Comparison of Physical Activity and Body Mass Index in women with and without Miscarriage Experiences

Ali Reza Khademi, Gholamhosyn Rahimi, Mohammad Mohammadi

ABSTRACT

The main purpose of this study was a comparison of physical activity and body mass index in women with and without miscarriage experiences. The relationship between physical activity and body fat levels is completely unclear, despite large number of studies. It has been estimated that, unless effective action is taken, about one-third of adult women would be obese by 2010. Modifiable physical activity and sedentary diet behaviors are associated with morbidity and mortality, and improving these behaviors in all populations, including women, is a national health priority. Studies showed that light physical activity or sub maximal aerobic training not only improves the health of mothers, but also would have potential long-term beneficial effects on the fetus health. Therefore, in the current study, women with (N=54) and without miscarriage (N=70) experiences were compared by, Beck physical activity questionnaire, and body mass index (BMI). For statistical analysis was used SPSS software and independent T-test statistical method. All statistical operations were performed in confidence distance = 95%, alpha = 5%. The results showed that, there was a significant difference between women without and with miscarriage experiences in term of their body mass index and physical activity (P <0.05). Women without miscarriage experiences had desirable weight in terms of physical activity and were more active than women with miscarriage experiences. Women with miscarriage experiences had overweight. Current study indicated that increasing physical activity and reducing obesity are the greatest priorities for enhancing women's health. The appropriate physical activity programs are optimal to help preventing chronic disease such as obesity and overweight in women, and are most beneficial for miscarriage and development. It is necessary, obese women must to reach the desired weight in prior to pregnancy. Results from this investigation help provide direction for future research efforts and health education programs.

Key words: physical activity, body mass index, women with and without miscarriage experiences.

Introduction

With overweight and obesity on the rise in world, it is of utmost importance that all people maintain or increase their current level of physical activity. This also is true for pregnant women. For obvious reasons, there are no controlled studies looking at physical activity during pregnancy. For many years, even physician groups advised against moderate exercise. Lack of attention to issues related to health, could endanger the life of mother and fetus. One of the risk factors of pregnancy is miscarriage (Thomson, 2012). According to the American College of Obstetricians and Gynecologists (2006), miscarriage is the most common type of pregnancy loss. Studies (Kramer, 2002) reveal that anywhere from 10-25% of all clinically recognized pregnancies will end in miscarriage. Miscarriage annually causes maternal deaths about 70 thousand and disabilities of 5 million in worldwide. About 40 percent of pregnant women in the world are excluded of medical facilities and training period before, during and after pregnancy (Thomson, 2012).

In the past, the main concerns of exercise in pregnancy were focused on the fetus, and any potential maternal benefit was thought to be offset by potential risks to the fetus. In the uncomplicated pregnancy, fetal injuries are highly unlikely. Most of the potential fetal risks are hypothetical .The principal question that remains to be answered is does the selective redistribution of blood flow during regular or prolonged exercise in...
pregnancy interfere with the trans placental transport of oxygen, carbon dioxide, and nutrients. It is well recognized that, during obstetric events, transient hypoxia could result initially in fetal tachycardia and an increase in fetal blood pressure. These fetal responses are protective mechanisms allowing the fetus to facilitate transfer of oxygen and decrease the carbon dioxide tension across the placenta. Any acute alterations could result in fetal heart rate changes, whereas chronic effects may result in intrauterine growth restriction. There are no reports to link such adverse events with maternal exercise (Artal and Catanzaro et al., 2007). Contrary to previous assumptions, studies show that physical activity not only improves maternal health but also has beneficial long-term effects for the child potentially (Moffett and Hiby, 2007). According to Artal et al (2007) and Wolfe et al (2003) in the field of sports and active lifestyle of women in different periods of life, it is observed the positive role of physical activity on health and life of the fetus and the mother clearly. Recently, researchers (Williams and Mittendorf, 2000) have begun to consider the role of physical activity in more traditional chronic disease prevention light, for both mother and offspring. This roundtable was undertaken to discuss current findings, as well as future directions that should be considered when studying the role of physical activity during pregnancy/postpartum on long-term health. Specific topic are as included the role of physical activity on pregnancy induced hypertension, gestational diabetes, musculoskeletal disorders, breastfeeding and weight loss, mental health, miscarriage, offspring health and development (Walker and Williams et al., 2000).

Pregnancy is associated with profound respiratory changes: minute ventilation increases by almost 50%, largely as a result of increased tidal volume (Prowse and Gaensler, 1965). This results in an increase in arterial oxygen tension to 106–108 mm Hg in the first trimester, decreasing to a mean of 101–106 mm Hg by the third trimester. There is an associated increase in oxygen uptake, and a 10–20% increase in baseline oxygen consumption. Physiological dead space during pregnancy remains unchanged (Prowse and Gaensler, 1965; Pivarnik and Lee et al., 2010; Sady and Haydon et al., 1990) during treadmill exercise in pregnancy, arteriovenous oxygen difference is decreased (Pivarnik and Clark, 1990) because of the increased resting oxygen requirements and the increased work of breathing caused by pressure of the enlarge uterus on the diaphragm, there is decreased oxygen availability for the performance of aerobic exercise during pregnancy. Thus both subjective workload and maximum exercise performance are decreased (Artal and Gavard, 2007). However, in some fit women, there appear to be no associated changes in maximum aerobic power or acid-base balance during exercise in pregnancy compared with non-pregnant controls (Pivarnik and Spillman et al., 2010).

The cardiovascular system is affected the most by the increased metabolic demands of exercise, and therefore a major factor is the dissipation of the excess heat generated by exercise. During pregnancy basal metabolic rate, and therefore heat production, is increased above non-pregnant levels. The increase in body temperature during exercise is directly related to the intensity of the exercise. During moderate intensity aerobic exercise in the neutral conditions, the core temperature of non pregnant women rises an average of 1.5°C during the first 30 minutes of exercise and then reaches a plateau if exercise is continued for an additional 30 minutes (Sorensen and Williams et al., 2003). A steady state of heat production versus heat dissipation is accomplished by increased conductance of heat from the core to the periphery through the cardiovascular system as well as through evaporative cooling through sweat. If heat production exceeds heat dissipation capacity, for example during exercise in hot, humid conditions or during very high intensity exercise, the core temperature will continue to rise. During prolonged exercise, loss of fluid as sweat may compromise heat dissipation. Maintenance of dehydration, and therefore blood volume, is critical to heat balance. It is note that, an increase in maternal core temperature of more than 1.5°C during embryogenesis has been observed to cause major congenital malformations. Data on the effects of exercise on core temperature during pregnancy are limited (Sorensen and Williams et al., 2003). Fetal body core temperatures are about 1°C higher than maternal temperatures. In animal studies, an increase in maternal core temperature of more than 1.5°C during embryo genesis has been observed to cause major congenital malformations [34]. These data coupled with the results of human studies suggest that hyperthermia in excess of 39°C during the first 45–60 days of gestation may also be teratogenic in humans (Edwards, 2005; Milunsky and Ulcickas et al., 1992). However, there have been no reports that hyperthermia associated with exercise is teratogenic in humans.

American College of Obstetrics and Gynecology (ACOG) guidelines promote continuation of prepregnancy exercise activities and recommend that sedentary women start exercising during pregnancy (Artal and Catanzaero et al., 2007). According to Cargill et al (2003) all pregnant women are encouraged to be physically active for at least 30 minutes on most days of the week, in the absence of medical or obstetrical contraindications. Wolfe and Davies (2003) recommended that previous sedentary women should start moderate exercise for a minimum of 15 minutes, 3 to 4 times a week and increase to 30 minutes 5 times a week. However, the optimal rate for recreational physical activity during pregnancy remains to be determined, and the impact of prolonged and repeated aerobic exercise on clinical outcomes for mother and infant are still unknown (Chasan and Evenson et al., 2007; Kramer, 2006). A systematic review associated physically demanding work with increased risk of premature birth (Bonzini and Coggon, 2007) whereas a recent large cohort study showed (Madsen and Jorgensen et al., 2007) incremental risk of early spontaneous miscarriage with > 7 h/wk of high
impact exercise. Potential risk factors of exercise have been listed as fetal hyperthermia with potential teratogenic effects, reduction of oxygenated blood flow (leading to fetal hypoxia) and reduction in essential substrates leading to fetal growth restriction (Cargill and MacKinnon et al., 2003).

Kennedy (2011) showed that intensity of exercise is the most important part of training programs for pregnant women, so they would be asked to take part in light training (3 to 4 minutes fast walking or jogging). Researcher (Burne and Callaway et al., 2010) in sport medical institute in the United States indicated that Pregnant women with obesity, diabetes, morbid obesity, or chronic hypertension should have individualized exercise prescription. The information available in the literature is limited with regard to the role of physical activity for these women. Two randomized trials of exercise training in women with gestational diabetes have been published (Burne and Callaway et al., 2010). In one study (Haakstad and kari, 2011) ergometry exercise three times a week for about 20 minutes a session at 50%maximal oxygen consumption resulted in normalization of glycaemic control after four weeks in contrast with diet alone. A second study (Hegaard and Pedersen et al., 2007) included 41 women at 28–33 weeks gestation who despite dietary treatment, had persistent fasting hyperglycaemia of 105–140 mg/dl. Study control subjects were treated with insulin. The exercise patients performed moderate cycle exercise three times a week and maintained an active lifestyle for duration of pregnancy. Through this regimen, the exercising patients maintained euglycaemia (A normal level of glucose in the blood) and did not require insulin. In a study of obese women (Hegaard and Pedersen et al., 2007) with type I diabetes mellitus, a postprandial walking program didn’t achieve the desirable glycaemic. Epidemiological data (Hegaard and Pedersen et al., 2007) suggest that exercise may even be beneficial in the primary prevention of gestational diabetes particularly in morbidly obese women (body mass index >33), but not in women of normal weight. Hegaard et al (2007) in American Diabetes Association has endorsed exercise as "a helpful adjunctive therapy" for gestational diabetes when euglycaemia is not achieved by diet alone. There is currently no information available on the effect of exercise on women with chronic hypertension. The standard of care for pregnant women induced hypertension is to limit physical activity. Wolfe and Davies (2003) suggested that pregnant women should perform aerobic exercise regularly for at least 15 minutes, 3days a week at the target intensity. Previously inactive women can gradually increase the duration of exercise from 15 to approximately 30 minutes per session over the course of the second trimester. The frequency of aerobic exercise can also be increased from a minimum of 3 to 4 or 5 days a week. Exercise durations of 25 to 30 minutes per session at the target intensity have been shown to be safe and effective to increase maternal physical fitness.

Keep in mind while pregnant, the respiratory rate is naturally increased, therefore the body must work harder to give enough oxygen to you and your baby. This can reduce the rate of oxygen available for exercise and can cause decrease of energy and endurance. Ladies listen to your pregnant bodies, do not push yourself. Women who have no time or desire to exercise pre, during or post pregnancy can still participate in a regular, more generalized exercise program. It is now effective to have short activities several times a week, for at least 10 minutes to be effective (Lerner, 2003). Investigators showed (Kardel and Johansen et al., 2009) vigorous exercise in early pregnancy increase miscarriage three times. They found that intense sprints, ball sports and sports that can be done with a rocket increase this risk. Also, more than 7 hours of exercise a week will lead to increase risk of miscarriage. In another study Kardel et al (2009) studied 90 thousand women. In this study, the risk of miscarriage in women who did contact and impact sports, was more than inactive women. On the other hand, Johansen et al (2009) have announced women to continue their exercise and normal physical activity they must to stop practice when they were tired.

Haakstad and kari (2011) in their research showed that aerobic exercise was not associated with reduction in birth weight, preterm birth rate or neonatal well-being and miscarriage. In other study, Olson et al (2009) choose a greater number of women to exercise in pregnancy as the recommendations by the American College of Obstetrics and Gynecology (ACOG) and other organizations have changed in recent years. Exercise during pregnancy can be beneficial to the health of the fetus and mother. Physicians should be aware of the contraindications to exercise, the warning signs to terminate exercise, and the latest recommendations by the ACOG. In the absence of contraindications, the researchers (Haakstad and kari, 2011) believe that physicians should help to develop a reasonable exercise protocol for women based upon their previous activity levels. It is incumbent upon physicians to be aware of the unique physiologic factors present during pregnancy that may predispose women to injuries (Haakstad and kari, 2011).

More recently, the Physical Activity Readiness Examination (PAR med-X for Pregnancy) (Cargill and MacKinnon et al., 2003) was made available for use by physicians and midwives to provide medical clearance for their pregnant patients to initiate prenatal exercise programs. A summary of guidelines for the prescription of aerobic exercise and muscle conditioning was also included to assist health care providers in advising their pregnant patients on safe and effective types, intensities, and durations of exercise and suggested rates of progression. Safety precautions and reasons to stop exercise and consult a physician were also in corporate, along with advice for active living, healthy eating, and maintenance of a positive self-image.
Obesity is becoming an epidemic worldwide. According to Gupta et al (2007) in London St Mary's Hospital, on 696 women with miscarriage experiences, women who have one miscarriage experience, are at the greater risk of miscarriage again, if they are obese. The experts (Gupta and Kapwepe, 2007) at a conference in Canada was announced, the risk of miscarriage in later pregnancies in obese women increased 73 percent. However, experts in nutrition science warned that attempts at weight loss during pregnancy can have dangerous consequences. Medical researchers (Gupta and Kapwepe, 2007) was announced, obesity increases the risk of miscarriage in women. Dr. Mostafa Motavalli and colleagues (2007) in University of Sheffield in England announced that obesity in the world has increased considerably and this uncontrollable obesity can increase miscarriage statistics.

Straford and colleagues (2009) conducted a chart review of women with miscarriage experiences in 2005-2007. The rate of miscarriage was compared for women with Body mass index (BMI) less than 30 to women with BMI greater than 30 Of the 1202 eligible procedures, there were 341 women with BMI less than 30 and 861 women with BMI greater than 30.

Among young women, obesity is especially important because maternal obesity confers an increased risk of preeclampsia (Moffett and Hiby, 2007). Preeclampsia literally means 'before eclampsia' as it can potentially progress to a more dangerous condition known as eclampsia, which occurs in one in 2,000 pregnancies. Eclampsia can cause fits or convulsions. In severe cases, eclampsia can sometimes cause the death of the mother or the baby. Therefore, it is important to manage the condition safely. Pre-eclampsia is thought to affect one in twenty of all pregnancies. In most of these cases, it will be a mild case and may have no effect on pregnancy. Approximately one in two hundred women will go on to develop severe pre-eclampsia. Preeclampsia is a medical condition in which hypertension arises in pregnancy in association with significant amounts of protein in the urine (Courtney and Baha, 2006; Drife, 2010) Preeclampsia is diagnosed when a pregnant woman develops high blood pressure (two separate readings taken at least six hours apart of 140 or more in systolic blood pressure and/or 90 or more in diastolic blood pressure) and 300 mg of protein in a 24-hour urine sample (proteinuria). A rise in baseline blood pressure (BP) of 30 mmHg systolic or 15 mmHg diastolic, while not meeting the absolute criteria of 140/90, is still considered important to note, but is not considered diagnostic."Severe preeclampsia" involves a BP over 160/110 with additional symptoms (Drife, 2010). It is not known why obesity is a risk factor for preeclampsia, but these conditions might be related through common features related to oxidative stress, inflammation and altered vascular function. Recently, extensive vascular infiltration of neutrophils and vascular inflammation has been reported in both preeclampsia (sever preeclampsia) women and obese women. Therefore, if the vasculature of obese women is inflamed, they could be at increased risk of developing preeclampsia when they become pregnant and are exposed to the additional burdens of pregnancy (Marcoux and Berube et al., 1999). To date there are only three published studies (Marcoux and Berube et al., 1999) that have assessed the occurrence of preeclampsia in relation to maternal recreational physical activity. Over a decade ago, Marcoux and colleagues (1999) performed a case-control study of previously pregnant Canadian women. Women who participated regularly in recreational physical activity during the first 20 weeks of pregnancy experienced a 43% reduction in risk of preeclampsia as compared to sedentary women. The investigators (Sorensen and Awilliams et al., 2003) also noted that the relative risk of preeclampsia decreased as average time spent performing physical activities increased. Sorensen and colleagues (2003) found that regular participation in recreational physical activity during the first 20 weeks of pregnancy was associated with a 35% reduced risk of preeclampsia. The risk of preeclampsia decreased in proportion to exercise intensity and total energy expended during the activities. The researchers (Sorensen and Awilliams et al., 2003) also documented a possible reduction in risk of preeclampsia in relation to walking and stair climbing, activities that pregnant women perform routinely. Women who climbed stairs regularly experienced a 44% to 69% reduction in risk of preeclampsia, and the reduction was evident among all women, irrespective of their participation in recreational physical activities. In 2004, Saftlas and colleagues (2004) reported results from a nested case-control study of New Haven, CT women that corroborated the previous reports from Montreal and Seattle (Sorensen and Awilliams et al., 2003; Maiese, 2010).

Polycystic ovary syndrome (PCOS) is also resulting of obesity in women. Women with PCOS who also have a raised LH measurement (normal range =1 - 10 mU/L) are at an increased risk of miscarriage. The mechanism of this association is unknown (Ahmadi, 2008). Results of research conducted in Royan (Ahmadi, 2008) showed, along with proper diet and regular moderate physical activity combined with weight control, is effective for regular ovulation and increased fertility in infertile women. Providing proper diet and regular physical activity and well-balanced and weight-control methods are main treatment for polycystic ovary syndrome. Among 300 obese patients with polycystic ovaries, 106 patients were randomly selected and some of variables such as: age, duration infertility and BMI were recorded for patients using a questionnaire. The results of this study showed that women who were pregnant with diet and exercise showed greater weight loss than other women. Also, 74 patients with polycystic ovary that have been diet and exercise associated with assisted reproductive therapies, 17 were pregnant. This syndrome is one of the most common hormonal disordering in pregnant women that is usually associated with hormonal disorders such as: obesity, irregular menstruation and
hirsutism. More than 50 percent of women with PCOS are obese. Proper nutrition, physical exercise and an active lifestyle is one of the best ways to prevent and treat this syndrome (Ahmadi, 2008).

The findings of Dr. Qarakanloo and Dr. Agha Ali Nejad (2004) showed, the mean of body mass index and fat percentage of women with 30 to 35 years old in Tehran, is higher than the measurements obtained in most studies conducted in other countries. In fact, high anthropometric values in our country may have several reasons. Since that, researchers in this study (Qarakanloo, and Agha Ali Nejad et al., 2004) found significant relationship between physical activity and the obtained index, the low levels of physical activity is one of the major causes of high values of the indicators mentioned. Other factors that can be noted are dietary habits. Consumption of high-calorie food, increases the amount of body fat in women. Obese women as participants in research were in very dangerous threshold. Cultural issues, geographic conditions, type of clothing and body cover, racial factors, the lack of suitable space for women's sports, Lack of information or insufficient information about the risks of obesity, lack of exercise, local and regional anthropometric norms related indicators of the country, are the most important reasons for this difference.

Khademi et al (2011) showed that systolic and diastolic blood pressure reduced significantly (P=0.000) in experimental group after eight weeks sub maximal aerobic exercise for 30-45 minutes, three times a week, but not significant in control group (P=0.85 5, P=0.245) (sub maximal aerobic exercises are those in which one can speak comfortably, his (her) speech is not interrupted and choppy and does not feel pain or discomfort during exercise). Reduction of LDL, TC and TG was significantly occurred after eight weeks of exercise (P<0.05) but not only significant increase was shown in HDL, but increased (P>0.05). No significant change was seen in abovementioned variables in control group (P>0.07). so, eight- week aerobic exercises with low severity and sub maximal leads to significant reduction in blood pressure, LDL, TC and TG. No increasing of HDL, as a usual fat, may be related to the severity and duration of exercise which requires more study.

Many women have been barred from physical activity or exercise during pregnancy and think that physical activity and exercise are dangerous factors for fetal defects disabilities and consider miscarriage. The activities treated sub maximal, light and the lack of competition and severe physical performance not only is very effective for fetal and maternal health but also prevent structural abnormalities (Kardel and Johansen et al., 2009). Access to education and health services for women and mothers and families to familiarize them with various training methods and based on correct principles, in addition to the lack of problems during pregnancy, causes maternal and fetal health and also decreases labor. Questions remain unanswered concerning contraindications for recreational physical activity during pregnancy. For instance, although physical activity is often prescribed as a non pharmacological therapy for mild hypertension in non pregnant individuals, pregnant women presenting with mild hypertension may be directed to go on bed-rest. The question of whether women with high-normal or slightly elevated blood pressures in early pregnancy should be encouraged to begin a supervised moderate-intensity physical activity regimen is a good one. After pregnancy, athlete mothers have rapid recovery and in addition to reducing the cost of treatment, they gain their effectiveness for social and personal affairs quickly (Ahmadi, 2008; English and Musselet et al., 2007).

Materials and Methods

The purpose of this study was comparison body mass index in women with and without miscarriage experiences. Thus, women with miscarriage (N=54) and without miscarriage experiences (N=70) that were referred to Health Center of Fereydoonshahr city, were studied. Some of the women didn’t have interest or ability to answer the questions of questionnaire or absented in health center. This limits resulting to decrease number of subjects. Also, some women with experiences of miscarriage in early pregnancy were not complete medical records or didn’t present information for various reasons and some women were not available. Some women view the medical records at the health center was not willing to cooperate and provide information on pregnancy, or there was not complete information in their minds and didn’t know the meaning of the research questions. First, the demographic data and medical records of individuals including age, weight, height and body mass index, history of specific disease and miscarriage experiences were identified. To assess physical activity was used Beck Physical Activity Questionnaire. According to studies of Rio and colleagues (2007) Beck physical activity questionnaire in all domains concerned with the validity and reliability is high in women. Pearson correlation between physical activity questionnaire and pedometer was calculated. The questionnaire included 16 spectra and three indexes: sport index, work index and leisure physical activity, and the total amount of them can be evaluated physical activity. Evaluation method is as following:

Work index = \( (I_{1} + (6 - I_{2}) + I_{3} + I_{4} + I_{5} + I_{6} + I_{7} + I_{8}) ÷ 8 \)

Sport index = \( (I_{9} + I_{10} + I_{11} + I_{12}) ÷ 4 \)

\( I_{9} = 1.25 \times [\text{intensity} \times \text{time (h)} \times \text{repetition (month)}] \)

In \( I_{9} \), the range between 0 to 1, 1 point, 1 to 4, 2 points, 4 to 8, 3 points, 8 to 12, 4 and greater than or equal to 12, 5 points.

Leisure index = \( (I_{13} + I_{14} + I_{15} + I_{16}) ÷ 4 \)
Physical activity = Work index + Sport index + leisure index

BMI = height$^2$ (m)$^2$ / weight (kg) was used to measure body mass index. This formula has a correlation coefficient over 69% with the body density.

**Table 1:** Pregnancy weight gain guidelines.

<table>
<thead>
<tr>
<th>Pre-pregnancy body mass index (BMI)</th>
<th>BMI category</th>
<th>Recommended total weight gain in pounds for pregnancies</th>
<th>Recommended total weight gain in kilograms for pregnancies</th>
<th>Recommended total weight gain in stones for singleton pregnancies</th>
<th>Recommended total weight gain in kilograms for pregnancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 19.8</td>
<td>Underweight</td>
<td>15</td>
<td>7</td>
<td>1.1</td>
<td>26.8</td>
</tr>
<tr>
<td>19.8-26.0</td>
<td>Healthy</td>
<td>15-25</td>
<td>7-11</td>
<td>1.1-1.8</td>
<td>26.80-37</td>
</tr>
<tr>
<td>26.1-29.0</td>
<td>Overweight</td>
<td>25-35</td>
<td>11-16</td>
<td>1.8-2.5</td>
<td>37.10-45</td>
</tr>
<tr>
<td>More than 29.0</td>
<td>Obese</td>
<td>28-40</td>
<td>13-18</td>
<td>2.0-2.9</td>
<td>More than 45.1</td>
</tr>
</tbody>
</table>

Source: Adapted from the Institute of Medicine (1990) guidelines for total weight gain during pregnancy in:


For statistical analysis was used SPSS software and independent T-test statistical method. All statistical operations was performed in confidence distance = 95% and alpha = 5%.

Note the amount of sport, work and leisure during pregnancy is one of the important factors influencing the test results, which can affect the accuracy of results.

**Findings:**

**Table 2:** Mean of weight, height, age, body mass index and level of physical activity in women with and without miscarriage experiences.

<table>
<thead>
<tr>
<th>Row</th>
<th>Variable</th>
<th>Mean</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With miscarriage experiences</td>
<td>Without miscarriage experiences</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Weight (kg)</td>
<td>67.61± 11.74</td>
<td>62.50± 3.87</td>
</tr>
<tr>
<td>2</td>
<td>Height (m)</td>
<td>1.60± 0.06</td>
<td>1.60± 0.06</td>
</tr>
<tr>
<td>3</td>
<td>Age (year)</td>
<td>31.62± 5.59</td>
<td>43.75± 10.46</td>
</tr>
<tr>
<td>4</td>
<td>Body mass index</td>
<td>25.83± 4.29</td>
<td>24.46± 0.49</td>
</tr>
<tr>
<td>5</td>
<td>Level of physical activity</td>
<td>8.28± 1.10</td>
<td>12.03± 0.40</td>
</tr>
</tbody>
</table>

**Table 3:** Comparison of body mass index in women with and without miscarriage experiences.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>BMI</th>
<th>Mean deviation</th>
<th>Sig</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>With miscarriage experiences</td>
<td>25.83± 4.29</td>
<td>1.36</td>
<td>0.02*</td>
<td>2.27</td>
</tr>
<tr>
<td>Without miscarriage experiences</td>
<td>24.46± 0.49</td>
<td>0.05*</td>
<td></td>
<td>2.27</td>
</tr>
</tbody>
</table>

Fig. 1: body mass index in women with and without miscarriage experiences.
Table 4: Comparison of physical activity in women with and without miscarriage experiences.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Physical activity Mean deviation</th>
<th>Sig</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>With miscarriage experiences</td>
<td>8.28± 1.10</td>
<td>-3.74</td>
<td>0.000*</td>
</tr>
<tr>
<td>Without miscarriage experiences</td>
<td>12.03± 0.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P<0.05*

Fig. 2: physical activity in women with and without miscarriage experiences.

Discussion:

The results of this study show that, there were significant differences in body mass index between women with and without miscarriage experiences, (P <0.05). The mean of body mass index in women with miscarriage experiences was 25.83 ± 4.29 and in women without miscarriage experiences was 24.46 ± 0.49 (during pregnancy). According Wells and Murray guidelines (2003) for total weight gain during pregnancy women with miscarriage experiences had more weight than women without experiences. BMI category in women with miscarriage experiences tend to overweight (BMI ≥30). Strafford, Mottl, Savla, Soodoo and Borgatta (2009) compared the miscarriage for obese women and non obese women. 861 women with BMI less than 30 and 341 women with BMI greater than 30 were investigated. The results of this study showed that the risk of miscarriage in obese and non obese women is 5% and 6%, respectively (P = .72) that correspondent with current study.

According to Farshchi investigation (2010) obesity and overweight are important factors for miscarriage. Researchers in Royan Institute (Ahmadi, 2008) showed that inactive life style and incorrect nutrition regimen are essential factors for overweight and obesity. Reproduction organism is one of the organelles that affected in due to obesity. Studies showed (Farshchi, 2010; Ahmadi, 2008) that obesity in women induct to female hormone abnormality increase infertility and risk of miscarriage. In women that start pregnancy with obesity, the risk of miscarriage and pregnancy hypertension is increasing. Probability of infertility in the women suffering from overweight and obesity is low, but it is essential that, obesity is one of the important risk factors for miscarriage after fertility. With prevalence the obesity in young ages, the number of women that suffering from obesity during pregnancy are increasing. Results of studies show that risk of miscarriage in obese women is 67 percent more than women with desirable weight. It is note that, obese women start losing overweight after gestation, because nutrition has a vital role for health of mother and fetus. It is note that the women should be have a regular nutrition regimen during pregnancy and should avoid to consume too much high-calorie foods. American Medical Association (AMA) urges physicians to assess obese women before the pregnancy for overweight and obesity during routine medical examinations and discuss with at-risk patients the health consequences of further weight gain. If treatment is indicated, physicians should encourage and facilitate weight maintenance or reduction efforts in their patients and refer them to a physician with a special interest and expertise in the clinical management of obesity (Artal and Catanzaro et al., 2007).
There is considerable relationship between the epidemiology of preeclampsia, essential hypertension and risk factor of heart diseases such as obesity. Obesity, sedentary lifestyle, diabetes experiences, familial history of essential hypertension women with a preeclampsia experience have increased risk of developing essential hypertension in the years following such pregnancies (Marcoux and Berube et al., 1999; Saftlas and Logsden et al., 2001; He and Bazzano, 2000; Mayer and Agostino et al., 1998). Potential intermediate effects include reduced blood pressure, decreased concentrations of pro-inflammatory cytokines and leptin in peripheral circulation, reduced oxidative stress, and improved plasma lipid and lipoprotein concentrations.

As mentioned previously, polycystic ovary syndrome is also resulting of obesity in women (Ahmadi, 2008) in the women with polycystic ovary syndrome risk of miscarriage is increasing and well-balanced and weight-control methods are main treatment for polycystic ovary syndrome. It is assumed that, women who don’t have polycystic syndrome are lower at risk of miscarriage.

Results of current study showed that there is significant difference between women with and without miscarriage experiences in physical activity (P<0.05). This show that women without miscarriage experiences are active than women with miscarriage experiences in pregnancy period. Result of current study is correspondent with Schlussel, De Souza, Reichenheim and Kac (2008) regardless of methods. These researchers showed that physical activity has a supporting role in pregnancy and gestation.

In current study, women with and without miscarriage experiences didn’t have underweight (BMI<18.5). Women with inadequate weight gain were also more likely to deliver low birth weight infants than women achieving the recommended weight gains. Wells and Murray (2003) also undertook an analysis of birth certification data in Colorado and found that 23% of women gained weight below the recommended ranges. It has also been suggested that attempts to lose weight, fasting diets, or self-reported eating disorders and a low intake of dietary folate during pregnancy, particularly in the first three months, may be associated with an increased risk of delivering a child with neural tube defects (NTDs) (Micali and Simonoff, 2007). The fact that dieting behaviors were most strongly associated with NTDs in the first three months of pregnancy rather than before pregnancy suggests that dieting during this time may impede fetal development (Olson and Strawderman et al., 2003). This theory is further supported by research undertaken by Sekiya and colleagues (2007), which studied the effects of weight gain in each of the three trimesters of pregnancy in relation to birth weight and length of pregnancy. The results of the investigation showed that weight gain in the second trimester was positively associated with both birth weight and length of pregnancy (Sekiya and Anai et al., 2007). Therefore, it seems that an inadequate weight gain during the second trimester may be a strong risk factor for low birth weights and premature infant deliveries. Regular exercise program, before pregnancy, can decrease intensity of lumbosacral syndrome. Unfortunately, occurring back ache during pregnancy means that we must to be waiting for intense back ache in next pregnancy (Kennedy and Marquette et al., 2011).

Obesity in pregnancy periods in addition to negative effects on muscle skeletal structure result in cardiovascular diseases such as hyperlipidamia. Using of sub maximal and light training that don’t decrease weight significantly, is advised in periods. Jogging, cycling and swimming are advertised for most of pregnant women 20-45 minutes in day and 3-5 times per week. Women should exercise, mild to moderate and avoid of tedious exercises. Women must to note that, every physical activity is better than of inactive life style, even 10 minutes walking before lunch. It is reminder that, you must to announce every pain in lumbar and abdominal regions to your physician (Bertagnoli, 2012).
Physical activity can be evaluated of sport index, work index and leisure index (Arvidsson and Slinde et al., 2005). Quality of work at home or work place (sitting, standing or walking), crying furniture at home, amount of exhaustion and evaporation are effective in work index. Intensity, duration and repetition are effective in sport index and quality of using leisure time (watching TV, walking and swimming) is important in leisure index (Arvidsson and Slinde et al., 2005). Women without history of miscarriage had high score in all of above index than women with history of miscarriage. Providing the best and optimal blood circulation for gain of foodstuff, rejection of excessive and dangerous matters and regulation of body temperature are important factor in health of women and fetus, specially, in first 3 month. Normal accordance in second half of pregnancy, including of increase the Insulin resistance, can gain in health with physical activity. We will gain this important object, with doing regular physical activity and correct foodstuff regiment. Regular physical activity result in reduction of poisoning pregnancy that is accompany with general body swelling, rapid overweight, hypertension and rejection of urinary protein. All above mentioned are important risk factors for miscarriage (Kramer, 2002; Paisley and Price, 2003; Thomson, 2012).

In collection and resulting of 11 studies (Kramer, 2002; Paisley and Price, 2003; Thomson, 2012) in 472 pregnant women, showed that regular and sufficient physical activity affected in health and physical fitness of mother and fetus. Risk factor such as: inactive life style, obesity and insufficient nutrition regiment have undesirable effect on mother and fetus, even result in miscarriage. These results, regardless to methods are correspondent with current study.

Kramer (2002) and Paisley (2003) in Obstetric and gestation collage of USA in 1985 described that heart rate (HR) shouldn’t excessive of 140 (per minute) in women during pregnancy. This college in 1994 described that pregnant women shouldn’t participate in exhaustive training and cut down or finish exercise by feeling fatigue. In 2002 this college advertised that pregnant women must to participate in light to moderate exercises and they were avoided to participate severe and competitive exercise and sport. Mothers should be aware of consequences for more than 45 minutes exercise before training program. Exercise should be considered in the environment that is neutral in temperature (neither cool nor warm). In physical activity for pregnant women, should be established the balance between energy consumption and production (Kennedy and Marquette et al., 2011). Environment must to consider for sports so that every 30 minutes of exercise 5/1 ° C increase in body temperature (Artal and Gavard, 2007). Artal and Gavard (2007) in Prevention and Control Colleges of U.S.A suggested that pregnant women who maintain and enhance your physical health can exercise 60 minutes per session. Above college has expressed that aim of exercise is health and also it has been recommended 30 minutes exercise for pregnant patients who have a medical problem (Artal and Gavard, 2007). Pregnant women that before pregnancy had no mobility, intensity of exercise must gradually increase to 30 minutes gradually and should not develop sports activities during pregnancy. We should consider general exercise for them (Artal and Gavard, 2007). Pregnant women should not do recreational activities that they are in danger of falling or abdominal lesions. Participate in recreational activities such as ice hockey, soccer and basketball can bring serious damage to the mother and fetus (Artal and Gavard, 2007). During pregnancy should be avoided of diving because the fetus is at risk of reducing air pressure. Studies (Artal and Gavard, 2007) showed activity in the highlands (mountains) and the altitude lower of 2500 m, is dangerous for fetus. In these conditions, women can use of light activities such as stretching, but do not use of vigorous activity in any way. Water sports other than swimming and diving at depths don’t have any bad effect on the fetus and mother (Artal and Gavard, 2007).

Pregnant women should use relaxation methods in exercise program and they should be careful their body temperature doesn’t increase, because it disturbs fetus growth. During exercise particular care should be done in the field of preterm labor, it is because the hormonal response to exercise and secretion of catecholamines (adrenaline and nor adrenaline) Physical activity should be advised as sub maximal aerobic exercise and it can be prevented diversion of oxygen to the tissues far of the fetus. Mild increase in heart rate during pregnancy is beneficial for the health of both mother and fetus (140 beats per minute). Bleeding in the first four months of pregnancy, and mothers with cardiopulmonary disease should avoid exercise (Kramer, 2002; Paisley and Price, 2003; Thomson, 2012). Exercise prescription requires knowledge of the potential risks and assessment of the physical ability to engage in various activities. Given the potential risks, albeit rare, thorough clinical evaluation of each pregnant woman should be conducted before an exercise program is recommended. Routine prenatal care, as advocated in ACOG publications, is sufficient for monitoring the exercise program (Artal and Gavard, 2007). With the following symptoms should stop exercise at any intensity: vaginal bleeding, respiratory problems before or during exercise, lethargy, and asthenia, headache, chest pain, muscle weakness, decreased fetal movements and any vaginal discharge (Kramer, 2002; Paisley and Price, 2003; Thomson, 2012).

Pregnancy should not be a state of confinement, and pregnant women with uncomplicated pregnancies should be encouraged to continue and engage in physical activities. Recreational and competitive athletes with uncomplicated pregnancies may remain active during pregnancy, and modify their usual exercise routines as indicated in this study. All active pregnant women should be examined periodically to assess the effects of their exercise program on the developing fetus, so that adjustments can be made if necessary. Women with
medical or obstetric complications should be carefully evaluated before recommendations on physical activity participation during pregnancy are made. Despite the fact that pregnancy is associated with profound anatomical and physiological changes, exercise has minimal risks and confirmed benefits for most women.

Therefore obese women that are susceptible to diseases such as diabetes, pregnancy hypertension, high cholesterol and polycystic syndrome (factors affecting miscarriage), with performing light and moderate physical activity (heart rate under 140 beats per minute), such as walking, middle to moderate running, recreational sport such as swimming, cycling and avoidance of competitive and impact sports, can reduce risk factors for miscarriage. Physical activity (working in work place or home, sport and any activity in leisure times) can reinforce rectus, transverse, internal and external abdominal muscles and prevent of anterior tilt of pelvic, thus it is important factor to stable fetus and embryo and prevent miscarriage and pregnancy diseases, respectively. Obese women should reduce their weight before pregnancy and should consult with physician for any physical activity and diet, before, during and after pregnancy.

References


