British Journal of Healthcare and Medical Research - Vol. 12, No. 04
Publication Date: July 25, 2025
DOI:10.14738/bjhr.1204.19075.
Giasuddin, A. S. M., Parveen, N. T., Banu, L. A., & Parveen, S. (2025). Medical Features, Clinical Investigative Findings, Hormonal Parameters and Husband's Semen Analysis in Infertile Women Attending Outpatient Departments of Obstetrics and Gynecology at Two Hospitals in Dhaka City Bangladesh. *British Journal of Healthcare and Medical Research*, Vol - 12(04). 123-132.

Medical Features, Clinical Investigative Findings, Hormonal Parameters and Husband's Semen Analysis in Infertile Women Attending Outpatient Departments of Obstetrics and Gynecology at Two Hospitals in Dhaka City Bangladesh

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ABSTRACT

Background: Women infertility is a multifactorial issue with social, economic and cultural influence and it is a global health problem; Objectives: The study was conducted to determine types of infertility and their contributing factors among infertile women at Dhaka city, Bangladesh; Methodology: This prospective cross-sectional study was conducted among infertile women attending two Outpatient Departments (OPDs) of Gynecology & Obstetrics at Impulse Hospital, Tejgaon, Dhaka, Bangladesh and Popular Hospital Ltd., Mirpur, Dhaka, Bangladesh from December 2024 to March 2025. A total of 130 infertile women (Age: 18-40 Years) were included in the study from December 2024 to March 2025 with proper investigations and evaluation for types of infertility and their contributing factors. Data were collected using a semi-structured information collection sheet by face-to-face interviewing followed by relevant clinical and Laboratory investigations. The data were analysed statistically and reported accordingly; Results: Out of 130 infertile women, primary infertility was found among 73 (56.2%) and secondary infertility was found among 57 (43.8%) of respondents. Regarding body mass index (BMI), majority of the respondents had normal (56,43.1%) followed by overweight (46, 35.4%), obese (17,13.1%) and thin (11,8.4%) BMI. Large proportions of

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infertile women from both primary and secondary categories of infertility had BMI in the overweight and obese ranges. Psychological features such as anxiety and depression were not significantly present in both categories of infertility. Transvaginal (TV) scanning revealed that overall, 61 (46.9%) had normal ovary with 30 (23.1%) had fibroids and 39 (30.1%) had polycystic ovarian syndrome (PCOS). TV scan findings were not significantly different between the women with primary and secondary infertility. Serum prolactin levels (127, 97.6%) and TSH levels (120, 92.3%) were within normal ranges. Semen analyses of husbands showed mostly normal pattern (104, 79.9%); Conclusions: TV scanning findings should be meticulously evaluated, interpreted and used for establishing the women infertility accordingly. The studies with larger samples, longer duration and multicentered evaluating psychological features and molecular genetic factors also are recommended to assess the accurate picture of women infertility and its causes in Bangladesh. Women infertility should be treated as a significant national public health issue and government should develop effective policy to help these women and mitigate the problem.

Keywords: Infertility, Primary infertility, Secondary infertility, PCOS, Amenorrhea, Oligomenorrhea.

INTRODUCTION

Infertility in women means inability to get pregnant and produce children. It is one of the most important and serious complications in Obstetrics and Gynecology. It is interpreted as the inability to achieve pregnancy after one year (12 months) of unprotected intercourse (1,2,3). The World Health organization (WHO) has identified infertility as a global public health problem (2,4,5). It is divided into primary and secondary categories defending on the presence or absence of previous pregnancy (3,5,6). Primary infertility refers to inability to conceive after a year of regular, unprotected sexual intercourse when a person has never been pregnant. Secondary infertility, on the other hand, occurs when a person has had at least one previous pregnancy but is unable to conceive again (1,6,7).

Both female and male factors can lead to infertility (1,3,5). Female factors that affect fertility include the following categories: anatomical abnormalities, cervical stenosis, menstrual cycle irregularity, fallopian tube deformities, congenital abnormalities, acquired defects including fibroids and others, anatomic defects and physiologic dysfunctions such as infection, adhesions, adnexal masses, uncontrolled hypo/hyperthyroidism, hypertension, obesity, diabetes and others (1,5,6,8,9).

Male factors that affect fertility include the following categories: acquired diseases of the pituitary gland, hypothalamus, or other organs affecting the hypothalamic-pituitary axis, genetic causes, factors disrupting normal transportation of sperm in the ductal system (1,5). Factors affecting fertility in both genders include the following: advanced reproductive age, environmental and occupational factors, toxic effects related to smoking or drug abuse, excessive exercise, deficient diet associated with extreme weight loss or gain (1,8). There are unexplained causes of infertility in both genders in which the couples investigate themselves after one year of marriage without conceiving and all their investigations are normal, yet they cannot conceive (1,3,7).

Some studies on infertility and its related factors among women in Bangladesh were reported in the literature (10,11,12,13). Anwar et al reported among 100 couples at Dhaka that 57% had female factors, 25% had both male and female factors, 3% had male factors and in 1.5%, the causes of infertility were unknown (10). Siddique et al revealed, among 500 infertile women from Rajshahi city, that 60% women had been suffering from the primary infertility. More than 68% infertile women were trying for getting baby for the last 5 years. Most of the women (82.8%) did not try to get pregnant at specific period of their menstrual cycle. Many of their respondents (79.6%) were not aware about the concept of fertile period (11). Magdum et al included 111 infertile women in a prospective study in Dhaka city and observed primary infertility in 90 (81%) and secondary infertility in 21(18.9%) of their respondents. Among the direct risk factors of female infertility, ovulation failure was reported to be the majority of the cases, 74 (35.1%), and it was mainly observed in 58 (33.9%) primary infertile women (12). Roy observed that women's age, age at marriage and BMI were associated with infertility in Bangladeshi significantly (13).

There were considerable limitations of the studies reported from Bangladesh as stated above (10,11,12,13) as analysed and reported by several investigators (13,14). Infertility is not merely an individual concern; it is a national public health problem and rather an international issue (12,13,14). We therefore decided to conduct the present study to further enrich the information on women's infertility from Bangladesh and the results are reported in the present article accordingly.

METHODOLOGY

Study design: A prospective cross-sectional study; **Place of study:** Outpatient departments (OPDs) of Impulse Hospital, Tejgaon I/A, Dhaka-1208, Bangladesh and Popular Hospital Ltd., Dhanmondi, Dhaka-1207, Bangladesh; **Study period:** December 2024 to March 2025; **Sample size:** A total of 130 infertile women with age range 20-40 years (Mean ± SD: 26 ± 5), 73 with primary infertility and 57 with secondary infertility were included; **Inclusion criteria:** Women with more than one year of sub-fertility within the age range of 20-40 years with necessary clinical and laboratory investigations were included and the body mass index (BMI) of the respondents were calculated; **Exclusion criteria:** Infertile women above 40 years of age and couples not willing to participate and without necessary investigations were excluded from the study; **Data collection method:** Data were collected using structured questionnaire by face-to-face interview of respondents from the OPDs of the two selected Hospitals. Data were checked and calculated as percentages and presented in tables with statistical analyses; **Ethical issues:** National and international ethical guidelines for biomedical research involving human subjects were followed throughout the study (15,16,17).

RESULTS

The data were analyzed statistically as the number (percentage) of respondents (Infertile women, n=130) and are presented in the tables i.e. Table-1, Table-2, Table-3, Table-4, Table-5 and Table-6 respectively as stated below.

Table-1: Distribution of Patients According to Pattern of Body Mass Index (BMI)

Pattern of BMI*	Number of patients (N, %)	Age (Years)		Overall age Mean±SD (Years)
		Range	Mean± SD	
<18.5 (Thin)	11 (8.4)	20-30	25±3	26±5

URL: http://dx.doi.org/10.14738/bjhr.1204.19075.

18.5-24.9 (Normal)	56 (43.1)	19-40	27±7	
25.0-29.9 (Over Weight)	46 (35.4)	18-37	26±6	
>30.0 (Obese)	17 (13.1)	18-37	26±5	
Total Patients (N, %)	130 (100)	18-40	26±6	
Chi-squared (x^2) test	x^2 = 56.83, df = 3, p<0.01			

*BMI: Body Mass Index, N: Number of Patients, %: Percentage, p≤0.05: Significant, p>0.05: Not significant.

Table-2: Distribution of Patients According to Type of Infertility and Pattern of BMI

Type of infertility	Pattern of BMI (N, %) *				Total Patients (N, %) *
	<18.5	18.5-24.9	25.0-29.9	>30.0	
Primary infertility with normal menstrual cycle	7	18	11	2	38
Primary infertility with oligomenorrhea	1	14	12	7	34
Primary infertility with heavy bleeding	1	-	-	-	1
Primary infertility (Total)	9 (6.9)	32 (24.7)	23 (17.7)	9 (6.9)	73 (56.2)
Chi-squared (x^2) test	x^2 = 34.29, df = 3, p<0.02				
Secondary infertility with normal menstrual cycle	-	12	10	3	25
Secondary infertility with oligomenorrhea	1	9	14	5	29
Secondary infertility with heavy bleeding	1	2	-	-	3
Secondary infertility (Total)	2 (1.5)	23 (17.7)	24 (18.5)	8 (6.1)	57 (43.8)
Chi-squared (x^2) test	x^2 = 51.81, df = 3, p<0.01				
Grand Total (N, %)	11 (8.4)	55 (42.5)	47 (36.1)	17 (13.0)	130 (100)
Chi-squared (x^2) test	x^2 = 43.64, df = 3, p<0.01				

*BMI: Body Mass Index, N: Number of Patients, %: Percentage, p≤0.05: Significant, p>0.05: Not significant.

Table-3: Distribution of Patients According to Type of Infertility and Psychological Features

Type of infertility	Psychological Features			Total Patients (N, %) *
	None	Anxiety	Depression	
Primary infertility with normal menstrual cycle	34	1	3	38
Primary infertility with oligomenorrhea	26	2	6	34
Primary infertility with heavy bleeding	-	1	-	1
Primary infertility (Total)	60 (46.2)	4 (3.1)	9 (6.9)	73 (56.2)
Chi-squared (x^2) test	x^2 = 46.17, df = 2, p<0.02			
Secondary infertility with normal menstrual cycle	23	1	1	25
Secondary infertility with oligomenorrhea	26	1	2	29
Secondary infertility with heavy bleeding	1	-	2	3
Secondary infertility (Total)	50 (38.5)	2 (1.5)	5 (3.8)	57 (43.8)
Chi-squared (x^2) test	x^2 = 74.27, df = 2, p<0.01			
Grand Total (N, %)	118 (90.8)	3 (2.3)	9 (6.9)	130 (100)
Chi-squared (x^2) test	x^2 = 193.45, df = 2, p<0.005			

* N: Number of Patients, %: Percentage, p≤0.05: Significant, p>0.05: Not significant.

Table-4: Clinical Investigative Findings According to Type of Infertility in Patients

Type of infertility	Transvaginal (TV) Scan*			Total Patients (N, %) *
	Normal	Fibroid	PCOS	
Primary infertility with normal menstrual cycle	25	8	5	38
Primary infertility with oligomenorrhea	11	7	16	34
Primary infertility with heavy bleeding	-	1	-	1

Primary infertility (Total)	36 (27.8)	16 (12.3)	21 (16.1)	73 (56.2)
Chi-squared (x^2) test	x^2 = 19.92, df = 2, p<0.02			
Secondary infertility with normal menstrual cycle	11	8	6	25
Secondary infertility with oligomenorrhea	13	4	12	29
Secondary infertility with heavy bleeding	1	2	-	3
Chi-squared (x^2) test	x^2 = 42.33, df = 2, p<0.01			
Secondary infertility (Total)	25 (19.2)	14 (10.8)	18 (13.8)	57 (43.8)
Grand Total (N, %)	61 (46.9)	30 (23.1)	39 (30.1)	130 (100)
Chi-squared (x^2) test	x^2 = 11.74, df = 2, p<0.05			

* TV: Transvaginal, N: Number of Patients, %: Percentage, p≤0.05: Significant, p>0.05: Not significant.

Table-5: Laboratory Results (Hormonal) In Patients and on Husband's Semen Analysis According to Type of Infertility

Type of Infertility	Laboratory Test Results (Hormonal) In Patients and Husband's Semen Analysis *												Total (N, %)
	LH	FSH	TT	PRL				Husband's Semen Analysis					
	NA	NA	NA	Nm	L	H	Total	Nm	Oligo	Oligo(↓M)	Azoa	Total	
Primary infertility with normal menstrual cycle	38	38	38	36	-	2	38	28	4	4	2	38	38
Primary infertility with oligomenorrhea	34	34	34	34	-	-	34	27	3	3	1	34	34
Primary infertility with heavy bleeding	1	1	1	1	-	-	1	1	-	-	-	1	1
Primary infertility (Total)	73	73	73	71 (54.6)	0 (0.0)	2 (1.6)	73 (56.2)	56 (43.1)	7 (5.4)	7 (5.4)	3 (2.3)	73 (56.2)	73 (56.2)
Chi-squared (x^2) test/PRL				x^2 = 100.21, df = 2, p<0.005				x^2 = 83.78, df = 3, p<0.01					
Secondary infertility with normal menstrual cycle	25	25	25	25	-	-	25	20	2	2	1	25	25
Secondary infertility with oligomenorrhea	29	29	29	29	-	-	29	25	2	1	1	29	29
Secondary infertility with heavy bleeding	3	3	3	2	-	1	3	3	-	-	-	3	3
Secondary infertility (Total)	57	57	57	56 (43.1)	0 (0.0)	1 (0.7)	57 (43.8)	48 (36.9)	4 (3.1)	3 (2.3)	2 (1.5)	57 (43.8)	57 (43.8)
Chi-squared (x^2) test				x^2 = 88.35, df = 2, p<0.01				x^2= 87.77, df = 3, p<0.01					
Grand Total (N, %)	130	130	130	127 (97.7)	0 (0.0)	3 (2.3)	130 (100_	104 (80.1)	11 (8.5)	10 (7.6)	5 (3.8)		130 (100)
Chi-squared (x^2) test				x^2 = 242.61, df = 2, p<0.005				x^2 = 210.35, df = 3, p<0.005					

*LH: Luteinizing Hormone, FSH: Follicular Stimulating Hormone, TT: Testosterone, PRL: Prolactin, Nm: Normal, L: Low, H: High, N: Number, %: Percentage, NA: Not available, p≤0.05: Significant, p>0.05: Not significant

Table-6: Thyroid Function Test Results (Hormonal) in Patients According to Type of Infertility

Type of Infertility	Thyroid Function Test Results (Hormonal) In Patients*						Total (N, %) *
	T3	T4	TSH				
			Nm	L	H	Total	
Primary infertility with normal menstrual cycle	NA	NA	34	-	4	38	38
Primary infertility with oligomenorrhea	NA	NA	32	1	1	34	34
Primary infertility with heavy bleeding	NA	NA	1	-	-	1	1

URL: http://dx.doi.org/10.14738/bjhr.1204.19075.

Primary infertility (Total)	NA	NA	67 (51.6)	1 (0.8)	5 (3.8)	73 (56.2)	73 (56.2)
Chi-squared (x^2) test			x^2= 88.16, df = 2, p<0.01				
Secondary infertility with normal menstrual cycle	NA	NA	25	-	-	25	25
Secondary infertility with oligomenorrhea	NA	NA	26	-	3	29	29
Secondary infertility with heavy bleeding	NA	NA	2	-	1	3	3
Secondary infertility (Total)	NA	NA	53 (40.7)	-	4 (3.1)	57 (43.8)	57 (43.8)
Chi-squared (x^2) test			x^2= 81.13, df = 2, p<0.01				
Grand Total (N, %)	NA	NA	120 (92.3)	1 (0.8)	9 (6.9)	130 (100)	130 (100)
Chi-squared (x^2) test			x^2= 204.35, df = 2, p<0.005				

*T3: Triiodothyronine, T4: Thyroxine, TSH: Thyroid Stimulating Hormone, Nm: Normal, L: Low, H: High, N: Number, %: Percentage, NA: Not available, p≤0.05: Significant, p>0.05: Not significant.

DISCUSSION

The findings regarding various aspects of medical and clinical investigative findings in our infertile women (respondents) have been presented in the respective tables with statistical analyses i.e. in Table-1, Table-2, Table-3, Table-4, Table-5 and Table-6 respectively.

Distribution of the respondents according to age and pattern of BMI are presented in Table-1. It showed that quite a large number i.e. is 63 (48.5%) of them belonged to overweight and obese categories (x^2= 56.83, df= 3, p<0.01). The distribution of the respondents according to the type of infertility and pattern of BMI are stated in Table-2. Among the women with primary infertility (73,56.2%), 38 were with normal menstrual cycle, 34 were with oligomenorrhea and only 1 with heavy bleeding. Among the women with secondary infertility (57,43.8), 25 were with normal menstrual cycle, 29 were with oligomenorrhea and only 3 were with heavy bleeding. It also indicated that women belonging to primary infertility and secondary infertility were similarly affected due to BMI (Primary infertility: x^2= 34.29, df = 3, p<0.02; Secondary infertility: x^2= 51.81, df = 3, p<0.01). Also, both the categories together showed the similar pattern i.e. majority of them (64,49.1%) belonged to overweight and obese categories (x^2= 43.64, df = 3, p<0.01).

Similarly, the distribution of respondents according to the type of infertility and presence of psychological features are presented in Table-3. Most of the infertile women, in both types of infertility had no psychological features with minority of them having anxiety and depression (Primary infertility: x^2= 46.17, df = 2, p<0.02; Secondary infertility: x^2= 74.27, df = 2, p<0.02). Also, both primary and secondary infertility together showed the similar pattern (x^2= 193.45, df = 2, p<0.005). In Table-4, clinical investigative findings in the respondents according to the type of infertility are presented. The transvaginal (TV) scan showed significant presence of fibroids and PCOS in both categories of infertility and in combination of both, although majority of the respondents had normal findings by TV scan (Primary infertility: x^2= 19.92, df = 2, p<0.02; Secondary infertility: x^2= 42.33, df = 3, p<0.01; Both together: x^2= 11.74, df =2, p<0.05).

Serum hormonal tests in infertile women and their husband's semen analysis results are presented in Table-5. It was disappointing that many of the serum hormonal test results i.e. for FSH, LH and TT were not available. Only the results on serum PRL levels were available and

they were mostly normal for both the categories individually and together (Primary infertility/PRL: x^2= 100.21, df = 2, p<0.005; Secondary infertility/PRL: x^2= 88.32, df = 2, p<0.01; Both together/PRL: x^2= 242.61, df =2, p<0.005). Regarding husband's semen analysis, majority of them had normal pattern and very minority of them had oligospermia and azoospermia as stated in Table-5 (Primary infertility: x^2= 83.78, df = 3, p<0.01; Secondary infertility: x^2= 87.77, df = 3, p<0.01; Both together: x^2= 210.35, df =3, p<0.005). As stated in Table-6, only serum TSH test results were available which showed similar patterns as for PRL levels (Table-5) i.e. mostly in the normal range of TSH (Primary infertility/TSH: x^2= 88.16, df = 2, p<0.01; Secondary infertility/TSH: x^2= 81.13, df = 2, p<0.01; Both together/TSH: x^2= 204.35, df =2, p<0.005).

The results of previous studies reported from Bangladesh have been mentioned earlier (10,11,12,13) Those studies had considerable limitations such that infertile women of single centre only were evaluated on a small population for a limited period of time. However, the results of our present study suggested that higher BMI is a possible contributory factor for women infertility (Table-1). Our finding was supported by Roy who reported that women's age, age at marriage and BMI significantly contribute to women infertility (13). The presence of oligomenorrhea seemed to be quite high in both the primary as well as secondary infertility, although majority of the infertile women in both categories had normal menstrual cycle (Table-2). Regarding psychological features, 60/130 (46.2%) women with primary infertility, 50/130 (38.5%) with secondary infertility and both together 118/130 (90.80%) infertile women were normal having no psychological features, although anxiety and depression were present in very low percentages in our respondents (Table-3). However, several authors observed and reported that anxiety, depression and stress were significantly present more in infertile women then fertile women (18,19,20).

Interestingly, TV scan detected fibroids and PCOS in both categories of women infertility, although, majority of the respondents (primary and secondary infertility together) revealed normal ovarian features (61/130, 46.9%) with 30 (23.1%) fibroids and 39 (30.1%) PCOS and infertile women with oligomenorrhea were mostly affected (Table-4). Serum PRL levels were mostly normal for both categories of infertility individually and together as well (127/130, 97.7%). These results ruled out the possibility of role of PRL in women infertility particularly in our respondents. Husband's semen analysis also showed normal pattern with very minority of them had oligospermia and azoospermia eliminating the male factor for infertility in our infertile women respondents. The possibility of involvement of thyroid disfunction was also eliminated as serum TSH levels were mostly normal (120/130, 92.3%) in both categories of infertility together (Table-6).

Several investigators highlighted the lack of consistency in the definition of infertility in women through their systemic review of literature on prevalence studies measuring infertility (13,14). In global perspectives, the health community had great success in improving maternal and child health in the past decades, partly due to a focus on reproductive health. But surprisingly, even though infertility is a critical component of reproductive health, it has been neglected in these efforts (13,21). In Bangladesh, infertility issue is ignored in country's reproductive health policy, instead, the prominence has always been related to overpopulation and controlling fertility (14,15).

URL: http://dx.doi.org/10.14738/bjhr.1204.19075.

Gurunath et al highlighted the lack of consistency in definition of infertility through their systemic review of literature on prevalence studies measuring infertility (14). The WHO also adds that women whose pregnancy spontaneously miscarries, whose pregnancy results in a still birth, without ever having a live birth would present with primarily infertility (22). Based on their findings, they identified several risk factors for women infertility such as women's age, age at marriage, BMI, education level, religion, wealth, etc (12,23,24). Thus, definition of women infertility should be taken into consideration while including or excluding respondents for the studies on women infertility. However, knowledge about sexual and reproductive health has been a great concern for every woman and it is an integral part of women's overall health (23,24). Chowdhury et al reported a negative association between women's empowerment and the control of fertility and reproductive health. They recommended that greater policy focus should be directed toward women empowerment factors to improve the fertility situation and reproductive health status in Bangladesh and other countries (24). In 2022, Ahmed et al observed in adolescent girls and women in three isolated rural communities of Bangladesh that norms of privacy and silence, local beliefs and a culture of shame led to belief that human body is 'natural' and does not require formal sexual and reproductive health care and child marriage high (25). We reported that rural women were far behind compared to urban women about the levels of knowledge on, and attitude towards, women's sexual and reproductive health (26).

In conclusion, therefore, Bangladeshi women's age for risk of infertility and legal age at marriage should be identified and women should maintain their standard BMI to avoid infertility complexity. High quality counseling should be given to minimize the implications of infertility for women. It is high time to consider women infertility as a serious emerging issue in Bangladesh. Women infertility is not merely an individual concern, rather it is a public health issue nationally. However, the limitations of the present study were that it was conducted evaluating the infertile women from two centers only in Dhaka city, sample size was small and the study was conducted for a short period of time. Therefore, further studies are warranted taking into consideration overcoming the limitations of the present study and also including investigations for molecular genetic factors and further psychological features in infertile women in Bangladesh.

ACKNOWLEDGEMENT'S

The authors would like to appreciate the authorities of Impulse Hospital, ImHSMRCLtd, 304/E Tejgaon Industrial Area, Dhaka-1208, Bangladesh and also Popular Diagnostic Center, Mirpur/Pallabli, Dhaka-1216, Bangladesh for providing permission to use their facilities and the patients. The authors would like to convey their special thanks to the participating respondents without whom the study would not have been possible. Also, the authors would like to thank Mr. Palma Shuvo, IT Programmer, Impulse Hospital, ImHS&RCLtd, Tejgaon Industrial Area, Dhaka-1208, Bangladesh for computer composing the manuscript.

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