



Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/18321

DOI URL: <http://dx.doi.org/10.21474/IJAR01/18321>



RESEARCH ARTICLE

INFLUENCE OF THE MENSTRUAL CYCLE ON THE PHYSICAL PERFORMANCE OF YOUNG FEMALE STUDENTS AT THE INSTITUT NATIONAL SUPERIEUR DE L EDUCATION POPULAIRE ET DU SPORT (INSEPS) IN DAKAR

Mountaga Diop, Papa Serigne Diène, Ndiack Thiaw, Mame Ngoné Bèye, Daouda Diouf, Ndarao Mbengue, Amadou Diouf and El Hadji Mamouthiam Diop

Research Laboratory in Sciences and Techniques of Physical and Sports Activities, Youthand Leisure of the Institut National Supérieur de l'Education Populaire et du Sport (INSEPS)oftheUniversité CheikhAntaDiop (UCAD) in Dakar.

Manuscript Info

Manuscript History

Received: 26 December 2023

Final Accepted: 28 January 2024

Published: February 2024

Key words:-

Menstrual Cycle, Vertical Relaxation, Reaction Speed, Abdominal Endurance, Backendurance

Abstract

OBJECTIVE: To evaluate the influence of the menstrual cycle on the physical qualities of some INSEPS students.

METHOD: 15 female students participated in our study. Each subject performed the vertical relaxation, reaction speed, abdominal endurance and back endurance tests on the third day of menstruation and the third one after cessation of bleeding.

RESULTS: On average, the subjects had better vertical expansion after menstruation (45.13 cm) than during menstruation (43.33 cm), with no significant difference ($p=0.57$). In terms of reaction speed, the girls performed better on average during menstruation than after (1'11 versus 1'47), with no significant difference ($p=0.06$). The best average performance in abdominal endurance was achieved during menstruation (390.6 repetitions versus 367.73 repetitions) but this difference was statistically insignificant ($p=0.56$). In back endurance, the best average performance for girls was achieved after menstruation (342.67 repetitions versus 337.53 repetitions). The difference was statistically insignificant ($p=0.92$).

CONCLUSION: This study shows that the menstrual cycle does not have a significant influence on the vertical relaxation, reaction speed, abdominal endurance and back endurance of the INSEPS students in our sample.

Copy Right, IJAR, 2024,. All rights reserved.

Introduction:-

Four years after the first Olympic Games of the modern era in Athens, women took part in their first Olympic Games in Paris in 1900. Despite the reluctance of the Games' renovator, Pierre de Coubertin, 22 women out of a total of 997 athletes competed in five sports: tennis, sailing, croquet, horse riding and golf. In the 1970s, as awareness of the role played by women grew around the world, women's participation in sporting competitions and the Olympic Games increased [1]. In fact, according to Baron Pierre de Coubertin, "muscles did not suit them, in his eyes he recommended gymnastics", which is why he was fiercely opposed to women taking part in the Olympic Games [2]. Why this opposition to women taking part in competitive sport? One of the physiological differences between men and women is that women menstruate regularly.

Corresponding Author:- Mountaga Diop

Address:- Research Laboratory in Sciences and Techniques of Physical and Sports Activities, Youthand Leisure of the Institut National Supérieur de l'Education Populaire et du Sport (INSEPS)oftheUniversité CheikhAntaDiop (UCAD) in Dakar.

By definition, the menstrual cycle prepares a woman's body for a possible pregnancy. This series of events takes place every month during a woman's fertile years (from puberty to the menopause), except during pregnancy. The menstrual cycle generally lasts between 25 and 32 days [3]. The menstrual cycle is influenced by physical activity, which can accentuate or reduce the physiological problems that accompany it (breast tension, nervousness, nausea or vomiting, abdomino-pelvic pain) [4]. However, is the opposite effect possible, i.e. an influence of the menstrual cycle on physical activity and, more specifically, on performance?

Several studies have been carried out on this subject. In 2005, Kishali reported on 241 female athletes, including basketball players, judokas and volleyball players, that physical performance was not influenced by menstruation and that dysmenorrhoea decreased during this period thanks to training and competition [5]. Botcazou's study [6] follows this logic, stating that "neither physical performance nor plasma concentrations of catecholamines and lactates in response to a six-second sprint exercise are influenced by the menstrual cycle in untrained women. In the same vein, Jaffre et al [4], following a Wingate test, showed that the menstrual cycle had no influence on performance. Studies by Lebrun [7], Giacconi [8] and Middleton [9] corroborate the results of the above investigations. In Senegal, the only study to our knowledge [10] carried out on 50 female athletes (runners) in the Dakar region still shows that the menstrual cycle in no way affects their performance in the 100 metres. However, recent studies by Oosthuysen do not agree with those cited above. They reported a significant effect of the menstrual cycle on physical performance [11]. We have also observed that during Physical Education and Sports (PE) assessments in secondary schools, pupils who are menstruating ask teachers to postpone tests to avoid under-performing. At INSEPS, some girls have found that their worst performances were achieved during their period. Others report that they excel during this period. Students in Dakar athletics clubs would like league competitions to be held on days when they menstruate, as this would be a good time to perform. For all these reasons, we propose to study the influence of the menstrual cycle on the physical qualities of some INSEPS students.

II- METHOD

15 female students from the Institut National Supérieur de l'Éducation Populaire et du Sport (INSEPS) aged over 20 and under 29, not suffering from any illness, not using any form of contraception, with no previous gynecological history and seeing their periods regularly, took part in our study.

We first assessed the students' reaction speed, vertical relaxation and abdominal and back endurance on the third day of bleeding. Then, three days after the bleeding had stopped, they again underwent the same tests. Finally, we compared the average performances obtained in the two phases of our protocol.

Description and conduct of the tests

Reaction speed test

Developed in 2001 by Cometti [12], the 10m sprint assesses the reaction speed of subjects. It expresses the explosive force characteristic of the sprinter. The subject stands after the starting line, feet behind the line. The start is initiated by the subject. As soon as he starts the race, the stopwatch is started. The timekeeper starts his stopwatch once the subject's head crosses the finish line. The subject then walks and stretches to recover before doing the second trial.

1.2-Vertical expansion test

The subjects were given the vertical relaxation test developed by Sergent (1921). This test, a squat jump performed on a wall graduated in centimetres, determines the difference between point A reached by a subject standing with arms outstretched and point B reached during the jump. It expresses the ability to propel the body as high as possible on its own: the explosive power of the legs.

To carry out this test, the subject stood close to the wall in profile. The arm on the side of the wall was extended, with the shoulder stretched out to give the maximum height the hand could reach when standing. The first measurement was taken with the heel on the ground. Then, without taking a run-up, the subject jumped up to touch the highest possible point on the vertical scale with the tips of his fingers, which were coated with a material (chalk) of a different colour to that of the wall. The subject made two attempts and the best performance was taken. The value of the vertical rebound corresponded to the difference between the height reached while standing and the one reached during the jump. The trial was valid if the subject started from the squat position, i.e. with bent knees.

1.3-Abdominal muscular endurance test

This test is also known as the set-up test. It is a trunk test involving the abdominal muscles in endurance. It is performed with the subject seated, knees bent, heels 10 cm from the buttocks, hands behind the neck. The subject

tries to perform as many sit-ups as possible in 30 minutes, starting from a supine position with the shoulders 5cm off the ground. This test assesses abdominal endurance and speed. Once in the gym, the subject rested for 5 minutes, then changed into his or her uniform to perform the test. After explaining the criteria for a valid repetition (raising the torso to at least 2 cm from the knees, returning to the floor, shoulders 5 cm from the floor), we gave them the signal while simultaneously starting the stopwatch for 30 minutes. We accompanied the subject while counting the sit-ups performed until the end of the time. The subject then rested for an hour before starting the back endurance test.

1.4-Back endurance test

This test requires both strength and endurance of the back muscles. To perform this test, the subject lies on a mat on their stomach with their lower limbs locked, their hands on the back of their neck and their chest resting on the floor. The subject straightens their torso, with their shoulders well above the height of their buttocks. Each sit-up is followed by a return of the chest to 5cm above the ground. This test lasts 30 minutes and is used to assess a subject's back endurance. lkk

Once in the gym, the subject rested for 5 minutes, then got dressed to perform the test. After giving them the criteria for a valid repetition (feet flat on the floor, shoulders slightly above buttock height during the sit-up, chest 5 cm above the mat), we gave them the signal and started the stopwatch for 30 minutes. We accompanied the subject while counting the sit-ups performed until the end of the time.

STATISTICAL PROCESSING

Once all the subjects had completed all the tests, on the third day of bleeding and on the third day after bleeding had stopped, we calculated and compared the average performance of the group obtained during the two phases using a Student's test. To carry out this statistical test we formulated the following hypothesis:

Ho: There is no statistically significant difference between the average performance recorded on the third day of bleeding and that obtained 3 days after the bleeding stopped. We set our probability of error at 5% (0.05), i.e. the error we accept in making a decision with respect to the hypothesis. If the probability of error p found in the Student's t-test is less than 5%, the Ho hypothesis is rejected, i.e. there really is a statistically significant difference between the average performance achieved in the two phases of the study. If the probability of error p found in the Student test is greater than 5%, the Ho hypothesis is confirmed, i.e. there is no significant difference between the average performances achieved in the two phases.

RESULTS

Table 1: Comparison of mean values for vertical relaxation, reaction speed, abdominal endurance and back endurance recorded on the third day of bleeding and those obtained on the third day after bleeding had stopped.

	Vertical expansion		Reaction speed		Abdominal endurance		Back Endurance	
	3rd day During menstruation	3rd day After menstruation	3rd day During menstruation	3rd day After your period	3rd day During menstruation	3rd day After your period	3rd day During menstruation	3rd day After your period
Average	43,33	45,13	1,11	1,47	390,6	367,73	337,53	342,67
Standard deviation	8,61	8,36	0,54	0,42	86,22	124,43	117,51	148,14
α	0,05		0,05		0,05		0,05	
P	0,57		0,06		0,56		0,92	
Decision	Not significant		Not significant		Not significant		Not significant	

DISCUSSION

The explanation of the effect of the menstrual cycle on physical performance has been the subject of controversy among many authors. Some of these authors maintain that the menstrual cycle has no effect on physical performance. For others, the menstrual cycle does have an effect on physical performance. These controversies, together with information gathered in the field, prompted us to carry out this study.

Four physical variables were chosen to deal with this subject. These were vertical relaxation, reaction speed, abdominal endurance and back endurance. The study of these variables enabled us to give our opinion on the subject.

The results show that there was no significant difference between the mean values of the variables recorded on the third day of bleeding and those collected on the third day after bleeding had stopped. Our study involved relatively young girls, aged between 20 and 29, practising different sports.

Although the best performance in the vertical expansion test was achieved after menstruation (45.13 cm compared with 43.33 cm), there was no statistically significant difference found between the two phases of the cycle ($p = 0.57$). This would mean that menstruation had no influence on the girls' performance in the vertical expansion test. In terms of reaction speed, the girls achieved the best times during the menstrual period. But the difference was not significant ($p = 0.06$). With an average time of 1'11 during menstruation and 1'47 outside menstruation, our girls performed less well than that (0'30) found by Diatta [13] in Senegalese women handball players. The women's performance was also studied in terms of abdominal endurance and back endurance.

On average, abdominal muscle endurance was better during menstruation than outside it. As the difference was not significant, we conclude that menstruation does not influence the performance of the abdominal muscle group. The endurance of our girls' back muscles was better outside the period than during it. This difference could not be taken into account because of the very high margin of error ($p=0.92$). We also concluded that the menstrual cycle did not significantly influence back endurance.

Our results show that the menstrual cycle does not have a significant effect on the power, endurance and speed of INSEPS students aged over 20 and under 29.

Our results are in line with those of Kishali et al [5], who reported that physical performance was not affected by menstruation in a study of 241 athletes (female judokas, basketball players and volleyball players). Jaffre and colleagues [4], using a Wingate test at the beginning of the menstrual cycle (between the 5th and 9th days) and at the end of the menstrual cycle (between the 19th and the 27th days) to record Peak Power (PP), Mean Power (PME), the fatigability index (IF) and lactatemia, reported non-significant differences whatever the group of subjects tested.

The results reported by Botcazou and colleagues [6] corroborate our own and those of Kishali [5] and Jaffre [4], as they found no statistically significant difference in catecholamine concentrations, plasma lactate and performance recorded before the onset of menses and during menses in untrained young women subjected to a 6-second sprint test.

CONCLUSION

The aim of our investigation was to study the effect of menstruation on the physical performance of some INSEPS students. To this end, 15 INSEPS students underwent physical tests to evaluate reaction speed (30 m sprint), explosive power (vertical rebound), abdominal endurance (set-up test) and back endurance on the 3rd day of menstruation and 3 days after the end of menstruation.

This study shows that menstruation does not have a statistically significant effect on the above physical qualities of the INSEPS students in Dakar who took part in our study.

On the basis of these results, INSEPS students, secondary school girls and schoolgirls will be advised not to be afraid of underperforming physically when they have to undergo tests.

BIBLIOGRAPHICAL REFERENCES

1. International Olympic Committee. Factsheet: Women in the Olympic Movement. IOC, December 2009.
2. Charpentier C. 100 ans de Jeux olympiques, Paris, France-Empire, 1996.
3. Mtawali G., Pina M., Angle M., Murphy C. The menstrual cycle and its relationship to contraceptive methods: a reference for reproductive health trainers; University of North Carolina at Chapel Hill School of Medicine PRIME/ USAID INTRAH project, 1998; ISBN 1-881961-11-7.

4. Jaffre C., Zouhal H., Ranou F., Delamarche P., Gratas D. Influence of menstrual cycle or oral contraceptive use on performance in the Wingate test, vol. 21, no1, pp. 20-22. 2006.
5. Kishali N.F., Imamoglu O., Katkat D., Muli A., Akyol P. Effects of menstrual cycle on sports performance ; Intern. J. Neuroscience, 116:1549- 1563, 2006 Informa Healthcare ISSN: 0020-7454 / 1543-5245.
6. Botcazou M., Delamarche G.S., Delamarche A.P., Zouhal H, Influence of menstrual cycle phase on catecholamine responses to sprint exercise in women. The free Librerary by FARLEX. October 2006.
7. Lebrun, C.M, Mckenzie.M,D.C,Juor,Taunter.J Effects of menstrual cycle phase on athletic performance. Med. Sci. Sports Exercices,. 1995.
- 8 Giacomoni M, Bernard T, Gavarry O. et al. Influence of the menstrual cycle phase and menstrual symptoms on maximal anaerobic performance. Med Sci Sports Exerc, 2000;32(2):486-92.
- 9 Middleton L., Wenger H. Effects of menstrual phase on performance and recovery in intense intermittent activity,.2006.
- 10-Djitte A. Vécu des menstruations et influence sur les performances physiques : à propos de 50 athlètes de la région de Dakar ; Mémoire de Maitrise ES Sciences Et Techniques de l'Activité Physique et du Sport ; Université Cheikh Anta Diop de Dakar. 2006.
11. Oosthuysen T.; Bosch A.N.; Jackson S.N. Effect of menstrual phase of the accelate correction factor used in metabolic tracer studies, university of the Witwatersrand. Volume 28, n° 6, pages 818-830. Human Kinetics Publishers, Champaign, IL, USA,. 2003.
12. Commetti G. La préparation physique au Football. Paris, Amphora, 1997.
- 13-Diatta S. Physical abilities and level of play of Senegalese women handballers. Evaluation and Perspectives. Master's thesis in the sciences and techniques of physical activity and sport. Cheikh Anta Diop University. Dakar, 1984.