

Evaluation of Validity of Ultrasonography findings in the Diagnosis of Subfertility

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Abstract: Infertility is more of a social problem rather than a medical problem. The term "subfertility" used to describe any form of reduced fertility that results in a prolonged duration of unwanted lack of conception. The difficulty to conceive or subfertility constitutes a major social and psychological burden amongst couples especially in lower-middle country like Bangladeshi women. Accurate and precise diagnosis is mandatory prior to management of case. Although there are many diagnostic tests available, the clinical presentation of each patient can usually be linked to specific and efficient testing strategies. Ultrasonography is an accurate and reliable test for evaluation of subfertility. Ultrasonographic imaging is easy to use, safe, and readily available noninvasive means to evaluate fertility potential. The purpose of the study is to evaluate and correlate the clinical findings with ultrasonography finding of the subfertile female patient. A hospital based cross sectional study conducted Department of obstetrics & Gynecology (Infertility unit), Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka. Sample was selected from the population by Purposive sampling. All subjects were subfertility in reproductive age group. Total 50 patients were enrolled for study after fulfilling inclusion and exclusion criteria Detail demographic data were collected from the patients and recorded in structured case report form. All collected questionnaire checked very carefully to identify the error in the data. Data processing work consist of registration schedules, editing computerization, preparation of dummy table, analyzing and matching of data. Maximum numbers of patients (62.0%) were between 20-30 years age group with mean age was 26.47 ± 11.57 years. Detailed history taking, examination suggested that, etiology for subfertility were (14%) for tubal factors and (26%) ovarian factors. Clinical and pathological factors for subfertility were verified by pelvic ultrasonography in all the cases. In case of female infertility, uterine factors account for 32% of the cases. Among the uterine causes, fibroids or myomas in the uterus found (16%) cases, endometrial thickening (10%), endometrial polyp and endometriosis (6%) cases. Ovarian factors like polycystic ovary syndrome (PCOS) found (18%) cases. In 24% of women, USG tests were normal and there is no easily identifiable cause for infertility. Subfertility is not an uncommon problem in our country, major social, personal and economical burden. When pregnancy is considered such an important event in life, and considered a "socially unacceptable condition", it can lead to a search for treatment appropriately and accurately. Aetiology of infertility are numerous and presentation also variable, sometimes confusion occurs regarding the actual diagnosis and thus delay the prompt management which may result in poorer clinical outcome. Therefore proper clinical evaluation with sonographic and other pathological findings correlation, interpretation helps to proper diagnosis, treatment and prevention as well..

Keywords: Subfertility, Ultrasonography.

INTRODUCTION

The effect of infertility can lead to social shaming from internal and social norms surrounding pregnancy, which affects women around the world. Infertility may be caused by an underlying medical condition that may damage the fallopian tubes, interferes with ovulation, or causes hormonal

complications. These clinico-pathological conditions include pelvic inflammatory disease, endometriosis, polycystic ovarian syndrome, premature ovarian failure, uterine fibroids and environmental factors. Other causes of infertility in females include ovulation problems, tubal blockage, age-related factors, uterine problems, previous tubal ligation and hormone imbalance while

the main cause of male infertility is poor semen quality [1]. Female infertility affects an estimated 48 million women with the highest prevalence of infertility affecting people in South Asia, Sub-Saharan Africa, North Africa/Middle East, and Central/Eastern Europe and Central Asia [2]. Accurate diagnosis and proper clinical evaluation can reduce the burden of infertility in our society.

Infertility is a complex disorder with significant medical, psychosocial, and economic problems [3]. Data from population - based studies suggest that 10-15 % of couples in the world experience infertility [4]. There is no unanimous definition of female infertility, because the definition depends on social and physical characteristics which may vary by culture and situation. NICE guidelines state that: "A woman of reproductive age who has not conceived after 1 year of unprotected vaginal sexual intercourse, in the absence of any known cause of infertility, should be offered further clinical assessment and investigation along with her partner" [5]. According to the World Health Organization (WHO), infertility can be described as the inability to become pregnant, maintain a pregnancy, or carry a pregnancy to live birth [6]. A clinical definition of infertility by the WHO and ICMART is "a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse" [7].

It is important to understand the normal conception mechanism and process prior to fertility tests and treatments. First, ovary release (ovulate) an egg, which must be picked up by the fallopian tube. Sperm must travel through the vagina, into the uterus, and up into the fallopian tube in order to fertilize the egg. Fertilization usually takes place in the fallopian tube. Then, the fertilized egg, or embryo, travels down the fallopian tube to the uterus, where it implants in the uterine lining and develops. A problem that develops in any part of this process can lead to infertility [8].

Ovulation disorders account for major aetiology for infertility. These can be caused by flaws in the regulation of reproductive hormones by the hypothalamus or the pituitary gland, or by problems in the ovary itself. Polycystic ovary syndrome (PCOS) is an ovulation disorder. Damaged or blocked tube (tubal infertility) is another factor for female infertility. Several uterine or cervical causes can impact fertility by interfering with implantation or increasing the likelihood of a miscarriage. Benign polyps or tumors (fibroids or myomas) are common in the uterus, and some types can impair fertility by blocking the fallopian tubes or by disrupting implantation.

Proper diagnosis and assessment can reduce the burden of infertility. Fertility tests may include: ovulation testing. Other hormone levels, such as prolactin, also may be checked. Diagnostic evaluation of ovarian factors are- Cycle day 3 follicle stimulating hormone (FSH) and Estradiol (E2), thyroid stimulating hormone (TSH), prolactin, androgens (testosterone; DHEAS and 17-OHP if hirsutism present) [9]. Hysterosalpingography is another important test.

Ultrasonographic imaging is an effective, easy to use, safe, and readily available noninvasive means to evaluate fertility potential. It has become one of the most useful tools available to assess the causes of infertility and to implement many of the treatments used to ameliorate infertility [10]. Ultimately, ultrasonography improves the quality of care provided by the assisted reproductive technologies (ART) by facilitating rapid diagnosis and the visualization of changes in reproductive physiology required to direct therapy. The objective of this study was to evaluate and detect the clinical findings with ultrasonography finding of the subfertile female patient attending in hospital.

MATERIALS & METHODS

A descriptive cross-sectional study, conducted in the Infertility unit of Bangabandhu Sheikh Mujib Medical University (BSMMU), women who presented with infertility from reproductive age group and ultimate management for infertility. This is a questionnaire based cross sectional study. The study protocol included a thorough history taking regarding age, sociodemographic features, etc were noted in detail. A thorough clinical examination including general physical examination, systemic and gynecologic examinations was done meticulously. All the recruited patients subjected to routine investigations like hemoglobin, ESR, LFT, Random blood sugar, urine examination, hormone assessment, T₃, T₄ and TSH. Then all patients subjected to ultrasound abdomen and pelvis. All tests report was assayed by same laboratory by same technique in BSMMU. Patient data, clinical & laboratory findings was noted and correlated.

RESULT

Maximum numbers of cases (62.0%) were between 20-30 years age group, next (24.0%) were 31-40 years age group. Mean age was 26.47 ± 11.57 years. Large numbers of respondents came from urban area (58%) (Table-1). Socioeconomically patients are grouped into three classes. Among the patients the poor class 26(52%) comprising the major percentage of the patients, which is followed by upper class 14(28%) and remaining are middle class 10(20%).

Table-1: Demographic characteristics of the patients (n=50)

Demographic Profile		
	<i>Number of Pt (n=50)</i>	<i>Percentage (%)</i>
Age (yr.)		
<20	6	12.0
20-30	31	62.0
31-40	12	24.0
>40	1	2.0
<i>Mean ± SD</i>	<i>26.47 ± 11.57</i>	
Residence		
Rural	15	30.0
Urban	29	58.0
Slum	6	12.0

On evaluation of clinical manifestation, abnormal uterine bleeding was most common symptoms, present in 88% cases; next common symptoms were abdomi-

nal pain (76%), lump in lower abdomen (26%), Feeling of heaviness in lower abdomen (54%), loss of appetite, dyspepsia (50%), and weight gain (26% of cases).

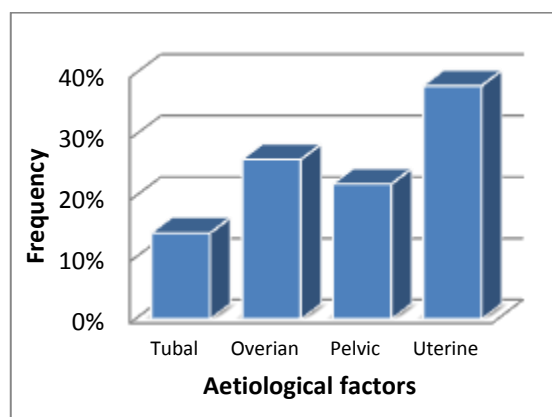


Fig-1: Nature and types of subfertility according to clinical diagnosis (n=50)

Detailed history taking, thorough clinical examination, and routine labs workup suggested that, etiology for subfertility were, (14%) for tubal factors, (26%) ovarian factors, (22%) pelvic pathology and (38%) for uterine factors by evaluation of medical records, examination findings (Figure-1). Ultrasonography findings revealed that, uterine factors

account for 32% of the cases. Among the uterine causes, fibroids or myomas in the uterus found (16%) cases, endometrial thickening (10%), endometrial polyp and endometriosis (6%) cases. Ovarian factors like polycystic ovary syndrome (PCOS) found (18%) cases. In 24% of women, USG tests were normal and there is no easily identifiable cause for infertility (Table-2).

Table-2: Ultrasonography findings of the Subfertile Patients (n=50)

USG findings	Frequency	Percentage (%)
Polycystic ovary syndrome (PCOS)	9	18.0
Fibroids or myomas in the uterus	8	16.0
Endometrial thickening	5	10.0
Endometrial polyp	1	2.0
Endometriosis	2	4.0
Pelvic inflammatory disease	8	16.0
Tubal infertility	2	4.0
Cervicitis	3	6.0
Normal findings	12	24.0

Finally clinical and lab report findings correlated with ultrasonography findings.

Ultrasonography is an accurate and reliable imaging technique for diagnosis of pelvic pathology. We found

79% accuracy rate and 73% accuracy rate in diagnosis of uterine aetiology and pelvic factors for subfertility respectively. On the other hand fewer cases matched in diagnosis of tubal factors. So, Ultrasonography considered as invaluable for the evaluation of uterine

and pelvic pathology because it provides easy visualization of the external appearance of the fallopian tubes, ovaries, panoramic and magnified view of other pelvic organs (Table-2).

Table-3: Correlation of clinical diagnosis with USG findings (n=50)

Types of Subfertility	Clinical & patho. diagnosis	Match with USG		Accuracy (%)
		Yes	No	
Tubal Factors	7	2	5	28.57%
Ovarian Factors	13	8	5	61.53%
Pelvic disease	11	8	3	72.72%
Uterine factors	19	15	4	78.94%

Ultrasonographic imaging is an effective, easy to use, safe, and readily available noninvasive means to evaluate fertility potential. Study estimated that 79% accuracy rate and 73% accuracy rate in diagnosis of

uterine aetiology and pelvic factors for subfertility respectively. On the other hand fewer cases matched in diagnosis of tubal factors (Figure-2).

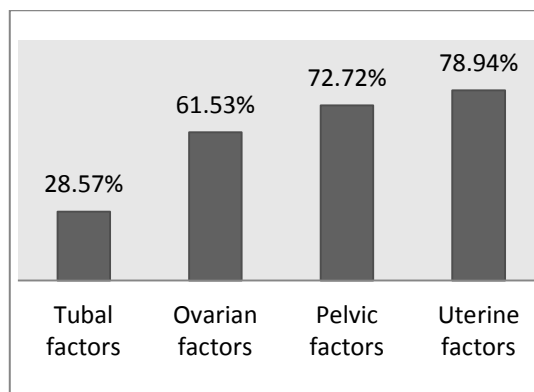


Fig-2: Nature and types of subfertility according to clinical diagnosis (n=50)

DISCUSSION

Infertility is defined as the inability of a couple to conceive after unprotected and adequate sexual intercourse. It is a problem of global proportions affecting 10-15% of the couples. In case of female infertility, uterine factors account for 10-15% of the cases [11]. A woman's fertility is affected by her age. In this study mean age of the patients was 26.47 ± 11.57 years. Frequency of subfertility rises with ageing. Study show that, 36 to 45 years were more prevalent for subfertile disorders among women's of reproductive age, observed in (52.0%) cases, and following that prevalence of disease gradually decreased with raised age. All these findings correlate with the results of similar studies at home and abroad. The average age of a girl's first period (menarche) is 12-13 (12.5 years in the United States [12], 12.9 in the UK [13], but, in postmenarchal girls, about 80% of the cycles are anovulatory in the first year after menarche, 50% in the third and 10% in the sixth year [14]. A woman's fertility peaks in the early and mid 20s, after which it starts to decline, with this decline being accelerated after age 35. However, the exact estimates of the chances of a woman to conceive after a certain age are not clear,

with research giving differing results. Another study reported that, fertility declines with age. Female fertility is at its peak between the ages of 18 and 24 years [15], while, it begins to decline after age 27 and drops at a somewhat greater rate after age 35 [16].

Present study shows that, age, smoking, sexually transmitted infections, and being overweight or underweight can all affect fertility. Family history of infertility and previous obstetrics abnormalities with pregnancy were found as a strong associated factor. About twelve percent women answered 'yes' when they are asked whether any in their immediate relation like parents, siblings, children, uncles and aunts, grand parents have known history of infertility. The association of other risk factors was obesity present in 26.0% cases; H/O DM was 10.0% cases and previous surgery 16.0% cases. Findings are consistent with result of other study. Study demonstrated that, tobacco smoking is harmful to the ovaries, and the degree of damage is dependent upon the amount and length of time a woman smokes or is exposed to a smoke-filled environment. Cigarette smoking interferes with folliculogenesis, embryo transport, endometrial

receptivity, endometrial angiogenesis, uterine blood flow and the uterine myometrium.¹⁷ Smokers are more likely to be infertile than non-smokers. Sexually transmitted infections are a leading cause of infertility. They often display few, if any visible symptoms, with the risk of failing to seek proper treatment in time to prevent decreased fertility [18].

Clinical and pathological factors for subfertility were verified by pelvic ultrasonography. In case of female infertility, uterine factors account for 32% of the cases. Among the uterine causes, fibroids or myomas in the uterus found (16%) cases, endometrial thickening (10%), endometrial polyp and endometriosis (6%) cases. Ovarian factors like polycystic ovary syndrome (PCOS) found (18%) cases. In 24% of women, USG tests were normal and there is no easily identifiable cause for infertility. Findings are consistent with result of other study. Fatima N et al¹¹ reported that, tubal factors like pelviperitoneal adhesions, hydrosalpinx, proximal tube obstruction, endometriosis etc. account for about 40% of the cases of female infertility.

Ultrasonography is a accurate and reliable imaging technique for diagnosis of pelvic pathology. In our study correlation was done clinical, supportive pathological report findings with ultrasonography findings. We found 79% accuracy rate and 73% accuracy rate in diagnosis of uterine aetiology and pelvic factors for subfertility respectively. On the otherhand small number of cases matched in diagnosis of tubal factors. So, Ultrasonography considered as invaluable for the evaluation of uterine and pelvic pathology because it provides easy visualization of the external appearance of the fallopian tubes, ovaries, panoramic and magnified view of other pelvic organs.

CONCLUSIONS

Subfertility is a global health issue affecting majority of couples. It is a multidimensional problem with social, economic and cultural implications, which can take threatening proportions in countries with demographic problems, such as Bangladesh. The effect of subfertility can lead to social shaming from internal and social norms surrounding pregnancy, which affects women around the world. Present study shows that, infertility is caused by many sources, including nutrition, diseases, and other malformations of the uterus, polycystic ovary syndrome, anovulation, endometriosis, pelvic inflammatory disease, Uterine fibroids etc.

There is several investigation protocols for diagnosis of subfertility, but USG is modern, cheap and non-invasive technique than other. Nowadays ultrasound is an accepted method in the diagnostic procedures of this field. It permits the visualization of the position and size of the uterus, Fallopian tubes and ovaries, the exclusion of genital anomalies and the demonstration of physio-

logical changes of these organs during the menstrual cycle. Ultimately, ultrasonography collaborates & validates the clinical-pathological profile, improves the quality of care by facilitating rapid diagnosis and the visualization of changes in reproductive physiology.

REFERENCES

1. Eniola, O. W., Adetola, A. A., & Abayomi, B. T. (2017). A review of Female Infertility; important etiological factors and management. *Journal of Microbiology and Biotechnology Research*, 2(3), 379-385.
2. Mascarenhas, M. N., Flaxman, S. R., Boerma, T., Vanderpoel, S., & Stevens, G. A. (2012). National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. *PLoS medicine*, 9(12), e1001356.
3. Kuohung, W., Hornstein, M. D., Barbieri, R., & Barss, V. (2009). Overview of treatment of female infertility. *UpToDate*, Waltham, MA. Accessed, 3(22), 17.
4. Evers, J. L., & Collins, J. A. (2003). Assessment of efficacy of varicocele repair for male subfertility: a systematic review. *The Lancet*, 361(9372), 1849-1852.
5. National Collaborating Centre for Women's and Children's Health (UK). (2004). *Fertility: assessment and treatment for people with fertility problems*. RCOG press.
6. World Health Organization. 2013. "Health Topics: Infertility". Available <http://www.who.int/topics/infertility/en/>. Retrieved November 5, 2015.
7. Zegers-Hochschild, F., Adamson, G. D., de Mouzon, J., Ishihara, O., Mansour, R., Nygren, K., ... & Van der Poel, S. (2009). The international committee for monitoring assisted reproductive technology (ICMART) and the world health organization (WHO) revised glossary on ART terminology, 2009. *Human reproduction*, 24(11), 2683-2687.
8. Infertility: An Overview. A Guide for Patients Revised 2012. American Society for Reproductive Medicine. Visit www.ReproductiveFacts.org
9. Pisarska, M. Evaluation and Treatment of Female Infertility. David Geffen School of Medicine at UCLA.
10. Chizen, D., & Pierson, R. (2010). Transvaginal ultrasonography and female infertility. *Glob libr women's med*.
11. Fatima, N. (2015). Role of Laparoscopy In Infertility. Free paper abstract book. 58th All India Congress of Obstetrics & Gynaecology. Chennai, INDIA.
12. Anderson, S. E., Dallal, G. E., & Must, A. (2003). Relative weight and race influence average age at menarche: results from two nationally

- representative surveys of US girls studied 25 years apart. *Pediatrics*, 111(4), 844-850.
13. http://vstudentworld.yolasite.com/resources/final_year/gynae_obs/Hamilton%20Fairley%20Obstetrics%20and%20Gynaecology%20Lecture%20Notes%202%20Ed.pdf
 14. Apter, D. (1980). Serum steroids and pituitary hormones in female puberty: a partly longitudinal study. *Clinical endocrinology*, 12(2), 107-120.
 15. Agboola, A. (2004). Textbook of Obstetrics and Gynaecology. *Heinman Educational Books, Ibadan, 1*, 174-176.
 16. Hall, C. T. (2007). Smokers, your addiction is all in your head, study finds. *San Francisco Chronicle*, January, 25.
 17. Dechanet, C., Anahory, T., Mathieu Daude, J. C., Quantin, X., Reyftmann, L., Hamamah, S., ... & Dechaud, H. (2010). Effects of cigarette smoking on reproduction. *Human reproduction update*, 17(1), 76-95.
 18. FERTILITY FACT > Female Risks By the American Society for Reproductive Medicine (ASRM). Retrieved on Jan 4, 2009.