

Environmental /Occupational Factors and Seasonality of Birth- Male Infertility

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Abstract- Reproductive failure or infertility may be due to several factors that are not limited to one sex. It remains a common problem causing significant psychological distress to those affected individuals and who are increasingly seeking medical advice. Male infertility means inability to induce conception in normal woman within a year. The etiological factors associated with male infertility are anatomical, developmental, seminal, hormonal, immunological and environmental factors. The paper was aimed to highlight the environmental factors and its association to male infertility and seasonality of birth and its influence. The data was collected from the 75 male patients referred with infertility for karyotyping and counseling. Their age ranged from 21 to 45 years. It is opined that certain occupations are preferentially associated with male infertility.

Index Terms- Environmental, occupational, Seasonal, male infertility

I. INTRODUCTION

Infertility is defined as the failure of a couple to conceive after twelve months of regular intercourse without contraceptive [1]. Though a fairly high proportion of males suffer from impaired fertility the causes of this abnormality remains obscure in the vast majority. Many causes are attributed to male infertility that include genetic and environmental factors such as single gene, chromosomal, multifactorial, hormonal, infections, anatomical, environmental/occupational, immunological and idiopathic causes. In general, the environmental factors in male infertility are linked to occupational hazards and lifestyle. The suspected environmental factors are: infections (viruses, bacteria, toxins), exposure to radiation, food habits, seasonality, life style (working duration, stress/strain, smoking, alcohol), medications (ayurvedic, allopathy). There is association between infertility and occupational exposure to heat/ pesticides/ chemicals/ altered hormonal changes/ sedentary lifestyle/consumption of animal fats/ smoking/dietary changes has detrimental effect on sperm morphology and time to conception.[2,3]. Exogenous heat, pesticides/glycol ethers /printing/adhesives/ metals like lead, cadmium, mercury are known to have adverse effect on sperm production [4].

II. MATERIAL AND METHODS

The study reports the gathered data from the consecutively referred 75 male patients with infertility to Division of Human Genetics, St.John's Medical College, Bangalore, India for karyotyping and genetic counseling. The reasons for the referral were primary and secondary infertility, with seminal abnormalities like azoospermia, oligospermia, asthenospermia, varicocele and absence or poorly developed primary or secondary sexual characters. Their age ranged from 21 to 45 years. Clinical profile and other information regarding their occupation were gathered from the detailed proforma and the data was analyzed. It may be noted that at the time of referral, patients consent was duly obtained.

III. RESULTS

Table I: Environmental/occupational factors/infertility

Occupation	n-75	%
Business	12	16
Agriculture	13	17.3
Executive/employee/pvt company	11	14.6
Teachers/auditors/official	11	14.6
Doctors/health dept	05	6.6
Engineers/scientist	04	5.3
Workshop/turner/mechanic/technician	06	8
Goldsmith/laborer/garments/driver/police	08	10.6
Painter	01	1.3
Drugs: allopathy/ayurveda/homeopathy	04	5.3

Interpretation: Out of 75 probands, 12 were involved in business (16%). 13(17.3%) agriculturists, 11(14.6%) executives, 11 (14.6%) teachers/auditors/officials, 5(6.6%) doctors/health dept, 4(5.3%) engineers/scientists, 6(8%) in workshops as mechanics/technicians, 8(10.6%) goldsmith/laborers/garment factory and 1(1.3%) painter.

Table:II Seasonality of birth/Infertility

Season	Infertility(n-75)	%
Jan-Mar	12	16
Apr-June	17	22.6
July-Sep	6	8
Oct-Dec	6	8
Not known	34	45.3

Interpretation; out of 41 probands with infertility 17(22.6%) were born between April-June, 12(16%) during Jan-Mar, 6(8%) July-sep and 6(8%) during Oct-Dec.

IV. DISCUSSION

In general the environmental factors in male infertility are linked to occupational factors and life style. The suspected environmental factors are : infections (viruses, bacteria, toxins), exposure to radiation, food habits, seasonality, life style (working duration, stress/strain, smoking, alcohol), medications (ayurvedic, allopathy etc). Exposure to radiation, heavy metals, occupational exposure to heat might cause damage to spermatogenesis. Chronic marijuana use, may cause endocrine abnormality with low levels of plasma testosterone. Agricultural chemicals /welding exposure have showed significant reduction in sperm motility and increased tail defects. It has also been reported welders had shown increased risk of seminal abnormalities. Drugs such as propranolol and guanethidine may affect sympathetic system by impairing erectile function. Pesticides/glycol ethers, printing/adhesives/ metals like lead, cadmium, mercury are also known to have adverse effect on sperm production. [2,3,5,6,7]. Sperms are normally produced at a temperature lower than the normal body temperature 37 ° c. The testis is vulnerable to heat than any other organ of the body[8]. Precise thermoregulation of the testis is evidenced by the fact that even slight elevation in scrotal temperature is associated with infertility. Sedentary jobs sitting for longer durations and by virtue prolonged scrotal temperature may increase and cause infertility. Over the last decades the overall quality of semen has changed worldwide and one of the main causes for this may be presence of toxic agents in the environment. Environmental and occupational exposure to physical and chemical agents[2]. Exposure to metals like lead and cadmium, Nutritional deficiency and psychological stress were also reported to affect fertility in males. Life style factors as reported in literature play an important role in the causation of infertility.

In the present study, (Table -I) the incidence of infertility was observed in 16% businessmen and 14.6% executives. This may be because businessmen and executives have more psychological stress and strain. It is known that stress and strain cause infertility [9]. Agricultural workers especially those who are applying pesticides have a greater risk as they are directly exposed to the pesticides and other chemicals.

In the present study , 17.3% were agriculturists. Studies have reported the effects of pesticide exposure and chemicals on the reproductive performance of these workers and also studies

have reported that occupational exposure to different chemical agents in the workers employed in various chemical plants, cement factory[3,8].

In the present study, 20% of cases included the mechanics and the technicians in workshops, goldsmiths/laborers/garment factory workers/ painters, may have had exposure to toxic agents affecting normal spermatogenesis.

Seasonality of Birth (Table-II): seasonality has been defined as a consistent variation of rate with season over a period of some years. Many studies have been done about seasonal clustering of births. In Chromosomal abnormality only for Down and Klinefelter syndrome seasonal variation has been observed. But few studies have not observed seasonal clustering, may be due to low ascertainment of cases which obscure temporal change. Environmental factors as per season may influence the non-disjunction of chromosomes Harlap (1974) cited in [10]. In the present study most of the patient were born between April-june, summer season in India, probands may have been conceived in July/August/September, the border months between summer and autumn, since the sample size is less, further interpretation could not be done.

V. CONCLUSION

The data presented in the present article has shown the environmental factor as one of the aetiological factors in male infertility. Besides many other factors such as hormonal, anatomical/developmental, immunological factors might be involved in causation of infertility. Hence it is imperative to undertake extensive studies to delineate all the factors involved in infertility, so that necessary medical intervention programmes may be considered for the benefit of infertile couples particularly males.

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