

Pedagogic Sciences

Педагогические науки

UDC 37

Effect of Menstrual Cycle on the Exercise Concert of Zambian Female Long Distance Runners

Mathivanan. D & clementchileshe

St.Eugene University, Zambia
Director, Olympic youth Development centre
E-mail: gokulvarshan2004@gmail.com

Abstract. The Focusing of the study is to determine the effect of exercise during menstrual cycle on female long distance runners. The Main objectives of this study were to assess the effect of exercise concert at the period of menstrual cycle. The menstrual cycle do not affect muscle contractile characteristics. Most research also reports no changes over the menstrual cycle for the many determinants of maximal oxygen consumption (VO₂max), such as lactate response to exercise, bodyweight, plasma volume, hemoglobin concentration, heart rate and ventilation. Therefore, it is not surprising that the current literature indicates that VO₂max is not affected by the menstrual cycle. These findings suggest that regularly menstruating female long distance runners, competing in strength-specific sports and intense anaerobic/aerobic sports, do not need to adjust for menstrual cycle phase to maximize performance. For prolonged exercise performance, however, the menstrual cycle may have an effect. To evaluate that whether the exercise are harmful during menstruation or not, to assess what changes occurs before, during, and after menstruation, and to know the effects of menstruation upon personal performance A questionnaire was developed and distributed among the female long distance runners. The received responses of female long distance runners were tabulated and analyzed. Main findings were that exercises are not harmful during menstruation; personal performances are increased during bleeding days.

Keywords: Exercise concert; menstrual cycle; Effects; long distance runners.

INTRODUCTION

The recently increased popularity and quality of competition of women sports has drawn attention to the physiological responses of women to exercise. Of special interest is the relationship between athletics training and female menstrual cycle and reproductive function. In the past, it has been generally believed (without scientific evidence) that participation in strenuous exercises and sports during menstruation could be physiological harmful. Only recently has it been established somewhat clearer that vigorous athletic training and competition do not adversely affect the menarche, menstruation, or subsequent obstetric and gynecological history. All of these changes occur because of programmed fluctuations in hormone levels. Estrogen dominates during the follicular phase, and progesterone rules the luteal phase. Levels of both plummet sharply in the time preceding menstruation. But that's not all these hormones do. They can also cause changes in mood and other physical symptoms. Because of the sharp drop in hormone levels prior to menstruation, many women experience some of the following symptoms: Like Anxiety, Depression, Increased insulin responsiveness, Food cravings, Fatigue, Headaches Obviously, these symptoms can make exercising during your period unpleasant to say the least. But exercising can actually make your period more manageable, decreasing many of these symptoms.

It is safe and beneficial to exercise during your period. The women by virtue of her special role in the process of reproduction exhibit not only changes in degree in the distribution or character of the general body tissues but also peculiarities of form and function which are relevant to the context of sports and physical recreation Anemia is multifactorial; having a period doesn't necessarily make you anemic, he asserts. Being iron-deficient isn't equivalent to being anemic. "Females are likely to be more prone to iron deficiency because of the iron loss that occurs with the accrued blood loss from menstruation,"

According to Glowney explains. "Some also theorize there might be male to female differences in iron content ingested in diet too." Studies have shown that running can potentially cause any runner (regardless of gender) to lose iron through their gastrointestinal tract and even through their sweat, says Glowney, an endurance coach and former elite-level triathlete. Then there is the footstrike theory which suggests that runners lose iron when the red blood cells in their feet are broken during the pounding occurring when they run. A relatively new theory, Glowney reports, surmises that the peptide hepcidin, which decreases iron uptake, is secreted by the liver when the body recognizes itself in a state of acute inflammation. Eight to 10 hours after a hard race/training session the body will release hepcidin. So iron absorption for all runners is compromised after working at a high intensity.

STATEMENT OF THE PROBLEM:

While an uncomfortable and typically taboo topic for most men and some women, it's something that every woman runner needs to take into consideration when planning a training schedule and understanding running performance. And in order to grasp the important differences occurring during the phases, one has to first understand the menstruation cycle. The first day of the cycle is the first day of menses. Bleeding is usually complete by day 5 or 7. Days 1-14 are called the follicular phase. By day 14 or 15, ovulation begins with a surge in estrogen and luteinizing hormone.

Many running articles focus on endurance female athletes with a heavy training load experiencing amenorrheic or irregular cycle issues. The research findings on the effects of a regular menstrual cycle, on average testing women ages 20-35, vary widely thanks in part to the rollercoaster of hormones. The timing of testing and the individual variability in estrogen and progesterone levels make testing a challenge. However, most studies agree on several key aspects.

Although understanding of the unique physiology of the female athlete has increased, there are still many questions to be answered. Endogenous and exogenous female sex steroids have been shown to influence various cardiovascular, respiratory, and metabolic parameters, but these changes probably have minimal impact on the ability of most recreational athletes to participate in and enjoy their sport. Statistically significant data may or may not have clinical or performance relevance. The effect of menstruation on the individual subject varies enormously in some individuals, the cycle progresses throughout entirely without any apparent disturbance. While in others the changes are quite profound and may indeed be sufficient to give rise to regular periods of significance incapacity, in the majority of cases, the cycle gives rise to little apparent disability, though the physiological changes, which take place, may significantly affect human physical performance. For example, the weight gain associated with water retention during the premenstrual period will clearly be disadvantageous, also the feeling of dragging in abdomen as well as the fullness and discomfort felt in the breasts. Psychological changes are also demonstrable during the cycle. Showing considerable fluctuation in the level of intellectual and psychological performance capacity. Similarly, a statistically insignificant change may mean the difference between first and second place to an elite athlete. For an athlete concerned about maximizing performance, individual variability in menstrual cycle changes to various performance parameters must be considered. Thus the purpose of the study is to examine the effect of menstrual cycle on the exercise concert of Zambian female long distance runners

OBJECTIVES OF THE STUDY

1. To assess the effect of exercise on menstrual cycle of female long distance runners
2. To examine that either or nor the exercise are harmful during menstruation cycle.
3. To identify the Physiological & Psychological changes occurs before, during, and after menstruation of female long distance runners.
4. To know that effects of menstruation cycle influences in muscular strength and athletic performance.

HYPOTHESIS OF THE STUDY

1. It is hypothesized that the Physiological response to exercise of the long distance runner could differ before and during menstruation
2. It is presume that the Exercise on premenstrual and menstrual symptoms Change in blood volume due to light & rigid exercise
3. It hypothesized that Pain increases while performing Light exercise and rigid Exercise
4. It is assumed that the Performance increases at the time of menstrual cycle

LIMITATION OF THE STUDY:

- The study is carried out among the volunteers performing in long distance running.

- The study is investigated in the selected 5 colleges athletic competitions held in Zambia.
- The subjects are from various colleges in Zambia in the age group of 18 to 22

REVIEW OF RELATED LITERATURE:

The study by Kirchengast and Gartner (2002) stated that the effect of the menstrual cycle on WHR of thirty-two females. Of the thirty-two females, twentyfour (75%) were non-oral contraceptive (NOC) users and eight (25%) were oral contraceptive (OC) users. The NOC users were placed into three groups depending upon the length of their menstrual cycle: 27-30 days, 23-26 days, and 31-34 days. The OC users were group four. The results indicated a slight increase in body weight in all 13 groups during the second half (~ ovulation to menstruation) of the menstrual cycle with the 27-30 day group and the 31-34 day group experiencing an increase in body weight. A change in WHR was also noted in the 27-30 day group with a decreased in WHR at the time of ovulation and then increased post ovulation, but remained low in comparison to the first day of menstruation until ovulation. Lack of significant changes in WHR may be due to subject error as each administered her own WHR measurement.

Thomas (2000) suggested that strenuous athletic training might affect the normal menstrual cycle. Such disruptions include delayed menarche in ballet dancers and gymnasts, shortened luteal phase and secondary amenorrhea associated with high training loads and competitive stress. Fluctuations in the steroid hormones have been associated with changes in muscle strength.

Giacomoni et al (2000) study imply no significant differences were observed among the three stages of the menstrual cycle in maximal jumping power, or maximal height of jump in menstrual discomfort. In menstrual symptoms, only maximal jumping power decreased by 8% in menstruation compared with that in midfollicular phase ($P < 0.05$). Although there were, no significant differences in maximal anaerobic performance during different menstrual cycle phases, results of the study suggest that the presence or absence of premenstrual or menstrual syndrome symptoms may have an effect, possibly through an action on the stretch-shortening cycle of tendons and ligaments.

Frankovich (2000). The periodic cycle of ovulation and menstruation produces not only local changes in the glands but also general psychological disturbances, which may be quite profound. The development of the embryo following conception alters not merely the women's general physiological behavior but also drastically modifies, although only temporarily, body structure particularly that of the abdomen. Nowadays females are taking part in sporting activities at large scale, and they are performing well. Menstrual cycle is unavoidable in female athletes; it has some physiological and psychological affects. Therefore, the need was to investigate the problem, but it was a difficult task to investigate because of the nature of topic, but it was happily done at last due to volunteer athletes. They gave their responses and it was become possible for researcher to draw conclusions in the light of those responses.

According to Goodman, 2009. The menstrual cycle. The menstrual cycle is characterized by changes in estrogen and progesterone levels driven by the endocrine system for the purpose of reproduction. The menstrual cycle is commonly divided into 2 phases, the follicular and luteal phases, which vary in duration between women but usually lasts 28 days. The first day of menstruation is usually referred to as day 1. During the early follicular phase (days 1-7) of the menstrual cycle, follicles in the ovary begin to mature. At this time, estrogen and progesterone concentrations are low. The levels of these hormones change during late follicular phase (days 9-14). Progesterone levels rise and estrogen levels reach its peak. Estrogen is secreted by the corpus luteum of the developing follicle, initially rises to stimulate the growth of epithelial cells of the endometrium and increase its thickness. Progesterone, also secreted by the corpus luteum, plays a role in differentiating cells of the endometrial lining and preparing the uterus for the implantation of the ovum. Progesterone also rises in response to the surge of the luteinizing hormone to decrease luteinizing hormone levels after its peak. The menstrual phase after ovulation is called the luteal phase. Both estrogen and progesterone concentrations are high during the midluteal phase (days 20-25). They serve to maintain the thickness of the endometrium. Eventually, the corpus luteum loses the ability to produce estrogen and progesterone, Texas Tech University, Melissa Mae R. Inigo, May 2012 such that both ovarian hormone levels decline and the endometrium degenerates. This ultimately leads to menstruation, after which the body goes through the entire cycle again in a pre-menopausal woman.

Juworksi et al., (1981) No study has directly investigated the influence of the menstrual cycle phases in women with EIB. Rather, in healthy women, studies investigating the effect of menstrual cycle on exercise performance have been mixed. reported that after 40 minutes of submaximal cycling,

the time to exhaustion of the following cycling task at 90% of maximum cycling power output was significantly longer during the midluteal phase than the mid-follicular phase.

In contrast, Campbell et al. (2001) found that the 4 kJ/kg of body weight time trial results of moderately trained women, following a 2-hour long cycling task at 70% VO₂max, was 13% faster during the follicular phase than luteal phase. Lastly, numerous studies have reported no difference between follicular and luteal phases in time to exhaustion during high-intensity exercise (Oosthuysen et al., 2010) and time trial (16 km) performance (McLay et al., 2007) when performed following prolonged exercise. Interestingly, Oosthuysen et al. (2010) observed that significant

RESEARCH DESIGN: This study was aimed at summarizing the effect of exercise during menstruation on female athletes. For the study 25 volunteer sports, girls were selected. These girls have participated in different sports at college level competitions.

For the collection of relevant information the researcher have prepared a closed form questionnaire containing 24 questions with the help of expert in the field and available literature, the questionnaire was divided in to three sections. The first section included Physiological responses to exercise throughout the normal menstrual cycle. The second section discusses the effect of regular strenuous exercise on premenstrual and menstrual symptoms. The third section deals with a topic that has attracted considerable research interest in the last few decades, which is personal performance during the menstrual cycle. The questionnaire was distributed and collected personally. The percentage of each question was calculated and presented in the form of table.

PRESENTATION AND ANALYSIS OF DATA:

Table: 1 Physiological response to exercise

S. No	Questions	Responses			
1.	Regular menstruation	Yes		No	
		77.77%		33.33%	
2.	some sign of nervousness	Before menstruation		During Menstruation	
		25.75%		32.38%	
3.	During menstruation	lumbago	queasiness	Headache	sickness
		63.65%	5.43%	10.11%	10.11%
4.	Period of menstruation	4 Days	5 Days	6 Days	7 Days
		21.21%	43.43%	21.12%	10.10%

Table: 1 According to respondent nearly 32.38% feels some sign of nervousness during menstruation and 25.75% feels sign of nervousness before menstruation therefore it is understood that some sign of nervousness could happen in performer before competition.

Table: 2 Exercise on premenstrual and menstrual symptoms

S. No	Questions	Responses					
1.	Change in blood volume due to light & hard exercise	Light Exercise 1 & 2 days		Rigid Exercise 1 & 2 days			
		Yes	No	Yes.	No.		
		44.44%	55.55%	72.22%	27.77%		
		Light Exercise 3 & 4 days		Rigid Exercise 3 & 4 days			
		Yes	No.	Yes.	No.		
		16.66	83.37%	27.77%	72.22%		
		Light Exercise 5 & 6 days		Rigid Exercise 5 & 6 days			
		Yes. 00%	No. 100%	Yes.	No. 94.44%		
				5.56%			
2.	Pain before, during, and after menstruation	Before cycle		During cycle		after cycle	
		Yes	No	Yes	No	Yes	No
		44.44	55.55	61.11	38.88	5.55	94.44
3.	Pain increases with	Light exercise		Rigid Exercise			
		Yes	No	Yes	No		
		33.33	66.66	38.88	66.11		

Table: 2 According to respondent nearly 55.55% response that change in blood volume occurs due to light exercise and nearly 72.22% response that change in blood volume occurs due to hard exercise. Most of the respondents 61.11% accept that there is pain during cycle. Hence it is identified that there is impact in change of blood volume due to rigid exercise. And pain during menstruation.

Table: 3 Personal performance during the menstrual cycle

1.	Performance increased	First 2 days		3 & 4 days		5 & 6 days	
		Yes	No	Yes	No	Yes	No
		11.11	88.88	55.55	44.44	72.22	27.77
2.	Performance decreased	83.33	16.66	33.33	66.66	16.66	83.33

Table: 3 According to respondent 72.22% of performance increased on 5 & 6 days during the menstrual cycle. Similarly 83.33% of performance is decreased on first 2 days. It is concluded that at time of menstrual cycle performance is increased in 5&6 days and performance decreased in first 2 days.

FINDINGS, CONCLUSION AND RECOMMENDATIONS:

Findings in the study

1. It is understood that some sign of nervousness could happen to the long distance runners before competition at the period of menstrual cycle therefore there is a possibilities that there is a change in their psychological behavior which leads to a poor performance.

2. It is identified that there is impact in change of blood volume due to rigid exercise. And pain during menstruation which also change their psychological pattern.

3. It is found that at time of menstruation first 2 day the performance is decreased and the performance increases after 5 & 6 days.

Conclusion

Sportswomen tend to be young, healthy, who must be able to maintain a steady, consistent performance of high quality in which even slight variations spell defeat. Their best performance are frequently achieved in those years during which sexual development is occurring, for once full development is complete the peak may be passed. Undoubtedly, the menstrual hormones play an important part in any sportswomen's career, but it is not possible to generalize about their influence. It is just as incorrect to say that all sportswomen are affected by menstruation, as it is to say that none is affected. For each woman the influence of menstruation is a personal and very individual effect, and the old adage "know thyself" is vital to success. The only way in which this essential knowledge can be obtained is by meticulous recording on personal menstrual chart of every variation in performance together with the dates of menstruation. It is then possible to discover whether performance is related to a particular phase of the menstrual cycle, and which hormone levels are most advantageous. Many sportswomen are Meso-morphs, and therefore not so markedly influenced by menstrual hormones. The incidence of menstrual disturbances among athletes appears to relate the type, intensity, and duration of the exercise performed. This probably accounts for much of the variability among athletic populations at the prevalent rate for amenorrhea. Several investigators note that menstrual disturbances are most common in athletes who are champions or who have the heaviest physical workloads. Distance runners appear to have more menstrual irregularities than those competing in other sports, although many sports have not been studied adequately.

Strenuous exercise can cause menstrual dysfunction, but many other factors may also be associated with athletic amenorrhea and thus increase a women's weakness to this condition. Low body weight and low body fat are most commonly associated with exercise-related menstrual disturbances, but other factors, such as emotional stress and dietary changes, may also be more stresses, as strenuous exercise, may disrupt cycle menstrual activity.

Recommendations

1. More studies has to be done in the menstrual cycle process that could help the sports competitor to achieve better performance while compete in various competitions.

2. The findings should be observed by the athletic coaches, physical educators, and recreation providers may understand the problem at the time of menstrual cycle.

References:

1. Campbell, S.E., Angus, D.J., & Febbraio, M.A. (2001). Glucose kinetics and exercise performance during phases of the menstrual cycle: effect of glucose ingestion. *American Journal of Physiology- Endocrinology Metabolism*, 281, 817-825.
2. Frankovich R.J., Lebrun C.M. (2000) "Menstrual cycle, contraception, and performance" *Journal of Clinical Sports & Medicine*; 19(2):251-71
3. Giacomoni, M., T. Bernard, O. Gavarry, S. Altare, and G. Falgairette (2000) "Influence of the menstrual cycle phase and menstrual symptoms on maximal anaerobic performance" *Journal of Medicine & Science in Sports & Exercise*. 32(2):486.
4. Goodman, H.M. (2009). *Basic Medicinal Endocrinology* (4th ed.). Burlington, MA & San Diego, CA: Elsevier.
5. Jurkowski, J.E., Jones, N.L., Toews, C.J. (1981). Effects of menstrual cycle on blood lactate, O₂ delivery, and performance during exercise. *Journal of Applied Physiology*, 51, 1439-1499.
6. Kirchengast, S. & Gartner, M., (2002). Changes in fat distribution (WHR) and body weight across the menstrual cycle. *Collegium Antropologicum*, 26, Suppl. 47-57.
7. Thomas Reilly (2000) "The Menstrual Cycle and Human Performance: An Overview" *Biological Rhythm Research: Volume 31, Number 1- 29–40*.

УДК 37

Влияние менструального цикла на согласованность тренировок замбийских женщин-бегунов на длинные дистанции

Матхиванан. Д. Клементчилеше

Университет Сант Евгений, Замбия
 Директор олимпийского центра развития молодежи
 E-mail: gokulvarshan2004@gmail.com

Аннотация. Исследование направлено на определение эффекта от тренировок женщин-бегунов на длинные дистанции во время менструального цикла. Основная задача исследования – добиться эффекта согласованности тренировок в период менструального цикла. Менструальный цикл не влияет на сократительные характеристики мышц. Большая часть исследований доказывает, что во время менструального цикла не происходит изменений большинства детерминант максимального потребления кислорода (VO₂макс), таких как реакция лактата на упражнение, вес тела, уровень плазмы, концентрация гемоглобина, частота сердечных сокращений и вентиляция. Следовательно, неудивительно, что в современной литературе указывается, что менструальный цикл не влияет на VO₂макс. Эти исследования предполагают, что женщины- бегуны на длинные дистанции с регулярным менструальным циклом, соревнующиеся в силовых и интенсивных анаэробных/аэробных видах спорта не должны приспосабливаться к менструальному циклу, чтобы усилить результативность. Тем не менее, менструальный цикл может влиять на длительное физическое выступление. Чтобы оценить, является ли физическая нагрузка вредной во время менструации или нет, оценить изменения, происходящие до, во время и после менструации и узнать влияние менструации на индивидуальную производительность, был разработан опросник и распространен среди женщин-бегунов на длинные дистанции. Ответы, полученные от женщин-бегунов на длинные дистанции, были внесены в таблицу и проанализированы. Основные результаты показали, что физические нагрузки во время менструации не вредны, а индивидуальная производительность во время менструации возрастает.

Ключевые слова: согласованность физических упражнений; менструальный цикл; эффекты; бегуны на длинные дистанции.