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A Comparative Study on Effect of Isotonic Exercise on Sperm Count

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Abstract:
Background: Physical exercise is an extremely stressful event that the body encounters during everyday life. During acute bout of exercise, the body must make rapid and integrated cellular and organ system adjustment to meet body's metabolic, thermal and fluid demands. So this study was undertaken to study the effect of isotonic exercise on sperm count in healthy males.
Aim and Objectives: To study the effect of isotonic exercise on sperm count in healthy males.
Materials and Methods: An analytical study was done on 90 males for a duration of 1 year. Semen examination of the sedentary healthy individuals and those healthy individuals who were involved in regular isotonic exercises (weight lifting exercises for upper limbs, lower limbs and torso) for 1 year and 5 years respectively was done in accordance with the standardized method of the World Health Organization.
Results: There is no significant difference ($p>0.05$) between Control group A, Study group B & Study group C with respect to age, weight, height and Body mass index. There was highly significant difference (p less than 0.001) in mean values of sperm count among the 3 groups.
Conclusion: The levels of isotonic exercises reported in this study exert a positive effect on the sperm count of these men.

Keywords: Isotonic exercise, sperm count, physical activity.

1. Introduction:

Physical exercise is an extremely stressful event that the body encounters during everyday life. During acute bout of exercise, the body must make rapid and integrated cellular and organ system adjustment to meet body's metabolic, thermal and fluid demands. In contrast to the effect of exercise on the menstrual cycle in female athletes, the effect of physical activity in the form of weight lifting exercises on the male reproductive system is described far less

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extensively in the scientific literature. The male reproductive system consists of the hypothalamic-pituitary unit and the testes. The testes are responsible for the production of sperm and androgens, mainly testosterone. Androgens are responsible for the development of secondary male characteristics, muscle and bone growth, and production of red blood cells, sex drive and other behavioral aspects. Exercise training frequently results in a decrease of serum testosterone, and may be associated with reduced libido, sperm production and fertility. In addition, the reduced testosterone levels may attenuate the exercise-associated muscle hypertrophy, reduce the repair of muscle damage, reduce post exercise muscle rehabilitation and may play an important role in the development of over-training syndrome. Other consequences include decreased bone density and a possible effect on mood and behavior. Surprisingly, even in the medically well supervised elite athletes, changes in testosterone levels and their effects on performance and health are rarely evaluated (2, 3). A single bout of short and moderately intensive aerobic and anaerobic exercise usually increases also important are the slower adaptations to physical training which occurs over weeks and months of repeated bouts of physical activity. The hormonal rhythms that regulate reproduction are generally robust in both men and women but they are subject to changes with short or long term physiological stresses. Such changes may be clinically significant or insignificant. Endurance and other forms of training can induce subclinical inhibition of normal reproductive function but clinical expression of reproductive dysfunction with exercise is uncommon in men. Long-term, exercise-associated suppression of hormone and sperm production by the testis is rarely of clinical significance or at least few athletes are prepared to admit publicly that they have problems (4-9). So this study was undertaken to study the effect of isotonic exercise on sperm count in healthy males.

Aim and Objectives:

To study the effect of isotonic exercise on sperm count in healthy males.

2. Materials and Methods:

Study Design: This was an analytical study.

Source of Study Population: Semen examination of the sedentary healthy individuals and those healthy individuals who were involved in regular isotonic exercises (weight lifting exercises for upper limbs, lower limbs and torso) for 1 year and 5 years respectively was done in accordance with the standardized method of the World Health Organization.

Sample Size: Total sample size = 90 males

Informed Consent: Complete procedure was explained to the subject and a written informed consent was taken.

Requirements:

Instruments: Haemocytometer, Compound microscope, Calibrated micropipettes

Chemicals: Semen diluting fluid, Sodium hypochlorite (10%), Distilled water.

Others: Rubber gloves, Droppers, Wide mouthed bottle for specimen collection.

Study Procedure:

Prerequisites for study: The subjects had to observe three days of abstinence and semen samples were delivered on the fourth day. Semen samples were collected by masturbation.

Consent: The study objectives and procedure were explained and a written consent was taken.
History: A detailed and relevant history was taken which included their personal history, past history, family history and medical history. A detailed history about duration of associated diseases and medications were also noted.
General and Systemic Examination: After general and systemic examination, inclusion criteria and exclusion criteria were applied.
Collection of semen sample: After taking the history of the subjects, following instructions regarding the collection of semen were followed:
The samples were collected after a fixed abstinence period of 3 days. The name of the patient, the period of abstinence, the date and time of collection and interval between collection and analysis were recorded. Sample was collected as per the subject's convenience. The subjects were properly instructed and motivated to provide full cooperation and they were properly explained the correct method of collection (Masturbation), importance of abstinence period and collection of the sperm rich first few drops of the ejaculation as all these factors are very important for getting accurate results. The semen was obtained by masturbation into a clean, sterile wide mouthed plastic semen container from a batch which was been confirmed to be nontoxic to spermatozoa. The semen containers were labelled with the patient's name, registration Number, date and time of collection. The semen sample was stored at room temperature and examined within 1 hour of collection but only after complete liquefaction. If any abnormalities were found in macroscopic examination of semen like delayed liquefaction (> 1 hour), hematospermia or semen volume less than 1.5ml, it was not considered for recording data. However even such subjects were given free medical counselling and advice. Once the sample was analysed and data was recorded, the sample was discarded in the washroom after treating it with 1 drop of 10 % sodium hypochlorite solution.

3. Results:

Table I – Comparison Between Control Group A, Study Group B& Study Group C With Respect To Age, Weight, Height And Body Mass Index.

Characteristics	Group A Mean ± SDN=30	Group B Mean ± SDN=30	Group C Mean ± SDN=30	p value
Age (Years)	26.0 ± 4.9	27.9 ±4.9	25.7 ± 5.3	>0.05*
Weight (Kg)	78.2 ± 4.4	77.4 ± 3.5	77.6 ± 4.6	>0.05*
Height (m)	1.70 ± 0.05	1.70 ± 0.04	1.70 ± 0.05m	>0.05*
BMI (Kg/m^2)	26.8 ± 2.4	26.6 ± 1.8	26.9 ± 2.1	>0.05*

There is no significant difference (p>0.05) between Control Group A, Study group B & Study group C with respect to age, weight, height and Body mass index.

Table IIA – Table Showing Comparison between Control Group A, StudyGroup B &Study Group C With Respect To Sperm Count.

Groups	Sperm countin millions/ml (Mean ± SD)	'p' value (One wayANOVA)
A	55.6 ± 15.38	'p' < 0.0001*
B	82.8 ± 7.93	
C	54.8 ± 15.63	

*p value < 0.0001 was considered as highly significant.

Table Ii B – Bonferroni's Multiple Comparison Test For Sperm Count AmongControl Group A, Study Group B And Study Group C.

Group Comparison	'p' value	Significant /Nonsignificant
Group A vs Group B	< 0.05	Significant
Group A vs Group C	> 0.05	Non-Significant
Group B vs Group C	< 0.05	Significant

4. Discussion:

In contrast to the effect of exercise on the menstrual cycle in female athletes, the effect of physical activity in the form of weight lifting exercises on the male reproductive system is described far less extensively in the scientific literature. Moreover, in India such studies are rarely been conducted and publications on such topics are very less. In the present study, the mean levels of sperm count is estimated and compared between sedentary healthy subjects (Control group A), healthy subjects involved in regular isotonic exercises for 1 year (Study group B) and healthy subjects involved in regular isotonic exercises for 5 years (Study group C). The mean age (± Standard Deviation) for Group A, Group B and Group C was 26.0 ± 4.9, 27.9 ± 4.9 and 25.7 ± 5.3 respectively. The mean weight in kilograms (± Standard Deviation) for Group A, Group B and Group C was 78.2 ± 4.4, 77.4 ± 3.5 and 77.6 ± 4.6 respectively. The mean height in metres (± Standard Deviation) for Group A, Group B and Group C was 1.70 ± 0.05, 1.70 ± 0.04 and 1.70 ± 0.05 respectively. The mean body mass index (± Standard Deviation) for Group A, Group B and Group C was 26.8 ± 2.4, 26.6 ± 1.8 and 26.9 ± 2.1 respectively. The above data thus shows that there was no significant difference (p > 0.05) between Control Group A, Study group B & Study group C with respect to age, weight, height and Body mass index. Hence these groups were comparable. If subjects are not matched for age and maturity level, whenever possible, variance in the outcomes can be potentially increased. For example, a 40-year-old male and an 18-year-old male will not typically display the exact same hormonal exercise responses or relationships. Post andropausal male could have drastically different hormonal responses when compared to a relative pre andropausal male. For example, growth hormone and testosterone levels typically decrease with age while cortisol and insulin resistance levels increases. These mean Values for Group A, Group B and Group C were 55.6 ± 15.38, 82.8 ±7.93 and 54.8 ± 15.63**.** Thus the above data shows that there was highly significant difference (p less than 0.001) in mean values of sperm count among the 3 groups. Table II B and Graph 1 show that there was significant difference (p value less than 0.05) in mean values of sperm count between Group A and Group B. Also there was significant difference (p value less than 0.05) in mean values of sperm count between Group B and Group C. However, there was no significant difference (p value more than 0.05) in mean values of sperm count between Group A and Group C. Hartley et al (1972) showed that exercise training altered the response of many hormones to prolonged exercise. They found that sperm count significantly increased with acute bout of moderate intensity weight lifting (Isotonic) type of exercises while sperm count was slightly decreased (but not significantly) with chronic exercise as well as in high intensity isotonic exercises.

5. Conclusion:

It can therefore be concluded that the levels of isotonic exercises reported in this study exert a positive effect on the sperm count of these men. These findings are encouraging since they contribute to elucidate the proper intensity and frequency of physical activity which may exert a positive effect.
- Such kind of studies are very rare in India and have a definite role in primary male infertility, hence future studies are required in defining the intensity and threshold to be considered as beneficial for favorable semen parameters.

Conflict of Interest: NIL
Financial Support: NIL

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