e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(9); 1102-1105

Original Research Article

In Relation to Male Infertility, the Environment and Occupational Risk Factor

Komal Gupta

Assistant Professor, Department of DNB (Family Medicine), Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India

Received: 25-06-2023 / Revised: 28-07-2023 / Accepted: 30-08-2023
Corresponding author: Dr. Komal Gupta
Conflict of interest: Nil

Abstract:

Introduction: Male infertility describes a man's inability to conceive a child with a fertile woman. Forty to fifty percent of human infertility is caused by male causes. Male infertility is frequently brought on by a decline in sperm quantity and quality. The main objective of this study was to identify the environmental risk factors that may be affecting Lord Buddha Koshi Medical College and Hospital in Bihar's declining male fertility.

Method: 300 infertile males were chosen and assessed for this cross-sectional descriptive study using convenience sampling.

Results: As a result of their direct exposure to pesticides and other chemicals, people who applied pesticides are more likely to experience infertility. When they drink alcohol and smoke, a higher percentage of males (39.18%) are infertile. Men who have been exposed to chemicals exhibit sperm destruction and low sperm counts.

Conclusion: A variety of contributing factors may be to blame for the multifactorial illness process known as male infertility. Pesticide residues, xeno-estrogens, and dietary and lifestyle decisions could all have a negative impact on spermatogenesis. The negative societal effects should be lessened by taking action to raise awareness of the problem and by looking into male partners first.

Keywords: Alcoholism, Infertility, Environmental Variables, and Workplace Exposure.

Introduction

Male infertility describes a man's inability to conceive a child with a fertile woman. When known female causes of infertility are ruled out and semen quantity and quality don't meet WHO standards, male infertility is taken into account [1]. Even though the root cause and scope may differ depending on where in the world you are, it is a global issue that affects people from all communities. Infertility is a social injustice and inequality issue as well as a health issue [2]. In more than 50% of cases, the precise etiology of male infertility is still unknown [3].

In general, job risks and way of life are connected to environmental factors in male infertility. A variety of contributing factors may be to blame for the multifactorial illness process known as male infertility. There is a link between infertility and work-related exposure to heat, pesticides, chemicals, altered hormonal changes, sedentary lifestyles, consumption of animal fats, smoking, and dietary changes. These factors have a negative impact on sperm morphology, time to conception, changes in motility, and an overall increase in the number of abnormal sperm [4,5].It is well recognized that metals like lead, cadmium, and mercury, pesticides, glycol ethers, printing, adhesives, and exogenous heat all negatively affect sperm production [6]. There is strong evidence that spermatogenesis is impaired in chronic drinkers, and that sperm counts and testosterone levels are decreased [7, 8].

Urbanization and industrialization have drastically altered lifestyles, which has gradually increased the number of environmental risk factors. Humans are exposed to noxious substances such as lead in the air, arsenic, chromium, and benzene in drinking water, pesticides and chemical fertilizers in agricultural water and soil that will result in contaminated crops, the use of hormones and drugs in animal husbandry and the presence of their residues, such as steroidal hormones in meat and dairy products, and the increasing use of smog. crop contamination production usage of synthetics and preservatives in the food business, the use of hormones and pharmaceuticals in animal husbandry, and the presence of their residues, such as steroidal hormones in meat and dairy products [9] Given the foregoing context, the objective of

the current study is to examine environmental risk factors, particularly emerging risk factors, on reducing male fertility in Lord Buddha Koshi Medical College and Hospital in Bihar.

Method:

300 infertile males were chosen and assessed for this cross-sectional descriptive study using convenience sampling. The study materials are from infertile males from various socioeconomic backgrounds and communities who sought medical care at three private infertility clinics in Saharsa. These clinics have the necessary infrastructure in place for conducting any type of clinical investigation into male or female infertility. At the time of the interview, the interviewees were given a brief overview of the study's objectives and told that participation was entirely voluntary, their anonymity would be protected, they could withdraw from the study at any time, and the information they provided would be used only for the needs of the study.

All male clinic patients were enrolled and examined by history, clinical examination, and investigations like urine R/E, ultrasound abdomen/pelvis and scrotum, and semen analysis after receiving ethical committee approval and obtaining informed consent. Patients were asked about their current job and daily activities in addition to providing a thorough work history that included both current and previous occupational exposures. Patients were also informed that the researcher would be in charge of maintaining the confidentiality of their data and that they could ask for its deletion at any time.

Any medical condition that prohibits them from becoming pregnant and any neurological or psychiatric disorder are considered exclusion criteria. In addition to conducting clinical investigations on the sample, a validated questionnaire about living styles was also used to gather information about the causes of infertility. The outcomes obtained in this manner have been evaluated critically and presented.

Results:

Table 1 shows that 32 people (17.58%) who worked as businesspeople, computer operators, engineers, and other sedentary jobs had infertility. 86 (23.31%) of the instances included mechanics or workshop technicians. Goldsmiths, medicine manufacturers, and employees in other businesses that expose their workforce to harmful substances that interfere with normal spermatogenesis make up 110 (27.90%) of the total. Under private jobs, teachers, officials, and police, 52 (13.56%) were listed. 12 (10.31%) belonged to the X-ray, health, and doctor departments. 8 (7.25%) were within the categories of agricultural workers, painters, and labourers; in particular, individuals who applied pesticides were at higher risk due to their direct exposure to pesticides and other chemicals.

Table 1: Distribution of infertile men based on their professions

Occupation	Number	Percentage
Painters/labors/Agriculture	8	7.25%
Doctor/Health dept./X-ray dept.	12	10.31%
Private jobs/ Teachers/ Officials/ police	52	13.56%
Gold smith /Drug factories/ workers in industries	110	27.90%
Drivers/mechanic/technician/workers/ sportsmen	86	23.31%
Business/ Sedentary/ Computer operator/Engineer	32	17.58%

Table 2 displays the distribution of the sample by habit type. Based on the drinking and smoking behaviors of infertile men, it is found that a higher percentage (39.18%) of men is infertile when they engage in both activities. However, when drunkenness and smoking are taken into account separately, infertility rates for smokers are 32.51% and 23.91%, respectively. It demonstrates that infertility and drinking and smoking are strongly associated.

Table 2: Distribution of infertile men based on drinking and smoking use

Habit Type	Number	Percentage
Normal	25	4.38%
Smoking & Alcoholism	150	39.18%
Alcoholism	45	23.91%
Smoking	85	32.51%

Numerous poisons, including toluene and glycol ethers, lower the sperm count. Polyvinyl chloride, or phthalates, will reduce sperm counts. Lead (found in batteries, ceramics, and plastic) lowers sperm count and affects fertility. Pesticides and chlorinated hydrocarbons are likely to have a negative effect on sperm damage and sperm count.

Discussion

Infertility is a pretty widespread condition in the world, and numerous academics have made great efforts to delve into the statistics and reasons of this issue. In general, lifestyle and professional factors are connected to environmental factors in male

infertility. In the current study, the prevalence of infertility among businessmen and executives was noted. This may be due to higher psychological stress and strain experienced by businesspeople and other executives. Infertility is a known result of stress and pressure [10]. Males of all ages today work in greater numbers of sedentary professions and engage in more sedentary hobbies and less physical activity [11]. Agricultural workers are more at risk since they are directly exposed to pesticides and other chemicals, especially when spraying pesticides. Studies have documented the impact of chemicals and pesticide exposure on the ability of these workers to reproduce, as well as the effects of occupational exposure to various chemical agents on those working in cement factories and chemical facilities [12].

It has been noted that more men (39.18%) are infertile when they smoke and drink often. Other studies have found a pattern similar to this one, showing that smokers had a 60% higher risk of infertility than non-smokers. Smoking increases the probability of an IVF pregnancy miscarrying by 30% and decreases the likelihood that an IVF pregnancy will result in a live birth by 34% [13]. Other research demonstrates that smoking harms male sperm generation, motility, and morphology and raises the risk of DNA damage [14]. Thus, there is substantial evidence that smoking has harmful effects on fertility that act through a variety of routes in both the general population and the infertile population. Furthermore, there is strong evidence that spermatogenesis is impaired in chronic drinkers, and that sperm counts and testosterone levels are decreased [7,8]. It has been demonstrated in other research that excessive alcohol consumption may also have a direct impact on ovulation, blastocyst development, and implantation [15].

Infertility has been linked to pollutants like glue, volatile organic solvents, silicones, physical agents, chemical dusts, and pesticides [16]. Male fertility has been shown to significantly decline as a result of occupational lead exposure [17]. Toxic occupational exposure may potentially have an impact on sperm quality. Pesticides, cadmium, lead, manganese, and other substances can all affect reproduction. Inhalation, cutaneous absorption, and dietary exposure to phthalates have all been associated to decreased spermatogenesis and increased sperm DNA damage [18].

Conclusion

A variety of contributing factors may be to blame for the multifactorial illness process known as male infertility. Environmental and occupational factors must be considered because the majority of male infertility cases are caused by inadequate sperm production of unknown origin. Examining occupational risk factors is necessary, including heat, chemical, and heavy metal exposure. Pesticide residues, xeno-estrogens, and dietary and lifestyle decisions could all have a negative impact on spermatogenesis. Avoid habits including using illegal substances, binge drinking excessively, smoking, using certain medications, heating up the scrotum excessively, and using anabolic steroids for bodybuilding, which have direct impacts on the testis by reducing the body's ability to produce its own testosterone. Infertility is heavily influenced by the malefactor, and there are several curable causes that are simple to identify. Therefore, action should be done to raise awareness of the problem, and the male partner should be looked at first to minimize any bad societal effects.

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