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Menstrual parameters in the graduate students undertaking mental or physical activity based education

Mental veya fiziksel aktivite temelli eğitim alan öğrencilerde menstrual siklus parametreleri

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ABSTRACT

Objective: Mental activity and physical activity appears to affect body functions differently. Both activities appear to have impact on reproductive functions of the women. Aim of the current study was to compare the students undertaking mental activity based education (MABE) and physical activity based education (PABE) on menstrual cycle parameters.

Methods: A total of 390 female students participated to the study. However, the students who were using any drugs (painkiller, contraceptives, etc.) were removed and the groups consisted of 171 MABE students (faculty of medicine) and 169 PABE students (faculty of sports sciences). Participants were asked to provide information about their menstrual cycles, sleep quality, pain perception. Moreover, they filled in a questionnaire about their preferences for visual, verbal, gustatory, mental, auditory, and physical activities.

Results: Length of the menstrual cycle was similar between the MABE and PABE (29.5±0.3, 29.0±0.2 days, respectively, p>0.05) but length of menstruation was longer in MABE students (6.0±0.1 and 5.5±0.1 days, p=0.007). MABE students fall asleep quicker in the night, slept one h less and woke up earlier with better sleep

ÖZET

Amaç: Mental aktivite ve fiziksel aktivite vücut fonksiyonlarını farklı şekilde etkiler. Her iki aktivitenin de kadınların üreme fonksiyonlarını etkilediği bilinmektedir. Bu çalışmanın amacı, mental aktivite temelli eğitim (MABE) ile fiziksel aktivite temelli eğitim (PABE) alan öğrencilerin menstrual siklus parametrelerini karşılaştırmaktır.

Yöntem: Çalışmaya toplamda 390 kadın öğrenci katıldı. Ancak herhangi bir ilaç kullanan (ağrı kesici, kontraseptif vd.) öğrenciler çalışmadan çıkarıldı ve gruplar 171 MABE (tıp fakültesi) öğrencisi, 169 PABE (spor bilimleri fakültesi) öğrencisinden oluşturuldu. Katılımcılardan menstrual siklusları, uyku kalitesi ve ağrı algısı hakkında bilgi istendi. Ayrıca katılımcılara görsel, sözlü, tatsal, zihinsel, işitsel ve fiziksel aktivitelere yönelik tercihleri hakkında bir anket uygulandı.

Bulgular: Menstrual siklus uzunluğu MABE ve PABE arasında benzerdi (sırasıyla 29,5±0,3, 29,0±0,2 gün, p>0,05) ancak MABE öğrencilerinin menstruasyon süresi daha uzundu (6,0±0,1 ve 55±0,1 gün, p=0,007). MABE öğrencilerinin gece daha çabuk uyudukları, bir saat daha az uyudukları ve daha iyi uyku kalitesiyle daha erken uyandıkları saptandı. PABE öğrencileri alışveriş

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quality. PABE students wanted to do shopping and have their hair cut and dyed while MABE students wanted to chat with a friend or make a voyage.

Conclusion: Longer menstrual bleeding in MABE students requires special attention as it may result in iron deficiency anemia. Moreover, different physiological (menstruation, sleep-wake cycle) characteristics and everyday life priorities suggest that format of education and social activities of female students might require differential approaches for each education types.

Key Words: Mental activity, physical activity, menstrual cycle, menstruation

yapmak ve saçlarını kestirip boyatmak isterken MABE öğrencilerinin bir arkadaşıyla sohbet etmek veya yolculuk yapmak istedikleri saptandı.

Sonuç: MABE öğrencilerinde daha uzun süren menstrual kanamalar, demir eksikliği anemisine neden olabileceğinden özel dikkat gerektirmektedir. Ayrıca farklı fizyolojik (menstruasyon, uyku-uyanıklık siklusu) özellikler ve günlük yaşam öncelikleri, eğitim formatının ve kadın öğrencilerin sosyal aktivitelerinin her eğitim türü için farklı yaklaşımlar gerektirebileceğini düşündürmektedir.

Anahtar Kelimeler: Mental aktivite, fiziksel aktivite, menstrual siklus, menstruasyon

INTRODUCTION

Puberty is a period when sexual maturation occurs and sexual characteristics emerge. This period starts with menstruation and ovulation in women (1). According to the World Health Organization (WHO), puberty occurs between the ages of 10-19 (2). Menstruation is a normal physiological process that occurs every month following puberty (3). The female menstrual cycle is divided into follicular and luteal phases. Menstrual bleeding starts at the end of the luteal phase and continues trhough the beginning of the follicular phase. The follicular phase starts from the day the bleeding begins and continues until ovulation in mid-cycle. Luteal phase starts with ovulation and ends with menstrual bleeding if there is no pregnancy.

Menstruation is a cyclic monthly endometrial change that causes uterine bleeding every 28 ± 7 days (4, 5). Average menstrual bleeding continues for 5 days in women who are in reproductive age (6). Menstrual bleeding occurs most intensely on the second day, with an average of 10-84 mL of blood loss per cycle (7). Iron deficiency anemia may be present in adolescent women with heavy menses (8, 9).

It is known that exercise affects menstrual parameters. Women having PABE engage more with sportive activities than those of the women having MABE. Women who have mental-based education have a sedentary lifestyle and women who receive physical activity based training adopt a life that is more intertwined with active physical life. In particular, mental education may lead to a sedentary lifestyle and may create health problems such as obesity. The beneficial effects of physical activity on body health and mind have been reported in numerous scientific studies (10, 11). However, excessive exercise can be harmful to some organs and systems of the body. Many studies have shown that intense exercise causes menstrual dysfunctions

(oligomenorrhea, amenorrhea) in athletes. There are many studies about exercise-induced menstrual cycle changes in age-specific populations. Studies have shown that women who have regular menstrual cycles became irregular when heavy exercise programs are implemeted (12, 13). Animal studies support the hypothesis that menstrual disturbances may result from exercise stress, which is physical training (14). It has been shown that hormonal changes can impair reproductive function through both central and peripheral effects (15). Exercise, which is considered to be atype of physical stress, causes an increase in corticotropin-releasing hormone (CRH). Increased CRH through cortisol activation leads to menstrual disorders (16).

Aim of the current study was to compare the female students undertaking MABE and PABE on the length of the menstrual cycle and menstruation, pain perception, sleep duration and quality, and their preferences for having visual, verbal, gustatory, mental, auditory, and physical activities.

MATERIAL and METHOD

Healthy young women (n=390) participated to the current study following approval by the Local Ethich Committee (No:2016/216). Participants the graduate women studying at Inönü University Faculty of Medicine, Inönü University Faculty of Sport Sciences, Fırat University Faculty of Medicine and Fırat University Faculty of Sport Sciences. The participants were 18-30 year-old and were apperently healthy. They, did not have a chronic disease, were not using a drug or a supportive substance, were not pregnant or given birth recently, were not chronically ill. They were included in the study on the condition of having a regular menstrual cycle, not smoking, not using painkillers, and not using contraceptives. The data of a total of 50 participants were not evaluated because they did not meet the above conditions. Finally, data of 171 MABE and 169 PABE students were evaluated.

ACOG (American College of Obstetricians and Gynecologists) (17), VAS (Vizuel Analog Scale) (18), pain scale parameters, Karolinska Sleep Scale (last four weeks sleep pattern), Karolinska Sleep Diary (19), Pittsburg Sleep Quality Index (20), STAI-I (immediate anxiety) and STAI-II (trait anxiety) (21) ,scales were applied to the participants. Moreover, we prepared a questionnaire to find out the activity they tend to do (verbal, visual, gustatory, physical, mental, etc.). Before starting fillig in the questionnaires, each of the questionnnaires was explained to all of the participants. Participants filled in the length of the menstrual cycle and menstruation, sleep duration and quality, premenstrual and menstrual pain scales, height, weight, age and the activity parameters they wanted to do out of the curriculum.

Parametric analyses (length of the menstrual cycle and menstruation) were carried out using Tukey's t-test. For the evaluation of questionnaires, Kruskal-Wallis test was used. Parametric data were presented standard error of mean (SEM) while non-parametric data were presented as median and min-max. An alpha level lower than or equal to 0.05 was considered significant.

RESULTS

Length of menstrual cycle was similar between the groups ($p>0.05$) but length of menstruation was longer in MABE women ($P=0.007$, Figure 1).

In terms of VAS (pain scale), pain was found to be higher in the premens and menstrual periods in PABE women ($p <0.05$) (Table 1). According to ACOG parameters, depression, social withdrawal and abdominal distension symptoms were found to be higher in MABE women ($p <0.05$, Table 2). In PABE women, the problem of falling asleep, sleeping longer, waking up to use the toilet in the night, feeling hot, not being awake in any activity and problem in doing the job with enthusiasm were found to be higher than MABE women ($p <0.05$, Table 3).

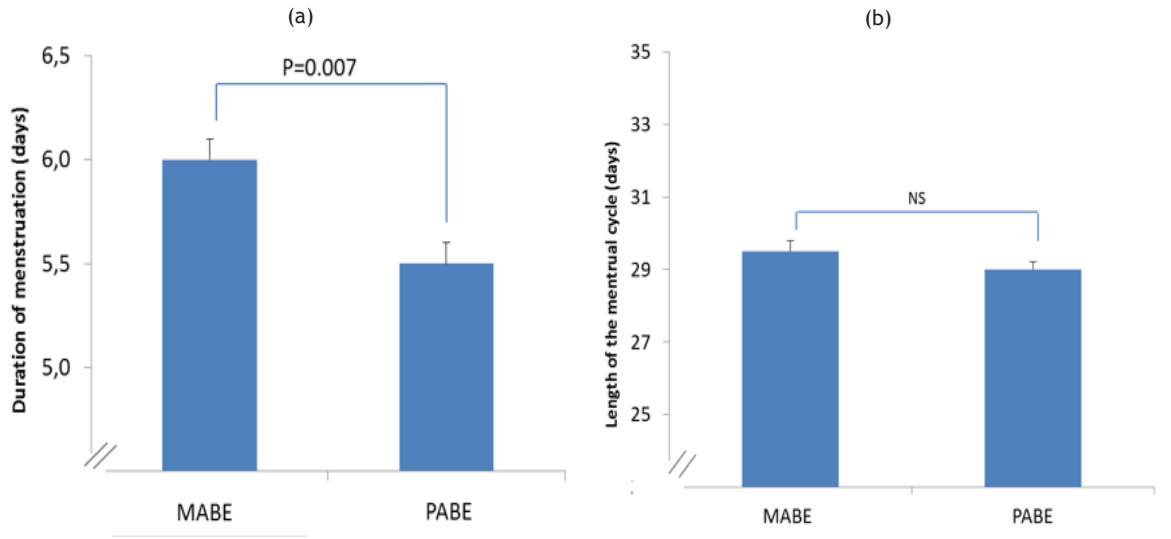

Figure 1. Length of the menstrual cycle (a) and menstruation (b) in women undertaking PABE or MABE. Values represent mean± SEM

Table 1. VAS pain perception parameters in women undertaking PABE or MABE. Values represent median (min-max). (0 = No pain, 10 = Unbearable pain)

VAS scale	PABE	MABE	p value
Luteal phase	2 (0-10)	0 (0-8)	0.881
Premenstrual period	4 (0-10)	4 (0-10)	**0.001**
Menstrual period	6 (0-10)	6 (0-10)	**0.024**

Table 2. ACOG in women undertaking PABE or MABE. Values represent median (min-max). (0 = Very little, 4 = Much)

ACOG questionnaire	PABE	MABE	p value
Depression	2 (1-4)	2 (1-4)	**0.017**
Angry outbursts	2 (1-4)	2 (1-4)	0.191
Anxiety	2 (1-4)	2 (1-4)	0.132
Irritability	3 (1-4)	3 (1-4)	0.085
Confussion	2 (1-4)	3 (1-4)	0.070
Social withdrawal	2 (1-4)	2 (1-4)	**0.002**
Breast tenderness	2 (1-4)	2 (1-4)	0.842
Bloating	2 (1-4)	3 (1-4)	**0.028**
Headache	2 (1-4)	2 (1-4)	0.337
Swelling of the extremities	2 (1-4)	2 (1-4)	0.588

Table 3. Pittsburg Sleep Quality Index parameters in women undertaking PABE or MABE. Values represent median (min-max). (0 = Good, 3 = Bad)

Pittsburg Sleep Quality Index	PABE	MABE	p value
During the past month, when have you usually gone to bed at night?	1 (0-5)	1 (0-11)	0.277
During the past month, how long has it usually take you to fall asleep each night? (minute)	20 (1-12)	15 (1-12)	**0.003**
During the past month when have you usually gotten up in the morning?	1 (1-1)	1 (1-1)	**0.001**
During the past month how many hours of actual sleep did you get at night?	8 (0-12)	7 (1-10)	**0.001**
Cannot get to sleep within 30 minutes	1 (0-3)	1 (0-3)	0.190
Wake up in the middle of night or early morning	2 (0-3)	1 (0-3)	**0.001**
Have to get up to use the bathroom	1 (0-3)	0 (0-3)	**0.001**
Cannot breathe comfortable	0 (0-3)	0 (0-3)	0.355
Cough or snore loudly	0 (0-3)	0 (0-3)	0.401
Feel to cold	0 (0-3)	1 (0-3)	0.375
Feel to hot	1 (0-3)	0 (0-3)	**0.001**
Had bad dreams	1 (0-3)	1 (0-3)	0.379
Have pain	0 (0-3)	0 (0-3)	0.104
During the past month how often have you taken medicine to help you sleep?	0 (0-3)	0 (0-3)	0.095
During the past month how often have you had trouble staying awake while driving?	0 (0-3)	1 (0-3)	**0.001**
During the past month how much of a problem has it been for you to keep up enough enthusiasm to get things done?	1 (0-3)	1 (0-3)	**0.001**
How was your sleep quality last month?	1 (0-7)	1 (0-6)	0.588

When the Karolinska Sleep Diary parameters were compared for MABE and PABE women, difficulty in falling asleep, restlessness in sleep, early awakening and inability to sleep again, frequently waking at night, disturbance of sleep, difficulty in being awake were found to be higher PABE women ($p < 0.05$) (Table 4).

When the parameters of the Karolinska Sleep Scale were compared between the two groups of women, sleep disturbance and its frequency, frequently awakening very early and not being able to fall asleep again and sleep quality score parameters were found to be higher in PABE women ($p < 0.05$) (Table 5). When the extracurricular activity parameters were compared, MABE women wished to chat with friends, to go a journey while PABE women wished to do shop, dyeing their hair or having a haircut ($p < 0.05$) (Table 6).

Table 4. Karolinska Sleep Diary parameters in women undertaking PABE or MABE. Values represent median (min-max). (0 = Little, 5 = Much)

Karolinska Sleep Diary (last night)	PABE	MABE	p value
Was it difficult for you to fall asleep?	3 (1-5)	2 (1-5)	**0.001**
Were you restless in your sleep?	3 (1-5)	2 (1-5)	**0.001**
Didn't you wake up too early and fall asleep again?	2 (0-5)	1 (0-5)	**0.001**
How many times did you wake up at night?	1 (0-5)	0 (0-5)	**0.001**
How was your sleep?	3 (1-5)	2 (0-5)	**0.021**
How rested do you feel?	3 (1-5)	3 (1-5)	0.086
Was it easy for you to wake up?	3 (1-5)	3 (1-5)	**0.051**
What time did you go to bed?	1 (0-2)	0 (0-5)	0.065
What time did you wake up?	3 (1-5)	0 (0-0)	**0.001**

Table 5. Karolinska Sleep Questionnaire parameters in women undertaking PABE or MABE. Values represent median (min-max). (1 = Allways, 3 = Never)

Karolinska Sleep Questionnaire (last 4 weeks)	PABE	MABE	p value
How often have you had sleep disturbances?	3 (1-5)	3 (1-5)	**0.001**
How often have you had problems falling asleep?	3 (1-5)	4 (1-5)	**0.001**
How often you woke up too early and did not fall asleep?	3 (1-5)	4 (1-5)	**0.001**
How often did you wake up many times and did not fall asleep again?	3 (1-5)	4 (1-5)	**0.001**
How often did you have trouble waking up?	3 (1-5)	3 (1-5)	0.242
How often did you feel drained when you woke up?	3 (1-5)	3 (1-5)	0.778
How would you rate your overall sleep quality?	3 (1-5)	3 (1-5)	**0.020**

Table 6. Extracurricular activity parameters in women undertaking PABE or MABE. Values represent median (min-max). (0 = No, 10 = Very much so)

Which of the following activity you wish to do in your extracurricular times?	PABE	MABE	p value
I would like to chat with friends	6 (0-10)	7 (0-10)	**0.045**
I would like to walk	7 (0-10)	7 (0-10)	0.244
I would like to do jogging	4 (0-6)	4 (0-10)	0.742
I would like to ride bicycle	5 (0-10)	6 (0-10)	0.326
I would like to do sports like swimming, ice-skaing etc.	6 (0-10)	5 (0-10)	0.081
I would like to listen music	8 (0-10)	8 (0-10)	0.454
I would like to watch TV	5 (0-5)	6 (0-10)	0.359
I would like to go to cinema	6 (0-10)	7 (0-10)	0.992
I would like to read a book	6 (0-10)	7 (0-10)	0.244
I would like to do shopping	9 (0-10)	7 (0-10)	**0.027**
I would like to eat sweet things	8 (0-10)	8 (0-10)	0.806
I would like to sleep	7 (0-10)	8 (0-10)	0.220
I would like to solve crosswords	2 (0-10)	3 (0-10)	0.369
I would like to go a journey	8 (0-10)	9 (0-10)	**0.032**
I would like to have my hair cut or have it dyed	4 (0-10)	3 (0-10)	**0.029**

DISCUSSION

In this study, mental- or physical-activity based education was associated with differences both in physiological parameters and in psychological parameters. In that respect, length of menstruation, perception of pain, quality of sleep and everyday priorities were different. Awareness in these issues might culminate in better management of these education types.

In this study, PABE women had greater pain perception durin premenstrual and menstruation phases compared to the MABE women. Normally, towards the end of the menstrual cycle, the uterine tissue is prepared for menstruation following a decrease in progesterone. This causes physiological and psychological changes, leading to a restless, painful and a low quality cycle. Hence, increased pain perception in PABE women during this stage of the cycle suggests that excersize has detrimental effects during premens and menstruation periods. In the literature search, it has been found out that exercise decreases premenstrual symptoms but it appears that duration and intensity of the exercise are also important (22). Taken together with the current

study, it appears that women who are exercising as a part of their curriculum in a long-term basis might have increased pain perception. On the other hand, premenstrual syndrome symptoms, depression, abdominal bloating and social withdrawal were higher in the MABE women. These results, therefore, supports the well known notion that exercise or sports decreases depression and causes socialization. As a whole, during two important stages of the menstrual cycle, i.e. premenstrual and menstrual stages, it appears that excersize increases pain perception but at the same time it decreases depression and increases socialization.

Data regarding the sleep questionnaire for the last night (Karolonska Sleep Diary) showed that PABE women had more difficulty in falling asleep, they were more restless during the sleep, they woke up earlier but could not fall asleep later, they had more disturbed sleep and their sleep quality was lower compared to the MABE women. Additionally, MABE women woke up earlier and more easily in the morning. The differences between two groups of female students suggest that MABE students are probably more forced to a standard lifestyle required for heavier responsiblities for health care activities. Thus, probably they get accustomed for sleeping at the right time and waking up earlier for better performance. A similar trend was also observed of the sleep questionnaire for the last month and likewise, MABE students had better sleep parameters than that of the PABE students.

Sleep quality questionnaire (Pittsburg Sleep Quality Index) showed that the PABE women fall asleep later, woke up late in the morning, slept longer in the night, woke up in the middle of the night, had hot flushes, and had difficulty in concentrating to an activity compared to the MABE women. On the other hand, MABE women were less pleasant with their work. Similarly, a study carried out by Janet et al., (20) showed that sleep disturbance parameters were higher in women compared to men.

Menstrual parameters showed that MABE women had similar duration of menstrual cycle compared to PABE women. However, lenth of menstruation was longer in MABE students. We were unable to measure the amount of menstrual bleeding but the current data suggest that longer duration of bleeding in MABE students might likely make them prone to aneamia. This is an important finding and suggests that new studies are required to find out the prevalence of anemia in MABE women.

Everyday life priorites also revealed some important findings. Students did not differ in terms of their will in walking, jogging, cycling bicycle, and swimming. This suggests that executing physical work doesnot differ between MABE and PABE women. Moreover, they did not differ in terms of their will to have visual task activities including watching TV or going to the cinema. Additionally, their gustatory will was not also different like eating sweet things. It is a well experienced notion that premenstrual women higher will towards eating sheets lie chocolate. In the current study, a difference was not observed between the PABE and MABE women in terms of their will to eat sweet things. As aim of the current study was not to make a phasical comparison but rather we aimed to compare PABE and MABE women. Therefore, this type of will towards sweet things can not be ruled out in the current study. As a function of higher cortical centers, both PABE and MABE students did not differ in solving crosswords, suhhesting that bothe women behaves in th same manner in terms of solving the puzzles. However, interestingly, MABE women had stronger will for verbal activities like chating with a friend. This may be due to tight timetables of medical education as this might result in less time for chating with friends. Similarly, MABE women wanted to go a journey more than that of the PABE students, again suggesting a will for moving away from the tight medical curriculum. On the other hand, PABE women had more wish to go for shopping and to have their hair cut or dyed. This suggests that PABE student are more oriented towards being good looking and being

more attractive. Whether this is the cause or the result of PABE education remains to be elucidated.

In conclusion, physical- and mental-activity based courses have differential impacts on women in terms of their physiological functions (menstrual pain, menstruation, sleep duration and quality, etc.) and psychological perceptions (chating with a friend, looking good). Increased information in this area may affect designing curriculum by taking into account the social and physical environment of the women.

ETHICS COMITTEE APPROVAL

* The study was approved by the Inönü University Clinic Research Ethics Committee (Date: 28.12.2016 and Number: 2016/216).

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