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INVESTIGATION OF THE EFFECT OF MENSTRUATION PERIOD ON SPORTIVE PERFORMANCE OF WOMEN'S FUTSAL PLAYERS[i]

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Abstract:
This paper was to investigate the effect of menstruation cycles on sportive performance in women's futsal players. A total of 8 healthy, active and volunteer women players who had a regular menstruation period and didn't use any regulatory medical supplement (oral contraceptive) were recruited for this study. To analyse data, means of age, height, body weight and BMI values of the players, standard deviation, minimum and maximum values were calculated. The Friedman Two Way Analysis of Variance (ANOVA) test from nonparametric tests was employed to determine if there is a difference among menstrual phases. Findings clearly indicate that flexibility, vertical jump and anaerobic power values showed significant decrease (P<0,01), while other performance variables didn't show statistical significant differences (P>0.05) among menstrual cycles. In a nutshell, it can be concluded that menstrual cycles of women's futsal players don't affect the flexibility, power, speed, anaerobic and aerobic power performances.

Keywords: menstruation, futsal, women, performance

1. Introduction

Futsal that is based on high technical skill, anaerobic endurance, speed, agility, promptness and flexibility has players who are adaptable for fast and hard games, active and lithe with flexible bodies as well as having strong wrists. Those fast and strong players who can pass in a quick way and can do several actions have organisms adaptable for anaerobic exercises based on aerobic power (Ocak & Bugdayci, 2012).

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Menstruation in women players may lead to several physiological difficulties and performance loss in trainings or competitions. They often try to abstain from trainings or competitions psychologically during menstruation periods. Several scholars have attempted to illuminate the effect of menstruation on performance but no conclusive evidence related to if there was a negative or positive effect was found (Kalyon, 2000; Lebrun, 1993; On, 2012; Sevim, 2002; Tsampoukos et al., 2010).

Research on the topic has focused on sportive performance in four cycles of menstruation period and revealed that women players perform worse during their menstruation periods. However, there have been several studies concluding that players get the best performance at the beginning of their menstruation periods. Some others also suggest that menstruation and sportive activities affect one another and some extraordinary sportive achievements have been witnessed in each phase of menstruation periods of women (Ertas & Ersoz, 2002; Karacan et al., 2013; Karakas, 1987; On, 2012). On the other hand, a line of research focusing on performance of women during menstruation periods concluded that there is no change in power output values in terms of sprint tests in menstruation period. In another study, it has been found that muscle endurance is at the highest level in the middle of the follicular phase, whereas it is at the lowest level in the half of the luteal phase. Additionally, it has been found that performance is better at early luteal phase. Finally, other studies have concluded that the best performance values have been measured after ovulation and menstruation phases, while the worst performance values were obtained during pre-menstruation period (Lebrun, 1993; Fomin et al., 1989; Lind & Petrofsky, 1976, On, 2012, Ozdemir & Kucukoglu, 1993; Tsampoukos et al., 2010).

In this regard, this paper was to investigate the effect of menstruation periods of women's futsal players on several sportive performance levels.

2. Material and Method

The research methodology is presented below:

2.1. Study Group

A total of 8 healthy, active and volunteer women player who had a regular menstruation period and didn't use any regulatory medical supplement (oral contraseptive) were recruited for this study. The participants were players in women's futsal team of Amasya University Department of Physical Education and Sport Teacher. The average physical properties of the participants were as follow: age (20.26), height (1.65 m) and body weight (51 kg).

2.2. Data Collection

The body weights of the participants were measured via electronic bascule (Arzum AR 553). The physical traits of participants, including height, body weight, age and menstruation cycles were noted. Additionally, push-up, sit-up, flexibility, 30 m speed

and vertical jump tests were employed in order to determine sportive performance values. All measurements were taken with participants' tights and T-shirts. Tests were conducted on the 2nd (menstrual), 8th (menstrual follicular) and 23rd (follicular-luteal-ovulation) days of menstrual cycle.

2.2.1. Height and Body Weight

Body weight measurements of players were conducted through weighing machines with 0,01 kg sensitivity, while height measurements were done via tools with 0,01 m sensitivity. In order to determine the body fat level, body mass index (BMI) was used and values for futsal players were calculated via this formula: BMI= Body weight (kg)/ Height $(m)^2$.

2.2.2. Flexibility

The flexibility measurements of players were calculated via sit and reach tests and sit and reach test box was employed. Before the measurement, participants were informed on how it would be conducted. Tests were repeated two times and the highest measurement was noted in the information form.

2.2.3. Push-up

Push-up test was employed so as to determine the power and sustainability of power at 30 sec intervals and the highest push-up scores in 30 sec were noted.

2.2.3. Sit-up

Sit-up test was employed so as to determine the power and sustainability of power at 30 sec intervals and the highest sit-up scores in 30 sec were noted.

2.2.4. Vertical Jumps

To test anaerobic power, the vertical jump test was conducted. It was conducted through vertical jump meter that is a measure of how high an individual or athlete can elevate off the ground from a standstill. Players were informed before the test and two measurements were conducted and the highest measurement was noted. The calculation of vertical jump values were calculated via Lewis formula: P = √4,9 x Body Weight (kg) x √ Jumping Level (m) = kg-m/sec.

2.2.5. Speed

In order to determine the speed, 30 m speed test was conducted. The test was conducted via sprint start tips from the start line in 30 m and the measurement was done via Casio Brand time keeper. Each player's running was measured two times via two time keepers simultaneously (the average measurement of two time keepers was considered as one) and the best one was noted in the information form.

2.2.6. Running Sit-up

The aerobic endurances of the players were tested through 20 m running sit-up and the necessary information was provided to the participants before the measurement. The running speed was designed as voice signals recorded in a cassette. Developed by Department of Physical Education and Sports Sciences in Loughborough University to test aerobic fitness, the Maximal Oxygen Consumption (also called as VO2max) values were taken as a reference in order to measure 20 m running sit-up and VO_2 max, sit-up levels and scores were noted in terms of ml/kg/sec (Ramsbottom et al., 1988; Tamer, 2000).

2.3 Statistical Analysis

To analyse data, means of age, height, body weight and BMI values of the players, standard deviation, minimum and maximum values were calculated. The Friedman Twoway Analysis of Variance (ANOVA) test from Nonparametric tests was employed to determine if there is a difference amount menstrual phases. The standard level of significance used to justify a claim of a statistically significant effect is P=0.05.

3. Findings

All findings related to women's futsal players are presented in Table 1 and Table 2 in detail and discussed:

Table 1: Demographic Information on Women's Futsal Players

Variables	n	X±Sd	Minimum	Maximum
Age (year)	8	20,26±1,14	18,00	23,00
Body Weight (kg)	8	51,00±7,73	40,00	62,00
Height (m)	8	1,63±0,07	1,54	1,75
BMI (kg/m²)	8	19,38 ±2,23	16,87	22,23

The average means of the participants are as follows: age 20.26±1,14 year; height 1,62±0,07 m, body weight 51,00±7,73 kg and BMI (Body Mass Index) 19,38±2,23 kg/m² (Table 1).

Table 2: Performance Analysis of Women's Futsal Players During Menstrual Cycles

Performance Variable	n	Personal Variables			
		Regular Day	2nd Day	8th Day	
		X±Sd	X±Sd	X±Sd	P
Flexibility (cm)	8	35.88 ±4.12	33,38±4,03	33,75±4,06	0,01**
Push-up (number)	8	16.88 ± 7.24	13.88 ± 6.47	14.50 ± 6.59	0,12
Sit-up (number)	8	25.00±7.09	25.75±7.46	25.75 ± 7.50	0,71
Vertical Jump (cm)	8	43,00±4,11	40,75±3,66	41,38±4,34	0,00**
Speed (sec)	8	5,53±0,43	5,40±0,46	5,41±0,46	0,30
Anaerobic Power (kgm/sec)	8	74,20±13,39	72,20±12,86	72,80±13,45	0,00**
Running Sit-up (sit-up)	8	22,25±6,88	20,50±5,43	21,00±6,33	0,21
Aerobic Power (ml/kg/min)	8	30,39±1,16	30,10±1,12	30,19±1,10	0,37

*P<0,05 , **P<0,01

As shown in Table 2, the flexibility, push-up, sit-up, vertical jump, speed, anaerobic power, running sit-up and aerobic power values during menstruation periods of the players are as follows respectively: 35.88 ±4.12 cm, 16.88±7.24 number, 25.00±7.09 number, 43..00±4.11 cm, 5,53±0,43 sec, 74,20±13,39 kgm/sec, 22.25±6.88 sit-up and 30,39±1,16 ml/kg/min on 23rd day; 33,38±4,03 cm, 13.88 ± 6.47 number, 25.75±7.46 number, 40.75±3.66, 5,40±0,46 sec, 72,20±12,86 kgm/sec, 20.50±5.43 sit-up and 30,10±1,12 ml/kg/min on 2nd day and 33,75±4,06 cm, 14.50 ± 6.59 number, 25.75 ± 7.50 number, 41.38±4.34 cm, 5,41±0,46 sec, 72,80±13,45 kgm/sec, 21.00±6.33 sit-up and 30,19±1,10 ml/kg/min on 8th day. Findings clearly indicate that flexibility, vertical jump and anaerobic power values showed significant decrease (P<0,01), while other performance variables didn't show statistical significant differences (P>0.05) among menstrual cycles.

4. Discussion and Result

This study has sought to illuminate the effect of menstruation periods of women's futsal players on several sportive performance levels. Previous studies have revealed that women players sometimes experience difficulties in taking part in sportive activities during menstruation cycles. On the other hand, some other studies have provided compelling evidence suggesting that menstruation cycles pose different effects on women and some women don't experience any effect in menstruation phases even though many others have some physical and psychological health problems, including pain, weakness, nervousness and coordination problems. Therefore, it has a well-known fact that women become very sensitive and stressful during menstruation periods (Ozdemir & Kucukoglu, 1993). In this regard, it can be concluded that findings of the studies dwelling on performance varieties of women players during menstruation periods may vary. In a study conducted by On (2012), for example, the effect of menstruation period on anaerobic power and active jumping performance was examined and no significant evidence was obtained. In a similar study conducted by Giacomoni et al. (2000), 10 players who used any regulatory medical supplement (oral contraceptive) and 7 healthy players who didn't use any medicine were recruited and no statistical difference was found between and in-group comparisons of squat jumpings. In another one conducted by Ozdemir and Kucukoglu (1993), the authors investigated the effect of menstruation on speed and endurance, it was concluded that menstrual phase didn't affect speed and endurance scores of the women players, but it adversely affected those with a painful menstruation period in terms of endurance. Hazir et al. (2011) dwelled on menstrual cycles' effect on repetitive sprint performance and the speed of removing of lactic acid from the blood during active recovery and conducted 5x6 sec power loss test which are against to the resistance corresponding 10% of body weight in mechanic ergometer cycling after anthropometric measurements during follicular and luteal phases of 11 women players with regular menstruation cycles but found no significant differences among the values including 5x6 sec repetitive sprint maximum power measured during follicular and luteal phases, total

power and power loss values. They concluded that no negative effect of menstrual cycle on repetitive sprint performance and then the speed of removing of lactic acid from the blood during active recovery were found. Dibrezzo et al., (1988) performed a study on dynamic power and performance variables during the three cycles of menstrual period and found no significant difference between power variables during the three cycles of menstruation period. In another study conducted by Cakmakci et al. (2005), Wingate Test was conducted on women students of physical education teaching at the 2nd and 14th day of their menstrual periods and no significant difference was obtained between anaerobic performance measured menstrual and follicular phases. Guvenman (2007) examined the effect of menstrual cycles on physical parameters and reaction time, compared jumping scores of 8 elite and 12 sedentary women players and found no statistical difference in the analysis. Canpas Cakir (2006), on the other hand, conducted a study in which cardio-respiratory response on exercise in follicular and luteal cycles of menstrual cycles of normal and overweight women who don't exercise and found that luteal phase in overweight and follicular phase in normal women affect the exercise performance.

In a study by Tsampoukos et al (2010), the effect of menstrual cycle on sprint performance was examined and found no difference in sprint test scores of the participants. In this present study, we obtained no significant data on the effect of menstruation periods of women's futsal players on flexibility, power, speed, anaerobic and aerobic power performances (P>0,05) (Table 2). Our findings align with the studies mentioned above. That is to say, it can be concluded that menstruation period don't have positive or negative effect on sportive performance in women players. However, Karacan et al. (2013) investigated menstrual situations of 133 elite women players in different branches of sports and found that menstruation period affects the sportive performance psychologically and that sportive activity affects menstrual phases. In another study by Karacan and Gunay (2003), it was attempted to investigate the effect of menstruation and pre-menstrual syndrome on performance in short term and high level exercise parameters, such as attention, concentration, speed and promptness and found that general coordination, anaerobic power, vertical jump and 30 m sprint values were found to be significant after menstruation period when compared to premenstrual and menstrual phases ($p<0.05$). Additionally, it was found that significant differences were found in visual reaction times ($p<0.05$) and the best score was obtained three days after the menstruation ($p<0.05$).

Masterson (1999) found significant differences between two groups, those in follicular phase and luteal phase who exercise at least 3 days in a week, by applying anaerobic power test. Ertas and Ersöz (2002), on the other hand, concluded that women players gave the best performance during their beginning of the menstruation period.
Wearing et al (1972) conducted a study on the effect of menstruation period on physical fitness tests, examined four phases of menstrual cycle and concluded that the worst performance was noted in menstrual phases. On the other hand, Karakas (1987) noted that extraordinary achievements and world records of women players were obtained

during each cycle of the menstruation period. In contradiction with this, Lebrun and Rumball (2001) indicated that the best performances were obtained after ovulation and menstruation periods, while the worst ones are the result of premenstrual periods. In our study, we don't corroborate with the existing literature in that, we found no significant difference between sportive performance and menstruation periods of women players (Table 2).

In a nutshell, it can be concluded that menstruation cycle of women's futsal players don't affect the flexibility, power, speed, anaerobic and aerobic power performances.

References

Aras A., Arslan E., Atlı A., Şahin, F.N. (2016). Menstrual Döngünün Fazlarına Göre Sedanter Kadınlarda Anaerobik Güç Değerlerinin İncelenmesi

Canpas Çakır, B. (2006). Spor Yapmayan Normal Kilolu ve Şişman Bayanlarda Menstrual Siklusun Foliküler ve Luteal Fazlarında Egzersize Kardiyorespiratuvar Yanıtlar, Yüksek Lisans Tezi, Eskişehir Osmangazi Üniversitesi Sağlık Bilimleri Enstitüsü, Eskişehir.

Çakmakçı E., Sanioğlu A., Patlar S., Çakmakçı O., Çınar V. (2005). Menstruasyonun anaerobik güce etkisi, Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi, 3, 145-49.

Dibrezzo, R., Fort, I.I., Brawn, B.: (1988), Dynamic Strength and Work Variations During three Stages of the Menstrual Cycle. Year Book of Sports Medicine 30-31.

Ertaş B, Ersöz (2002) Bayan Yüzücülerde Farklı Menstruasyon Dönemlerinin Seçilmiş Performans Kriterlerine Etkileri. 7. Uluslararası Spor Bilimleri Kongresi, Ekim, Antalya.

Fomin S.K. Pivovarova, V.I., Voronova, V.I. (1989) Changes in The Working Special Capacity and Mental Stability of Well Trained Women Skiers at Various Phases of The Biological Cycle. Sports Training Med. Rehap. P:89-92.

Giacomoni, M., Bernard, T., Gavarry, O., Altare S., Falgairette G. (2000). Influence of The Menstrual Cycle Phase and Menstrual Symptoms on Maximal Anaerobic Performance. Med Sci Sports Exercise, 32 (2), 486– 492.

Hazır T, Akdoğan B, Açıkada C. (2011). Menstrual Döngü Fazlarının Tekrarlı Sprint Performansı ve Aktif Toparlanma Esnasında Kandan Laktik Asitin Uzaklaştırılma Hızına Etkisi, Spor Bilimleri Dergisi, 3, 115–123.

Kalyon T.A. (2000). Spor Hekimliği, Gata Basımevi 5. Baskı Ankara.

Karacan S. (2000). Bayan Sporcularda Mentruasyon ve Premenstrual Sendromu, Bazı Temel Motorık Özelliklere ve Fizyolojik Parametrelere Etkisi Gazi Üniversitesi Beden Eğitimi ve Spor Anabilim Dalı Sağlık Bilimleri Enstitüsü Yayımlanmamış Yüksek Lisans Tezi, Ankara.

Karacan S., Çolakoğlu F., Ersöz G. (2013). Değişik Takım Sporlarındaki Türk Elit Kadın Sporcuların Menstrüal Durumlarının Değerlendirilmesi, Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 7 (2), 2-93.

Karacan S., Günay M. (2003). Sporcularda Menstruasyon ve Premenstrual Sendromun Bazı Temel Motorik Özelliklere ve Fizyolojik Parametrelere Etkisi, Gazi Beden Eğitimi ve Spor Bilimleri Dergisi, 8 (4), 49-57.

Karakaş, E.S. (1987). Sporcu Sağlığı, Erciyes Üniversitesi Yayınları, Kayseri.

Lebrun C.M. Rumball J.S. (2001) Relationship Between Athletic Performance and Menstrual Cycle, Curr Woman's Health Rep. Dec

Lind A.R., Petrofsky J.S (1976) Isometric Strength and Endurance during the Menstural Cycle, J. Apple Phsysiol 35 P:1-10.

Masterson G. 1999. The Impact of Menstrual Phases on Anaerobic Power Performance in Collegiate Women, Journal of Strength and Conditioning Research, 4, 325–29.

Ocak, Y., Buğdaycı, S. (2012). Futsal (Salon Futbolu). BEDRAY Basın Yayıncılık Ld. Şti. İstanbul.

Ön, S. (2014). Adolesan Voleybolcularda Menstruasyonun Anaerobik Güce ve Aktif Sıçrama Performansına Etkisi, NWSA-Sports Sciences, 2B0099, 9, (2), 32-42.

Özdemir R., Küçükoglu S. (1993). Bayan Sporcularda Mentruasyonun Sürat ve Dayanıklılığa Etkisi, Sosyal Bilimler Dergisi Cilt 4 Sayı 4, 3 - 9.

Ramsbottom, R., Brewer, J. and Williams, C. (1988). A Progressive Shuttle Run Test to Estimate Maximal Oxygen Uptake, Brit. J. Sports Med., December, 4 (22), 141-144.

Sevim Y., (2002) Antrenman Bilgisi, Nobel Yayın Dağıtım 7. Baskı Ankara.

Tamer, K. (2000). Sporda Fiziksel, Fizyolojik Performansın Ölçülmesi ve Değerlendirmesi, Bağırgan Yayımevi, Ankara.

Tsampoukos A., Peckham E.A., James R., Nevill M.E. (2010). Effect of Menstrual Cycle Phase on Sprinting Performance, European Journal of Applied Physiology, Volume 109, Issue 4, 659–667.

Wearing, M.P., Yuhosz, M.D., Campbell, R.: (1972), The Effect of Menstrual Cycle on Tests of Physical Fitness, J. Sports Med. Phys. Fitness, 12, 38-41

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