



MALE INFERTILITY AND RELATED RISK FACTORS IN B AND C TEACHING HOSPITAL

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ABSTRACT

Infertility has become an ominous problem. On an average, about 10% of all couples face difficulty in starting a family and this creates a feeling of great personal failure, particularly in developing countries where religious and socio-economic traditions have made it almost imperative for everyone to have children. An association has been found between impaired semen quality including sperm count, motility and morphology. In this study, the various contributory aetiological factors i.e., blood relatives, tumors, chronic illness, STDs, genital infection, surgery, smoking and modern life style had been discussed which have a serious impact on male infertility. In this research we analyzed data from various sources and present evidences of the possible etiology and risk factors for male infertility, there is a need to emerge at the indiscriminate use of tobacco smoking, excessive alcoholism, and STDs to control infertility.

KEYWORDS: Male infertility, Oligospermia, Asthenospermia, Teratozoospermia and Azoospermia.

INTRODUCTION

Infertility affects more than 80 million people around the globe, with one in 10 couples experiencing primary or secondary infertility. Infertility is more prevalent in those countries defined as the infertility belt, namely the central and the southern African countries, and developing countries, where as many as one-third of the couples in some populations are unable to conceive.^[1] Globally, the overall prevalence ranges between 8%–12%, with a core prevalence of primary infertility of about 5%.^[1,2] The causes of infertility have been attributed to a variety of anatomical, genetic, endocrinological and immunological factors.^[3]

The majority of the gynecological workload in the developing world is attributed to infertility problems.^[4] Infertility problems are understudied at all biological, clinical and epidemiological perspectives; up to 30% of the causes of infertility are idiopathic.^[5] Prevention and appropriate treatment of infertility in terms of concrete strategies of actions are lacking.

Infertility poses severe ramifications at the cultural, social and emotional levels. It directly affects the lives of married couples resulting in distress, anxiety, blame and marital and sexual problems.^[6] This is compounded by the limited availability of infertility treatments especially in the poorest and most affected developing countries.^[1,4]

Epidemiological studies assessing the prevalence of and risk factors for, infertility are relatively scarce in the developing world. On one hand, there is international community neglect, as infertility is considered a natural check on population growth in countries with high fertility levels. On the other hand, a range of logistical and methodological problems exists pertaining to carrying out epidemiological infertility research in the developing world. Conducting sound studies on infertility, in general, and male infertility, in particular, is significantly controversial in male patriarchal societies, which relate fertility with masculinity. Many cases of male infertility in those societies remain unidentified. As such, the accurate estimation of the prevalence of this condition and its contributing factors or causes is an issue of major uncertainty globally.^[1]

Infertility is defined as the state in which a couple wanting a child cannot conceive after 12 months of unprotected intercourse.^[7] It is a problem faced by couples rather than individuals. Among the causes of infertility, about half of them could be traced to the male partner. When efforts to have children are unsuccessful, feelings of helplessness, frustration and despair are common; it can be a major life crisis for many couples. They go through enormous emotional crisis and psychological distress, as their friends and peers begin to have children.

Male infertility

In men, the main causes of infertility are oligospermia, asthenospermia, teratozoospermia and azoospermia, which account for 20–25% of cases.^[8] There are a number of risk factors such as STD involving *N. gonorrhoeae* and *C. trachomatis*. These cause changes in semen quality and chronic infection may lead to a block of the vas deferens or seminal vesicles.^[10] Mumps, though rare in adults, can result in azoospermia. Anatomical abnormalities such as varicocele, vesicular damage due to torsion and obstruction of testicular sperm passage can all lead to male infertility. It is however, believed that nonobstructive azoospermia has a strong genetic basis.^[11] Male infertility can occur either as an isolated disorder or within the framework of a known complex disorder or syndrome. There is an excess of autosomal abnormalities in men with non-obstructive azoospermia or severe oligospermia. Besides, congenital bilateral absence of the vas deferens (CBAVD) associated with the phenotype of CFTR gene mutations cause obstructive azoospermia.^[12]

This research seeks to assess the underlying factors of this condition in a society. It specifically aims to investigate the impact of various risk factors on male infertility – reproductive infections, traumas and illness, lifestyle.

MATERIALS AND METHODS

Study Design and Population

The study was conducted among males at a reproductive age attending B & C Teaching Hospital. The total number of males who participated in the study was 287. Out of those 120 were infertile and the remaining 167 were fertile males. The study excluded males with a duration of infertility less than one year. Convenient sampling technique was used according to their sequence of arrival during the study time.

Specimen collection and processing

Semen samples were obtained by masturbation in the laboratory Procedure Room after a recommended period of 3–5 days of sexual abstinence and was processed in clinical laboratory by standard operating protocol described by WHO (WHO Manual for the Examination of Human Semen) with some modifications.

Data Processing and Analysis

Data generated was subjected to statistical treatment using SPSS software. Percentages, Frequency tables and graphs were used to summarize and present the data. Chi-square was applied to see the possible presence of association. Besides, odds ratio was calculated to determine the strength of association between the variables. P- Value less than 0.05 was taken as significant.

RESULTS

The research was conducted among infertile males and fertile males who attended B & C Teaching Hospital

(n=287). Out of 287 males, 120 were infertile males who were complaining of fertility problem and 167 were fertile males who came to visit their wives in the post delivery room.

The mean age of the infertile males was 38.63 ± 9.4 years with a minimum of 23 years and maximum of 72 years. Out of the infertile males 40.8%, 40.9% and 18.3% were between the age of 20-35, 36-45 and greater than 46 years respectively. Out of the infertile males 59.2%, 27.5%, 10% and 3.3% had a duration of infertility of 1-5 years, 6-10 years, 11-15 years and more than 15 years respectively.

Table: 1 Gross description of the study subjects attending B & C Teaching Hospital.

Characteristics	Infertile males (n=120)	Fertile males (n=167)
Age		
20-35 years	49(40.8%)	36(21.6%)
36-45 years	49(40.8%)	83(49.7%)
More than 46 years	22(18.3%)	48(28.7%)

Risk Factors associated with male infertility

The presence of possible underlying risk factors among participants were assessed by filling the structured questionnaire, related to the basic demographic, medical, surgical, reproductive history, recent illnesses, treatment, familial history of infertility, occupational history, associated risk factors, consumption of alcohol, tobacco over the last 6 years, sexuality, lifestyle and duration of infertility as indicated in table 2.

The responses associated with the medical risk factors from infertile males were found to be; the Yes responses for having a blood relative with a fertility disorder were 20% and there were also 80% No respondents. The Yes respondents for having tumor were 8.3% and the No respondents were 91.7%. The Yes respondents for having chronic illnesses were 12.5% and the No respondents were 87.5%. The Yes respondents for having sexually transmitted diseases were 33.3% and 66.7% responded No for having sexually transmitted diseases. The Yes respondents for having genital infection before puberty were 5.8% and there were 94.2% No respondents. The Yes respondents for having surgery regarding their reproductive organs were 2.5% and there were 97.5% No respondents.

With regard to habits among the infertile males, The Yes responses for smoking were 35% and there were 65% No respondents. The Yes responses for consuming tobacco were 10.8% and there were 89.2% No respondents. There were 1.7% Yes respondents for consuming illegal drugs and the remaining 98.3% were No respondents for consuming illegal drugs. The Yes responses for taking excessive alcohol were 40.8% and there were 59.2% No respondents.

All the above risk factors and practices in relation to male infertility were found to be statistically significant with the exception of having surgery in the reproductive organ, consumption of illegal drugs and having chronic

illness. In order to see the strength of the association of the risk factors and practices between the fertile and infertile males, odds ratio was calculated as shown in table 2.

Table: 2 strength of the association of the risk factors and practices between the fertile and infertile males.

Risk Factors		Infertile (n=120)	Fertile (n=167)	Total (n=287)	Odds ratio	P - Value
Blood relative	Yes	24(20%)	10(6%)	34(11.8%)	3.925(1.799-8.564)	.000
	No	96(80%)	157(94%)	253(88.2%)		
Tumor	Yes	10(8.3%)	2(1.2%)	12(4.2%)	7.5(1.612-34.888)	.005
	No	110(91.7%)	165(98.8%)	275(95.8%)		
Chronic illness	Yes	15(12.5%)	16(9.6%)	31(10.8%)	1.348(0.639-2.846)	.447
	No	105(87.5%)	151(90.4%)	256(89.2%)		
STDs	Yes	40(33.3%)	12(7.2%)	52(18.1%)	6.458(3.209-12.996)	.000
	No	80(66.7%)	155(92.8%)	235(81.9%)		
Genital infection	Yes	7(5.8%)	0(0%)	7(2.4%)	2.50*10 ⁻⁹ (2.509*10 ⁻⁹)	.002
	No	113(94.2%)	167(100%)	280(97.6%)		
Surgery	Yes	3(2.5%)	0(0%)	3(1%)	8.915*10 ⁻⁸ (8.915*10 ⁻⁹)	.072
	No	117(97.5%)	167(100%)	284(99%)		
Smoking	Yes	42(35%)	43(25.7%)	85(29.6%)	1.553(0.932-2.588)	.010
	No	78(65%)	124(74.3%)	202(70.4%)		
Tobacco	Yes	13(10.8%)	4(2.4%)	17(5.9%)	4.951(1.573-15.587)	.004
	No	107(89.2%)	163(97.6%)	270(94.1%)		
Illegal drugs	Yes	2(1.7%)	0(0%)	2(0.7%)	3.252*10 ⁻⁸ (3.252*10 ⁻⁸)	.174
	No	118(98.3%)	167(100%)	285(99.3%)		
Alcohol intake	Yes	49(40.8%)	8(4.8%)	57(19.9%)	13.717(6.175-30.467)	.000
	No	71(59.2%)	159(95.2%)	230(80.1%)		

DISCUSSION

General note on the study

Infertility affects more than 80 million around the globe, with one in ten couples experiencing primary or secondary infertility. Globally, the overall prevalence ranges between 8%–12%, with a core prevalence of primary infertility of about 5%.^[1,2] The causes of infertility have been attributed to a variety of anatomical, genetic, endocrinological and immunological factors.^[3] The majority of the gynecological workload in the developing world is attributed to infertility problems.^[4] Infertility problems are understudied at all biological, clinical and epidemiological perspectives; up to 30% of the causes of infertility are idiopathic.^[5] Prevention and appropriate treatment of infertility in terms of concrete strategies of actions are lacking. In developing countries, patterns of infertility are quite different from those in developed countries. Generally speaking, the incidence of preventable infertility is much higher in developing countries.^[13] The exact prevalence rate of male infertility in the general population of Mechi Zone of Nepal is unknown, and the only data available is the intermittent course of three months, case report of male infertility from B& C Teaching Hospital. In light to this, this study being a cross-sectional study which the objectives of assessing male infertility and its related risk factors in B& C Teaching Hospital could be described as the first study of its kind in Mechi zone of Nepal.

This study identified the common semen abnormality by assessing semen quality (liquefaction time, volume, pH, sperm motility, sperm count and morphology) and identified the possible risk factors associated with male infertility in Mechi Zone B & C Teaching Hospital, with fertility problem. Comparisons of the risk factors were made between fertile men whose wives gave birth during the study time and infertile men included in the study. Evaluation of risk factors between those two groups were made based on detailed questionnaires related to personal information, medical history, clinical presentation, associated risk factors, and consumption of alcohol, and tobacco over the last 6 years. Additionally knowledge and attitude of the study participants were determined parallel with the practices and risk factors related to male infertility. The study subjects were 120 infertile males who were complaining of fertility problem and 167 fertile males who came to visit their wives in the post delivery room. The study subjects were selected using convenient sampling according to their sequence of arrival. The study excluded infertile males having duration of infertility less than a year. This is because according to the world health organization, infertility is defined as the state in which a couple wanting a child cannot conceive after one year of unprotected intercourse. After taking informed consent, data was collected on self administered questionnaire comprising of personal data of the participants, knowledge on the major causes of infertility, attitude on the treatment of infertility and risk factors known to expose the males to

fertility problem. Infertile males after filling consent and questionnaire were requested to give semen sample where as the fertile males only filled the questionnaire. Because they were not volunteers to give semen sample for analysis.

Risk factors associated to male infertility

Risk factors and practices known to expose an individual to male fertility problem were assessed. A total of ten risk factors and practices were included in the questionnaires. In this study the number of frequencies and percentages of the risk factors and practices from the total number of participants (n=287) in descending order were found to be smoking 29.6%, consumption of alcohol 19.9%, sexually transmitted diseases 18.1%, having a blood relative with a fertility disorder 11.8%, chronic illness 10.8%, consumption of tobacco 5.9%, genital infection 2.4%, surgery 1% and consumption of illegal drug 0.7%.

When risk factors; having a blood relative with a fertility disorder, tumor, chronic illness, genital infections, previous surgery and sexually transmitted diseases were compared among the fertile and infertile males, the responses were found to be much higher in the infertile males rather than the fertile males. With regard to the habits; smoking cigarettes, consumption of tobacco and consumption of illegal drugs, the responses were found to be much lower in the fertile males in comparison to the infertile males. Since the infertile males were exposed more to the risk factors they had reduced sperm quality and quantity, which leads them to infertility. All the risk factors and practices were statistically significant, with the exception of having previous surgery in the reproductive organs, consumption of illegal drugs and having chronic illnesses. In order to see the strength of the association of the risk factors and practices, odds ratio were calculated. Those males who had STDs had 6.5 times higher risk (95% CI; 3.209-12.996) of getting infertility than those who hadn't STDs. Those males who had tumor had 7.5 times higher risk (95% CI; 1.612-34.888) of getting infertility. Those males who were taking heavy alcohol had 13.7 times higher risk (95% CI; 6.175-30.467) of getting infertility.

In a similar study which was conducted by Sin Eng – Chia *et al*, the frequency were found to be 50% smokers, 39.7% alcohol consumers. Comparison of this finding to the exposure of the risk factors showed a little difference with the finding in this study. Another study which was conducted by G.Bayasgalan *et al* in Mongolia found out 48.8% smokers, 14.9% alcohol consumers, 1.8% had previous surgery, and 26.3% had STDs. When results were compared with the finding in this study it was found to be higher. In another similar study which was conducted by J.F.Velez de la *et al*, in a military population of France the frequency of the risk factors and practices were found to be 51.6% tobacco consumers, 52% alcohol consumers, 5.3% having genital infection and 3.1% surgery. The finding in this research indicated

low response by the study subjects to the presence of the risk factors related to smoking, alcohol intake, consumption of tobacco and consumption of illegal drugs as compared with other similar studies. This might be associated due to the cultural, social and religious believes, which is considered as taboo in the society. The reason behind such a low response rate among the study subjects to the question of having previous surgery might be associated with low surgical practices in the reproductive organs.

CONCLUSION

The study out of the risk factors and practices associated with male infertility, the major risk factors and practices were found to be smoking, consumption of alcohol, sexually transmitted diseases. Majority of the fertile males were not exposed to the risk factors related to fertility problem as compared to the infertile males. All the risk factors and practices were statistically significant with the exception of having previous surgery in the reproductive organs, consumption of illegal drugs and having chronic illnesses.

Among the infertile males the variables that had statistically significant correlation with sperm abnormality were: smoke and previous histories of STDs. Those infertile males who were smoking cigarettes had 46.875 times higher risk of getting asthenozoospermia than those who didn't smoke. The result showed that those infertile males who had STDs had 29.4 times higher risk of getting hypospermia than those who hadn't STDs. And that those infertile males who had STDs had 5.778 times higher risk of getting azoospermia and 0.778 times higher risk of getting oligospermia than those who hadn't STDs. In conclusion that oligozoospermia was the major cause of infertility among the laboratory findings. Smoking, and having history of STDs were significant predictors for infertility among the males.

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