



International Journal of Pharmacology

ISSN 1811-7775

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Male Infertility in Bangladesh: What Serve Better-Pharmacological Help or Awareness Programme?

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Abstract: Treatment of male infertility is one of the challenging tasks in developing nation given the nature of tradition and superstition of 'professed confidentiality'. Traditionally, the issue of human infertility is mainly considered 'infertility in women' which is a mistaken and orthodox attitude. Due to a number of constraints especially collecting data, research in this area is often ignored. However, since it is a vital area to investigate in order to mapping the scenario and to provide policy guidance especially for awareness and for further course of actions of both governmental and institutional as well as family levels, we took an initiative to work at this area using the small amount of data available at Infertility Treatment and Research Centre (ITRC), in Bangladesh. Since July 2004 about 9000 couples have been recorded and evaluated at the ITRC. Three semen analyses have been made with an interval of one week. Special care was taken for collection, preservation and analysis in respect of macroscopic, microscopic and biochemical analysis. Repeated microscopic examination has been made in some cases to avoid errors. The fructose test was done for azoospermic in every sample at ITRC laboratory. Our study indicates that in 60% cases, male are responsible for Infertility either fully or partially. Of them 40% were azoospermia 34% were oligospermic and the rest 5% were asthenospermia and teratospermia 1% case was due to non descendent and mal development of testes rest per cent was design as unexplained infertility. This paper suggests that awareness on male infertility helps more than having medical treatment with pharmacological aid and supplement.

Key words: Male infertility, post coital test, spin bracket test, policy, Bangladesh

INTRODUCTION

Infertility is a graver concern affecting couples including loss of status within the family and community. About 20% men could suffer worldwide from fertility problems and the rising level of male infertility has become a serious trepidation for public health (Orbiclinc, 2011). Fertility has been the main study of civilization since immemorial time but the progression is rather sluggish. Infertility can be defined as the incapacity to fulfill pregnancy after 12 months of unprotected sex (Orbiclinc, 2011; Gaur *et al.*, 2007). Global data confirms that male are to be responsible either fully or partially for 35-40% cases of infertility, while female partners are responsible for 35-40% and the remaining 20-30% is the combination of couples and a small percentage of unknown causes (Orbiclinc, 2011). Generally, infertility risk factors particularly for the case of male may append by gland infection, mumps orchitis, varicocele and

cryptorchidism (Okonofua *et al.*, 1997; Berger, 1990). According to Orbiclinc (2011), common causes of male infertility include low sperm counts; abnormal morphology (shape and size of sperm), slow sperm motility (movement) and related problems with semen. Several studies have demonstrated that hazardous effect by environmental factors such as toxic substances radiation and pesticides can affect the male reproductive function (Upton, 2002). The abuse of tobacco, alcohol and caffeine also has been seen as a way of linkage with male infertility (Oladejo and Brieger, 2000; Zhang *et al.*, 2000; Kunzle *et al.*, 2003). However, the intensities of risk factors for male infertility in different countries and regions vary and the identification of major risk factors in any particular country would have importantly significant to public health.

In developing countries, patterns of infertility are quite different from those in developed countries and the incidence of preventable infertility is much higher in

developing countries (Bashed, 2011). Many cases of male infertility require sophisticated and expensive treatment. Therefore, the addressing the issue of male infertility appears to be one of the priority tasks of infertility programmes in the developing countries; Bangladesh is not an exception. Traditionally, the major focuses of fertility problems in the past have been the female partners. Infertility as a socio medical problem can be considered in Bangladesh because male infertility adversely and negatively causes family unrest, multiple marriages, divorce and even sometime suicide. There are about three million couples in Bangladesh are infertile and it is increasing rapidly changing in socio economic norm. Unfortunately like other developing nations, wives in Bangladesh are mostly blamed albeit husbands are responsible for 60% happenings.

There are ample literature can be found on the issues on human diseases and diagnosis, women infertility, medial problem, pharmaceutical issues, drug inefficiencies, diagnosis difficulties, social and socioeconomic issues and negative incidents, research in men infertility is yet to receive much attention (Arora and Samples, 2011; Rafi *et al.*, 2011; Risvanli, 2011; Attitalla, 2011; Osman, 2011; Raja *et al.*, 2010; Rahman, 2010; Mathur *et al.*, 2010; Moeini *et al.*, 2009; Lokesh, 2009; Saki *et al.*, 2009; Pasqualotto *et al.*, 2008; Iheukwumere *et al.*, 2008; Ghasemzad *et al.*, 2007; Lorzadeh *et al.*, 2007; Jensen *et al.*, 2006; Mayyas *et al.*, 2005; Golam Sadik *et al.*, 2001; Agarwal *et al.*,

1995; Alexander and Anderson, 1989; Lastikka *et al.*, 1976). However, male infertility studies are rather scare in the related literature, particularly in Bangladesh (Nikbakht and Hemadi, 2012; Anwary *et al.*, 2011; Akhter *et al.*, 2011; Abdalla, 2011; Bashed, 2011; Karthishwaran *et al.*, 2010; Saalu, 2010; Osibote *et al.*, 2010; Tayrab *et al.*, 2010; Abbasalizadeh *et al.*, 2008; Tabarraie *et al.*, 2008; Zeighami *et al.*, 2007).

A number of factors that can cause or contribute (medical, socio-economic and environmental) to male infertility are such as by (a) infections, (b) surgery of the reproductive tract, (c) damage to the vas deferens (vasectomy), (d) scrotal varicose veins (varicocele), (e) depression, (f) exposure of the testes to high temperatures, (g) use of tobacco, marijuana, or alcohol, (h) medical conditions (diabetes), (i) genetic or hormonal problems, (j) testicular injury, (k) change of environment, (l) indiscriminate use of contraceptive (m) dietary, intake of fruits, vegetables and grains and (n) socio economic condition and pressure (Fig. 1). In our study an analytical approach is used to figure out and to justify the prevailing disagreements in Bangladesh by providing specific evidences. Therefore, this study intended to comprehend the major gaps in the subject matter by providing specific evidences by a socio medical problem. Doing the above, this study understands the necessary provision and expanded roles of partners as wives are mostly blamed in Bangladesh.

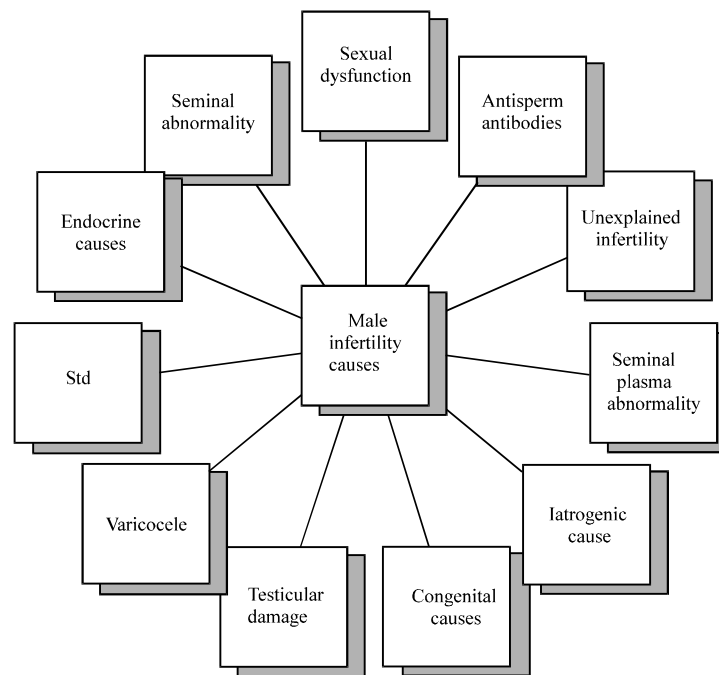


Fig. 1: WHO diagnostic categories for male infertility cause Rowe *et al.* (2000) and WHO (2000)

MATERIALS AND METHODS

This study considered a sample of 9000 couples since 2004. The comprehensive methodology of the evaluation and recorded process has been used (Bashed, 2011). Briefly, three semen analyses have been made with an interval of one week. Analyses have been made as per WHO (2000) schedule (Fig. 1). Special care was taken for collection, preservation and analysis in respect of macroscopic, microscopic and biochemical analysis. In some cases repeated microscopic examination has been made in a particular sample. In azoospermic cases, fructose test was done in every sample at the ITRC laboratory by the same pathologist. The following steps have been done to find out the scenario of male infertility in Bangladesh.

Semen collection and test: The semen quality and movement are important than the number. To be an effective fertile, at least 50% of the sperm should be motile for 2 h after ejaculation. Normal human semen contains a great variation in number and verity of abnormalities in sperms shapes and even motility than most of the mammalian species. Generally, up to 40% of sperm may show abnormal morphology without any basis for infertility. It has been emphasized that abnormal morphology is more important in diagnostic sense than its questionable affect on infertility. Normal ejaculation has a volume between 1 to 6 cc. Lower volume associated with absence of sperm in the post coital test suggest the need of artificial insemination. However, we have used several methods such as IVF (Invito Fertilizatin), ICSI (Intra-cytoplasm Sperm Injection), IVM (In Vitro Maturation) but IUI (Inter uterine Insemination) gives better outcome than others applied (Fig. 2).

The entire specimen has been collected because there are variations in both sperm count and movement between the first and second ejaculation. All collections

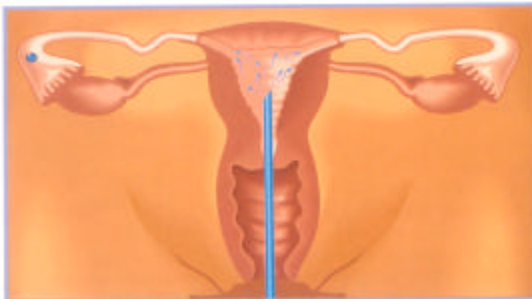


Fig. 2: IUI (Inter uterine insemination) ITRC, Dhaka, Bangladesh

are made in a reasonable hygienic condition, ventilated clear room with hygienic environment. Several cautions have been also taken care in the semen collection. For example, an attempt to collect by withdrawal, during intercourse runs the risk of missing rich portion and collection in a condom can decrease the motility due to spermicidal agents. Frequent coitus may degrade motility and count of sperm. As advised, time period of abstinence of intercourses as 48 h abstinence for collection was taken care to have better result.

Finally, men with Klinefelter syndrome have taken care of as usually have small testis and azoospermia. Varicocele, Hydrocele, hemia is most important factors for impotency and in turn influencing semen quality and fertility. We have been also cautious during our sample collection as speculation concerning the effect by a possible elevation in testicular temperature and local pressure. Whereas the physical examination of the male does not uncover the abnormality, testicular biopsy PESA, MESA, TESA (Testicular Sperm Aspiration), TESE (Testicular Sperm Extraction) utilized to find out the abnormality and infertility azoospermia associated with normal spermatogenesis and ductile obstruction (Fig. 3). We made a decision in conclusion of infertility, if the biopsy reveals complete hyalinization and fibrosis of the seminal tubules.

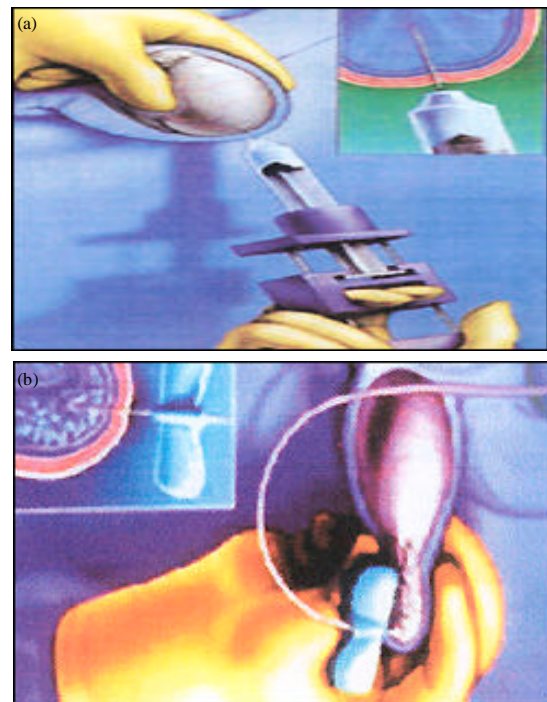


Fig. 3(a-b): PESA (Percutaneous epididymal sperm aspiration) ITRC, Dhaka, Bangladesh



Fig. 4: A Normal Sperm, ITRC, Dhaka, Bangladesh

Leutinising hormone: Testosterone therapy once was popular but lately, it has been limitedly considered. Unlike hormone therapy we have utilized Leutinising Hormone (LH) and Human Chronic Gonadotropin (HCG). As the sperm motility is more important for fertility than increase the sperm count, therefore, we exploited Leutinising Hormone (LH). Some embryologist suggest the use of Human Chronic Gonadotropin (HCG) to identify male infertility but it is reported to increase the sperm count but to have only a limited effect on sperm motility. However, the recently Human Menopausal Gonadotropin (HMG) preparations which have Follicular Stimulation Hormone (FSH) and Leutinising Hormone (LH) have become available. The advantages of using HMG and LH is the easily establishment of spermatogenesis (Fig. 4). A number of European investigations have reported improvement in the semen quality of oligospermic cases that have normal pituitary function, therefore, is advised by sampling study (Bashed, 2011).

Frequency of exposure: Infertile couples concern the optimum frequency of expose to achieve pregnancy. The frequency of sexual relation may have bearing with fertility. However, men with border line semen numbers of daily exposure may depress the counts to a level where

Table 1: Summary Statistics of male patients in ITRC, Dhaka, Bangladesh

No. of patients (couples)	9000
Male patient	5400
Average Age (in years)	36
Average income (per month) BDT*	12000.00
Average conjugal life	8 years
Azoospermia	40%
Oligospermia	34%
Asthenospermia	5%
Teratospermia	1%
Socio-economic	20%
Block of Vas	56%
Others	10%
Pregnancy out	34%
Cost of treatment (BDT)**	
IUI	62000-70000
IVF	250000-300000
ICSI	300000-400000
IVM	350000-500000

*BDT (Bangladesh Taka), Bangladeshi Currency, Exchange Rate US\$1: BDT 72.4 as in the late 2010, **Cost involvement as followed by including investigation

chances for pregnancy are diminished. Persistence and infrequent coitus or premature ejaculation may require sexual counseling.

FINDINGS

General portrait: About 9000 couples were investigated in the Infertility Treatment and Research Centre (ITRC) since 2004 and of them 5400 male were found fully or partially responsible for the cases of infertility. Therefore, about 60% of our sampling males are somehow suffering for infertility. According to our findings of the male patients, 40% were azoospermic, 34% were oligospermic, 5% were asthenospermia and teratospermia 1% cases. Moreover, in another test 56% found block of Vas and 34% found pregnancy out, 20% by socioeconomic issues, 10% for other issues (Table 1). The main causes of azoospermia are due to measles, mumps, tuberculosis, trauma, small pox, STD and our sampling indicates that the case history are very common in Bangladesh. The average age of male patients was reported as 36 years with a mean age of marital life was 8 years.

RATIO OF INCOME AND EXPENDITURE

The average monthly income of an infertile man is BDT 12000.00 equivalent to USD 150. The treatment at Infertility Treatment and Research Centre (ITRC) includes IUI (Inter Uterine Insemination), IVF (Invito Fertilizatin), ICSI (Intra-cytoplasm Sperm Injection) and IVM (*In vitro* Maturation) with the cost ranges from BDT 62,000 to

500,000. Since three out of five infertilities fully or partially attributed due to male factors, it is incumbent on the family physician to be knowledgeable in this field. According to our study, we find that after the initial semen analysis it is the responsibility of doctor to determine whether specialist consultation is required or not. There are still great deals of confusion concerning which factor contributes for not forming normal sperm. We have come out on the findings that 50% of pregnancies decrease when the sperm count drops below 30 million per/cc which is heavily surrounded within the males in Bangladesh.

EFFICIENCY OF FIVE METHODS ADOPTED

We have observed specifically five methods in our study to test the infertility (i.e. IUI, IVM, ICSI and ICVM). According to our sampling and study, we find that IUI give better and satisfactory result than others. This method is also deemed as the most cost effective one. Our findings indicate that not more than 0.5cc of sperm can be safely installed into the uterus to get the pregnancy. Therefore, ITRC prefers to insert very high quality wash sperm after meticulous monitoring of ovulation. We also utilize highly reported washed motile sperms to the uterus by means of Teflon polyethylene catheter to test the pregnancy and infertility. The patient remains on the table in a modified Trendelenburg positing for at least 40 min.

DISCUSSION

We have observed several risk factors that are directly or indirectly linked with the causes of male infertility in Bangladesh. They are, (a) age, (b) occupational exposure, (c) drinking alcohol and caffeinated beverages, (d) smoking and infertility, (e) psychological stress and (f) certain environmental and lifestyle factors. A recent study estimates that the prevalence of infertility among couples which was 40% male, 50% female and 10% involve both sexes (Anwary *et al.*, 2011). Another study was also conducted by Akhter *et al.* (2011) and according to their findings infertility among couples was present primary infertility in 61.9% and secondary infertility in 38%, a positive male factor alone was found in 13% of couples and their findings also indicated that oligospermia was the very common cause in Bangladesh.

Studies have shown that blood testosterone level decline with age and the risk of becoming infertile doubled in men who are over 35 years old compared with men who are under 25 years old and five times longer to conceive

at the age of 45 (Pasqualotto *et al.*, 2008). Production of testosterone hormone begins to decrease around the age of 40, sperm quality changes with aging, also there is a decrease in the semen volume, motility and normal morphology (Bayer *et al.*, 2007). Some studies point out that some solvents that are used in industry may have an adverse effect on male reproductive function like carbon disulphide that had shown to affect semen quality but in low exposures had shown no effect (Multigner *et al.*, 2007). The exposure to glycol ethers in work place associated with decrease in the semen quality (Multigner *et al.*, 2007; Jensen *et al.*, 2006). Furthermore, welding may reduce the quality and quantity of semen, likewise, occupations in which the workers exposed to heat they have reduced sperm count (Jensen *et al.*, 2006). Also workers in agriculture or in a pesticide factory may experience a negative effect on reproduction (Jensen *et al.*, 2006). Furthermore, mercury and copper can interfere in spermatogenesis (Queiroz and Waissmann, 2006).

Studies also find that consumption of alcohol and caffeinated beverages has significant affect on infertility especially moderate to heavy alcohol intake (Okonofua *et al.*, 2005). Drinking caffeinated beverages may interfere with fertility in men; a man who consumes more than three cups of tea daily is associated with decreased fertility (Curtis *et al.*, 1997). Researches found that smoking has the potential to damage a man's fertility in three areas: the quality of his sperm, his ability to have sexual intercourse and his libido. Studies have found that smoking men are more likely to produce sperm that has not been properly formed and is generally of a poorer quality than the sperm of non-smokers. They have also found signs of DNA or chromosome damage in smokers' sperm. Furthermore, nicotine releases secondary products in the body that have been found to reduce the mobility of sperm, meaning that a smoker's sperm may be at a disadvantage when it comes to swimming to meet his partner's ovum and that she has a smaller chance of getting pregnant (Chia *et al.*, 2000). Research has shown that smoking reduces a man's desire for sex. Carbon monoxide, one of the chemicals found in cigarettes has the potential to reduce a man's testosterone level-that influences negative impact of sex drive (Gaur *et al.*, 2007; Chia *et al.*, 2000) Some studies also found that occupational stress was negatively correlated with the proportion of normal sperm (Jensen *et al.*, 2006). The semen parameters of the men who are under stress are significantly decreased (Collodel *et al.*, 2008). Level of stress as occupational stress is negatively correlated with the proportion of normal sperm (Jensen *et al.*, 2006).

POLICY DIRECTION FOR AWARENESS PROGRAMME

This study discovered that infertility in men is guided by nature mainly, however, there are elements from our economy, society, lifestyle, work atmosphere, drinking and food habit and some livelihood issues that supplement and subsidize the infertility in men. No policy or awareness programme may help in reducing the issue of infertility in men caused by nature. However, policy guidance and awareness programme may help in addressing this unpleasant and cruel issue of family life where infertility in men is caused through other variables discovered. A further direction set up in this regards would also save the women for being the exclusive victims for the issue of infertility as both genders can be responsible for this.

It is thus, alongside with the medical treatment, government can help by imposing some effective governance and regulatory controls to these social and economic issues. Particularly, government can interfere in some options such as; on use of tobacco or alcohol, change of environment, indiscriminate use of contraceptive, occupational exposure, dietary intake, medical condition socio economic condition and certain lifestyle factors. Government may need to produce a policy document in consultation with different stakeholders, beneficiaries and partners for development to have a written guideline to address unwanted abuses and the fact experienced in this regards (Alam *et al.*, 2012, 2013).

CONCLUSION

Most of the developing countries have been suffering to place an effective and appropriate policy in the national development agendas and health and family planning mainly due to financial limitations (Al-Amin and Alam, 2011; Zarra-Nezhad and Hosainpour, 2011). Providing a decent policy may not be easy and straight forward but a starting would probably take a long way to reach the goal one day. However, now there is no alternative of being providing education and adequate knowledge and information to infertile men as part of social mobility that may improve the situations since simple changes in lifestyle can improve fertility which may not be received by expanding a lot of money.

ACKNOWLEDGMENTS

This study is the outcome of primary data sources with no conflict of interest. We have our cordial

acknowledgment to Infertility Treatment Research Center (ITRC), Mohammadpur, Dhaka1207, Bangladesh to carry out the study.

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