



# Aetiology of Infertility: An Epidemiological Study

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## ABSTRACT

**Introduction:** In a social set-up as existing in Indian subcontinent, with a strong emphasis on child-bearing; infertility manifests as a condition with psychological, economic and medical implications resulting in trauma and stress.

Rates of infertility varied widely among the different states of India viz. 3.7 per cent in Uttar Pradesh, Himachal Pradesh and Maharashtra, to 5 per cent in Andhra Pradesh, and 15 per cent in Kashmir.

As infertility plays vital role in post marital life, the present study is aimed at identifying aetiology of infertility with special reference to genital tuberculosis as a causative.

**Methods:** Data obtained from patients visiting OPD related to detailed history, clinical examination and records of previous investigations were considered for analysis.

**Results:** In more than half of the infertility cases, duration of marriage was less than five years. Ovarian & tubal factors together constitute 46.20% pitted against all other factors. Amongst male aetiological factors, sperm-cervical mucus anti-sperm antibody factor was the top contributor in the whole list i.e. 59.67% while remaining 40.33% other defects in seminology were responsible. Role of genital tuberculosis as a cause of infertility should be kept in mind especially in endemic zones.

**Conclusion:** The present study highlights the fact that male factors contribute predominantly for infertility though females are often blamed and are at the receiving end in this region.

**Keywords:** Infertility, epidemiology, aetiology

## INTRODUCTION

As infertility plays vital role in post marital life of Indian ladies, the present study is aimed at identifying aetiology of infertility with special reference to genital tuberculosis as a causative.

Beyond twelve or more months of regular unprotected sexual intercourse, if couple is unable to achieve the clinical pregnancy then it is termed as infertility, a disease of reproductive system according to the International Committee for Monitoring Assisted Reproductive Technology & World Health Organization (WHO).<sup>1</sup> In a social set-up as existing in Indian subcontinent, with a strong emphasis on child-bearing; infertil-

ity manifests as a condition with psychological, economic and medical implications resulting in trauma and stress.<sup>2</sup>

Infertility is categorised as primary and secondary infertility and operational definition, put forth by the WHO, defines primary infertility as the "When a woman is unable to ever bear a child, either due to the inability to become pregnant or the inability to carry a pregnancy to a live birth she would be classified as having primary infertility. Thus women whose pregnancy spontaneously miscarries, or whose pregnancy results in a still born child, without ever having had a live birth would present with primarily infertility.<sup>3</sup> Secondary infertility refers to the inability to conceive following a previous pregnancy.<sup>3</sup>

Globally, most infertile couples suffer from primary infertility.<sup>4</sup>The incidence of infertility in any community varies between 5 and 15 %.<sup>5</sup> The overall prevalence of primary infertility ranges between 3.9% and 16.8%.<sup>6</sup>

In some parts of the globe including South Asia, sub-Saharan Africa, the Middle East and North Africa, Central and Eastern Europe and Central Asia, the rates of infertility reach up to 30 %.<sup>7</sup> Infertility is estimated to affect as many as 186 million people worldwide.<sup>7</sup>

Rates of infertility varied widely among the different states of India viz. 3.7 per cent in Uttar Pradesh, Himachal Pradesh and Maharashtra, to 5 per cent in Andhra Pradesh, and 15 per cent in Kashmir.<sup>8</sup>

The aetiology of infertility can be grouped into male factors and female factors. In over 25% of infertility cases, no detectable cause can be traced after routine tests, which leaves the case as unexplained infertility.<sup>2</sup>

The role of laparoscopy in the diagnosis of primary and secondary infertility is established beyond any doubt.<sup>8</sup> In the assessment of tubal and peritoneal factors leading to infertility, laparoscopy is an initial diagnostic procedure. Laparoscopy is a valuable procedure to obtain tissue for histo-pathological examination, or for mycobacterial culture and PCR.<sup>9</sup> In many cases of genital tuberculosis abnormal findings were seen in fallopian tubes.

TB directly and / or indirectly affects female reproductive health and Genital tuberculosis is an important cause of sub fertility, especially in endemic zones such as South India. Because of lack of highly sensitive and specific tests the true epidemiology of this disease remains unknown. Genital tuberculosis not only causes tubal obstruction and dysfunction but also impairs implantation due to endometrial involvement and ovulatory failure from ovarian involvement.<sup>10</sup>

In India, infertility manifests as social problem where the females and not the males are solely held responsible for this lifetime problem of having no child.<sup>11</sup>

## MATERIALS &METHODS

For a period of one year i.e,from January to December 2003 all patients of infertility visiting the Obs & Gynae OPD from 8.00am to 2.30 pm of an established tertiary care hospital of repute in Punjab state of Northern India were subjected to a pretested proforma, the proforma was put to validation by first the internal experts of the de-

partment followed by the research committee of the institution. Data related to detailed history, clinical examination & records of investigations were considered for analysis. As all cases of infertility, consecutively were included for the duration of study period of one year (248 infertility cases out of 8548 cases reported to Gynaecology OPD) sample size calculation was irrelevant. The results of study were statistically interpreted to infer.

## RESULTS

Present study highlighted the sincerity with which, affected have sought early medical help and intervention as cases reported under-five years make up the bulk of reported infertile couples. Statistically significant association of infertility with duration of marriage was observed. The present study has thrown light on the fact that, while female factors were responsible for a meagre quarter of cases; the other quarter both male & female factors were responsible. Strikingly male factors alone were contributing to half of the cases of infertility.

**Table 1: Distribution of infertility according to duration of marriage**

Age	Primary infertility	Secondary Infertility	Total cases
0-5 years	111 (64.17)	24 (32.00)	135 (54.43)
6-10 years	32 (18.50)	27 (36.00)	59 (23.79)
11-15 years	22 (12.70)	17 (22.67)	39 (15.73)
16-20 years	7 (4.05)	5 (6.67)	12 (4.84)
21-25 years	1 (0.58)	2 (2.66)	3 (1.21)

**Table 2: Distribution of infertility cases by aetiological factors (gender-wise)**

Aetiological factors	Primary infertility	Secondary infertility	Combined
Female factors	44 (25.43)	20 (26.67)	64 (25.80)
Male factors	89 (51.45)	35 (46.66)	124 (50.00)
Both male & female factors	40 (23.12)	20 (26.67)	60 (24.20)

**Table 3: Distribution of female aetiological factors**

Aetiological Factors	Primary infertility	Secondary infertility	Total
*Tubal	17 (13.28)	29 (51.79)	46 (25.00)
*Ovarian	34 (25.56)	5 (8.92)	39 (21.20)
Uterine	20 (15.63)	8 (14.29)	28 (15.21)
Genital tuberculosis	17 (13.28)	7 (12.50)	24 (13.04)
Infections of lower genital tract	12 (9.38)	4 (7.14)	16 (8.70)
Cervical	10 (7.81)	2 (3.57)	12 (6.52)
Endometriosis	10 (7.81)	1 (1.79)	11 (5.98)
Thyroid/others	8 (6.25)	0 (0.0)	8 (4.35)
Total	128 (100)	56 (100)	184 (100)

\*p<0.05, significant

**Table 4: Distribution of male aetiological factors in relation to infertility**

Type of defect	Primary infertility	Secondary infertility	Total
Sperm cervical mucus antisperm antibody factor	48 (57.14)	26 (65)	74(59.67)
Asthenospermia	16 (19.05)	6 (15)	22(17.75)
Oligospermia	12 (14.29)	1 (2.50)	13(10.48)
Azoospermia	6 (7.14)	4 (10)	10 (8.07)
Oligoasthenospermia	2 (2.38)	3 (7.5)	5 (4.03)
Total	84 (100)	40 (100)	124 (100)

**Table 5: Findings of diagnostic laparoscopy of primary and secondary infertility cases**

Infertility	Normal	Abnormal
Primary Infertility		
Ovaries	41.02%	58.98%
Uterus	79.48%	20.52%
Fallopian tubes	61.53%	38.46%
Spill	64.10%	35.90%
Endometriosis	84.61%	15.39%
Secondary Infertility		
Ovaries	56.52%	43.48%
Uterus	91.30%	8.70%
Fallopian tubes	52.17%	47.83%
Spill	78.26%	21.74%
Endometriosis	95.65%	4.35%

**Table 6: Findings of diagnostic laparoscopy in genital tuberculosis**

Diagnostic part	Primary		Secondary	
	Normal	Abnormal	Normal	Abnormal
Ovaries	3	1	3	1
Uterus	4	0	4	0
Fallopian tubes	0	4	1	3

The highlighted feature is that ovarian & tubal factors together constitute 46.20% pitted against all other factors i.e. cervical, uterine, thyroid, endometriosis and genital tuberculosis. Interestingly enough, majority of cases suffered from ovarian factors (25.56%) amongst primary infertility cases, while it was tubal factors(51.79%) for the secondary infertility which was put to test to know the statistical significance.

Amongst male infertility aetiological factors, sperm-cervical mucus anti-sperm antibody factor was the top contributor in the whole list i.e. 59.67% while remaining 40.33% other defects in seminology were responsible.

Laparoscopy confirmed certain aetiological factors. 58.98% of cases abnormal findings were observed in ovaries amongst primary infertility cases while it was tubal (47.83%) in secondary infertility cases.

Laparoscopy in genital TB revealed that 1 out of 17 cases of primary infertility had abnormal ova-

ries and 1 out of 7 cases had abnormal ovaries in secondary infertility. On the other hand, 4 out of 17 cases of primary infertility had abnormal tubes while 3 out of 7 cases of secondary infertility had abnormal tubes.

Endometriosis was more in primary infertility as compared to secondary infertility.

## DISCUSSION

Findings of the present study as depicted in Table-1 are comparable to earlier reported data of Shilpa and Chethana regarding under-five year and even 5 to 10 year duration for primary infertility.<sup>12</sup>

As more sophisticated and well established IVF centres are in accessible vicinity. The persons from higher income group prefer to report there while majority of poorer population report to government institutions.

Data obtained in the present study are in consonance with a study conducted in Bangladesh by Sultana et al<sup>13</sup> as far as the shared responsibility by both the sexes for the aetiology of infertility is concerned. Whereas the role of male in the present study strikes a close similarity with data provided by Shamila and Sasikala<sup>14</sup> while the female factors is close to the figures in the text book description as in Howkins & Bourne Shaw’s textbook of gynaecology.<sup>4</sup>

**Table 7: Published data vis-à-vis present study (aetiological factors-gender wise)**

Study	Male factors (%)	Female factors (%)	Both (%)	Unexplained (%)
Sultana et al <sup>13</sup>	20	43.63	21.81	14.54
Shamila S, Sasikala SL <sup>14</sup>	54.33	45.67		
Howkins & bourne shaw’s textbook of gynaecology.16 <sup>th</sup> ed. <sup>4</sup>	33.33	33.33	33.33	
Present study	50	25.80	24.20	

Present study findings are in consonance with data projected in Dewhurst’s textbook of obstetrics and gynaecology<sup>15</sup> regarding tubal factors individually viewed in primary and secondary infertility cases; whereas in relation to tubal factors in primary infertility the Kashmir study by Wani et al<sup>7</sup> data is also as close.

The tubal factors in toto in the current study (25%) and that reported by Thonneau et al<sup>16</sup> (26%) are almost the same as in the Howkins & Bourne Shaw’s textbook of gynaecology<sup>4</sup> (25-30%).

Seminological studies done at Bangladesh by Sultana et al<sup>13</sup> and present study findings are quite close.

**Table 8: Published data vis-à-vis present study (female factors)**

Study	Primary infertility		Secondary infertility	
	Ovarian factors %	Tubal factors %	Ovarian factors %	Tubal factors %
Dewhurst's textbook of ob & Gy(7 <sup>th</sup> ed) <sup>15</sup>		15-20		40
Kashmir study by Wani et al <sup>7</sup>	7.3*	18.3	22.2	27.7
Present study	25.56	13.28	8.92	51.79

\* peritubal & periovarian adhesions

**Table 9: Published data vis-à-vis present study(male factors)**

	OligoSpermia Decreased count%	Asthenospermia Decreased motility%	AzooSpermia No sperms%	Oligo Astheno spermia%	Sperm cervical mucus antisperm antibody factor%	Others%	Low volume%	Abnormal morphology Teratozoospermia%
Manna N et al <sup>17</sup>	32.85	6.57						5.11
Sultana et al <sup>13</sup>	10.9	18.18	6.36				10.95	6.36
sefrioui et al <sup>18</sup>					40			
Thonneau P et al <sup>16</sup>	9*	17				39#		10
Yeboah E et al <sup>19</sup>	69.4		30.8			21@		
Present study	10.48	17.75	8.07	4.03	59.67			

\* secretory & excretory azoospermia; \$low fructose content; # normal semen; @ oligoteratoasthenospermia

Even the anti-sperm antibody interactions data from India as reported by Khatoun et al<sup>20</sup> (47.71%) are comparable and akin to the present study (59.67%).

A study reported in 2010 (Nadgouda SS et al) indicated 10% genital TB as cause of infertility which is close to our findings (9.67%).<sup>21</sup>

**CONCLUSION**

Attempt to establish the possible cause of infertility in this part of country was successful. The aetiological factors speak of facts alone. The magnitude of problem of infertility is not just numbers and as to who is responsible but how it is viewed, perceived and projected in the society where we live.

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