

# THE EFFECT OF RUNNING WITH MODERATE INTENSITY TOWARDS MORPHOLOGY OF SPERMATOZOA IN EXPERIMENTAL ANIMAL

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**Abstract:** Infertility is an inability to produce offspring. Nowadays, infertility cases is happening to 10-15% of couples that sexually active, and 50% of infertility cases are male factor infertility. Therefore, one of the effort that have been done by many people to increase or maintain fertility is by doing sport, especially running. Several studies claim that running have a bad impact to sperm quality. This study was conducted to find out whether running have a bad impact to sperm quality or not. This study design is experimental post-test only with control group design. The subject of this study are 14 Rattus Norvegicus mice with wistar strain. This study was conducted by counting the percentage of normal spermatozoa morphology under the microscope. The analysis result found that the data is not normally distributed and homogen. The result of non-parametric test found that there is significant difference between the percentage of normal spermatozoa morphology in experimental group and control group, this can be proved by significance value  $p < 0.05$ , other than that the mean value of normal spermatozoa morphology in experimental group is lower than in control group. Concluded that running with moderate intensity have a bad impact to percentage of normal spermatozoa morphology.

**Keywords:** Infertility, Running, Moderate Intensity, Morphology of Spermatozoa.

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## I. INTRODUCTION

Fertility is the natural ability to produce offspring. In recent years there has been an increase in cases of infertility, this can be seen from the increasing number of couples who consulted on infertility problems and in the last decade there has been an increase in cases of infertility in 10-15% of sexually active couples. (3) Half of cases of infertility are male infertility. (1) In the case of male infertility, it can usually be known through a test called sperm analysis, where sperm quality will be judged good or bad from various parameters such as concentration with a normal limit of 15 million per milliliter, normal motility with a minimum limit of 40%, normal morphology with a minimum limit of 67 -74%, etc. (7)

There are several factors that can cause deterioration in sperm quality such as disease, drugs, diet, addictive substances, temperature, and also exercise. Exercise is an interesting thing here because so many people try to live a healthy life, one of them is by exercising. However, it is unfortunate in some studies to say that excessive exercise from moderate to high intensity can reduce sperm quality. (2,3) Exercise can worsen sperm quality, including the morphology of spermatozoa, through mechanisms, such as increase scrotal temperature, hormonal changes, and oxidative stress which leads to increased free radicals that can damage DNA, lipids, proteins, sperm cell apoptosis, spermatogonia cells that play a role in spermatocytogenesis. (6) For this reason, this study was conducted with the aim of proving whether it is true that running exercise with moderate intensity can worsen the morphological percentage of spermatozoa or vice versa.

## II. MATERIAL AND METHODS

### A. Animal and Experimental Procedure

This study is an experimental laboratories with research design that is Randomized Posttest with Control Group Design. Our study was approved by Research Ethical Committee of Udayana University, Bali, Indonesia.

Sample that has been used in this research is fourteen male white wistar rats (*Rattus Norvegicus*), around 3 months old, and in good health were assigned randomly into two groups, each group consisting of seven rats. The control group, rats those who are not treated running with moderate intensity. While the experimental group, rats those who are treated running with moderate intensity. Running in moderate intensity means running with speed of 19.3 m/minute, with and inclination of 5 degrees, for 60 minutes per days, which is only for 5 days in treadmill that built for rats. (5)

All groups are acclimitized for seven days and given standard food and tap water drink ad libitum. On eight day, the rats has been given treatment appropriate to which group they are in.

On the twelfth day, in all rats euthanasia was carry out while they were under anesthesia and all the rats semen were taken from cauday epididymis. Then the semen from cauda epididymis were test under the microscope in order to count the percentage of normal spermatozoa morphology in each rat.

### B. Statistical Analysis

Data were analysed using the SPSS program for windows. The result were presented as percentage and mean  $\pm$  SD. The normality of the data distribution was confirmed using the Saphiro-Wilk tes. While the homogeneity of the data was confirmed using Levene's test. In the end, data were analysed by Kruskal-Walis Non-Parametric test, and the result were considered statistically significant at  $p < 0.05$ .

## III. RESULT AND DISCUSSION

### A. Result

The result of the measurement of percentage of normal spermatozoa morphology of wistar rats in both control and experimental group are presented in Table 1.

**Table 1: Percentage of Normal Spermatozoa Morphology in Each Groups**

Number	Control	Experimental
1	87	90
2	92	88
3	94	88
4	91	86
5	91	75
6	90	90
7	95	86
Min. – Max.	87 – 95	75 - 90
Mean $\pm$ SD	91,43 $\pm$ 2,64	86,14 $\pm$ 5 ,18

The percentage of normal spermatozoa morphology in rats that are treated with moderate intensity running are significantly lower compared to group that are not treated with moderate intensity running  $p = 0.012$ .

**Table 2: Result of Kruskal-Wallis Test**

Group	Mean	Chi-Square	p
Control	91,43	6,305	0,012
Experimental	86,14		

### B. Discussion

The normal percentage of spermatozoa morphology between control group and experimental group are significantly different. This can be seen from mean of the normal spermatozoa percentage in control group is higher than in experimental group, and can be seen also from the result of Kruskal-Walis tes  $p = 0.012$ . This is due to increasing temperature of scrotum, oxidative stress and hormonal changes. (5)

The results we obtained in this study support the research conducted by De Souza et al. (3) That study involved runners who had approximately the same age which were then divided into three treatment groups, running in light intensity, moderate intensity, and heavy intensity. In this study there was a deterioration in some parameters of sperm quality, for example spermatozoa motility and its density in those who ran at moderate intensity and weight was lower than those who ran with low intensity. Furthermore, in this study it was also found that if there was an increase in the intensity of running exercise, it would be followed by an increase in the number of immature sperm cells.

In addition, the results we obtained in this study also support the results of a study conducted by Safarinejad in 2009, which in the study involved male runners and required them to run jogging in moderate and severe intensity within 120 minutes per year. day, five times a week, and is done for 60 weeks. In the study found at week 24, there was a decrease in sperm density, motility, and also a decrease in the normal percentage of morphology. In this study it was said that there would be a decrease in the quality of spermatozoa if running exercise was carried out in moderate to severe intensity. Although after further investigation there will be improvements to the parameters of the spermatozoa studied after not being treated with running away. (5) Meanwhile our results contradict the results obtained in a study conducted by Jensen in 1994, which stated that on 24 marathon runners treated with running each day for 1 year, there was no correlation between high intensity running and total sperm count, the percentage of normal spermatozoa motility, as well as the normal morphological percentage of spermatozoa. (4)

#### **IV. CONCLUSION**

It was concluded that moderate intensity running had a negative influence on the percentage of normal spermatozoa morphology. This can be seen from the results of the significance values of the Kruskal-Wallis Non-Parametric test that has been carried out. In addition, the mean morphology of normal spermatozoa in the group of rats treated with moderate running intensity was lower than the control group.

#### **ACKNOWLEDGEMENT**

We would like to appreciate Biochemistry Department of Medical Faculty Udayana University, Faculty of Medicine Udayana University, all the faculties, doctors and students who helped us to carry out this study.

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