bear offspring as they are totally infertile, while oligospermia male are subfertile hence 50 per cent chances are there.

The present chapter deals with 133 clinically diagnosed infertile male individuals. The diagnosed variabilities which left certain individuals for the effective treatment were not actually taken into consideration and these male individuals were 21 in number.
Infertility in males could be due to many reasons. It is evident from table 5.2, the different causes due to which a male remains affected, they have been categorised in the table. In order to understand the distribution amongst males, the nature of infection, the maximum and minimum percentage frequency has been insighted. The maximum percentage frequency has been observed in the infertile males due to infection at the age groups 26 to 30 and 31 to 35 years, this frequency decreases to a minimum percentage value of 0.75 at the age of 36 and 40 years. At the earlier stages of life the infection is more frequently found as compared to later years, normally due to unhygienic conditions and malnutrition.

Malnutrition remains also responsible for causing infertility in males. This fact remains evident from the table 5.2 where the maximum percentage frequency was observed, in the present work, amongst the age groups 26 to 30 and 31 to 40 years of age. Slightly lesser frequency was observed at the earlier age. The nutritional deficiencies due to vitamin A and E causes sterility, or excessive alcohol consumption could cause decrease in libido and oligozoospermia secondary to liver damage. Hence it can be deduced from the table that there is a definite association between nutritional deficiency and infertility.
### Table 5.2

**Infertility in Male Individuals**

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Congenital anomalies &amp; Genetic disorder</th>
<th>Trauma &amp; Traumatic</th>
<th>Physical &amp; Chemical agent</th>
<th>Infections</th>
<th>Endocrine agents</th>
<th>Nutritional deficiency</th>
<th>Vascular Pathology</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 25</td>
<td>2</td>
<td>1.50</td>
<td>2</td>
<td>1.50</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1.50</td>
</tr>
<tr>
<td>26 to 30</td>
<td>1</td>
<td>0.75</td>
<td>3</td>
<td>2.26</td>
<td>-</td>
<td>-</td>
<td>12</td>
<td>9.02</td>
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<tr>
<td>31 to 35</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>11</td>
<td>8.27</td>
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<tr>
<td>36 to 40</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1.50</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0.75</td>
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<td>41 and above</td>
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</table>

**Total**       | 133     | 100.00
The affected conditions of congenital anomalies and genetic disorder causes infertility in male individuals which was observed of the total male infertile, to be affected by this condition, a very clear picture can be observed from the table 5.2. At the age group of 20 to 25 years the percentage frequency was higher for this anomaly, while only one individual was observed between the age group 26 to 30 years.

Considering the infertility in males due to trauma and traumatic conditions a few individuals were observed at different age groups. In the present work between the age group 26 to 30 years maximum percentage frequency of 2.26 was observed. Similar percentage frequency of 1.50 was observed between the age groups 20 to 25 years and 36 to 40 years. During surgery for hernia or hydrocele if a vas deferens is damaged an individual becomes infertile, these conditions in a person could be observed at any age.

Causes of male infertility due to infection has been elaborately dealt in table 5.3. It is evident from the table that maximum percentage frequency at the age group 26 to 30 years for Gonoccocal and Syphilis is observed. Minimum percentage frequency of 3.76 was observed between the age group 31 to 35 years, and the least percentage frequency of this trait was noticed between 20 to 25 years of age.
Table 5.3

Male Infertility Due to Infection

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Mumps</th>
<th>Gonococcal &amp; Syphilis</th>
<th>Tuberculosis</th>
<th>Small Pox</th>
<th>Filarisis</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 25</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1.50</td>
<td>-</td>
<td>-</td>
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<tr>
<td>26 to 30</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>5.26</td>
<td>5</td>
<td>3.76</td>
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<tr>
<td>31 to 35</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>3.76</td>
<td>6</td>
<td>4.51</td>
</tr>
<tr>
<td>36 to 40</td>
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<td>-</td>
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<td>1</td>
<td>0.75</td>
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<td>41 and above</td>
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<td>Total</td>
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</table>
The condition of gonoccocal and syphilis may be responsible for pus cells in semen or oligozoospermic condition in the male of these individuals, who live in a very unhygienic conditions and these being venereal diseases remains to affect both the individuals, male as well as the female, if any one, of the two carry it.

Infertility due to infection of tuberculosis is quite prevalent in this part of country on account of Bidi industry. Maximum percentage frequency was observed between the age group 31 to 35 years, the least percentage frequency of 0.75 was observed at the age of 36 to 40 years in the present work. Between the age group 26 to 30 years a percentage frequency of 5.26 was observed.

Cause of infertility due to tuberculosis could be on account of multiple obstructions in the epididymis and vas deferens. If the lesions are bilateral it remains exceedingly responsible for severe oligozoospermia or azoospermia (Table 5.3).

Infertility in males due to genetic disorder or congenital anomalies was observed in three individuals. Genetic disorder causing infertility or subfertility in males due to sperm defect azoospermia or oligospermia respectively, has been dealt in further chapter.
Minimum percentage frequency of 0.75 was observed in only one individual between the age 20 to 25 years who was suffering from cryptorchidism a congenital anomaly due to bilateral undescended testis, which can be normally rectified by surgery, unless, it prevails in an individual, it, remains to be a cause of infertility (Table 5.4).

Semen analysis of infertile male individuals done for clinical diagnosis was to be brought under consideration. Defects in sperm usually makes an individual infertile. Table 5.5 gives the detailed type of semen analysis which is normally performed by the physicians (pathologists). Oligozoospermia and azoospermia caused due to infection of venereal diseases and tuberculosis was not considered for in the table, but other than them, male individuals who were infertile or subfertile due genetic variabilities was taken a note of. Equal percentage frequency of 0.75 was observed between 20 to 25 and 26 to 30 years of age. Genetic variabilities causing infertility and subfertility in the present sample has been discussed in further chapter.
## Table 5.4

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Cryptorchidism</th>
<th>Extreme degree of Epispadias and Hypopadias</th>
<th>Bilateral Congenital of Vas deferens etc.</th>
<th>Genetic disorder</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 25</td>
<td>1</td>
<td>0.75</td>
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<td>26 to 30</td>
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<td>36 to 40</td>
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<td>41 and above</td>
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<td><strong>Total</strong></td>
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</tr>
<tr>
<td>Age in years</td>
<td>Azoospermia</td>
<td>Oligozoospermia</td>
<td>Aspermia</td>
<td>Oligospermia</td>
<td>Asthenospermia</td>
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<td>20 to 25</td>
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<td>0.75</td>
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<td>26 to 30</td>
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<td>31 to 35</td>
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<td>41 and above</td>
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<tr>
<td>Not affected</td>
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<td>Total</td>
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</table>
Male individuals suffering from trauma and infection of venereal diseases were not considered for karyotyping. These conditions, as has been mentioned in text, are the cause for male infertility.

Semen analysis of the individuals suffering from tuberculosis and nutritional deficiency whether azoospermic or oligospermic has not been mentioned in table 5.4, as, these conditions do cause variations in the semen, which becomes a cause for infertility in males. The analysis mentioned here are of the individuals other than these infections.

The selected 112, individuals, no doubt were, a few suffering from tuberculosis and nutritional deficiencies, were taken for karyotyping with an idea, whether or not they showed any variability in their chromosomal abnormalities.
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Novak Edmund (1971); Novak's Gynaecology and Obstetric Pathology with Clinical Endocrine Relations, p. 660-661.