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RESEARCH ARTICLE

THE RELATION BETWEEN RECREATIONAL RUNNERS' EFFICIENCY AND PARTICULAR PHASES OF THEIR MENSTRUAL CYCLE

Grussmannová A[1]., Dorko F[1]., Tokarčík J[1]., Kredbová B[1]., Buroňová V[1]., Kikalová K[2] and Muri, J[1]

[1]Department of Anatomy, Faculty of medicine University of Ostrava, Ostrava, Czech Republic
[2]Department of Anatomy, Faculty of Medicine and Dentistry,
Palacký University, Olomouc, Czech Republic

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ABSTRACT

Due to a changing level of hormones, menstrual cycle and its phases influence the performance of every fertile woman, either to a smaller or greater extent. Regarding the increasing popularity of endurance running, we have decided to put these two facts into context.
There are many reasons why women decide to begin with recreational running – it can be an attempt to improve their health condition, lose weight, or to shape their bodies. After getting into a community of runners, women usually become interested in enhancing their performances; they got involved in various-distance races; these women try to shift their average time and find a cause of their fluctuating efficiency.
As for this research, we worked with the data of 53 fertile women, who have decided to devote their free time to recreational, longer-distance running (at least 10 kilometres 3 times a week). Out of these 53 women, we have earmarked a group of 15 using hormonal anticonception. Subjects were observed during a period of three menstrual cycles.
Concerning the group without hormonal contraceptives, the period of the first half of the cycle (ovulation, day 14. – 16.), the secretory and menstrual phases of the menstrual cycle were evaluated. For each of these phases, we established a number of potential problems women could possibly perceive. Further on, changing running pace per kilometre was examined in every single phase, too. As for the most important part of the research, we evaluated how the particular difficulties could influence both the training and resulting performance.
With women using the hormonal anticonception, only the second part of the cycle was taken into consideration.

INTRODUCTION

In the period between menarche and menopause, every fertile woman deals with cyclical changes of hormonal production. Both menstrual cycle, taking place in the uterine endometrium, and ovarian cycle, taking place in ovaries, are under constant control of the superior hypothalamo-hypophyseal system. Ovarian cycle consists of two phases: during the first, follicular, phase, the influence of FSH adenohypophysis (which is under influence of LHRH of the hypothalamus itself) causes the growth of ovarian follicles; growing follicles product oestrogen and cause their release into blood. [4] Their main function is to prepare the female organism for the egg fertilization; they also function in the womb to help starting the proliferation phase of the cycle. The increasing level of oestrogen in blood inhibits the FHS production and incites the LH production in adenohypophysis, which initiates ovulation, causes the oocyte maturation and controls the function of corpus luteum. After this period of ovulation, the second phase of the follicular cycle, the luteal phase, begins; during this particular phase corpus luteum products progesterone. Progesterone is necessary for establishing and maintaining pregnancy. With ovarian cycle, the menstrual cycle is closely connected; this cycle begins with the menstrual phase (1.-4. day of the cycle), continues with proliferation/follicular/ oestrogenic phase (5.-14. day of the cycle) which is ended by ovulation. Further follows secretory/luteal phase, where the endometrium is under complete control of progesterone; if the oocyte does not become fertilized, this cycle continues with the ischemic phase (day 28.), and then new menstrual cycle and menstrual phase begin again, de novo. [1]

Individual parts of the menstrual cycle can indicate varying conditions for both training and the performance itself.

Women might be affected by exhaustion, annoying underbelly ache, cramps or even vomiting during the first days of the menstrual period; those symptoms averagely last first three days. In the following days, some of these symptoms can be mitigated thanks to endorphins release during the training. It is commonly known that women achieve the best running results within the end of the menstrual period and the beginning of the proliferation one. The proliferation phase of the cycle is considered to be the most convenient in regards of the training; at the end of this phase, in the course of fertile days, the physical and mental conditions are necessarily not corresponding, reluctance towards running can appear, and the running motivation and desire to win may decrease, too. Secretory phase of the cycle is influenced by progesterone; woman can perceive weight gain, water retention, or increased perspiration. [2]At the end of this phase women are bothered by premenstrual syndrome which includes rapid mood swings, underbelly aches and cramps, migraines and increased exhaustion. During this period, less intensive training is recommended, as it can positively influence both mental and physical manifestations of premenstrual syndrome. [5]

MATERIAL AND METHODS

In this research, we worked with data of 53 women pursuing long-distance endurance running. Age range of these women was 19-46. When choosing the potential participants for the research, we set a collection of conditions which had to be fulfilled. The first condition was the reproductive activity – that means that women neither before menarche nor after menopause could be accepted. Further on, only recreational, not professional runners were selected. The last condition was the frequency of the activity; we looked for women who would run at least 10 kilometres 3 per week.

After fulfilling given conditions, women were observed for the period of three menstrual cycles, and they were obligated to make elaborate notes about their trainings. The average length of menstrual cycle was 29 +-3 days, the average length of menstrual cycle was 5 +-2 days. We examined the quality of training, average speed during the start of running, and emotional state of a woman; everything relating to a particular day of menstrual cycle. The aim of this research was to evaluate how the individual phases of the cycle influence the training, and how the performance during the menstrual cycle changes. Among the examined subjects, we incorporated a group of women using hormonal anticonception, too; thanks to this fact we were able to compare the differences between particular groups.

For the final evaluation we divided the women into two groups: the group with hormonal anticonception (n=15) and the one without any contraceptives (m=38). In the m- group, we evaluated the secretory phase, the period of ovulation and the menstrual period of menstrual cycle; we focused on how particular issues connected with individual phases influence the training. In the n- group, only the second half of menstrual cycle (ranging between the fourteenth and the last day of the cycle) was evaluated.

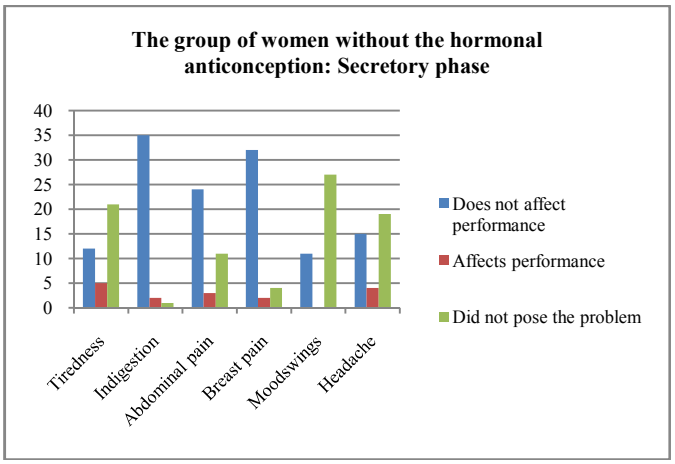
RESULTS

The group of women without the hormonal anticonception: Secretory phase

Secretory phase of the subjects with no hormonal contraception was evaluated as the very first. 38 women were divided into three groups according to their issues. The first groups consisted of women experiencing such issues, although in their case, these issues caused only discomfort, not negative influence on the performance. In the second group, women dealt with these issues in such an extent that their performance either objectively worsened (in regards to the average speed per kilometre), or it was even necessary to put the training to an end. The last group included women who did not have any issues or problems during the secretory phase whatsoever.

As for the issues, women perceived the feeling of increased exhaustion, gastrointestinal problems (including flatulence, constipation or diarrhoea, feeling of satiety, weight gain or increased appetite), breast pain and underbelly ache, headaches inclining to migraines, and last but not least, rapid mood swings (for example anxiety, aggression, mood worsening, apathy and activity reluctance).

	Does not affect performance	Affects performance	Did not pose the problem
Tiredness	12	5	21
Indigestion	35	2	1
Abdominal pain	24	3	11
Breast pain	32	2	4
Moodswings	11	0	27
Headache	15	4	19



The biggest influence of performance was caused by the feeling of increased exhaustion – 5 out of 17 women stated that this problem actually limited their performance. Next in a row were headaches and migraines, which meant certain limitation for 4 out of 19 women. The most prominent limiting factor were underbelly aches due to which 3 out of 27 subjects had to bring their trainings into an end, as it caused hardly tolerable pain which did not disappear even after a short-term rest. All three women experienced the onset of pain within the 2-3 kilometre of running, and this pain lasted since the beginning of the secretory phase until the beginning of the ischemic phase of menstrual cycle.

Among other interesting facts concerning this phase of the cycle we can point out the mood swings which were allegedly perceived by 11 women. They did not influence the training in a negative way, it just caused discomfort; nevertheless, all women stated that at the end of the training, the problems either weakened or disappeared.

The group of women without the hormonal anticonception: Ovulation

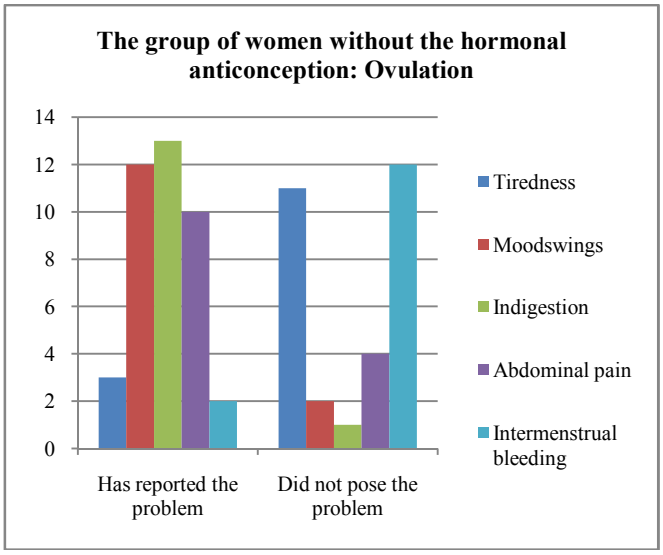
During the period of ovulation we examined the feelings of increased exhaustion, rapid mood swings including anxiety,

aggression, mood worsening, apathy and activity reluctance, gastrointestinal problems(including flatulence, constipation or diarrhoea, feeling of satiety, weight gain or increased appetite), underbelly aches and, in contrast with the secretory phase of menstrual cycle, we added a subpoint concerning intermenstrual bleeding.

The period of ovulation was evaluated between 14.-16. day of the cycle.

Only 14 out of 38 subjects perceived at least one of the problems; none of these issues was so significant to either negatively influence the physical performance, or even cause its interruption.

	Has reported the problem (n)	Did not pose the problem (n)
Tiredness	3	11
Moodswings	12	2
Indigestion	13	1
Abdominal pain	10	4
Intermenstrual bleeding	2	12

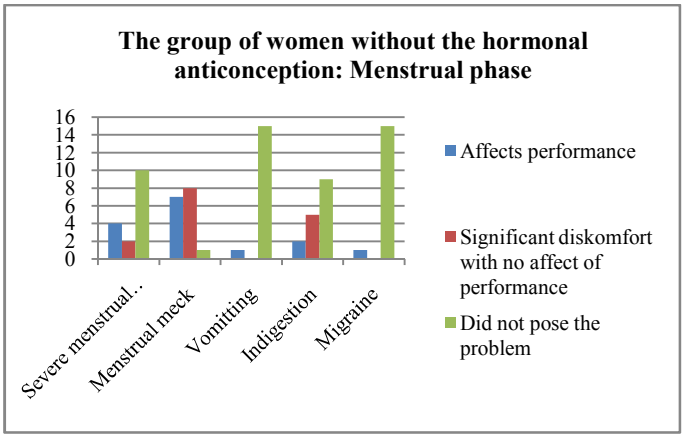


Among the most common issues subjects stated gastrointestinal problems, especially flatulence, feeling of satiety, and increased appetite.

The group of women without the hormonal anticonception: Menstrual phase

16 out of 38 women stated significant difficulties during the menstrual phase of menstrual cycle. These difficulties influenced their training to varying extent, and after the first three days of this phase they either weakened or disappeared. As opposed to the remaining examined phases, prominent menstrual bleeding was evaluated; this bleeding heavily influenced the performance of 4 out of 16 women. Menstrual pain in an underbelly turned out to be a big problem, which limited performance of 7 women; another 8 women did not feel limited, although they experienced distinctive discomfort.

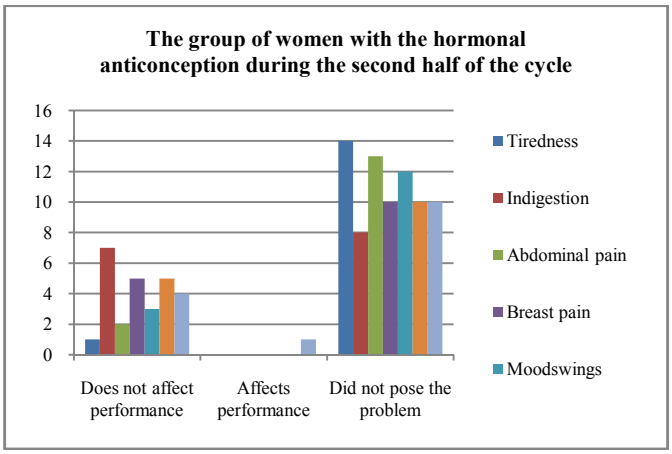
	Affects performance	Significant diskomfort with no affect of performance	Did not pose the problem
Severe menstrual bleeding	4	2	10
Menstrual meck	7	8	1
Vomitting	1	0	15
Indigestion	2	5	9
Migraine	1	0	15



The group of women with the hormonal anticonception: The second half of the cycle

The last examined group consisted of woman using some hormonal contraception. Out of 15 subjects, 9 used combined hormonal contraceptives, and 6 purely gestagen/progestin hormonal contraceptives. [3] All these women have been using the same type of contraceptives for at least a year. In comparison with other groups, women from this one had a significantly lower number of problems influencing the performance. As for the most commonly stated problem, women perceived breast pain; however, 5 out of 15 dealt with discomfort only, as this issue did not influence the quality of training. Swelling of the lower limbs turned out to be a new issue which appeared just in this particular group of women; 4 subjects described this issue to be insignificant and non-limiting, 1 subject's performance was limited by it.

	Does not affect performance	Affects performance	Did not pose the problem
Tiredness	1	0	14
Indigestion	7	0	8
Abdominal pain	2	0	13
Breast pain	5	0	10
Moodswings	3	0	12
Headache	5	0	10
Swelling of lower extremities	4	1	10



DISCUSSION

During individual phases of menstrual cycle, distinctive changes in the quality of training occurred. In the proliferation phase of the cycle, women stated great efficiency and described themselves as being in a right mood for training; average speed (kilometre per minute) was standardly 30 seconds lower than in the secretory phase (from 12 to 57

seconds). Around the half of the cycle (ovulation), women confessed to having more negative symptoms causing discomfort, although none of these problems was so significant to cause a negative influence on the performance. During the secretary and menstrual phases of the cycle we recognized a higher number of limiting symptoms. Some of these, especially mood swings, were positively influenced by training. Start of running meant either weakening or fully eliminating the issue. Women with hormonal anticonception showed fewer signs of performance deflection during both the first and the second part of the cycle. Changes of the average speed practically did not occur (+- 10 seconds). Throughout examined three months, none of the researched women experienced disappearing of the menstrual cycle (amenorrhea).

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