**Original Research Article**

# Determinants of Infertility among Married Couples in a Tertiary Hospital in Bangladesh

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## Abstract

*Introduction:* Infertility is a common issue among married couples in Bangladesh. Infertility is often caused by a combination of multiple factors, and that individual cases of infertility can be complex and difficult to diagnose. *Objective:* To assess the determinants of infertility among the infertile couples both male and female. ***Materials and Methods*:** This prospective observational study was conducted in the Infertility unit, Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during the period from 01.07.2018 to 30.31.12.2021. Five hundred infertile couples were recruited from the out-patient department of infertility unit who came to take treatment for their infertility problem. *Results:* Mean ($\pm$ SD) age of the female patients was 27.1 $\pm$ 5.2 years ranged between 18-44 years. Mean ($\pm$ SD) age of the husband of patients was 34.0 $\pm$ 5.9 years ranged between 22-55 years. Primary infertility was seen in 59.8% study subjects and secondary infertility was seen in 40.2% study subjects. In our study, most of the women (94%) had below normal (<3 U/L) serum FSH. Most of the women (96%) had below normal (< 2U/L) serum LH. Serum TSH was normal (0.2 – 4.5 mU/L) in 51.0% patients. Majority of the women (60.8%) had above normal (>21 pml/L) serum FT4 level. Most of the women 72.2% had normal serum prolactin level. In male patients, Testosterone level was above normal (>30 nmol/L) in majority of the patients (73.4%). In Hysterosalpigography (HSG), 0.40% had abnormal uterine cavity, 4.2% had septed uterus, 15.2% had bicornuate uterus, 1.0% had unicornuate uterus and 1.6% had endometrial polyp. Hysteroscopy found abnormal uterus in 1.2% of patients, abnormal uterine cavity in 11.4%, abnormal endometrial flakes in 12.4%, abnormal right ostium in 13.0% and abnormal left ostium in 12.6%. Intrauterine adhesion, polyp and submucus fibroid were found in 35.2%, 2.8% and 17.6% respectively. Laparoscopy found abnormal uterus in 3% patients, abnormal right fallopian tube in 33.2%, abnormal left fallopian tube in 34.2%. Also, abnormal right fallopian tube in 37.0% and abnormal left fallopian tube in 37.6%. Pouch of Douglas free was found in 63%. During dye test in laparoscopy, 57.6% patients were found positive. In quality, semen type was found poor (<4%) in majority (61%) of the husbands. Regarding semen count, above normal (>20 million/ml) level was found in majority of the patients (80.8%). Regarding semen quality, majority (96%) had oligospermia (<15 million/ml). In case of rapid linear (RL), normal (50-60%) level was seen in majority of the patients (81.6%). In case of slow linear (SL), below normal (<15%) was seen in majority (64.8%) of the patients. Regarding non-propagative (NP), normal (0-10%) level was seen in most of the (87.8%) patients. In case of morphology of sperms, above normal (>50 million/ml) level was seen in most of the patients (80.6%). *Conclusion:* This study shows that a significant percentage of both male and female are suffering from infertility. The major causes of male infertility are partly hormonal, structural abnormalities of male genitalia, infection of genital tract, and partly psychological. Causes of female infertility are mostly hormonal, structural abnormalities of the uterus, fallopian tubes, infection of the genital tract and partly psychological.
**Keywords:** Female Infertility, Male Infertility, Hormonal, Structural abnormality, and Semen abnormality.

# I. INTRODUCTION

Infertility may be defined as inability to conceive within one year of unprotected regular coitus. Approximately 85 – 90% of healthy young couples conceive within 1 year, most within 6 months [1]. Infertility therefore affects approximately 10 – 15% of couples and represents an important part of clinical practice [2]. A general classification of causes of infertility are male 35 – 40%, female 40 – 50% (tubal 25%, ovulatory 20% and cervical 1 – 2%), sexual 10% and unknown 10% [3]. More than one factor per couple accounts for the total percentage appearing to exceed 100%. Increased public awareness of the natural age – related decline in fertility and the increasing risk of chromosomally abnormal offspring with advancing maternal age, at a time when large numbers of women have deferred childbearing to pursue to carriers, has led to a new sense of urgency among the many couples who now seek to initiate and complete their families over a relatively short period of time before age 40 [3].

Infertility affects approximately 15% of couples. Roughly 40% of cases involve a male contribution or factor, 40% involve a female factor, and the remainder involves both sexes [4]. According to the American Society for Reproductive Medicine, infertility affects about 6.1 million people in the United States, equivalent to 10% of the reproductive age population. Female infertility accounts for one-third of infertility cases, male infertility another third, combined male and female infertility for another 15% and the remainder of cases is 'unexplained' [5].

It is important for couples who are struggling with infertility to seek help from a reproductive specialist. There are various treatment options of the infertile couples. Among them, counseling of the infertile couples is one of the main and most effective methods of treatment. In aim of this research was to assess the determinants of infertility among the infertile couples both male and female.

# II. OBJECTIVES

- To assess the determinants of infertility among the infertile couples both male and female.

# III. METHODOLOGY & MATERIALS

Materials and Methods: This prospective observational study was conducted in the Infertility unit, Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during the period from 01.07.2018 to 31.12.2021. Ethical clearance was got from Bangladesh Medical Research Council (BMRC) Dhaka, Bangladesh. Bangabandhu Sheikh Mujib Medical University (BSMMU) is a tertiary hospital, where patients of infertility come from different parts of the country. Here, diagnosis of infertility is done by most modern investigation techniques and most modern treatment and management is given for the infertile couples. 500 infertile couples who are sexually active were recruited from the out-patient department of infertility unit who came for diagnosis and take treatment for their infertility problem either primary or secondary. Inclusion criteria of male partners were from 22 years to 55 years sexually active one. Inclusion criteria of female partners were 18 years to 44 years who were menstruating. Exclusion criteria for male were sexually inactive, that means impotent. Exclusion criteria for female were post-menopausal whether naturally or surgically. All the study subjects were informed about the study and they were confirmed about the privacy and they gave their consent about the study. After collecting the data, it was analyzed by appropriate statistical methods using Statistical package for Social Sciences (SPSS) software program.

# IV. RESULT

Table I shows the socio-demographic characteristics of the study subjects. Mean (± SD) age of the female patients was 27.1 ± 5.2 years ranged between 18 – 44 years. Mean (± SD) age of the husband of patients was 34.0 ± 5.9 years ranged between 22 -55 years. Majority of the female partners were educated up to secondary level (49.4). Majority of the male partners were educated up to secondary level (30.4%) and graduated 148 (29.6%). Majority female partners were housewife (79.0%). Majority male partners were service holder (71.2%). Majority of the study people were from rural (62.0%) area. Duration of marital life in majority of the study people was <5 years (45.0%). Figure 1 demonstrates the BMI of the female patients. Majority of the female partners were overweight (56.2%). Figure 2 shows the type of infertility of the study subjects. Primary infertility was seen in 299 (59.8%) study subjects and secondary infertility was seen in 201 (40.2%) study subjects. Table II shows the medical history of the couple. In our study, 3.6% female and 5.6% male had diabetes, 0.2% female and 1.4% had mumps, 7% of female and 3.6% of male had chicken pox, 2.4% of female and 2% had hypertension, 0.2% male had chemotherapy, 0.4% of female and 0.6% of male had tuberculosis, 7.6% of female and 0.6% of male had hypothyroidism, 1% of both female and male had allergy, 0.2% male had radiation, 1.2% of male had orchitis. In drug history, 2.4% of the female partner took antihypertensive drug, 4% took antidiabetic drug, 1% took anti TB drug, and 6.8% took thyroid drug. In male partner, 3.2% took antihypertensive drug, 4.2% took antidiabetic drug, 1% took anti TB drug, and 0.4% took thyroid drug. Table III shows personal history and family history of the couple. Personal history of husband: Smoking = 129 (25.8%), alcohol = 3 (0.6%), others (nil) = 368 (73.6%). Disease of family: Hypothyroidism = 9 (1.8%), diabetes = 38 (7.6%), tuberculosis = 4 (0.8%), history of subfertility = 14 (2.8%), hypertension = 5 (1.0%), hypothyroidism with diabetes = 3 (0.6%), hypertension with diabetes = 4 (0.8%). Table IV shows hormonal

status of infertile women. In our study, most of the women (94%) had below normal (<3 U/L) serum FSH, followed by 5.4% had normal (3 – 10 U/L) serum FSH and 0.6% had above normal (>10 U/L) serum FSH. Most of the women (96%) had below normal (< 2U/L) serum LH, 3.4% had normal (2 – 9 U/L) and 0.6% had above normal (>9.0 U/L) serum LH. Serum TSH was normal (0.2 – 4.5 mU/L) in 255 (51.0%) patients and above normal (>4.5 mU/L) in 245 (49.0%) patients. Majority of the women (60.8%) had above normal (>21 pml/L) serum FT4 level and 39.2% had normal (9 – 21 pmol/L). Most of the women 72.2% had normal serum prolactin level and above normal level (>630 mU/L) was found in 139 (27.8%) patients. In male patients, Testosterone level was above normal (>30 nmol/L) in 367 (73.4%) patients and normal (10 – 30 nmol/L) in 133 (26.6%) patients. Table V shows the structural abnormalities of female organs. In Hysterosalpigography (HSG), there were seen patients with abnormal uterine cavity in 2 (0.40%) patients, septed uterus in 21 (4.2%) patients, bicornuate uterus in 76 (15.2%) patients, unicornuate uterus in 5 (1.0%) patients and endometrial polyp in 8 (1.6%) patients. In Hysteroscopy, abnormal uterus was found in 6 (1.2%) patients, abnormal uterine cavity in 57 (11.4%) patients and abnormal endometrial flakes were found in 62 (12.4%) patients. In 65 (13.0%) patients abnormal right ostium were found and in 63 (12.6%) patients abnormal left ostium were found. During Hysteroscopy, there were found intrauterine adhesion in 176 (35.2%) patients, polyp in 14 (2.8%) patients and submucus fibroid in 88 (17.6%) patients. During Laparoscopy, abnormal uterus were found in 15 (3%) patients, abnormal right fallopian tube were found in 166

(33.2%) patients and abnormal left fallopian tube were found in 171 (34.2%) patients. During Laparoscopy, there also was found abnormal right fallopian tube in 185 (37.0%) patients and abnormal left fallopian tube was found in 188 (37.6%) patients. During laparoscopy, there also was found pouch of Douglas free in 315 (63%) patients. During dye test in laparoscopy, 288 (57.6%) patients were found positive and rest of the patients was negative that means the tubes were blocked. Table VI shows the semen analysis of the husbands of the infertile female patients. In quality, semen type was found poor (<4%) in majority (61%) of the husbands and intermediate (4-14%) in 39% patients. Regarding semen count, above normal (>20 million/ml) level was found in majority of the patients (80.8%) and normal (15-20 million/ml) was in (19.2%) patients. Regarding semen quality, majority (96%) had oligospermia (<15 million/ml) and 4% had azospermia (0% count). In case of motility of sperms, rapid linear (RL), normal (50-60%) level was seen in majority of the patients (81.6%), below normal (<50%) was in 18% and above normal (>60%) was seen in 0.4% patients. In case of slow linear (SL), below normal (<15%) was seen in majority (64.8%) of the patients, normal (15-20%) in 25% patients and above normal (>20%) was in 10.2% patients. Regarding non-propagative (NP), normal (0- 10%) level was seen in most of the (87.8%) patients and above normal (>10%) was in 12.2% patients. In case of morphology of sperms, above normal (>50 million/ml) level was seen in most of the patients (80.6%) and normal (14-50 million/ml) level was seen in 14.4% patients and below normal (<14million/ml) level was seen in 5% patients.

**Table-I: Socio-demographic characteristics of the study subjects (N=500)**

| Demographic variables | | Number of patients | Percentage (%) |
|---|---|---|---|
| Age of the respondents | 18-20 | 32 | 6.4 |
| | 21-25 | 198 | 39.6 |
| | 26-30 | 152 | 30.4 |
| | 31-35 | 83 | 16.6 |
| | 36-40 | 31 | 6.2 |
| | 41-45 | 4 | 0.8 |
| | Mean±SD | 27.1±5.2 | |
| | Range | 18-44 | |
| Spouse's age | 21-25 | 14 | 2.8 |
| | 26-30 | 166 | 33.2 |
| | 31-35 | 160 | 32 |
| | 36-40 | 103 | 20.6 |
| | 41-45 | 42 | 8.4 |
| | 46-50 | 10 | 2 |
| | 51-55 | 5 | 1 |
| | Mean±SD | 34.0±5.9 | |
| | Range | 22-55 | |
| Educational level | Not education | 8 | 1.6 |
| | primary | 49 | 9.8 |
| | Secondary | 247 | 49.4 |
| | Graduate | 87 | 17.4 |
| | Postgraduate | 54 | 10.8 |

| Demographic variables | | Number of patients | Percentage (%) |
|---|---|---|---|
| | Other | 55 | 11.0 |
| Spouse's education level | Not education | 5 | 1.0 |
| | Primary | 27 | 5.4 |
| | Secondary | 152 | 30.4 |
| | Graduate | 148 | 29.6 |
| | Postgraduate | 74 | 14.8 |
| | Other | 94 | 18.8 |
| Occupation | Housewife | 395 | 79.0 |
| | Service | 103 | 20.6 |
| | Business | 2 | 0.4 |
| Occupation of spouse | Unemployed | 6 | 1.2 |
| | Service | 356 | 71.2 |
| | Business | 138 | 27.6 |
| Area of residence | Urban | 176 | 35.2 |
| | Rural | 310 | 62.0 |
| | Slum | 14 | 2.8 |
| Duration of marital life (years) | <5 | 225 | 45 |
| | 5-10 | 164 | 32.8 |
| | 10-15 | 77 | 15.4 |
| | 15-20 | 31 | 6.2 |
| | >20 | 3 | 0.6 |
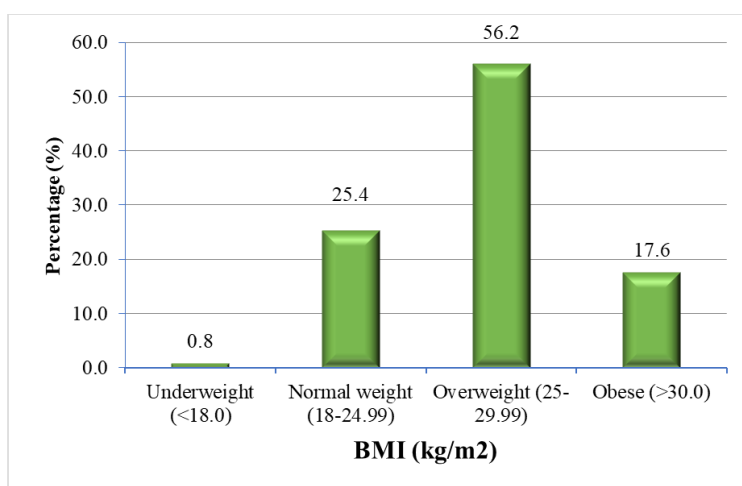


**Figure-1: Bar diagram showing the BMI of the study female patients (N=500)**
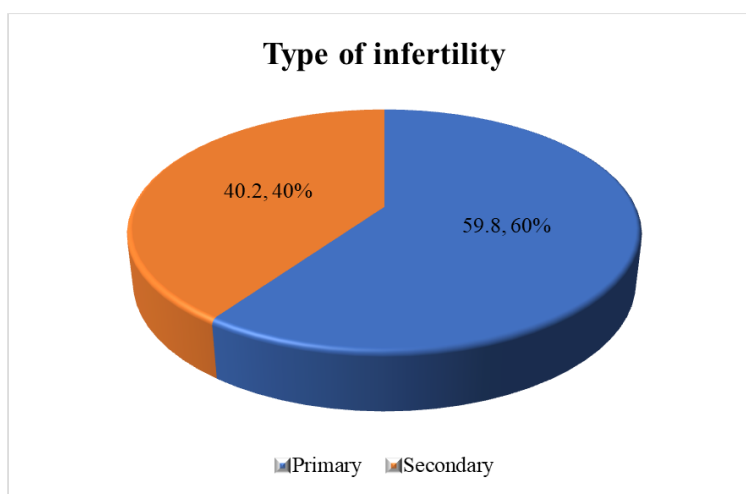


**Figure-2: Pie diagram showing the type of infertility (N=500)**

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**Table-II: Medical history and drug history of the couple. (N=500)**

| Previous history of couple | | Female partner | Male partner |
|---|---|---|---|
| | | No. (%) | No. (%) |
| Medical history of couple | Diabetes | 18 (3.6%) | 28(5.6%) |
| | Mumps | 1(0.2%) | 7(1.4%) |
| | Chicken pox | 35(7.0%) | 18(3.6%) |
| | Hypertension | 12(2.4%) | 10(2.0%) |
| | Chemotherapy | 0(0.0%) | 1(0.2%) |
| | Tuberculosis | 2(0.4%) | 3(0.6%) |
| | Hypothyroidism | 38(7.6%) | 3(0.6%) |
| | Allergy | 5(1.0%) | 1(0.2%) |
| | Radiation | 0(0.0%) | 1(0.2%) |
| | Orchitis | 0(0.0%) | 6(1.2%) |
| Drug history of couple | Anti-hypertensive | 12 (2.4%) | 16(3.2%) |
| | Anti-diabetic | 20 (4.0%) | 21(4.2%) |
| | Anti TB | 5 (1.0%) | 5(1.0%) |
| | Thyroid drug | 34 (6.8%) | 2(0.4%) |

**Table-III: Personal history and family history of the couple (n=500)**

| Parameter | | No of patients | Percentage (%) |
|---|---|---|---|
| Personal history of husband | Smoking | 129 | 25.8 |
| | Alcohol | 3 | 0.6 |
| | Others | 368 | 73.6 |
| Family history | Hypothyroidism | 9 | 1.8 |
| | Diabetes | 38 | 7.6 |
| | Tuberculosis | 4 | 0.8 |
| | History of subfertility | 14 | 2.8 |
| | HTN | 5 | 1 |
| | Hypothyroidism+ DM | 3 | 0.6 |
| | DM+HTN | 4 | 0.8 |

**Table-IV: Hormonal status of infertile women (N=500)**

| Hormonal status | Category | No of patients | Percentage (%) |
|---|---|---|---|
| FSH | Below normal (<3 U/L) | 470 | 94 |
| | Normal (3.0-10.0 U/L) | 27 | 5.4 |
| | Above normal (>10 U/L) | 3 | 0.6 |
| LH | Below normal (<2 U/L) | 480 | 96 |
| | Normal (2.0-9.0 U/L) | 17 | 3.4 |
| | Above normal (>9.0 U/L) | 3 | 0.6 |
| TSH | Normal (0.2-4.5 mU/L) | 255 | 51 |
| | Above normal (>4.5 mU/L) | 245 | 49 |
| FT4 | Normal (9-21 pmol/L) | 196 | 39.2 |
| | Above normal (>21 pmol/L) | 304 | 60.8 |
| Prolactin | Normal (25-630 mU/L) | 361 | 72.2 |
| | Above normal (>630 mU/L) | 139 | 27.8 |
| Testosterone | Normal (10-30 nmol/L) | 133 | 26.6 |
| | Above normal (>30 nmol/L) | 367 | 73.4 |

**Table-V: Structural abnormalities of female organs (N=500)**

| Structural abnormalities | | No of patients | Percentage (%) |
|---|---|---|---|
| HSG findings | Abnormal uterine cavity | 2 | 0.4 |
| | Septed | 21 | 4.2 |
| | Bicornuate | 76 | 15.2 |
| | Unicornuate | 5 | 1 |
| | Endometrial polyp | 8 | 1.6 |
| Hysteroscopy | Abnormal uterus | 6 | 1.2 |
| | Abnormal cavity | 57 | 11.4 |

| Structural abnormalities | | No of patients | Percentage (%) |
|---|---|---|---|
| | Abnormal Endometrium flakes | 62 | 12.4 |
| Ostium | Abnormal (Right) | 65 | 13 |
| | Abnormal (Left) | 63 | 12.6 |
| Any pathology | Intrauterine adhesion | 176 | 35.2 |
| | Polyp | 14 | 2.8 |
| | Submucous fibroid | 88 | 17.6 |
| Laparoscopy | Abnormal Uterus | 15 | 3 |
| | Abnormal (Right) | 166 | 33.2 |
| | Abnormal (Left) | 171 | 34.2 |
| Fallopian tubes | Abnormal (Right) | 185 | 37 |
| | Abnormal (Left) | 188 | 37.6 |
| Ovary | Pouch of Douglas (free) | 315 | 63 |
| | Dye test (positive) | 288 | 57.6 |

**Table-VI: Semen analysis of husbands (N=500)**

| Semen analysis (husbands) | | No of patients | Percentage (%) |
|---|---|---|---|
| Semen type | Intermediate (4-14%) | 195 | 39 |
| | Poor (<4%) | 305 | 61 |
| Semen count | Normal (15-20) | 96 | 19.2 |
| | Above normal (>20) | 404 | 80.8 |
| Semen analysis | Oligospermia (<15 million/ml) | 480 | 96 |
| | Azoospermia (0%) | 20 | 4 |
| Rapid linear (RL) | Normal (50-60) | 408 | 81.6 |
| | Above normal (>60) | 2 | 0.4 |
| | Below normal (<50) | 90 | 18 |
| Slow liner (SL) | Normal (15-20) | 125 | 25 |
| | Above normal (>20) | 51 | 10.2 |
| | Below normal (<15) | 324 | 64.8 |
| Non propagative (Np) | Normal (0-10) | 439 | 87.8 |
| | Above normal (>10) | 61 | 12.2 |
| Morphology | Normal (14-50) | 72 | 14.4 |
| | Above normal (>50) | 403 | 80.6 |
| | Below normal (<14) | 25 | 5 |

## V. DISCUSSION

The present study attempted to assess the determinants of infertility among the married couples who were attending the infertility outpatient department of Bangabandhu Sheikh Mujib Medical University, shahbagh, Dhaka. Socio-demographic characteristics of the married couples attending the infertility outpatient department are one of the determinants affecting fertility. Rural residents 310 (62%) are more sufferer of infertility than urban 176 (35.2%) ones. Mallikarjuna M. *et al.,* also shows in their study that rural couples are more sufferers in infertility than urban[6]. BMI more than 25 are 281 (56.2%) more affect fertility in female. Giwercman A *et al.,* has shown the results like ours[7]. Primary infertility was significantly higher 299 (59.8%) than secondary infertility 201 (40.2%). Similarly, one study by Singh K *et al.,* in Bihar, India also shows the results like those of ours [8]. In our study, nearly 77% of infertile couples reported to hospital for treatment between 2- 10 years of marriage. Singh K *et al.,* in Bihar, India also shows the same presentation like ours [8]. Determinants of infertility among the female partners of the couple were hormonal status like FSH

below normal (<3 U/L) was in 470 (94%), LH below normal (<2 U/L) was in 480 (96%), TSH above normal (>4.5 mU/L) was in 245 (49%), serum prolactin above normal (>630 mU/L) was in 139 (27.8%) which corresponds with the results of infertile married women of India [8] and Ethiopia [9]. Structural abnormalities of female organs which are the determinants of female infertility like HSG findings, Hysteroscopic findings, any pathology of uterus, laparoscopic findings of uterus, fallopian tubes, ovary all corresponds to the findings of Bihar, India [8]. Among the determinants of male infertility are: age, smoking, obesity, alcohol and caffeinated beverages consumption, stress, electronic devices, scrotal temperature, some drugs. Our findings of male infertility correspond with the findings of Mahat *et al.,* [10]. Besides, some structural factors of male genital tract, like varicocele, endocrine disorders, male reproductive tract infection, ejaculatory disorders, immunological factors, genetic and chromosomal defects also cause male infertility. One of the main causes of male infertility is semen quality. In our study, semen analysis shows normozoospermia and oligospermia together 96% and azoospermia 4%,

motility 81.6%, which corresponds to the study of Nigeria [11]. Bhattacharya *et al.,* also shows the male factors of infertility which also corresponds to our study results [12]. One study conducted by Farhi and Ben-Haroush *et al.,* also shows the similar results of male infertility like ours one [13]. Seminal fluid abnormalities among male partners of infertile couples in this study correspond to the study of male partners of Owolabi *et al.,* Ile-Ife, Nijeria [14]. Results of our study in socio-demographic characteristics also correspond to the study of Nepal (Tamarkar *et al.,* 2019) [15]. One study in India from the demographic health survey showed the Prevalence and Potential Determinants of Primary Infertility in India also corresponds to our study (Purakayastha *et al.,* 2021) [16].

## VI. CONCLUSION

In this study we have observed that a significant number of couples are suffering from infertility. Male partners of couples shows major determinants of infertility are partly hormonal, structural abnormalities of male genitalia, abnormal sperm counts in semen and partly psychological. Female partners of the couples are sufferers of both primary and secondary infertility. the most common determinants of female infertility are hormonal, structural anomalies of uterus, fallopian tubes, genital tract infection and partly psychological which can be overcome by counseling.

**Conflict of Interest:** None.

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