

ORIGINAL ARTICLE

Etiological Factors of Infertility among Couples Visiting Kathmandu Model Hospital: A Descriptive Cross-sectional Study

Srijana Bhandari¹, Ganesh Dangal¹, Aruna Karki¹, Hema Kumari Pradhan¹, Ranjana Shrestha¹, Kabin Bhattachan¹

ABSTRACT

Introduction: Infertility is one of the major health related concern in developing countries, affecting couples in various aspects of life such as emotional, mental, social, and financial. Hence, knowing about the prevalence and its causative factors can help to estimate its burden in the society and provides insight for proper investigation and management of the infertile couples and to address the major burden of the society. Also knowing about various etiological factors of infertility helps to address them timely with close follow up during antenatal period for better perinatal outcomes.

Methods: A cross-sectional study was carried out among 134 couples visiting Gynaecology OPD of a tertiary hospital using pretested structured questionnaire. Non probability convenience sampling was done and the data was analysed using SPSS version 25.0. Descriptive statistical method was used for analysis.

Results: Primary and secondary infertility was noted in 64.2% and 35.8% couples respectively. Among females, ovulatory disorder was the most common cause of infertility with polycystic ovarian syndrome found in 17.9% female along with unilateral fallopian tubal blockage seen in 17.9% followed by hypothyroidism found in 10.44%. Whereas in male, asthenospermia was the most common cause found in 32.25% followed by oligospermia found in 9.67% male.

Conclusions: The study provides valuable insights into the etiological factors of infertility among both men and women. The identified causes underscore the complexity of reproductive health and emphasize the need for a holistic approach to fertility assessments and interventions to reduce the burden of society and also for good perinatal outcomes.

Keywords: Asthenospermia, Hypothyroidism, Infertility, Oligospermia, Polycystic ovarian syndrome

INTRODUCTION

Infertility is failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse,¹ which can be either primary or secondary. Both male and female factors can cause infertility but sometimes actual cause might be unknown. Environmental and lifestyle factors can also affect

fertility by resulting in decreased numbers and poor quality of sperm and ovum.^{2,3} Estimates suggest that between 48 million couples and 186 million individuals live with infertility globally.⁴ The average prevalence of infertility in adult population is around 17.5%.⁵ Infertility causes psychological, emotional and social impact to the couples particularly to women, and its investigations and treatment process causes financial

¹Department of Obstetrics and Gynaecology, Kathmandu Model Hospital, Exhibition Road, Kathmandu, Nepal.

Corresponding author:

Dr. Srijana Bhandari, Department of Obstetrics and Gynaecology, Kathmandu Model Hospital, Exhibition Road, Kathmandu, Nepal. Phone: +9779841041180, Email: pista99sir@gmail.com

burden to the couples.³Also pregnancies following a period of infertility were at a higher risk of developing maternal and neonatal morbidity when compared to spontaneous conceptions.^{6,7} Hence, knowing about the etiological factors provides insight for proper investigation and management of the infertile couples.

METHODS

After obtaining approval from Institutional Review Committee (IRC), this prospective cross-sectional study was carried out in Gynecology OPD of Kathmandu Model Hospital, Kathmandu, Nepal from 1st May 2023 to 30th October 2023. Sample size of 134 was calculated using the formula for proportion, i.e., $n = [Z^2P(1-P)]/d^2$ where, z is level of confidence which is 95% i.e. 1.96, p is prevalence which is 0.21 and q is 1-p and d is margin of error which is 7%.

134 couples meeting the inclusion criteria i.e., couples between the reproductive age group 15-49 visiting the hospital with the complain of inability to conceive for at least one year of unprotected sexual intercourse; were recruited from Gynaecology OPD. The detail history of the couples and physical examination of the female partner was done and for male partner, examination was done by urologist when semen analysis was abnormal. All the female patients had abdominal ultrasound, hysterosalpinography on day 6 and day 11 of menstrual cycle and hormonal assessment included thyroid function test and serum prolactin done as a routine and all the male patients had undergone semen analysis after three days of abstinence. After obtaining informed consent, relevant clinical findings and results of investigations were documented using a structured questionnaire. The data were extracted from the same and analyzed using SPSS version 25.0. Qualitative variables like male causative factors i.e. oligospermia, azoospermia and female causative factors i.e. ovarian cyst, uterine fibroids, ovulatory disorder, PCOD and tubal blockage were recorded and presented as frequency and percentage. Data was stratified for age, education, occupation, duration of marriage, history of pelvic surgery, smoking history, and alcohol history to see the effect of these on outcome. Results were interpreted in tables and diagram as per appropriate.

RESULTS

The total number of patients attending Gynecology OPD during the study period was 3098 and 173 patients among them had infertility. Out of which, 134 patients fulfilling inclusion criteria were recruited in this research. 86 (64.2%) couples had primary infertility whereas 48 (35.8%) had secondary infertility. The average age of the female and male was 29.86 ± 4.98 years and 33.26 ± 4.87 years respectively with infertility more common in age group of 26-30 (36.6%) in females and age group of 31-35 (41.8%) in males. Mean duration of marriage was 5.39 ± 3.75 years and duration of infertility was 2.38 ± 1.85 (Table 1).

Table 1. History of the couples visiting with infertility

Variables	Statistics	
Age Groups (Years)	Female	Male
20-25	27 (20.1%)	8 (6%)
26-30	49 (36.6%)	29 (21.6%)
31-35	39 (29.1%)	56 (41.8%)
36-40	17 (12.7%)	33 (24.6%)
>40	2 (1.5%)	8 (6%)
Duration of marriage (Years)		5.39±3.75
Duration of Marriage category		
1-5 Years		92 (68.7%)
6-10 Years		27 (20.1%)
11-15 Years		12 (9%)
>15 Years		3 (2.2%)
Duration of infertility (Years)		2.38±1.85
Duration of Infertility category		
1-5		127 (94.8%)
6-10		5 (3.7%)
11-15		2 (1.5%)
Previous Pregnancy		
Yes (Secondary Fertility)		48 (35.8%)
No (Primary Fertility)		86 (64.2%)

About 48.5% women had average BMI while 43.3% were overweight and 8.2% were obese. 23% had history of hypothyroidism, 3% had history of tuberculosis, 7.5% had PCOS and 5.21% had previous pelvic surgeries whereas only 1.5% women had diabetes mellitus and PID. 0.7% women were smoker and 13.3% women used to consume alcohol in which 1.5% were regular drinker and 11.9% were social drinker, mostly taking beer or wine (Table 2).

Table 2. History and BMI of females visiting with infertility

Variables	Statistics
Height (cm)	155.54±5.33
Weight (kg)	61.17±8.43
BMI (kg/m ²)	25.28±3.44
BMI groups	
18.5-24.9	65 (48.5%)
25-29.9	58 (43.3%)
≥30	11 (8.2%)
Past Medical History	
Diabetic Mellitus	2 (1.5%)
Hyperthyroidism	1 (0.7%)
Hypothyroidism	31 (23.1%)
PID	2 (1.5%)
PCOS	10 (7.5%)
Pulmonary TB	4 (3%)
History Pelvic Surgery	7 (5.21%)
Personal History	
Smoking	1 (0.7%)
Alcohol Consumption	
No	116 (86.6%)
Regular	2 (1.5%)
Social	16 (11.9%)

Pelvic examination of female showed cervicitis in 6.7%, cervical polyp and cervical anomaly (two cervix) in 0.7% and enlarged uterus in 2.2% of women. On laboratory investigations, about 10% female had

hypothyroidism and about 3% had hyperthyroidism and 8.20% had hyper-prolactinemia. High level of AMH was present in 5.97% of women whereas 2.98% of women had high blood sugar level.

In Hystero-salpingography, unilateral fallopian tube blockage was found in 17.9% and bilateral tube blockage noted in 2.98% of women. Uterine mass in endometrial cavity found in 0.74% women and uterine anomaly was noted in 3.73% with one case of arcuate uterus, septate uterus, bicornuate uterus, unicornuate uterus and uterine didelphys.

Ultra-sonography showed uterus mass i.e., fibroids was found in 6.71%, uterine anomaly in 3.73% women as found in hystero-salpingography, PCOS was noted in 17.90%, unilateral hemorrhagic cyst in 3.7% and bilateral hemorrhagic cyst in 1.5% of women (Table 3).

Table 3. Ultrasonography findings of females visiting with infertility

Findings	Number	%
Ultrasonography		
Uterus		
Normal	120	89.55%
Anomaly	5	3.73%
Mass	9	6.71%
If Anomaly (n=5)		
Arcuate	1	
Septate	1	
Bicornuate	1	
Unicornuate	1	
Didelphys	1	
If Mass (n=9)		
Subserosal	2	
Intramural	5	
Submucosal	1	
Endometrial polyp	1	
Ovaries		
Normal	103	76.9%
Unilateral Hemorrhagic cyst	5	3.7%
Bilateral Hemorrhagic cyst	2	1.5%
PCOS	24	17.9%

In case of male, about 3% male were known case of Diabetes Mellitus, hypertension and hypothyroidism

and 1.5% had history of epididymo-orchitis and history of pelvic surgery was seen in 1.5%. 26.1% male were smokers and 61.9% used to consume alcohol out of which 2.2% were regular drinker and 59.7% were social drinker using mostly wine and beer. This showed the association between male infertility and smoking and alcohol use (Table 4).

Table 4. History of males visiting with infertility

Variables	Statistics
Male's History	
Past Medical History	
Diabetic Mellitus	4 (3%)
Hypertension	4 (3%)
Hypothyroidism	4 (3%)
Mumps	0
Epididymo-orchitis	2 (1.5%)
Injury of testis	0
Pelvic surgery	2 (1.5%)
Personal History	
Smoking	35 (26.1%)
Alcohol	
No	51 (38.1%)
Regular	3 (2.2%)
Social	80 (59.7%)

Semen analysis of male showed that 5.97% had low semen volume whereas 0.74% had aspermia and 6.71% had azoospermia. After excluding aspermia and azoospermia cases, 9.67% had oligospermia, 32.25% had asthenospermia, 3.22% had teratospermia. Similiarly, 8.87% had oligospermia with asthenospermia and 0.80% had oligospermia with teratospermia (Figure 1).

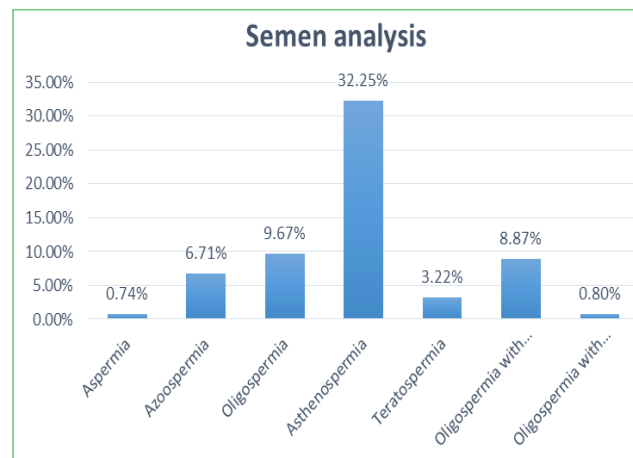


Figure 1. Semen analysis of males visiting with infertility

DISCUSSION

Infertility is a major cause of lack of harmony in marital life, although the reproductive process requires the interaction and integrity of the female and male reproductive tracts, any factor that affects any of the two can cause infertility.⁸ As the lady nurtures the pregnancy, she becomes the focus of investigations and bears the brunt of infertility, specifically in the developing countries. Therefore, the causes of male factor infertility generally remain under-diagnosed and under-treated.⁹

In our study, the average age of the female and male was 29.86 ± 4.98 years and 33.26 ± 4.87 years respectively. Mean duration of marriage was 5.39 ± 3.75 years and duration of infertility was 2.38 ± 1.85 . One study done in India also showed the mean age of women at presentation was 28.24 years.¹⁰ Delay in seeking treatment may be due to unawareness of fertility treatment, visit to unawareness of fertility treatment, poor access to appropriate treatment, prior unsuccessful medical treatment, social stigma, poverty. Delayed marriage and delayed age of conception is also one of the important factors of infertility and also affects perinatal outcome of pregnancy following infertility treatment.¹⁰

One study of Nepal showed primary infertility in 74.4% and secondary infertility in 25.6%¹¹ and another study done in India showed primary infertility in 57.5% whereas secondary infertility in 42.5%,¹² which is almost same as the finding in this study with primary infertility in 64.2% and secondary infertility in 35.8% but our study is in contrast to the study done by Subedi which showed primary infertility in 43.47% and secondary infertility in 56.52%.¹³

In this study, blockage of one or both fallopian tube was found in 21.63% (29/134) and ovulatory disorder with polycystic ovarian syndrome seen in 17.9% (24/104) and hypothyroidism in 10.44% (14/134), which is similar to the Mongolian study where tubal factor infertility was seen in 32.8% of women and to the study of Nepal where tubal factor infertility seen in 35.16%.¹¹ Another study showed that 24.05% women has one or both tubes blocked on hysterosalpingography and sub-clinical/clinical hypothyroidism seen in 23.9%¹⁰ which was in accordance with this study but it is in contrast with the study where tubal factor accounts for 12.15% only.

The prevalence of male infertility in general population varies from 9 to 15% and it accounts for about 30% according to various surveys.¹⁴ As mentioned in one study, male infertility was more common in age group of 30-34 years male. this is in accordance with our study which showed highest prevalence (94.18%) in age group of 31-35 years.¹⁵ Semen analysis of male in this study, showed that 9.67% had oligospermia, 32.25% had asthenospermia, 3.22% had teratospermia. Similarly, 8.87% had oligospermia with asthenospermia and 0.80% had oligospermia with teratospermia. These findings were similar to the study done by Khalid where asthenospermia was found in 31.3% and azoospermia in 19.2%¹⁶ and also to the study done by Bhasin in Boston and Mehta in India, where prevalence of azoospermia in Boston was 15-20% and 15-30% respectively. However, our result is different from figures of study done in Nigeria and also in Nepal where oligospermia was found in 46.82% and asthenospermia found in 14.28%, but the incidence of azoospermia was similar to our study (6.95% vs 6.71%).¹³

This study was a hospital-based study with a small sample size and a short time duration. The sample size was not adequate to address whole general population and to draw significant conclusions. All the risk factors and genetic etiological factors associated with infertility could not be assessed. Complete investigations could not be carried out due to lack of availability and non-compliance.

Further study with greater sample size should be done in order to validate the results of this study and to use its results for clinical benefits. Additionally, the study may benefit from further exploration of lifestyle factors, environmental influences, and genetic predispositions that could contribute to infertility.

CONCLUSIONS

This study reflected that ovulatory disorder i.e., polycystic ovarian syndrome was the most common cause of infertility in female along with tubal blockage. Also, obesity and hypothyroidism were commonly associated factors responsible for female infertility. Whereas asthenospermia was the most common cause of infertility in male with smoking and alcohol consumption as commonly associated factors for infertility.

Conflict of interest: None

REFERENCES

1. International Classification of Disease (ICD) [Internet]. [cited 2024 Aug 21]. [\[Full Text\]](#)
2. Gore A, Chappell V, Fenton S, Flaws J, Nadal A, Prins G, et al. EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-Disrupting Chemicals. *Endocrine Review*. 2015;36(6):E1-E150. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
3. Segal T, Giudice L. Before the beginning: Environmental exposures and reproductive and obstetrical outcomes. *Fertility and Sterility*. 2019;112(4):613-21. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
4. Mascarenhas M, Flaxman S, Boerma T, Vanderpoel S, Stevens G. National, regional, and global trends in Infertility prevalence since 1990: a systematic analysis of 277 health surveys. *PLoS Med* 2012; 9(12):e1001356. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
5. 1 in 6 people globally affected by infertility: WHO [Internet]. [cited 2024 Aug 21]. [\[Full Text\]](#)

6. Rengaraj N, Kubera N, Mondal N, Chitra T, Jha N, Ram A. Maternal and Perinatal Outcomes among Women after a Period of Infertility: A Cross-sectional Analytical Study. *J South Asian Feder Obst Gynaecol* 2023;15(1):29–33. [\[Full text\]](#) [\[DOI\]](#)
7. Wang E, Ramos L, Vyas N, Bhasin G, Simmons C, Pisarska M. Maternal and neonatal outcomes associated with infertility. *J Matern Fetal Neonatal Med*. 2019 Sep;32(17):2820-2823. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
8. Nwajiaku L, Mbachu II, Ikeako L. Prevalence, Clinical Pattern and Major Causes of Male Infertility in Nnewi, South East Nigeria: A Five-Year Review. *AFRIMEDIC J* 2012; 3(2):16-19 [\[Full text\]](#)
9. Cui W. Mother or nothing: the agony of infertility. *Bull World Health Organ*. 2010;88(12):881–2. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
10. Singh K, Kumari R, Ranjan A, Bharti G. Analysis of causes and clinical pattern of Infertility in couples coming to a tertiary care centre in Bihar, India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017 Jun;6(6):2279-83] [\[Full text\]](#) [\[DOI\]](#)
11. Rai S, Malla B, Upadhyaya PC. Determinants of infertility in couples attending maternity hospital. *J Kathmandu Med Coll*. 2021;10(4):229-32] [\[Full text\]](#) [\[DOI\]](#)
12. Deshpande P, Gupta A. Causes and Prevalence of Factors Causing Infertility in a Public Health Facility. *J Hum Reprod Sci*. 2019 Oct-Dec;12(4):287-293. doi: 10.4103/jhrs.JHRS_140_18. Epub 2019 Dec 17. PMID: 32038077; PMCID: PMC6937760. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
13. Subedi S, Lamichhane S, Chhetry M. Study of Infertile Couples Attending a Teaching Hospital in Eastern Nepal. *Journal of Nepal Medical Association*. 2016;55(203):22-5. [\[Full text\]](#) [\[DOI\]](#)
14. Barratt C, Björndahl L, De Jonge C, Lamb D, Osorio Martini F, McLachlan R, et al. The diagnosis of male infertility: An analysis of the evidence to support the development of global WHO guidance—Challenges and future research opportunities. *Hum. Reprod. Update*. 2017;23:660–680. [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
15. Huang, B., Wang, Z., Kong, Y, Jin M, Ma L. Global, regional and national burden of male infertility in 204 countries and territories between 1990 and 2019: an analysis of global burden of disease study. *BMC Public Health* 23, 2195 (2023). [\[PubMed\]](#) [\[Full text\]](#) [\[DOI\]](#)
16. Khalid A, Nizami N, Khan K. Contribution of Male Factor in Infertility in a sample of local population of Pakistan. *Pak J Med Heal Sci*. 2018;12(2);492-4.] [\[Full text\]](#)