

Spermatogenesis Stimulation and Sperms' Activation by Direct and Gradual Electrical Shocks on Testis in Infertile Males

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Abstract

Background:

Up to 15% of couples are infertile. In up to half of these couples, male infertility plays a role. Male infertility is caused by low sperm production, irregular sperm function, or blockages preventing the sperm delivery. Illnesses, accidents, chronic health issues, lifestyle choices and other factors can play a role in causing infertility among men.

Methodology:

It is a randomized controlled, single-blind clinical trial was conducted among 90 participants who have been diagnosed with (Oligospermia, Hypospermia, Asthenozoospermia or Necrozoospermia). Of a sample obtained by masturbation all the participants underwent a semen examination of their semen count, volume and motility. Then they got a small device, the device gives up to 5 milliamps of electrical shock. A final checkup for all was performed after the fourth months, and the data was collected and compared between (before and after) semen analysis.

Results:

The findings indicate an improvement in the count, volume and motility of the sperms after being shocked electrically in comparison with the control group. By using ANOVA-test, there were a statistically significant differences between the first seminal analysis result with each of the other results independently while it was not with the control group.

Conclusion:

Many treatments are available for infertility and other therapies and drugs and some of them are complicated and difficult to use. This painless and healthy way of enhancing sperm movement and count can be used by the male himself conveniently and at home to improve his chance of fertilizing an ovum.

Trial registration: NCT, NCT04173052. Registered 21 November 2019 - Retrospectively registered, <https://clinicaltrials.gov/ct2/show/NCT04173052>

Plain English Summary

The effects of infertility are myriad and can have impacts on society and personal suffering. Many therapies and medicines are available to tackle this issue, some of them are available and some are complicated and difficult to use. We developed a new novel and effective way of treatment for the infertility that can improve motility, count and volume of the seminal fluid. This painless and healthy way of enhancing sperm movement and count can be used by the male himself conveniently and at home to

improve his chance of fertilizing an ovum. This can be generated as a small tool which can be used by anyone in a schedule to achieve the best performance.

Introduction

Around 15% of couples fail to get pregnant within one year of unprotected sexual intercourse. In about 50% of these cases, a male infertility factor is found, and is solely responsible in 20% of couples. (1, 2)

Infertility is described as the inability after one year of normal, unprotected intercourse to attain conception. In the United States, infertility affects about 8 million people. The likelihood of conception during the first year of fertility-focused sexual activity is 84% for active young people. (1, 2)

Male infertility was due to a number of causes including lifestyle factors, exposure to gonadotoxins, hormonal dysfunctions, chromosomal abnormalities, varicoceles, testicular failure, disorders with the ejaculations and obstructions. If there is no specific treatment available, or the origin of male factor infertility cannot be corrected, there may be other options, such as assisted reproductive techniques (ART). (3–6)

The effects of infertility are myriad and can have impacts on society and personal suffering. Advances in assisted reproductive technologies, such as IVF, can offer hope to many couples where treatment is available, although medical coverage and affordability barriers exist. (7)

In many fields electrical shocks are used to treat many diseases and issues and it is used in many fields of medicine which is called energy medicine. Given its dangers but within current range (up to 5 milliamps) it may be useful. This tingle decreases in 1 milliamp will create only a slight tingle as the amount of current decreases until it produces a little discomfort with 5 milliamps. (8–10)

Males begin sperm development when they hit maturity, which is normally 10–16 years old. To increase the probability of sperm entering the egg, they are produced in vast amounts (~ 200 million a day). Sperm are created continuously as males need to be ready to use the female's limited fertility window. (11)

Sperm development occurs in the male tests, especially in the seminiferous tubules. Blood-testis membrane prevents the tubules separate from blood circulation.

Spermatogenesis takes approximately 70 days, therefore multiple spermatogenic processes occur simultaneously within the same seminiferous tubule, with new groups of spermatogonia occurring every 16 days (spermatogenic cycle) to ensure continuous and not intermittent sperm production. Each of those spermatogenic cell populations will be at different spermatogenesis stages. (11)

Oligospermia is an issue of male fertility, with a low sperm counts, Hypospermia is a disorder in which a man has an extremely small number of ejaculates (or semen), below 1.5 mL, Necrospermia (or necrozoospermia) is a disease in which semen contain a small percentage of live sperm and a very high percentage of immotile sperm and the medical term for reduced sperm motility is asthenozoospermia (or

asthenospermia). These terms and conditions are the most common issues of male infertility that need treatment and they are almost treatable. (1, 2)

In a study (NCT02617173) held by researchers from Sheba Medical Center in Israel, found (after shocking the animals' testis electrically) that keeping the tool close to the scrotum increased sperm concentration by 200 to 1.600 per cent, with the sperm contained outside the testicles and within the tubes known as epididymis where they mature. (12)

Regarding the adverse effects of the procedure, they stated the technology is safe enough to use for months without damaging the sperm.

Studies have shown that high electricity voltages can interact with the structure of the sperm and disrupt some function but the amount generated from this system is much lower. (12)

This study was tested on animals with good results and then it has been tested on 10 humans in 2016 but no results or any comments have been released.

In my study, the aim is to identify the effects of the moderate and controlled electrical shocks (below the sensation of pain or any bad sensation) on the infertile males with these four conditions: Oligospermia, Hypospermia, Asthenozoospermia and Necrozoospermia.

Methodology

• Study Design:

A randomized controlled, single-blind clinical trial was conducted among 90 participants who have been diagnosed with (Oligospermia, Hypospermia, Asthenozoospermia or Necrozoospermia) only, depending on the seminal analysis that have been done in specialized laboratories in Dhi Qar, Iraq by well-trained technician and thus, 5 participants were excluded because they have been diagnosed with (Aspermia or Azoospermia) by infertility specialist depending on the test's results. This process continued for four months (1st June – 25th September, 2019) with regular follow up by semen analysis. The semen analysis was applied at a licensed laboratory in Dhi Qar, Nassiryah city in the north of Iraq by many Laboratory assistances under the supervision of an infertility specialist. All the participants underwent a semen analysis for his semen count, volume and motility for a sample taken by masturbation before 5–13 minutes prior to examination and all participants had sexual abstinence period of 3–6 days.

This study was funded by the author himself without any financial support and the author wrote the full manuscript by himself under the supervision of the infertility specialist who evaluated the seminal analysis of the participants.

Ethical approval was obtained from the ethical committee in the university of Baghdad / College of Medicine on the 15th of March 2019.

The whole procedures and its consequences were explained clearly to the participants and a written informed consent was obtained from all participants before the initiation of any trial – related procedures and the follow up was done by internet messenger (WhatsApp) for any complications.

• **Participants:**

Infertile males aged > 18 years were eligible for the study who had one of the following issues and criteria:

1. Oligospermia: Counts < 5 million sperm/mL
2. Hypospermia: Volume < 1.5 mL
3. Asthenozoospermia: Sperm concentration < 20 at 106 mL
4. Necrozoospermia: Vitality staining performed to determine whether the sperm are dead or alive and immotile.

All the participants were stopped from taking any treatment or medications affecting the reproductive activity and spermatogenesis prior to the trial's initiation and they were checked for any chronic diseases or general examination was done for each one, semen quality was well assessed before being examined.
(13)

In addition to that, the examination of the testicular tissue was done by ultrasound in each month during the follow up procedure and each complaint from each one was assessed carefully. Their follow up is being continued each three months for two years coming in case they developed any issues or complications.

• **Procedure, Device and the Analysis:**

Participants who fulfilled the randomization criteria were randomly assigned, in a 1:1 ratio, to receive a small device (Created by an electrical engineer from Dhi Qar Engineering College) that gives an electrical shock up to 5 milliamps and low voltage which cannot cause any pain sensation or uncomfortable sensation for the participants (90 devices were built, 45 of them were working and 45 were not). Each one independently was told to use this device properly on his testis every day and come for follow up checking every month as follow:

1. The first month: 0.5 milliamp for the first 15 days and 1 milliamp for the second 15 days.
2. The second month: 1.2 milliamps.
3. The third month: 1.5 milliamps.

The device is designed to contain all the testis tissue as a cup and then extends to include the roots of the scrotal reaching the penile root to include the epididymis.

The device that gave electrical shocks were given to 45 participants and the other group received the same device with the same shape and description but they were not working (0 milliamps) and they were

the control group. This process was continued up to 4 months with monthly follow up by the seminal analysis and after the fourth month, the results were collected and analyzed by using Statistical Package for the Social Science (SPSS) version 25. ANOVA test was used in testing the significance differences between the variables and P-value < 0.05 was considered as statistically significant with confidence interval of 95%.

Results

The mean age was 34.51 with standard deviation 6.8, ranging from 25 years to 45 years. All of them were married and the cause of infertility belongs to them depending on their doctor's diagnosis and examination for both couples.

Figure (1) is a flow chart for the participants' selection process with inclusion and exclusion depending on the mentioned criteria in the methodology.

Figure (2) describes the occupations of the participants.

Figure (3) clarifies the educational level of the participants.

Table (1) demonstrates the mean and the standard deviation of the count, volume and motility for the first test (before trial) and the three tests during the trails for the participants who received the working devices.

Table 1
The mean and standard deviation of the results (Count, Volume and Motility)

The Test	The mean	Standard deviation
Test 1 (Before Trials)		
1. Count	34.37 million	8.9
2. Volume	1.38 mL	0.46
3. Motility	27.6%	10.95
Test 2 (First month)		
1. Count	38.28 million	7.9
2. Volume	1.83 mL	0.45
3. Motility	32.82%	8.48
Test 3 (Second month)		
1. Count	41.66 million	7.06
2. Volume	2.25 mL	0.55
3. Motility	36.1%	7.17
Test 4 (Third month)		
1. Count	45.37 million	5.2
2. Volume	2.76 mL	0.51
3. Motility	41.37%	6.28

By using ANOVA-test, there is a statistically significant difference between the mean of the first test and the means of the other three tests with P-values of 0.00, 0.00 and 0.011 for the count respectively, 0.00, 0.02 and 0.137 (Non-significant) for the volume respectively and 0.00, 0.046 and 0.446 (Non-significant) for the motility respectively.

Table (2) demonstrates the mean and the standard deviation of the count, volume and motility for the first test (before trial) and the three tests during the trails for the participants who were randomized as a control group.

Table 2		
The mean and standard deviation of the results for control group		
The Test	The mean	Standard deviation
Test 1 (Before Trials)		
4. Count	32.56 million	7.6
5. Volume	1.33 mL	0.34
6. Motility	28.7%	9.1
Test 2 (First month)		
4. Count	32.5 million	7.7
5. Volume	1.31 mL	0.42
6. Motility	29%	6.38
Test 3 (Second month)		
4. Count	32.3 million	7.2
5. Volume	1.32 mL	0.4
6. Motility	29.3%	6.2
Test 4 (Third month)		
4. Count	33.4 million	7.2
5. Volume	1.34 mL	0.43
6. Motility	29.2%	5.8

By using ANOVA-test, there is not a statistically significant difference between the mean of the first test and the means of the other three tests with P-values of 0.97, 0.985 and 0.592 for the count respectively, 0.804, 0.899 and 0.888 for the volume respectively and 0.857, 0.716 and 0.757 for the motility respectively.

Figure (4) compares between the results of the first and the fourth tests for each group of the participants in Count (A), Volume (B) and Motility (C).

No one of the participants complained of any side effect or any issue during the procedure frame and all the testicular examination by ultrasound were normal.

Discussion

As we compared the findings of the fourth semen study, seminal motility, volume and count clearly alter and boost. This can be used in the care of patients with infertility by applying a small amount of current

from outside under the level of sensation on the testis which can slowly increase sperm motility, volume and counts. In general, the procedure stimulates the spermatogenesis to higher level than usual in these participants.

After the first course of using, we found that the seminal analysis is changed into better in the group who used the working devices which can indicated the effects of these electrical pulses on the sperms itself too. So, the procedure has two parts of work or effects, the first one, on the spermatogenesis, it can induce it and stimulate it more effectively than nothing (if we compare with the control group's results who received the non-working devices), and the other part is to activate the sperms by increasing their motility and seminal volume (see Table 1).

It can also be used for those who are very rushed about fertilizing an ovum before intercourse time so their chances of having an embryo can increase.

This system can be developed so that any person with infertility (Oligospermia, Hypospermia, Asthenozoospermia, and Necrozoospermia) can get one and use it with instructions to make an ovum fertilizer more effective for his sperms. The role of this procedure during intercourse is to activate the sperms that have produced already before being ejaculated so they will be charged with positive electricity that accelerate their movement and increase the volume of the seminal fluid.

The explanation of this procedure's role in improving the quality and the quantity of the semen may be attributed to the ability of the sperms to gain the energy and the role of this energy in getting the sperms' normal status back.

The infertile males, whatever was the cause from the fourth issues mentioned in the study, have a decline from the normal physiology of the spermatogenesis that could be caused by many factors and causes but the main point is losing their normal status and become less active, so giving them these little shocks will cause them to be more active by charging them with energy (Electrical energy) and we know that the electrical shocks have been used in activating the sperms in vitro prior to fertilization process in IVF (In Vitro Fertilization) and it is used too in inducing the fertilization process during IVF. (14)

According to the study and during the follow up process that was done monthly for each participants by ultrasound by the specialists that showed no change or abnormalities in the tissues, that can be an indicator for the safety of the procedure if it is used properly and according to the instructions and in the limit of the current used in the device that has no bad effects on the human's physical and mental health (no effects on the external skin or internal tissues). The follow up process is still going on for the participants to be assure that there is no long-term complication for the procedure and there are not any of them till now. The procedure could be safe and successful for treating many cases of infertility among males and in short period of time (3 months which presents the period required for completed a one spermatogenesis process that requires up to 70 days to be done). (11)

Conclusion

Up to 15% are infertile in couples. This means they cannot conceive of a child while having regular, unwanted sexual intercourse for a year or longer. The effects of infertility are myriad and can have impacts on society and personal suffering. Many therapies and medicines are available to tackle this issue, some of them are available and some are complicated and difficult to use. This painless and healthy way of enhancing sperm movement and count can be used by the male himself conveniently and at home to improve his chance of fertilizing an ovum. This can be generated as a small tool which can be used by anyone in a schedule to achieve the best performance.

Abbreviations

1. **IVF:** In Vitro Fertilization.

Declarations

1. Ethics approval and consent to participate:

Ethical approval was obtained from the ethical committee in the university of Baghdad / College of Medicine on the 15th of March. All the participants gave their consents to participants in the study prior to enrollment.

2. Consent for publication:

All the participants gave their consent to publish the data.

3. Availability of data and materials:

All data and materials are available on request.

4. Competing interests:

The authors declare that they have not any competing interest.

5. Funding:

No funding received for the study, the authors funded the study by themselves.

6. Authors' contributions:

All the authors contributed equally in the study.

7. Acknowledgements:

None.

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Figures

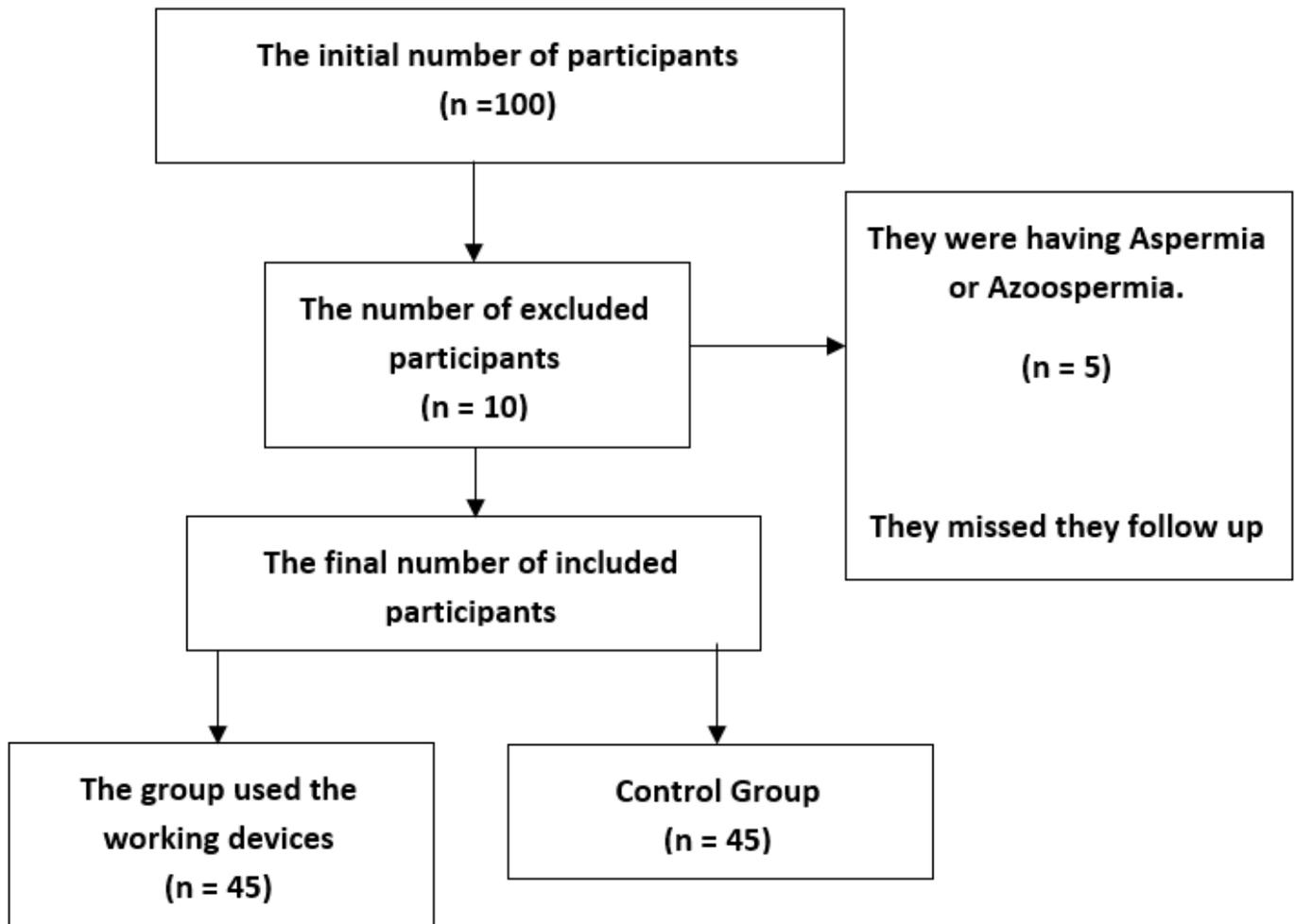


Figure 1

Flow Chart of the participants' Selection Process

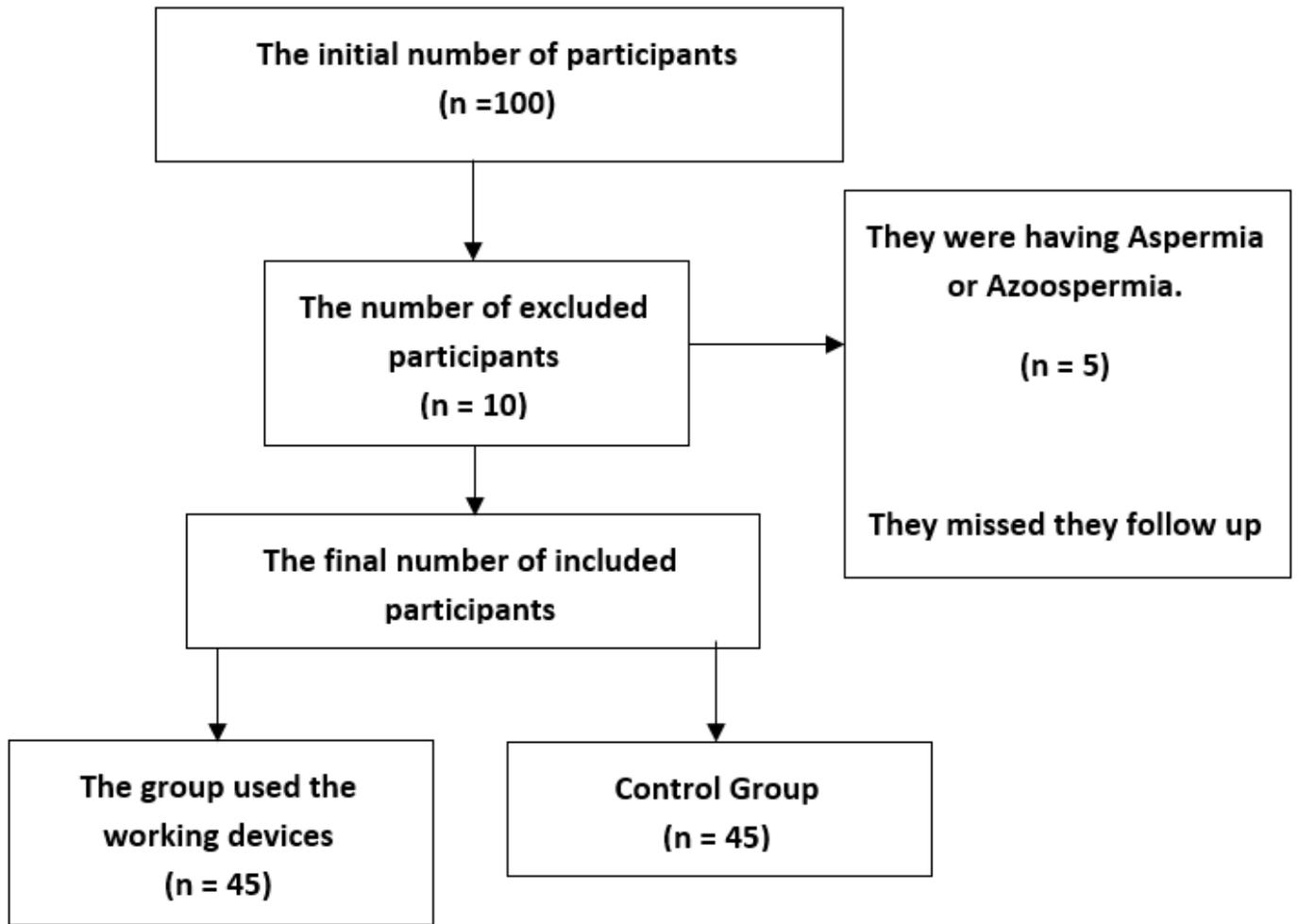


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Flow Chart of the participants' Selection Process

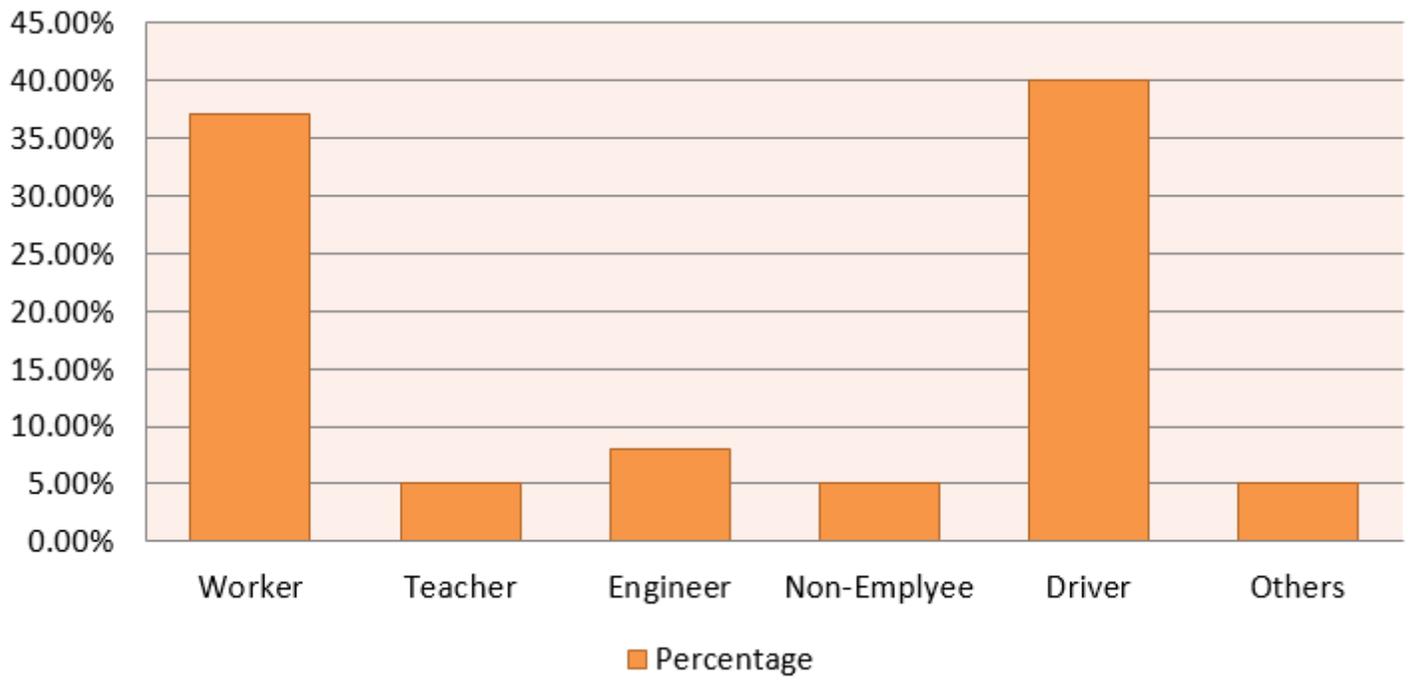


Figure 2

The occupations of the participants

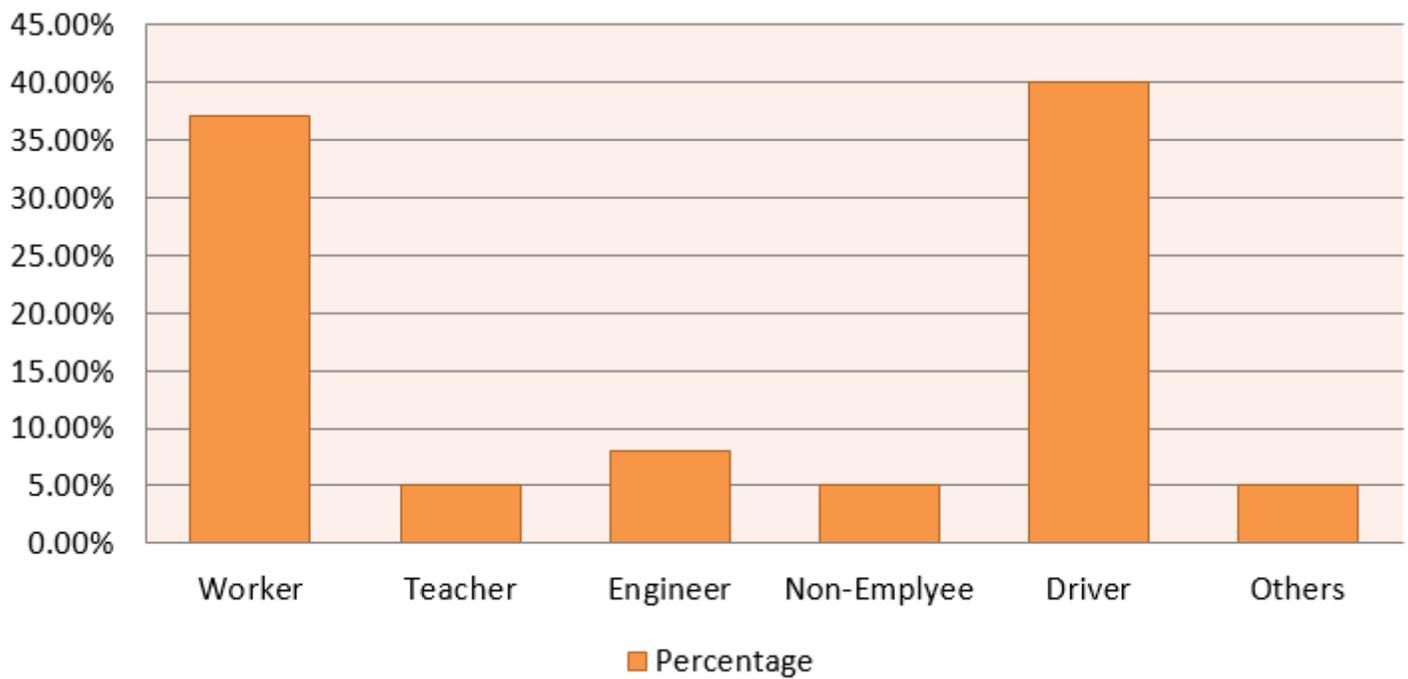


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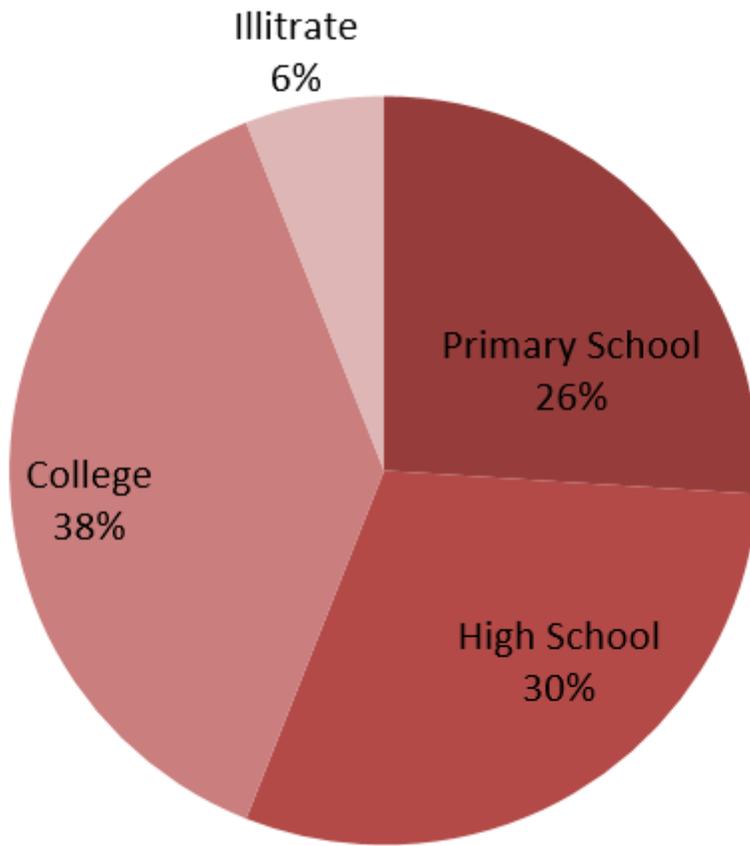


Figure 3

The educational level of the participants

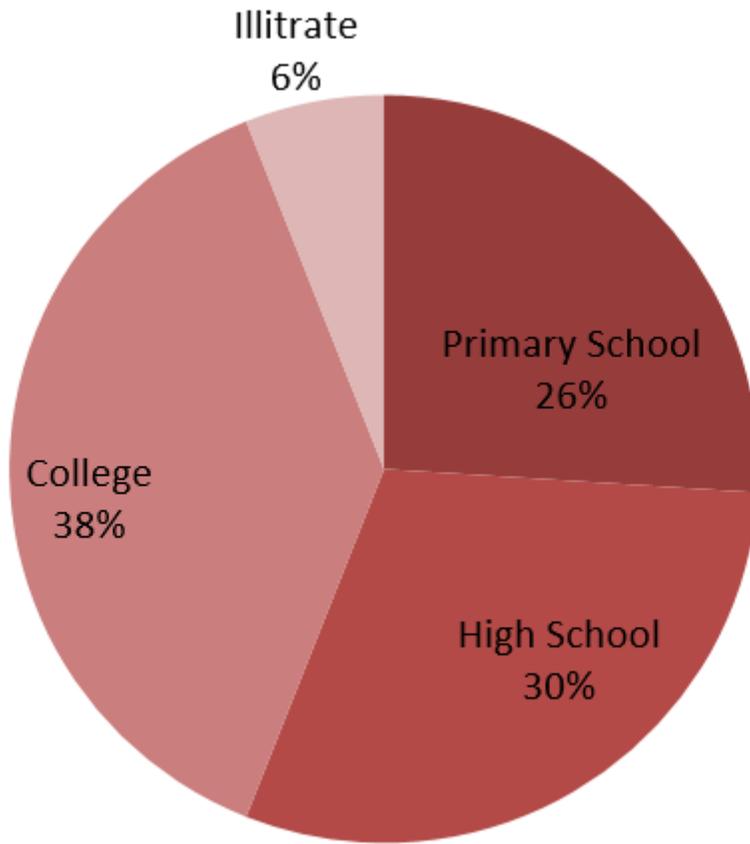


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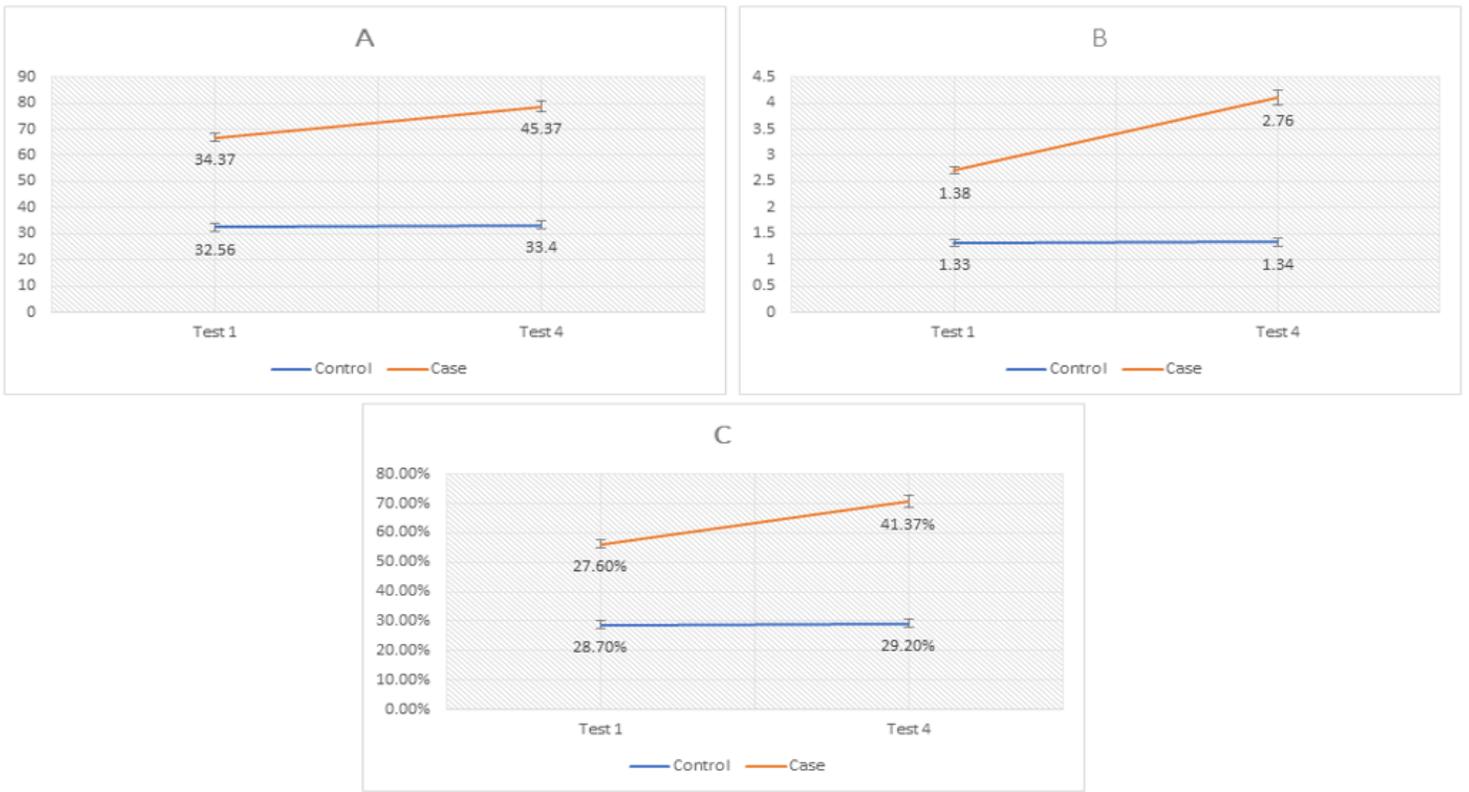


Figure 4

compares between the results of the first and the fourth tests for each group of the participants in Count (A), Volume (B) and Motility (C).

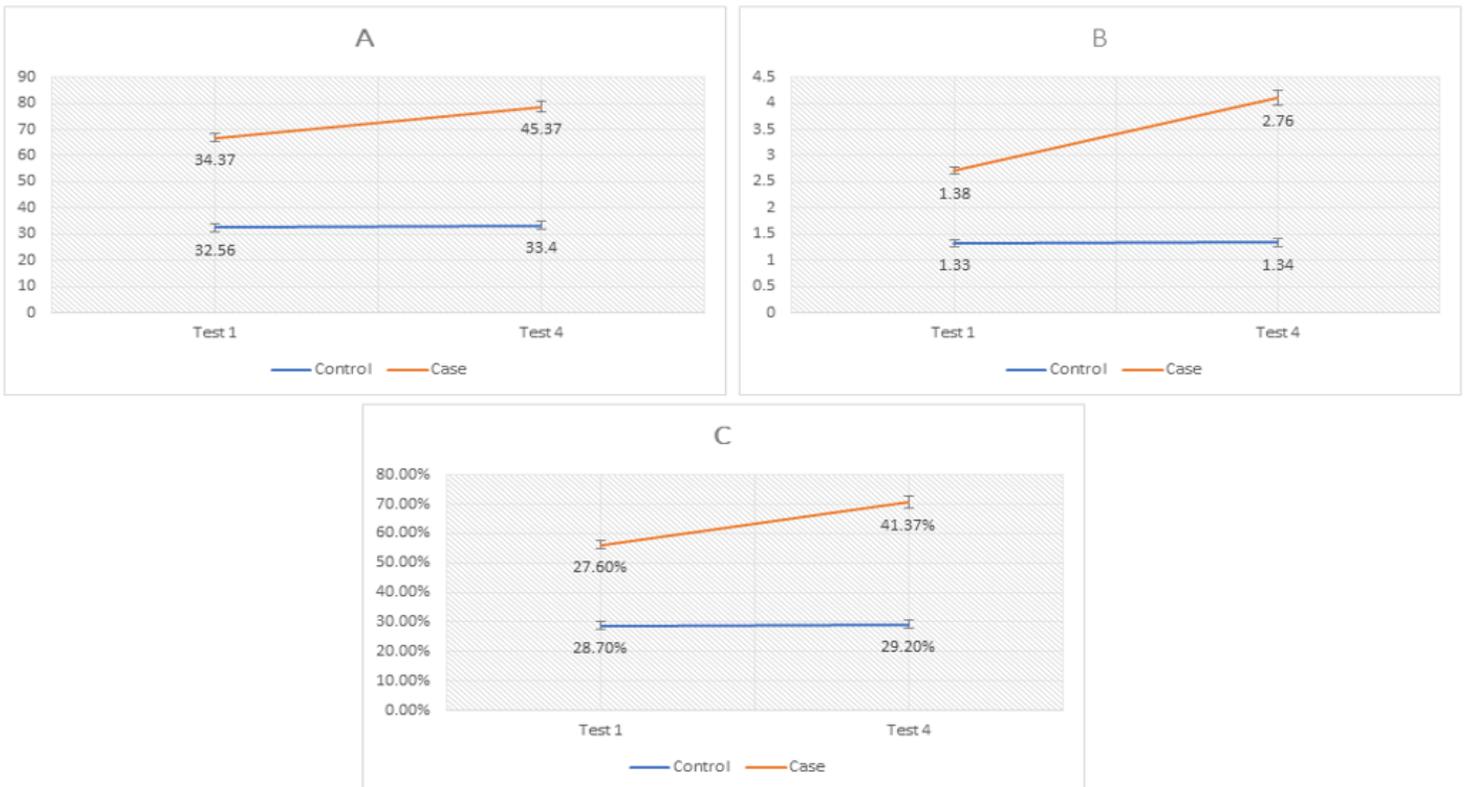


Figure 4

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