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Women Athletes' Endurance and Menstruation Cycle; Pre-Menstruation, 2nd day of Menstruation and 5th Day of Menstruation

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***Abstract*—Raised the issue about menstruation effects towards athlete's endurance, formally as a research, can help athletes and coach to anticipate any matter that can affect athlete's activity. The aim of this research is to know the difference of menstruation cycle towards women athletes' endurance in several sports number. This research was using the descriptive method, with three shoot case design. Subjects in this research were soccer women athletes in UPI student unit activity and Rowing Women Athletes in Indonesian gold medals program (PRIMA). The measurement of endurance was using 1500m run test. Data analyze was using SPSS. Research results are 1) Women soccer athletes in 2 days before menstruation average score was 36,0 in 2nd menstruation day the score decreased to 35,9, and in 5th menstruation day, the average score increased to 38,27. The results of the study show a significant difference. 2) In rowing women athletes, the results in pra-menstruation average score was 38,22 in 2nd menstruation day the average score decreased to 37,74 and in 5th menstruation day the average score increase to 39,77. The test showed no significant difference. Research conclusion: menstruation cycle gave significant effect to women soccer athletes meanwhile women rowing athletes is not affected by menstruation cycle.**

Keyword–endurance, menstrual cycle, pre-menstruation

I. INTRODUCTION

Women participation in achievement sports event has shown a quite significant increase. Participation in 'masculine' sports that for a long time assumed as man sports (body contact) such as soccer, karate, boxing, judo, and wrestling, is enough to conclude that true equality shown from the number and quality of participation. Women interest and desires to reach high achievement in some hard sports number not only shown by the increase of participation number but also the increase of sports event and competition that involve women to show their ability in sports number that for a long time only competed among men. The increase of sports number in multi-event both nationally or internationally is recommended by public. The phenomenon of women participation in masculine sports, different from past events here women in that time more likely to be directed to 'lady like' sports activity and not requiring dominating element of strength, power, and character that relate to masculinity [1].

II. LITERATURE REVIEW

There are many factors that affect women activity in their participation in masculine sport related to a psycho-social condition in their environment and also obstacle from anatomy-physiology dimension. One of the conditions from physiology dimension that usually considers as an obstacle for women to do achievement sports activity is menstruation. When in menstruation period, some women get some distraction, which will affect their activity in sport. Physical distraction such as pain on joint and muscle also psychologically distraction such as emotionally more sensitive and feels lazier. Menstruation syndrome considers as good obstacle both in participation in exercise or when in menstruation period which also effects to emotional swings and movement changes [2]. Even then, there is no medical indication that telling women to stop their physical activity during menstruation period, even some people intend to avoid that activity due to some personal occurrences to their self [2] Generally, women have their own ability to responds any menstruation effect to achieve a balance between physic and psychic [3]. In menstruation period women having some physical symptom as pain on the breast, stomach cramps, joint pain, stiff neck, headache, irregular heartbeats, and psychology symptom such as emotionally more sensitive, easily offended, anxiety, mood swings, easily tired, depression, lack of confidence, hard to concentrate, etc.

Relate to the obstacle of women participation in masculine sports, especially soccer and paddling from sociology dimension are caused by public opinion that seeing both sports as sports that only played by men so it is uncommon for women to participate in such sports. Women participation in masculine sports such as soccer usually get many obstacles, one of them is a negative reaction to women soccer event organizer as the impact of public opinion that declare that such a sport is not suitable for a woman and the perception that the event may shift man popularity [1]. Women athletes that participate in paddling physically are charged to have a prime physical condition. This is based on the argument that paddling is sports that completely exhausting and require a big amount of stamina and endurance, that is the reason why paddling used to call as an endurance sport. An athlete that participates in this sports number is charged to have proper body endurance. Beside called as endurance sports, paddling also known as speed sport because in paddling the champion is the one who reached the finish line in the quickest time.

Many sources explained, however, women considered as weak people that their existences would never out powering man. Even in sports that concerned to 'sportively and fair play', women existences are known for their lack in many aspects compared to man. [4]

From those factors that obstruct women as mention above, the focus of this study is menstruation cycle and many kinds of occurrence that happened on paddling and soccer women athlete. Menstruation for some women giving a big meaning in doing physical activities, but on another side, menstruation becomes an obstacle in doing sports activity. Studies about menstruation from functional dimension explained that menstruation itself are effect by progesterone hormones in women body. [5]. Reproduction function is arranged by a group of hormones. Gonadotropin-releasing hormone (GnRH) is one of hypo physio tropic hormone, which is produced by, neuroendocrine in the hypothalamus and get to hyphy anterior through the blood vessels hypothalamic-pituitary portal, which triggering the release FSH and LH. Both hormones produced gametogenesis process and secretion of sexual hormones that can give many effects to all reproduction organs and another part of the body. [6]. The menstrual cycle is a complex case that happened in the uterus. The occurrence that happened in the uterus itself is influenced by the changing of ovarium hormone secretion that going in a cycle. [2].

III. Research Method

A research method that used in this research is descriptive using three shot case design [7] Population and sample in this research are 11 women sports athletes age 17-23 years old was selected using purposive sampling. The test that used to measure body endurance is 1500m running test. Test time for each athlete is different; depend on their menstruation period schedule. The test is done three times which is on two days before menstruation (pra-menstruation), second and fifth day of menstruation period Kolmogorov-Smirnov for normality tests, and Levene test for homogeneity test. Data analysis is using Kruskal-Wallis method (not normal data distribution).

IV. Result and Discussion

Based on study result on endurance performance in three cycles of menstruation, highest score are on the fifth day of menstruation and the lowest score is on the second day of menstruation period. Average calculation and standard deviation are shown in table below:

Table 1. Average Score Result and Standard Deviation on Soccer

Observation	Average	Standard Deviation
X1	36	3,19
X2	35,09	2,98
X3	38,27	2,32

Table 2. Average Score Result and Standard Deviation on Paddling

Observation	Average	Standard Deviation
X1	38,22	2,295
X2	37,74	3,747
X3	39,77	3,352

Remarks:

X1 : Average score and standard deviation of endurance test on pre-menstruation day

X2 : Average score and standard deviation of endurance test on the second day of menstruation

X3 : Average score and standard deviation of endurance test on the fifth day of menstruation

Prerequisite test analyze is to observe normality and homogeneity of sample data. Set forth to prerequisite analyze result which is normality test that tested using Kolmogorov-Smirnov, data distributed not normal and Homogeneity test using Levene test, homogeny data. So that, in testing the hypothesis using nonparametric hypothesis test, Kruskal-Wallis.

Kruskal-Wallis hypothesis test (H-Test) with trust level (α =0,05) resulted h = 6,014, p .049 > 0,05, so H_0 are rejected. There is a significant difference in endurance during pre-menstruation (x=36), the second day of menstruation (x=35,09), and the fifth day of menstruation (x=38,27). Endurance sample on fifth day significantly different from pra-menstruation and second day of menstruation. The result of data analyze are shown on graphic chart below:

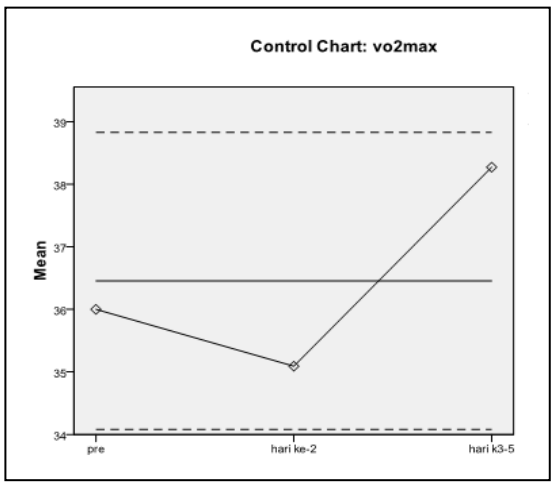

Fig. 1 Soccer Athletes Endurance Graphic Chart during Pra Menstruation and Menstruation Period (2nd and 5th)

Complete test result on rowing women athlete after the calculation is not too big difference in each set of test. The increase from second to the third test is 4% and the decline from the first and second test is 3%. From complete test on the sample, the decrease and decline are not too big.

Fig 2. Complete Test Result of Women Rowing Athletes

Similarity test results show that in average F-Calculation is 0,61 and F-Table on DK (2,12) with real extent α = 0.05 is 3,88. Known that exception hypothesis from ANAVA test is if F-Calculation < F-Table, can be concluded that hypothesis (H1) is accepted because F(0,61) < F(3,88). This means that there is no difference on athletes endurance on pre-menstruation period, the second day of menstruation, and fifth day of menstruation period.

Others information that also revealed is related to menstruation cycle and pre-menstruation and during menstruation obstruction is:

1. On average, athletes get menstruation disruption, which 10 of them got irregular menstruation cycle and 1 athlete got regular menstruation cycle.
2. Pre-menstruation symptoms that occurred to athletes on pre-menstruation are; a migraine or a headache, pain in hips, breast enlargement occur to most athletes but not too disturbing.
3. Symptoms on the second day of menstruation period, athletes feel sore on stomach and limp body.
4. On the fifth day of menstruation period, athletes don't feel any symptoms nor any disruption that caused by menstruation.

A significant difference between the three results of observation on soccer athletes is caused by the test that held on different body condition of athletes. The observation is done on three period which is two days before menstruation/pra-menstruation, the second day of menstruation, and fifth day of menstruation period.

Other information that also can be studied is almost all athletes said pra-menstruation and during menstruation symptoms are not bothering them too much. Pra menstruation symptom that occurred to athletes on pra-menstruation are; a migraine or a headache, pain in hips, breast enlargement. On the second day of menstruation period, athletes feel cramps on the stomach and limp body that effect the declining of test results. And on the fifth day of menstruation period, generally, athletes doesn't feel any symptoms and disruption that occurred by menstruation even the bleeding is still happening (as small blood stain only). The average of endurance result increases from second-day menstruation test.

Almost all results of endurance test on the second day of menstruation got decreased, meanwhile, on the fifth day of menstruation, the results are increased even bigger than test result on pra-menstruation.With that result, we can conclude that the best test result between three test is on the fifth day of menstruation period.

There is some symptom that occurs during menstruation period such as cramp that happened due to contraction of the soft muscle, headache, pain on the middle part of stomach, anxiety, limping, nasal congestion, and easily offended. As an example of menstruation symptom that occurred on athletes during menstruation period are; pain around the breast, migraine, stomach cramp, mood swings, and easily got depressed when got trouble that effect training and exercising performance become not maximum.

That symptom that occurs during menstruation period will affect women activity, especially in sports numbers that requiring big energy from the body because it ill is hard for women during menstruation to keep doing their activity normally with many symptoms, even more, to do endurance training [8].

One of the studies in Australia found that women are not only become slower on the week of menstruation period starting, it also burnt less fat. Menstruation cycle can affect athletes body endurance because many physical and physiological symptoms that happened during menstruation period. The previous study that did to an athlete on some sports number informed that the effect of menstruation symptoms are variation depends on sports characteristic. Body performance during menstruation period relatively worse if there is endurance element but best performance usually happened during the post-menstruation phase, and the worst are on pra-menstruation phase. This significant effect is assumed by hard working and long-term effort during exercise [8].

The study result of women swimming athletes short track number and long track number, there is no connection between heavy exercise routine with menstruation disruption [9]. Some research has shown that young athlete under 25 years old more likely to get amenorrhoea as the effect of their participation in sports (Baker, 1981; Speroff and Redwine, 1980 [8] . During menstruation period, there is a lot factor that can affect athletes totality in doing physical activity. Those things happen because during menstruation a woman got many symptoms such as pain, unstable emotion, and the decrease of body endurance. The decrease of body endurance happens because during menstrual women lost a lot of zinc that goes out with the blood. Blood volume that lost during menstruation period is about 15mg/month or 0,4-0,5mg/day for 28 days [10].

The amount of blood lost during normal menstruation has been studied by some research group found that the amount is about 25ml-60ml. On the Haemoglobin (Hb) normal which is 14g/dL and Zinc concentrate Hb 3,4mg/g, this blood volume contains 12-29mg zinc and shown blood loss equivalent to 0,4-1mg zinc per days during the cycle. [11]

During menstruation, many women complained about many uncomfortable conditions. Some women feel awkward and not confidence doing their routine, and also some women complained about the disturbing pain that makes them can not do their activity and furthermore to seek help from a doctor. These menstruation disturbance divided into many kinds based on the pain and the existing of symptoms that can be observed. Many disturbance not only happened during menstruation period but also pra-menstruation period, the disturbance can be felt, those symptoms called menstruation syndrome or known as PMS. Women can get many sensations before, during, and after menstruation.

Menstruation period often become an obstacle for women to do physical activity, this can be seen from many conditions where female students absent from sports time during menstruation. That condition is not only occurred on sports subject but also effect physical exercise on some athletes, so that not a little coach reduce exercise intensity when their athletes in menstruation period, like not giving them exercise in jumping and agility in high intensity.

V. Conclusion

The result of the endurance test on three different time period shown that there is a significant difference on soccer athletes. This means that during three different menstrual cycle athletes have difference body endurance that occurred by different body condition when they did the test. The best test result is on the fifth day of menstruation period. Meanwhile for rowing athlete, even there is score difference, the deviation is not significant.

VI. Recommendation

By understanding the effect of the menstrual cycle to women body endurance, this can be used as a based for an athlete to design and plan an exercise program to suit athlete condition. During the competition, to women athlete, high-stress pressure can ‘manipulate’ menstrual cycle. If possible, it is recommended to do monitoring and guiding from medical staff to minimize negative effect that may affect athletes performance. Even though ‘manipulation’ can be done, it is more important for a coach to minimize the menstrual effect to athletes performance, which is by psychology to give a guide, motivation, and suggestion to the athlete to keep performing in optimum condition. To get more comprehensive information, further research needs to be done by using more sample, and also deeper study to menstruation event that relating to athlete performance in other sports number.

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