"Evaluation Of Semen Parameter Contributing Infertility In Wardha Region"

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Abstract

Background: Male infertility is a socially disruptive sickness for couples that carries various stigmas and is a source of marital discord; it is also a global health issue. About 15% of all teams, or 48.5 million, struggle with infertility. It is believed that men account for 20-30% of all infertility cases. **Methodology:** The total participants (n = 100) will be included in this study. We will be performing the study on the infertility male participant. We will collect semen samples from the participant and scan them under the analysis under a compound microscope. This study will be carried out in Wardha test tube centre A.V.B.R.H., Sawangi (M), Wardha. History of childhood infections like mumps, S.T.D., tuberculosis, and Viral infection. Sexual history like potency, libido, the lubricant used, time and frequency of intercourse, Exposure to heat, alcohol, cocaine, cannabis abuse, tobacco use, and radiation exposure will be noted. **Expected Results:** Most of this research will be conducted on individuals with low sperm counts and aberrant sperm parameters, such as those affected by Asthenozoospermia, teratozoospermia, and oligospermia. Semen abnormalities (such as oligospermia and azoospermia) are expected to be more common among government employees and less common among factory workers. The results will be compared to those obtained from semen of the same ages. Oligospermia and azoospermia may be most common between 31 and 40 and become less common as people age. **Conclusion:** The correlation of professional exposure to male infertility will become evident with this study.

Keywords: Male infertility, MTHFR mutation, sperm motility, semen parameter, azoospermia.

Introduction:

Childlessness may be a tragedy to the married couple and can be a cause of marital upset as well as personal unhappiness. A child solidifies a marriage. A couple's desire for children typically outweighs their desire for physical attractiveness and may even outweigh a carrier's claims **[1].**

According to a general population survey, 12–15% of sexually active couples have infertility. A male component, either alone or in combination with a female element, can be determined to make up 50% of an infertile marriage when broken down by gender **[2].**

Both within and within nations, the prevalence rate varies. For instance, it is projected to be 6% and 10%, respectively, in the U.K. and the U.S.A. **[3]**. The infertility rate in Nigeria and other sub-Saharan nations may be higher than 30%. Reproductive tract infections, which result in aberrant semen parameters and low sperm count, are substantially to blame for the high rate of infertility in Africa. Only one piece of data, which ranges between 26-32% **[4],** is from the Kashmir valley in India.

Since there isn't much research on male infertility in India, we decided to perform the study above to identify the various factors. In developing nations like India, infertility is a severe social issue that affects afflicted families and couples. The affected family bears a heavy financial burden from the cost of infertility treatment.

A significant problem is the high infertility rate, linked to couples marrying later and waiting longer to conceive.

Despite the early start of infertility treatments, it is generally known that older mothers are more likely to experience more excellent rates of reproductive failure. In contrast, there has been far less focus on the association between paternal age and birth outcome. The difficulty of studying paternal age is caused by several reasons **[5].**

The maternal effects on fetal growth have historically received a lot of attention. Recent studies show men's semen quality may decline as they age and are exposed to harmful elements. Even though men can continue to father children into old age, sperm quality genetics, volume, and motility often deteriorate with age and unfavourable environmental circumstances. It is crucial to remember that sperm quality is currently the leading indicator of sperm's capacity to carry out fertilisation. Male infertility is primarily caused by decreased semen quality **[5]**.

Review of Literature:

Oliva A, Spira A, Multigner L., et al. (2001): In 2001, Alejandro Oliva published a study titled "Contribution of environmental factors to the likelihood of male infertility." In the Litoral Sur region of Argentina, one of the world's most prolific agricultural regions, they analyse 225 male partners from sequentially selected couples who received their first infertility consultation between 1995 and 1998. According to the study, sperm threshold values substantially below the upper limit for male fertility are significantly related to exposure to pesticides and solvents. Additionally, they discovered that these males had lower L.H. concentrations and greater serum oestradiol concentrations than non-exposed men. **[6].**

Gaur DS, Talekar MS, Pathak VP., et al. (2010): In 2010, Dushyant Singh Gaur from the Himalayan Institute of Medical Sciences in Dehradun conducted research on the effects of alcohol consumption and smoking, two significant lifestyle factors, on male fertility. To determine whether asthenozoospermia, oligozoospermia, and teratozoospermia were present in the semen samples from 100 alcoholics and 100 smoker males, they were compared to 100 non-smokers and non-alcoholic males. Compared to 37% of non-alcoholic, non-smoking males, only 12% of alcoholics and 6% of smokers had normozoospermic. Alcoholics were predominately teratozoospermia, then oligozoospermic. Smokers experienced the combined effects of asthenozoospermia and teratozoospermia, but not oligozoospermia. Light smokers exhibited asthenozoospermia more frequently. Heavy drinkers and smokers showed teratozoospermia, oligozoospermia, and asthenozoospermia. Toxins brought in by smoking essentially impair sperm motility and the quality of seminal fluid. **[7].**

Panti AA, Sununu YT et al. (2014): The profile of infertility in a teaching hospital in North West Nigeria was studied in 2014 by Abubakar A. Panti from University Teaching Hospital, Nigeria. In this prospective study, conducted from January 2011 to July 2011, 198 infertile patients were assessed. It was discovered that the prevalence of infertility was 15.7%, primary infertility accounted for 32.8% of cases, secondary infertility was 61.270, and there had previously been genital infections with symptoms such as lower abdominal pain (78.8%) and vaginal discharge (76.6%). Infertility caused by female partners accounted for 42.9% of the cases, while male reasons made up 19.70. 16 % of patients had both partners to blame for their infertility, while 20 % had no known cause. According to the study, secondary infertility predominates, with genital tract infections playing a significant role. Genital tract infections that are promptly diagnosed and treated may lower the prevalence of infertility in the study population. **[8].**

Lepecka-Klusek C, Wdowiak A, Pilewska-Kozak AB, Syty K, Jakiel G et al (2011): A unique article was written in 2011 by Polish author Celina Epecka-Klusek. They investigated "The impact of ageing, the environment, and employment conditions on semen density." The study included 224 men who had reproductive issues. According to their semen density, the study was conducted in three stages and had a prospective nature. Group I respondents made up 62 (27.7%), Group II respondents made up 121 (54.0%) males, and Group III respondents made up 41 (18.3%) males (just one spermatozoon or none). Men's ages, jobs, and general opinions of their positions are all substantially connected with male semen density (p 0.05). Male perceptions of demanding working conditions, occupational dangers, or the length of time spent in such situations are not associated in any significant way with male semen density. **[9].**

Kumar N, Singh AK. et al. (2015): Male factor infertility was highlighted by Naina Kumar and Amit Kant Singh in their 2015 study, Trends of Male Factor Infertility. Many scientists and physicians began to express concern about declining semen quality as early as the 1980s. A study was conducted in 1992 that comprised a meta-analysis of 61 publications that included 14.947 males who had never experienced infertility to understand this issue better. This study found that between 1938 and 1990, the mean sperm count of healthy men decreased by 1% year. Using linear regression data weighted by the number of men in each trial, they also revealed a statistically significant 50% decrease in the mean sperm count from 113 x 106 mL-1 in 1940 to 66 x 106 mL-1 in 1990 and the seminal volume from 3.40 to 2.75 mL. A more recent, thorough meta-analysis was conducted in 2000, which supported the pattern of declining

sperm counts. Additionally, according to another meta-analysis, sperm density has reduced globally over the previous 50–60 years by around 50% [10]. In the general population, semen quality decreased with time from 1998 to 2006, according to a Finnish study [11]. Another study conducted in the Sfax region of Southern Tunisia between 1996 and 2007 on a sample of 2940 infertile males found a deterioration in semen quality over 12 years. An analysis of 9168 cases (men ages 20 to 77) collected over ten years (1995–2004) from the Andrology and Reproduction Laboratory in Cordoba, Argentina, revealed a significant decline in seminal volume, sperm count, motility, viability, and normal morphology, as well as a reduction in alpha-glucosidase and fructose levels about age [12]. In addition, a study conducted at the Reproduction Biology Laboratory of the University Hospital of Marseille (France) between 1988 and 2007 that included the analysis of semen from 10,932 male partners of infertile couples found that overall population sperm concentration (1.5%/year), total sperm count (1.6%/year), total motility (0.4%/year), rapid motility (5.5%/year), and normal morphology (2.2%/year) were all declining. Additionally, the same patterns of sperm quality degradation with time were seen in the group of chosen samples with a total average sperm count. **[13].**

Aim:

The present study aims to discover different etiological factors contributing to male infertility.

Objectives:

To find out various etiopathological factors of male infertility.

- To elucidate the proper history to correlate the etiological factors.
- To do the clinical examination to find out different anatomical abnormalities.
- To do a semen analysis to find out different abnormalities of semen by WHO (2010) monogram.
- To do biochemical tests and hormone analysis to find out related abnormalities.
- To do a radiological investigation to find out the testicular volume and other comorbidities of the testicles.

The rationale of the Study:

- To know the underlying pathology by doing routine semen analysis.
- To formulate guidelines for further management by referring the case to specialist services like Urology, Biochemistry & Endocrinology.

Hypothesis:

Malefactors are equally responsible for infertility, and it is estimated that malefactors can be identified 50% of the time in isolation or in combination with a female factor.

Materials and Methods:

This study will be carried out in Wardha test tube centre A.V.B.R.H., Sawangi (M), Wardha. The following techniques will be used if both partners have provided written approval. The duration of the marriage, the CO-habit, and any history of childhood infections like measles, S.T.D.s, or tuberculosis will be noted in the past. Viral contamination Sexual history, including libido, the lubricant used, frequency and length of encounters, and potency. It will be pointed out if the patient has a history of systemic diseases, such as diabetes, cirrhosis, or hypertension. There will be a record of heat exposure, alcohol, cocaine, cannabis misuse, tobacco use, and radiation exposure. It will be recorded if the patient has a history of surgeries such as orchidopexy, herniorrhaphy, orchidectomy, pelvic and perineal surgery, and bladder neck surgery. We shall follow our setup's standard procedure. (Approval from the Institutional Ethics Committee of Datta Meghe Institute of Medical Sciences, (Deemed to be University). Is obtained for this research work).

Physical examination:

A comprehensive physical examination is a crucial component of assessing male infertility. A particular emphasis will be placed on the genitalia in addition to the history and general physical examination, including the following: a) examination of the penis, including the location of the urethral meatus; b) palpation of the testes and measurement of their sizes; c) presence and consistency of both the vasa and epididymis; d) presence of a varicocele; e) secondary sexual characteristics, such as body habitus, hair distribution, and breast Physical examination will be used to confirm the diagnosis of congenital bilateral absence of the vasa-deferentia (C.B.A.V.D.).

Study design:

POPULATION

A male partner of all infertile couples willing to participate in the study.

INTERVENTION

The result will be analysed as per observational findings from tests performed on male infertility patients.

COMPARISON

Results will be compared with the report of similar studies done in other centres.

OUTCOME

The outcome will be seen in the form of the evaluation and analysis with proper methods contributing to male infertility.

Semen Collection and Analysis:

The study's design is a semen collection for the infertility male participant will be included scan under the analysis in a compound microscope. The number of participants registered in this research study is 100 (n = 100). The participant will be a collection of semen that has undergone individual examination. Semen samples from the subjects will be collected in a sterile plastic container by masturbating after 3-5 days of ejaculatory abstinence (WHO, 2010). In a clean, dry, and biologically inert container, semen samples will be collected in the lab. For patients who are oligozoospermic or azoospermic, three semen samples will be taken on various days with three days of abstinence, followed by a comprehensive analysis. Within an hour of sample collection, the liquefied samples will be examined after 30 minutes at 37°C. The seminal plasma is isolated from the semen samples and stored at -800 C for future examination after being centrifuged at 3,000 rpm for 10 minutes. According to World Health Organization (WHO, 2010) Guidelines, macro and microscopic evaluation of the semen is done to determine semen volume, sperm count, concentration, sperm motility, viability, morphology, and leukocyte count.

Setting:

Department of IVF and Wardha test tube baby centre, Acharya Vinobha Bhave Rural Hospital, Datta Meghe Institute of medical sciences, Sawangi (Meghe), Wardha. Relevant dates, including periods of recruitment: September 2020 – September 2021

Sample size and Procedure:

In this study number of 100 (n = 100) participants will be registered for the research study on male infertility. All patients were referred to the Department of Obstetrics & Gynaecology under the Wardha test tube baby centre (Acharya Vinobha Bhave Rural Hospital, Datta Meghe Institute of medical sciences, Sawangi (Meghe), Wardha for performing a study and analysing of malefactors for responsible infertility. All procedures will be served after taking informed consent and ethical clearance; the patient will undergo history recording.

Participants:

The inclusion criteria for the participants are as under:

- Husbands of all infertile couples are recruited for semen analysis.
- Patients with a history of infertility.

The exclusion criteria for the participants are as under:

All males below 21 and above 60 years of age are not considered for the study. Men with genetic disorders, Erectile dysfunction, cardiovascular problem, H.I.V. positive and Hepatitis (HBsAg) positive patients are excluded from the study

Expected Outcomes/ Results

Initial participant participation is expected quarterly (3 months) with previous Consent and Performa at the data collection stage for this research project. Male volunteers with aberrant semen profiles also had endocrine disorders,

diseases of the reproductive tract, and infections like H.I.V. and HBsAg. Environmental elements including heat, pollutants, and lifestyle choices like nutrition, frequency of sex, smoking, and alcohol are known to negatively impact sperm parameters, which may contribute to male infertility. Other reasons for abnormal semen include physical and emotional stress, sleep deprivation, wearing tight clothing, hot tubs, etc. It is puzzling that this study showed more semen abnormalities in civil servants than in other professionals because there is no correlation between semen characteristics and occupation. In this study, oligospermia, asthenozoospermia, and teratozoospermia will be recorded as the main faulty semen parameters. The expected outcome may be discovered in a significantly high proportion of the population with low sperm count and very high defective parameters. According to the distribution of semen results by occupation, public officials will have the most elevated abnormalities (oligospermia and azoospermia), whereas industrial workers will have the lowest monsters. According to age group, it will be compared to semen findings. The age group 31–40 years may have the most significant abnormalities for oligospermia and azoospermia, whereas older age groups will have the lowest monsters.

Discussion:

Heat, telecommunication radiation, and chemical exposure are the only factors considered when investigating the effects of the employment environment. There aren't many studies on male infertility. The survey of the global burden of disease also takes evidence into account. To determine their impact on male infertility, several additional occupational and environmental factors, lifestyle choices, and other factors can be compared to determine whether there is a relationship between these factors and epigenetic factors. The same study can even be more accurate by sequencing or NGS (Next Gen. Sequencing) of the D.N.A. sample to determine the precise methylation points **[14-20].**

Male infertility can also be caused by **(a)** aberrant spermatozoa, which can be **(b)** abnormal seminal plasma (infection, auto- or isoimmunisation), **(c)** abnormal ejaculation (pathogenic or iatrogenic retrograde ejaculation), **(d)** abnormal ejaculation, and **(e)** abnormality of cause. 26% of our patients had average sperm counts. The implication is that low sperm counts may not cause infertility in these couples but somewhat abnormal semen characteristics or other etiological factors like environment or female component. It is well recognised that lifestyle choices like nutrition, frequency of sex, smoking, and drinking can negatively impact sperm characteristics, as environmental factors like heat and toxins. Other reasons for abnormal semen include physical and emotional stress, sleep deprivation, wearing tight clothing, hot tubs, etc. It is puzzling that more semen abnormalities were detected among civil employees than in other professionals in this study, as there is no correlation between semen characteristics and occupation. The high prevalence of abnormal semen in civil servants could be explained away by the fact that they are an elite group who are socially active and may engage in some social activities like smoking, excessive alcohol consumption, etc. that may affect semen qualities, even though there was no history of occupational exposure of our patients to environmental factors that can negatively affect semen quality and quantity **[21-29].**

Conclusions:

The correlation of professional exposure to male infertility will become evident with this study.

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