Introduction

It is known that the population is facing high levels of overweight, and according to the Ministry of Health in a survey conducted in 2016 (Government of Brazil, 2017) one in five people in the country is overweight. The prevalence of the disease increased from 11.8% in 2006 to 18.9% in 2016.

The big problem of the numbers shown, are the complications that the overweight population can suffer, such as chronic non-degenerative diseases, or in more severe cases, lead to death.

This is indicated by a recent survey published in the New England Journal of Medicine. where researchers claim that obesity kills more in the world than car accidents and Alzheimer’s. They still mention that 4 million people in the world died in 2015 due to overweight - or 7% of all deaths (Epoch, 2017).

In another study conducted by the IBGE and referenced by the Brazilian Association for the Study of Obesity and Metabolic Syndrome in 2015, obesity affects one in five Brazilians aged 18 years or more in 2013 (20.8%), and the percentage is higher among women (24.4% vs. 16.8% of men - ABESO, 2015).

The same study done by the IBGE still indicates that 52.1% of the women had a waist circumference greater than or equal to 88 cm. which characterizes abdominal obesity and warns that excess abdominal fat is associated with the risk of cardiometabolic diseases, such as obesity, diabetes and hypertension (ABESO, 2015).

Leitão et al. (2000. p.215) add: In 1996. Blair and colleagues published a follow-up of 8.900 women for 10 years. demonstrated that the greatest weight factor in general mortality was the low physical fitness. overcoming all other major risk factors, including smoking.

For Mendonça et al. (2004. p.698) the reduction of the level of physical activity is related to the industrialization. where the work with physical effort was reduced. and the practice of leisure had changes as well. such as sports practices were exchanged for hours before the television or computer.

Meléndez et al. (2004. p. 309) presents pertinent information about a survey conducted in Belo Horizonte between 1975 and 1997. where there is an increase in obesity among women of lower socioeconomic status and a decrease in those with a higher socioeconomic level in the studied regions.

Obesity can also harm the female (and the male) reproductive system. which can make the risk of miscarriage high in pregnancy and changes in the menstrual cycle. This is what Clapauch (2012. p.125) says:

These abnormalities (overweight) interfere in the dynamics of the female reproductive system at the central (hypothalamic-pituitary) and peripheral (ovary and endometrial) levels. leading to changes in the menstrual cycle (oligoamenorrhea) and fertility. as well as increased risk of miscarriage.

The woman’s body has several hormonal changes during the month. each phase is responsible for the release of specific hormones, which cause the woman to get from euphoric to discouraged quickly during the month.


- The normal cycle varies from 21 to 35 days. with an average of 28 days. and can be divided into three distinct phases: follicular, ovulatory and luteal. Each phase is characterized by alternating secretions of follicle stimulating hormone (FSH) and luteinizing hormone (LH) by the anterior pituitary and estrogen and progesterone by the ovaries.

Within the 28-day mean of the woman’s complete hormonal cycle. specific phases occur that are responsible for each part of the month. the follicular phase. the ovulatory phase. and the last phase. the luteal phase.

These three stages range from the preparation of the woman’s body to menstruation until the recovery of all the events that affect them in the process.

The follicular phase is the proliferative phase of the uterus. It lasts for the first 14 days of the menstrual cycle.

During the follicular phase. hormones stimulate the development of follicles. By day 5 or 6. a dominant follicle (which contains one egg to be released) emerges and the others return. During this time. the uterus. in its proliferative phase by stimulating estrogen. causes the endometrium to grow 1 to 3 mm after menstruation to 6 to 8 mm until ovulation (INTERNATIONAL ASHERMAN’S ASSOCIATION, 2017).

The ovulatory phase is the moment of the cycle in which the woman is fertile. It lasts between the 12th day of the cycle and the 16th day. according to the International Asherman’s Association (2017). With ovulation. progesterone levels begin to rise. Estrogens decrease their concentration. as well as the levels of LH / FSH (luteinizing hormone / follicle-stimulating hormone) in the ovulatory phase (Guyton. 1976 p.1086-103 apud Arruda et al. 2008).

The luteal phase is the final phase. from the 14th day of the cycle to the 28th and last day of the menstrual cycle.

LH (luteinizing hormone) induces the formation of the corpus luteum (which degenerates if a pregnancy occurs). The uterus still grows under the influence of estrogen and progesterone. The glands are enlarged and. if no implantation occurs. the endometrium begins to flake after day 28 of the cycle (INTERNATIONAL ASHERMAN’S ASSOCIATION, 2017).

Because the hormonal oscillations are very large during the month. it is difficult to carry out conclusive studies. as explained by Giambardino et al. (1997) apud Barbosa et al. (2007) that the studies attempt to explain the physio behavioral reactions of women. however. the research does not present consistency in its results.

Faced with these hormonal issues. one important factor is the use of contraceptives in women’s lives. Contraception has accompanied a good share of women around the world for a long time. whether it be the pill. condoms. injections. and so on. This is what the Earth Policy Institute (2012. web) says:
According to the United Nations, 63% of women of reproductive age worldwide, representing about 740 million couples practicing some form of contraception. Almost 90% of them employ modern methods, which include oral contraception (the pill), injections, implants, intrauterine devices (IUDs) and sterilization.

In Brazil, according to Espojo (2001) apud. Alves et al. (2007, p.274) contraception is concentrated in tubal ligation (40%) and contraceptive pill (21%).

It is often understood that all the hormonal phases of hormone and pregnancy highs and lows through which women spend their weight loss becomes more difficult and the probability of being overweight is much greater, and the number of tasks to be performed in a day becomes increasingly difficult to put physical activity as a priority on the agenda.

In order to encourage a more active lifestyle of the population, the guidelines propose that the population should adhere to the practice of physical exercises for 30 to 60 minutes for most of the week (Haskell et al. 2007; ACSM, 2011).

For Xavier et al. (2014, p.76) it is possible to see that high-intensity can promote metabolic adaptations promoting the increase of insulin sensitivity and, consequently, the regulation of glucose in overweight and obese individuals.

The HIIT modality practiced at FIT Academia has the main proposal of the modality, but it is applied in the open room, with the use of mats and body weight. Being then of the body work model, not using bicycles or mats like conventional HIIT.

Recently some researchers have reintroduced the concept of body weight training using the HIIT method in their experiments characterizing the method as wholebody training. Whole body calisthenics or as it is known in professional practice as HIIT BODY WORK (MACHADO, 2017).

Still for Xavier et al. (2014, p.76) HIIT demonstrates potential for the promotion of adaptations related to the reduction of body fat. Through protocol with volume and reduced frequencies allied to high intensity. The possible mechanisms responsible for the reduction in body fat induced by HIIT have not yet been determined; however, may be associated with increased fat oxidation during and especially after intermittent exercise (BOUTCHER, 2011 apud XAVIER et al. 2014, p.76).

For Tjona et al. (2009) and Sartor et al. (2010) apud Xavier et al. (2014, p.76), it is important to consider that this is one of the components of physical fitness related and an important indicator of good health.

For Gentil (2010, p.158) argues that although interval training has gained popularity in recent years, it has been used since the beginning of the century by coaches for athletes with the goal of improving their athletic performance.

Gentil (2010, p.76) points out that the use of low-intensity and long-term exercises for fat loss has been advocated. He argues that this information led many practitioners to believe that intense activities would not lead to weight loss, so the idea that fat oxidation would start only after twenty minutes of activity.

Considering that people currently have high workloads and little time for physical activity, the idea that there is a need for at least twenty minutes of aerobic weight loss can lead people away from seeking a gym. This current need leads one to believe that the TW may be a good option for weight loss to be achieved.

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Xavier et al. (2014, p.73) recall that HIIT does not only bring esthetic benefits, but also improves respiratory capacity. The improvement in cardiorespiratory capacity promoted by HIIT is very important considering that this is one of the components of physical fitness related and an important indicator of good health.

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There is currently not enough literature to address the HIIT variables so, the source of LAURSEN et al. (2002) apud. VECCHIO et al. (2014, p.11 to 13):

Stimulus: Period in which the exercise is performed with intensity. The working interval lasts from 10 seconds to 5 minutes, with intensity above the anaerobic threshold; Recovery: Intervals between exercises. The type of recovery is related to the HIIT protocol performed. However, longer recoveries of the order of 4min and 30s can be respected; Intensity: As with time. intensity is defined as a form of effort control in the stimulus period. Duration: The time spent in the training session, considering interval of work and recovery. The estimation is that the grouping of these activities requires a period between 20 and 25 minutes of, from 8 to 16 minutes are allocated to the exercise at high intensity; Series: The number of times the stimulus will be done. When the volume of work is low, the number of HIIT series is higher, with a duration varying from 1-4 minutes depending on the specificity of the modalities and the practitioner point out Vecchio et al. (2014, p.12).

This author also stresses the importance of having more studies about HIIT: It is important to emphasize that there is no consensus in the literature regarding the intensity, duration and number of ideal intervals for HIIT execution. Ideally that more studies are performed for which establishment of these issues (2014, p.12).

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In the light of the above, this study aims to compare the level of weight loss of HIIT women in the three different hormonal phases: follicular, ovulatory and luteal.

Materials and Methods

This is a bibliographical research, descriptive, semi-experimental design.

Given the nature of the research, it was decided to use the bio-impedance scale of the brand Serene Digi-Health Pro, using the data it provides: Weight, percentage of fat and percentage of muscle mass and will also use the scale of subjective perception of effort of OMNI-RES (GEARHART et al., 2002).

Before the beginning of the research, the participants signed the informed consent form to start the research. All participants reported when their menstruation began during the two months of follow-up, and according to the literature the researcher calculated the menstrual phases in which the participants should be weighed. the follicular phase, the ovulatory phase and the luteal phase, and at the end of HIIT sessions on the days they were weighed, responded to the subjective perceived effort scale of OMNI-RES (GEARHART et al., 2002) according to their fatigue at the time of 0 for extremely easy and 10 for extremely difficult.

The sessions were based on calisthenics exercises such as polycycles. squats. burpees. jumps and sit ups timed between exercise and interval. The sample was started in 20 women, ending in 15. They are separated into two groups with 8 in group A: Menstruate and take contraceptive and 7 in group B: Menstruate and do not take contraceptive. Between 21 and 46
However, there was a considerable increase in the amount of load supported in the leg press exercise 45º, from the study conducted by Oliveira (2016, p.32) with 20 women using contraceptives, the exercises tested were bench press, 45º leg press and low row with triangle. There were no significant changes in maximal strength levels when compared to the three different phases of the menstrual cycle in any of the three exercises evaluated.

In a study conducted by Simão et al. (2007) with 19 women who did not use regular contraceptives, used the 45º leg press and the triceps pulley test, it was noted in this study that there was an increase in performance in leg-press exercise, in the tests performed in the follicular and ovulatory phases. On the other hand, in the luteal phase, there was a decrease in the load / strength of the women tested.

In graph 1 it was possible to verify that the weight of the first weighing of the luteal phase is directly proportional to the weight of the second weighing of the luteal phase, which add up to a complete cycle between one and the other, suggesting a strong correlation (.99421).

In this case, the weight of the second weighing of the luteal phase remained like the weight of the first weighing. Observing graph 2 it was possible to note the correlation that the percentage of lean mass of the first weighing of the ovulatory phase with the weight of the second weighing of the luteal phase, they are inversely proportional, that is, as the weight decreases, and the lean mass increases it is understood that what decreases is body fat.

No studies were found that analyzed the weight loss before the hormonal phases using HIIT sessions, in this case were selected works that compared other physical valences with the female hormonal cycle.

In the study conducted by Rezende et al. (2009) with five women accustomed to resistance training may be like the results of this study. The women were followed by two menstrual cycles, 3 times a week. As a result, it was observed an increase in body weight, but the percentage of body fat decreased.

In a study conducted by Simão et al. (2007) apud. Costa (2014 p.24) with 19 women who did not use regular contraceptives, used the 45º leg press and the triceps pulley test, it was noted in this study that there was an increase in performance in leg-press exercise, in the tests performed in the follicular and ovulatory phases. On the other hand, in the luteal phase, there was a decrease in the load / strength of the women tested.

In graph 3 it is verified that the fat percentage of the first weighing of the luteal phase with the percentage of lean mass of the second weighing of the ovulatory phase are inversely proportional, that is, the percentage of fat decreased in relation to the gain of lean mass, suggesting again gains lean mass.

Observing graph 4, it is possible to observe the negative correlation that has the weight of the first weighing of the luteal phase with the percentage of lean mass of the second weighing of the ovulatory phase. They are inversely proportional, demonstrating again that what has come to decline was the percentage of body fat.

In the study conducted by Oliveira (2016, p.32) with 20 women using contraceptives, the exercises tested were bench press, 45º leg press and low row with triangle. There were no significant changes in maximal strength levels when compared to the three different phases of the menstrual cycle in any of the three exercises evaluated.

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premenstrual phase (208 kg [95% CI: 192.77; 223.22]) to the postmenstrual phase (233 kg [95% CI: 209.37, 256.62]). In this case, the post-menstrual phase refers to the ovulatory phase, showing relationship with the graphs presented in this work.

In analyzing graph 5, it is possible to verify the positive correlation between the percentage of lean mass of the first ovulatory phase and that of the second ovulatory phase, having a strong correlation among them (.91135). In this analysis that completes a complete cycle, it is possible to perceive the increase of lean mass in the ovulatory phase.

Graph 6 shows the comparison of the percentage of lean mass of the first weighing with the percentage of fat of the second weighing, including a strong negative correlation (-.6300), explaining that the fat percentage of the second weighing of the luteal phase is inversely proportional to the percentage of lean mass of the first weighing of the ovulatory phase.

When analyzing the groups that used contraceptive and those who did not use, it was proved that although there are significant differences between the averages obtained, this difference is not proved by the statistic.

Table 2. Subjective effort perception from the OMNI-RES scale (GEARHART, 2002).

Analyzing the subjective perception of the OMNI-RES effort (GEARHART et al., 2002) of the participants during all the phases, it is observed that in the first weighing of the follicular phase and in the second weighing of the same phase the average was greater than the others phases, with the first weighing 8 and the follicular phase of the second weighing 8.133333, the other phases remaining at a mean of 7.

The results show that even in the phases where the perception of effort was lower, it remained in a zone suitable for the desired intensity, 7 being a little difficult and 8 difficult on the scale.

The subjective perception of effort (PSE) is based on the perception of effort and fatigue of the subject during the exercise and is used with the objective of measuring or regulating the intensity of the same, through numerical value that represents the state of fatigue during exercise (BORG, 1970, GOMES et al., 2014, p.14).

The subjective perception in the absence of some means of heart rate measurement or the like, becomes very relevant to achieve the expected results with the HIIT sessions. As the subjects can define the effort through the PSE, they can improve the ability to self-regulate the workload more precisely (CÉLINE et al., 2011 apud GOMES et al., 2014 p.16).

A study by Melegratio et al. (2006) investigated the influence of the menstrual cycle on flexibility in women between the ages of 18 and 35 years of gymnastics who did not use contraception.

The flexibility was measured through goniometry, using eight movements, in three phases of the menstrual cycle, showed that there was no significant difference in the degree of flexibility of the women in the menstrual phases. Another study by Celestino et al. (2012), which aimed to compare the muscular strength of women in the age group of 18 to 30 years, in the three hormonal phases through 10 RM tests in the extensor chair and flexor chair also concluded that there were no important differences, but in the post phase Both groups presented a slight variation in maximal strength performance relative to the other two menstrual phases.

Ramos et al. (2018) verified the muscular strength of the lower limbs in the phases of the menstrual cycle. Strength was measured by the Welday (1988) submaximal test in the 45° leg press apparatus during all hormonal phases and as a result it was possible to observe an increase in strength in menstrual and post-menstrual, menstrual and post-ovulatory, ovulatory and ovulatory, menstrual and post-ovulatory.

Fleck and Kraemer (2006) add that the effect of the menstrual cycle on performance is still confusing and probably very specific to individuals.

According to Leitão et al. (2000) apud. Celestino et al. (2012) the different phases of the menstrual cycle do not interfere with physical performance, and some women who exercise regularly present relief from premenstrual symptoms.

Fleck and Kraemer (2006) apud. Celestino et al. (2012) cite that world records were established at all stages of the menstrual cycle.

On the other hand, Weineck (2005) contrasts with the fact that the optimal physical performance is achieved in the postmenstrual phase, due to the increasing rate of estrogen; in the postoperative phase is considered a phase of reduced performance capacity and during menstruation, about 70% of women achieve a performance equal to or better than at other times of the cycle and 30%, there is a decrease although not significant.

Final Considerations

When observing the data obtained with this research it is possible to conclude that between the group that took contraceptive and the one that did not take although there are expressive differences between the means, statistically this difference is not proven. The weight between the beginning and the end of the weighing was directly proportional, maintaining...
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THE IMPROVEMENT OF HIIT PRACTICING WOMEN IN THE DIFFERENT HORMONAL PHASES

This study had as objective compares the level of practicing women’s of HIIT weight loss in the three different hormonal phases: follicular, ovulatory and luteal. Through weightings in a bioimpedance scale. It is a research bibliographical. descriptive. quantitative of semi-experimental stamp. The sample was composed by 15 women. with age group between 21 and 47 years. divided in two groups: 8 made contraceptive use and 7 didn’t. The participants practiced sessions of HIIT frequently of at least three times the week during two hormonal cycles. The weightings took place for two months always in the beginning of the training sessions. the first. Monday and third weightings happened in the phases follicular, ovulatory and luteal respectively. To the end of the sessions of HIIT they answered the scale of subjective perception of effort of OMNI-RES (GEARHART et al. 2009). The collected data were made available in a spreadsheet of Excel for Windows and inserted in a statistical program where was were analyzed the normality, frequency, measures of central tendency and dispersion. also tested by the association of the variables with the correlation of Pearson with pvalue<0.05. It was noticed that the weight in the beginning of the weightings and in the end of the weightings it was directly proportional. in other words. he/she stayed. Already the percentile of thin mass was shown inversely proportional to the weight. having expressive increase of thin mass with the practice of sessions of HIIT.

Keywords: Weight loss; Woman; HIIT; Phases hormonal; Gym.

L’AMÉLIORATION DE LA PRATIQUE DES FEMMES HIIT DANS LES DIFFÉRENTES PHASES HORMONALES

L’objectif de cette étude était de comparer le niveau de perte de poids chez les femmes HIIT dans les trois différentes phases hormonales: folliculaire, ovulatoire et lutéale, en pesant dans une échelle de bioimpédance. Il s’agit d’une recherche bibliographique, descriptive, quantitative de nature semi-expérimentale. L’échantillon était composé de 15 femmes âgées de 21 à 47 ans, divisées en deux groupes: 8 utilisaient des contraceptifs et 7 non. Les participants ont pratiqué des séances HIIT au moins trois fois par semaine pendant deux cycles hormonaux. Des poids ont été réalisés pendant deux mois au début des séances d’entraînement, les premières, deuxième et troisième pesées ayant eu lieu respectivement dans les phases folliculaire, ovulatoire et lutéale. À la fin des sessions HIIT, ils ont répondu à l’échelle de perception subjective de l’effort d’OMNI-RES (GEARHART et al., 2002). Les données recueillies ont été mises à disposition dans une feuille de calcul Excel pour Windows et insérées dans un programme statistique analysant la normalité, la fréquence, les mesures de la tendance centrale et la dispersion, également testées par l’association des variables à la corrélation de Pearson avec pvalue<0.05. Il a été observé que le poids au début et à la fin de la pesée était directement proportionnel, c’est-à-dire qu’il était maintenu. Le pourcentage de masse maigre était inversement proportionnel au poids et il y avait une augmentation de la masse maigre expressive avec la pratique des séances de HIIT.

Mots clés: Perte de poids; Les femmes; HIIT; Phases hormonales; Académie.