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TO EXAMINE THE TRADITIONAL SPERM PARAMETERS OF MEN WHO HAVE LIVED IN HIGH-DENSITY INDUSTRIAL AREAS

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ABSTRACT

Semen quality may be affected by air pollution, however proof is currently lacking. If there are any differences between guys who live in industrial areas and those who don't, this study is designed to find out. Patients' conventional sperm parameters were assessed during an infertility counselling appointment at an assisted reproductive technology (ART) centre. Requested sperm samples from their female partner were tested. The programme had 184 participants. In comparison to men who reside in locations with a medium or high industrial density, those who live in lower industrial density areas have a higher sperm count. There was no difference in the sperm count, progressive motility, total motility, or normal forms between the two groups. These investigations support the findings of the Sicilian population. It is imperative that air pollution is efficiently regulated for the purpose of fertility of an individual.

Keywords:Atmosphericcontamination Male infertility. Sperm count. Sperm amount

1. Introduction

In Western countries, infertility is common. About 15% of couples in childbearing age are affected, and 50% of the time, male factor infertility is identified **(Valenti et al. 2013).** Sperm count have decreased significantly since 40 years, according to multiple meta-regression. Sperm quality has been linked to environmental contamination in a number of studies, despite the fact that data on this issue remain inconclusive **(Nobles et al. 2018).** Increased rates of male infertility have been linked with lower quality of seminal fluid, particularly because of metals' multifaceted toxicity and the general public's exposure to pollution on a large scale. There are some locations in the country where industrial pollution poses a serious threat to the

environment, according to the government. The Regional Environmental Agency provides additional information.

The agency tasked with keeping tabs on and evaluating the extent of environmental pollution is called Protection (ARPA). For example, it measures the amounts of sulphur dioxide (SO_2), NO_2, NOx, nitric oxides (NOx), (CO), ozone (O_3), CH_4, NMHC, and volatile organic compounds (VOCs) in the atmosphere (VOC). Incorporating data from environmental samples and industrial density, ARPA divided the country into four zonesshown in (Table 1, Fig. 1). The National Government has classified the final zone "high-risk for health zone" due to its higheramount of petrol-chemical toxic waste. Males who have lived in the area their entire lives have not been studied to see if pollution affects sperm parameters. The purpose of this study was to see if men living in ARPA zones had differences in their sperm parameters.

2. Methodology

2.1 Particpants

A Retroactive Study of the Productive Lab Database: Gynecology Unit of the Government Clinic was conducted using this database.To better understand the participantswith his who sought treatment for infertility at the Unit of Gynecology, we gathered data between January and December of 2013. The study only included men who were born and raised in an ABCD zone and whose sperm had been analysed at least twice in our Seminal Lab. Trial participants were barred from taking part if they had any of the following conditions: systemic diseases, genetic anomalies, alcohol and drug abuse, hormone treatment, varicocele, infection of the male accessory glands, microrchidism or cryptorchidism. Patients with incomplete or inconclusive medical histories were excluded from the research. As previously mentioned (Table 1 and Fig. 1) **(Cannav et al. 2010)**, patients were assigned to ARPA zones retroactively.

When the sperm count in an ejaculate is less than < 39 million, the condition is known as oligospermia. Analysis of sperm Samples of liquefied sperm were obtained by masturbating into a sterilised container and tested immediately. Based on World Health Organization recommendations in 2010, seminal volume and pH were measured for each sample. Sperm count was counted, as well as morphology and round cell content (WHO 2010). A positive control was obtained by treating spermatozoa for 60 minutes at 37 °C with 1 mg/mL of deoxyribonuclease I, which does not contain RNAse. The FL1 detector was used in flow cytometry for the reading.

Area	Industrial density	No. of towns	Inhabitants	PM10 (µg/mc)	NO_2 (µg/mc)	CO (%)	O_3 (%)	SO_2 (%)
A	Low	31	74,342	/	/	/	/	/
B	Middle-low	71	257,429	/	/	/	/	/
C	Middle	1	234,293	21 (2*)	31 (1*)	96 (1*)	46 (1*)	/
D	High	5	45,558	20 (4*)	7.2 (6*)	91 (1*)	96.7 (3*)	93 (5*)

Table 1 ARPA groups are defined by their socioeconomic and environmental characteristics.

Ozone, PM2.5, carbon monoxide, NO2, nitrogen dioxide, and sulphur dioxide are some of the pollutants that can be found in the air. There are a total of how many cities have had their measurements taken? In low-risk areas, there has been no detection.

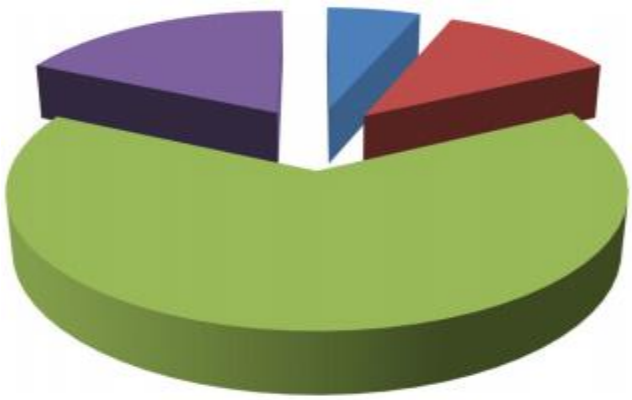

Fig. 2 In the entire sample, there were patients from each of the regional environmental protection agencies.

3. Analysis

In the total investigation, the mean standard deviation (SD) is presented. Using Pearson's chi-square test, we were able to compare the various categories. Student's t test, analysis of variance (ANOVA), and the Kruskal-Wallis rank test were used to examine trends in continuous variables. SPSS 22.0 for Windows (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. We defined statistical significance as any value below 0.05, as the gynecology unit of the public hospital was the location of this survey. The company's own Research Ethics Committee authorized the study protocol. In accordance with the stated objectives of the Declaration, the research was carried out

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4. Results

184 guys applied for the programme, and it was fully enrolled (average age 37.6 7.7 years). In ARPA group A, there are 11 members; in ARPA group B, there are 21, in ARPA group C there are 119, and in ARPA group D there are 33. (Fig. 2). Standard sperm parameters for each ARPA group are shown in Table 2. Table 3 includes asthenozoospermia, asthenozoospermia, and teratozoospermia. It was found that 45.7 percent of the sample had the condition of oligozoospermia; the percentages in the four groups ranged from 36.4 to 52.4 percent. There were no significant differences in the prevalence of opioid use across the various ethnic groups examined (Table 3). Patients in Group A and B had a significantly higher total sperm count than those in Group C and D(Fig. 3). Progression and total motility were also found to be the same, and the concentration of sperm in each sample Morphology was also found to be the same

Table 2DNA fragmentation in ARPA Groups based on the standard sperm characteristics.

Area	No. of patients	Age (years)	Sperm concentration (million/mL)	Total sperm count (million/ejaculate)	Progressive motility (%)	Total motility (%)	Normal forms (%)	Sperm DNA fragmentation (%)
A	11	39.6 ± 4.1	39.6 ± 92.3	135.3 ± 154.2	10.5 ± 13.3	57.7 ± 11.4	2.8 ± 1.5	23.6 ± 7.7
B	21	35.6 ± 8.6	35.9 ± 49.5	117.0 ± 147.8	18.1 ± 22.4	63.0 ± 23.0	2.6 ± 1.6	24.0 ± 33.9
C	119	37.4 ± 7.4	29.7 ± 34.4	79.3 ± 86.2	15.8 ± 18.6	57.1 ± 18.2	2.3 ± 3.3	19.6 ± 12.2
D	33	39.3 ± 9.3	33.4 ± 46.2	86.0 ± 114.9	8.5 ± 16.9	51.6 ± 15.6	2.3 ± 1.5	36.0 ± 9.9
All	184	37.6 ± 7.7	31.7 ± 39.35	88.1 ± 104.8	14.6 ± 18.7	57.0 ± 18.2	2.4 ± 2.8	22.2 ± 13.4

Table 3 This table shows the prevalence of each ARPA group in terms of the prevalence of oligozoospermia, asthenia, and teratozoospermia

Area	Oligozoospermia	Asthenozoospermia	Teratozoospermia
A	36.4% (4/11)	90.9% (10/11)	63.6% (7/11)
B	52.4% (11/21)	71.4% (15/21)	81.0% (17/21)
C	44.5% (53/119)	79.8% (95/119)	80.7% (96/119)
D	48.5% (16/33)	87.9% (29/33)	87.9% (29/33)
All	45.65% (84/184)	81.0% (149/184)	81.0% (149/184)

.5. Discussion

Long-term inhabitants (ARPA A through D) in zones with varying industrial densities had their traditional sperm parameters re-examined. Patients who wanted sperm analysis as part of female partner counselling for infertility were asked to submit information to our Gynecology Unit, where we compiled the information. Patients from the ARPA C region made up the majority of those who received treatment (119 out of 112, 21 out of 213 and 33 out of 334). A difference between patients from ARPA C and ARPA D industrial density zones and those from ARPA A and B industrial density zones was found in total sperm count, but no other differences were found in sperm characteristics. It has a substantial influence on public health since it increases

the risk of respiratory, and genital disorders. Various literatures have investigated relationship between atmospheric contaminants and infertility, with varying degrees of success. There has been no further investigation to validate the link between NO2 levels and sperm counts in total **(Zhou et al. 2014).** PM2.5 and PM10 were found to have an effect on sperm quality in a different study; however other investigations showed no link between these two noxious wastes and sperm quality. So_2 and CO have been shown to have varying effects on sperm quality **(Jurewicz et al. 2015).** According to a new longitudinal research of 8945 semen specimens, O_3 pollution may have contributed to the experiential reduce in sperm amount.

When urinary phthalate level was taken into consideration, another study indicated that sperm concentration and count declined by 2.62 percent and 3.12 percent annually, resulting in overall decreases of 37 percent and 42 percent, respectively. It is possible to estimate the long-term sperm counts **(Mnguez-Alarcón et al. 2018).** Reduced sperm motility in men from rural and industrial regions of the eastern Sicilian city of Regalbuto has been connected to Benzo(a)pyrene (BaP)-DNA adducts earlier **(Oliveri Conti et al. 2017).** Our study indicated that sperm concentration, total count, progressive and total motility, and normal forms were all considerably lower in Sicilian patients exposed to environmental car exhaust pollution than in the control group. Exposed spermatozoa had higher levels of damaged chromatin and fragmented DNA than controls, indicating that exposure to automobile exhaust is harmful to human sperm. Another recent study has found that sperm DNA fragmentation is an early sign of pollution and its harmful effects. It's possible that air pollution's harmfulimpact on sperm quality are due to sperm (ROS), but no one knows for sure. These ROS, which can harm sperm, have been demonstrated to rise in the lungs after contact to contaminated air

Measures for gonadotropins and total testosterone were not included in the trial, nor were tests for glucose, insulin, and insulin resistance or the amount of cigarette smoke consumed by patients who took part. These are all potential sources of bias. We couldn't find the data we were looking for because we conducted our search utilising our Seminal Lab database in the backseat. Male spouses of infertile women were involved in two separate cases. The possibility of male infertility could not be ruled out. It is also impossible to adequately quantify individual exposure to ambient pollutants based on lifelong residency data. Because the study was observational, it is

impossible to demonstrate a causal link between atmospheric contamination and infertility. We need to be aware of these limits and take them into account when conducting future research.

6. Conclusion

The results of this study demonstrate that lifelong inhabitants of middle and high industrial density areas had a lower total sperm count than residents of low and middle-low industrial density areas. This is in line with what we've learned from patients of Sicilian descent in the past. In order to avoid harming human reproduction, it is imperative that air pollution be well controlled.

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