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NUTRITION AND PHYSICAL ACTIVITY FOR PREGNANT WOMEN

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ABSTRACT

Recent estimates have shown a 30% increase in obesity prevalence among women, with 14% of women aged 15-19 years, 25% of those aged 20-30 years, and 28% of those aged 31-50 years obese. In pregnancy, good nutrition is particularly necessary, to maintain maternal and child health. Recommendations about what to eat and what to avoid eating and drinking during pregnancy have become increasingly extensive in recent decades. Food and Nutrition Guidelines, including guidelines for physical activity. They contain recommendations focused on the daily intake of the four major food groups: vegetables and fruit; bread and cereals; milk and milk products; and lean meat, meat alternatives, and eggs. Little is known about the dietary intake of pregnant women in Iraq, and where they get their information about diet and nutrition.

KEYWORDS: Nutrition, physical activity, pregnant women.

INTRODUCTION

Earlier studies conducted in Iraq have generally generated evidence that women in low-income countries have a high physical workload that is sustained during pregnancy. This high physical workload was believed to contribute to the high incidence of low birth weight. However, there are only a few published studies on physical activity among pregnant women in low-income countries, and most have based on questionnaires.[1]

There is ample and consistent evidence that promoting physical activity in women of reproductive age may be a promising approach for the prevention of excessive weight gain, gestational diabetes mellitus and subsequent complications suffered by children born from pregnancies affected by gestational diabetes mellitus.[2] At least 30 min of moderate activity

or 8000 steps/day equivalent to approximately 7.5 MET-h/wk is recommended for beneficial results.[3]

In a meta-analysis conducted by Dugas et al. (2011) it was suggested that women from developing countries perform similar amounts of physical activity as women from developed countries when assessed by doubled labeled water raising questions about actual physical workload. However, these data provide no insight into the patterns of physical activity. Thus, there is a need for more studies with objective methods for assessing physical activity among pregnant women.

Historically, pregnancy was regarded as a state of confinement. More recently, however, research has demonstrated many potential health benefits of aerobic and strength-conditioning exercise in pregnancy and the postpartum period. It is now considered safe, and even advisable, for otherwise healthy pregnant women to initiate or continue an active lifestyle during pregnancy.

Many anatomical and physiological changes take place during pregnancy and while there is no evidence to suggest that exercise in pregnancy is associated with any maternal or fetal adverse outcomes, it is prudent to adjust exercise regimes where necessary to avoid potential harm. Contact sports, as well as sports associated with a risk of falling, should be avoided. Brisk walking, stationary cycling, and swimming are examples of aerobic exercises that are recommended in pregnancy.[4]

It is advisable for all pregnant women wishing to pursue exercise in pregnancy to be screened for contraindications and risk factors, for subsequent recommendations to be made on an individual basis. It is useful to classify pregnant women into a sedentary, recreational and competitive athlete, as this will help guide the intensity of exercise. All women should be aware of warning symptoms that may develop during physical activity, and advised to stop the exercise and seek medical advice should they occur.

Exercise forms only one component of a healthy lifestyle. A nutritious diet, adequate hydration, and abstinence from smoking, alcohol and illicit drugs are crucial in maintaining optimal health during pregnancy. Lack of exercise during pregnancy might result in loss of muscular and cardiovascular fitness, excessive maternal weight gain with a raised risk of GDM, varicose veins, dyspnea, lower back pain, and poor psychological adjustment. An

initial approach to becoming more physically active could be to encourage women to incorporate unstructured physical activity into daily living, both before and during pregnancy. Giving women an appropriate exercise prescription can encourage them to participate in physical activity.[5]

BACKGROUND

The benefits of physical activity during pregnancy It is well known that regular physical activity can help to reduce the risk of:

Obesity

Type 2 diabetes

High blood pressure

Heart disease

Some Cancers

Osteoarthritis

Depression

This remains the case when pregnant. Additional benefits during pregnancy can include Improved state of fitness during pregnancy.

Reduction in common pregnancy complaints such as varicose veins, swelling in the legs and feet, lower back pain and fatigue, Reduction in risk of developing gestational diabetes and pre-eclampsia. There is also some evidence to suggest that women who exercise during pregnancy have shorter labors and fewer delivery complications than those who do not. If you had low levels of activity before pregnancy, begin with 15 minutes of continuous aerobic exercise, three times a week, and gradually increase this to 30-minute sessions four times a week or more. If you were very active and fit before pregnancy then you should be able to continue with your programme of activity, within reason, but should expect your fitness and activity levels to decrease as your pregnancy progresses.[6]

The changes body goes through whilst pregnant means must be more cautious with some activities and avoid others altogether. Steer clear of contact sports to reduce the risk of your bump being hit. You will need to avoid scuba diving too as the change in pressure may not be good for your baby. You should also avoid exercising at altitude (over 2500 meters) until you have acclimatized which may take a few days.

You may also wish to avoid sports such as horse-riding, skiing, ice hockey, cycling and gymnastics as losing your balance whilst taking part in these sports could hurt your baby.

You may notice that your joints become more flexible. This is because of hormonal changes and may make you at increased risk of injury. To reduce the risk, make sure you do warm up and cool down exercises, and avoid sudden changes of direction when exercising. Do speak to your doctor or midwife if you are concerned.

The need for effective nutrition and physical activity programming is evident with alarming childhood obesity levels. About 17% of all children and adolescents in the United States are obese—triple the rate from just 1 generation ago. Illinois rates are especially worrisome with nearly 1 in 3 low-income preschoolers (2-5 years old) reportedly overweight or obese. Obese children are more likely to remain obese into adolescence and adulthood with a heightened risk of cardiovascular disease, diabetes, cancer, and other chronic conditions.[7]

BACKGROUND

Physical Activity and Pregnancy

Physical activity during pregnancy has many positive effects on the mother as it reduces the risk of excessive weight gain, gestational diabetes, preeclampsia, premature birth, varicose veins and deep vein thrombosis, and lower back pain.[8] It also reduces the duration of labor and complications at childbirth, fatigue, stress, anxiety, and depression, leading to an improved sense of wellbeing. The potential benefits for the fetus can be summarized as follows: improvement of placental function with increased amniotic fluid, flow, and volume of the placenta, fetal vascular function, placental villous tissue, and speed growth, neuronal development and reduced percentage of fetal fat. All women should know how to safely exercise during pregnancy and in the postpartum period. Providing a woman with an adequate prescription of physical exercise can encourage her to take part in safe and effective activities throughout her pregnancy, in the absence of contraindications.[9]

Below it is possible to read the recommendations offered by the SOGC Clinical Practice Obstetrics Committee, the Executive and Council of SOGC, and the Board of Directors of the Canadian Society for Exercise Physiology and ACOG.

- Starting a physical activity program should be considered during the preconception phase, particularly by women who are overweight-obese and/or with other risk factors for gestational diabetes (previous gestational diabetes, first-trimester fasting hyperglycemia,

prior macrosomia, above 35 years of age, positive familiarity for diabetes, PCOS, high-risk ethnicity) in order to avoid excessive weight gain during pregnancy and prevent diabetes. (Level III, Strength B).[10]

- During pregnancy, all women without contraindications should be encouraged to do aerobic and strength exercises as part of a healthy lifestyle. (Level II, Strength B).
- 3.Women who are already physically active before pregnancy can maintain a satisfactory exercise level, without competitive activities, throughout their pregnancy, if the pregnancy does not show complications and the activity complies with safety criteria such as type, intensity, and frequency, without trying to reach peak fitness or train for an athletic competition. (Level II, Strength C).
- It is necessary to choose activities that minimize the risk of balance loss or fetal trauma. (Level III, Strength C).
- Women should be advised that physical activity does not increase the risk of maternal or fetal complications. (Level II, Strength.
- Performing pelvic floor exercises in the postpartum period can reduce the risk of future urinary incontinence. (Level II, Strength C).
- Women should be advised that moderate physical exercise during lactation does not affect the quality and quantity of breast milk or infant growth. (Level I, Strength A).[11]

Functional Adaptation during Pregnancy

Musculoskeletal adaptations

The physiological anatomical changes occurring during pregnancy may affect the musculoskeletal system both at rest and during exercise. The most obvious change is weight gain, which can intensify pressure on all the joints, especially the knees, causing discomfort for normal joints and damage increase in those previously unstable. It should be noted that weight gain and abdominal volume increase could cause lumbar lordosis and posture changes, putting women at risk of balance loss and falls. Finally, during gestation, it is observed an increased ligament laxity due to increased levels of estrogens and relaxin, which may predispose women to a higher risk of tearing and sprain. Although there is no evidence of an increased musculoskeletal injury during pregnancy, this possibility must be considered when prescribing physical exercise.[12]

Cardiovascular adaptations

Pregnancy leads to important cardiovascular changes: increased blood volume, heart rate, and stroke volume, and decreased systemic vascular resistance. During the mid-trimester, the cardiac output increases by 30-50% compared to the non-gestational state. Most studies show that blood volume increases by 10% by the end of the first quarter, while the heart rate increases by 20% during the second third quarter.[13] Mean blood pressure decreases by 5-10 mmHg by the middle of the second quarter and then gradually increases again returning to pregestational levels. The decrease in mean arterial pressure is due to an increase in uterus vascularization, uterine-placental circulation, and a decrease of vascular resistance mainly cutaneous and renal[14]

Moreover, after the first trimester, the supine position determines a related obstruction of venous return with reduced cardiac output, and it should, therefore, be avoided as much as possible both during rest and physical exercise. The orthostatic position without movement should be avoided as well, as it can lead to a significant decrease in cardiac output. These hemodynamic changes aim at obtaining a useful circulatory reserve to provide nutrients and oxygen to both mother and fetus, at rest and during a moderate (but not intense) physical activity.[15]

Respiratory adaptations

Pregnancy is associated with significant respiratory changes: 50% increase in ventilation and arterial oxygen tension, especially in the first quarter, the rise in the oxygen uptake and its consumption baseline. During pregnancy, the availability of oxygen necessary to perform aerobic exercise decreases due to a larger oxygen requirement at rest and increased breathing, which is caused by the pressure on the diaphragm due to uterine enlargement.[16]

Thermoregulation

During pregnancy, basal metabolism and heat production is increased. The fetal temperature is usually 1° C higher than the maternal one. The excess heat dissipation generated during physical exercise can pose a problem, given that some studies suggest that hyperthermia (body temperature > 39° C) during the first 45-60 days of gestation may be teratogenic in humans. During exercise, the body temperature increase is directly related to the exercise intensity itself, rising by an average of 1.5° C during the first 30 minutes. If the exercise is prolonged for another 30 minutes, then the body temperature reaches a plateau.[17]

A constant ratio between production and heat dissipation is usually guaranteed by an increase in heat conductance from the center to the periphery, through the cardiovascular system, and cooling through sweating. However, if the heat production exceeds the capacity of dissipation, for example during exercise in warm, humid conditions or a very high-intensity exercise is being performed, the temperature may further rise. Physical exercise should be preferably performed in a thermoneutral environment or under controlled conditions (such as air conditioning). (Level VI, Strength C) Furthermore, proper hydration must be maintained, since the fluid loss through sweating can affect heat dissipation during prolonged exercise. In the following section, we review the literature and make concrete suggestions regarding areas of prevention of gestational diabetes mellitus (GDM) in the general female population, treatment and/or prevention of GDM in gestation and prescription of exercise in pregnancy, with specific attention to type, intensity, and volume.[18]

Treatment

Physical exercise is highly recommended to the broad population before and during pregnancy, and to women suffering from gestational diabetes and to populations at risk for GDM. Both aerobic and strength exercise can determine higher insulin sensitivity, increased glucose uptake, smaller weight gain, delayed start of insulin therapy, a reduced amount of administered insulin, and it also improves cardio-respiratory fitness (Level III B) in women with GDM.

However, any kind of physical activity is not always sufficient to ensure proper metabolic control; thus, it is necessary to use insulin therapy to manage maternal hyperglycemia. One of the intervention studies (RCT) has shown that regular physical activity during pregnancy can improve other outcomes, such as 58% risk reduction of having an infant with macrosomia and 34% risk reduction of having a preterm delivery (Level I, Strength A).[19]

Exercise Training Prescription

In the beginning, we can encourage women to become more physically active by performing unstructured physical activity into daily living before and during gestation. This would be considered as a fitness starting point from which to progress towards the prescription of physical exercise, if there are no other contraindications,[20] The prescription should take into account type, intensity, frequency, duration and progression as shown in the tables 4 and 5 adapted from Colberg Type of exercise The majority of pregnant women with and without GDM can safely perform aerobic exercises of moderate/vigorous intensity. These include,

such as walking, running, dancing, strength machines and weightless body activities, such as cycling, different aquatic activities, exercises on the chair, hand-crank ergometer.[21]

The strength work is safe and effective when adapting the insulin (where necessary) and checking the hyperglycemia; weightlifting equipment exercises using progressive resistance elastic bands for arms, legs, abdomen, and back. The exercise must be tailored to each woman's physical condition with mild to moderate intensity. The most recent guidelines suggest adding a slight strength activity to routine physical activity.[22] Activities with a high risk of falling (horse riding, downhill skiing, etc.) or abdominal trauma should be discouraged. Sports with high potential for physical contact (such as ice hockey, football, and basketball) can cause severe trauma to both mother and fetus and should, therefore, be discouraged. Diving should be avoided during pregnancy because the fetus is at risk of decompression sickness. Caution should be observed in practicing physical exercise at high altitude (>2500 m). (Level VI, Strength C).

Intensity

Healthy women, who are already physically active during pregnancy and postpartum, are recommended to continue with a moderate-intensity aerobic activity (3-6 Mets, 40-50% Heart Rate Reserve (HRR) 4-6 of Borg CR10 Scale, Talk Test). A woman who is not physically active before pregnancy can start with 30% (HRR) and progress to a moderate level, using a heart rate monitor is helpful to control this variable.[23]

The "Talk test" is a simple system, alternative or complementary to the previous tests used to evaluate the adequacy of exercise intensity. If a woman is able to maintain a conversation while exercising, the intensity of the physical activity is adequate. Intensity should be reduced whenever the conversation is not possible. (Level VI, Strength C) The Borg scale is used to assess the INTENSITY of different training sessions, it represents the SUBJECTIVE assessment INDEX and perception of FATIGUE.[24]

Frequency

Existing guidelines, encourage physical activity throughout gestation, involving both aerobic and strength work during most, if not all, days; this also applies to women with GDM. Daily physical exercise improves glucose metabolism. The increased muscular sensitivity, due to the insulin, lasts for about 24 hours after exercising. It is, therefore, suggested that the

recommended frequency for any kind of physical activity in women suffering from GDM is from three to seven days a week.[25]

Duration

Pregnant women without medical and/or obstetrical complications should allocate at least 150 minutes per week to physical activities. Aerobic exercise should last for a minimum of 15 minutes per session, 3 times a week, and it should be gradually increased during the second quarter up to about 30 minutes per session, 4 times a week. (Level VI, Strength C) Aerobic activity should be preceded by a short warm-up (10-15 min) and followed by a short cooldown phase (10-15 min), including stretching and relaxation exercises (Level VI, Strength C).[26]

Progression

Sedentary women with GDM or non-insulin-treated type 2 diabetes should begin with low intensity (30%-39% HRR) and gradually progress to moderate intensity (40%-59% HRR) if there are no obstetrical contraindications. In the beginning, it is recommended to increase activity frequency and duration rather than its intensity. Women, who were active before and during pregnancy, should continue to engage in moderate to vigorous intensity after being diagnosed with GDM if there are no obstetrical contraindications. It is advised to continue physical exercises in the postpartum period. Physical activity increases cardio-respiratory fitness and improves mood without any negative effects on maternal milk volume and composition (Level I, Strength A). Soon after delivery, pelvic floor exercises can reduce the risk of future urinary incontinence (Level I, Strength C). Continuing physical activity after the pregnancy helps women in achieving and maintaining an ideal weight when combined with caloric restriction. (Level I, Strength A) This strategy can prevent and/or delay diabetes onset in women who previously suffered from gestational diabetes. (Level I, Strength B).[27]

RESULT AND DISCUSSION

Nutrition during pregnancy

Within Growing Up, dietary data were gathered using a semi-quantitative, forty-four item food frequency questionnaire (FFQ). This was administered during face-to-face interviews in the final trimester of pregnancy. The FFQ data allowed a description of the frequency of foods consumed within the four main food groups, and therefore enabled comparisons with the recommendations of the Ministry of Health Food and Nutrition Guidelines.

The daily number of servings consumed by pregnant women for each food group. Almost all (99%) of the pregnant women consumed pieces of bread and cereals on a daily basis. Milk or milk products were also consumed on a daily basis by almost all of the pregnant women (96%). Approximately one in five women consumed 1, 2 or 3 servings of vegetables per day during pregnancy and one in four women consumed 4 or more servings of vegetables per day. Approximately 40% of the pregnant women consumed 4 or more servings of fruit per day, with a further 20% consuming 3 servings of fruit per day.[28]

Most (72%) Iraqi pregnant women also consumed servings of lean meat, meat alternatives or eggs at least once daily. Approximately 28% of women consumed servings of lean meat, meat alternatives or eggs less than once per day.

pregnant women have a revealed that 37% respondents had knowledge of pelvic floor exercise, muscle strengthening exercise 51.3%, back care exercise 51.3% and relaxation and breathing exercise 59.8% as types of antenatal exercise in pregnancy. These findings underscore the importance of education to promote other forms of exercise that can be done without cost in these resources limited setting to promote wellbeing.

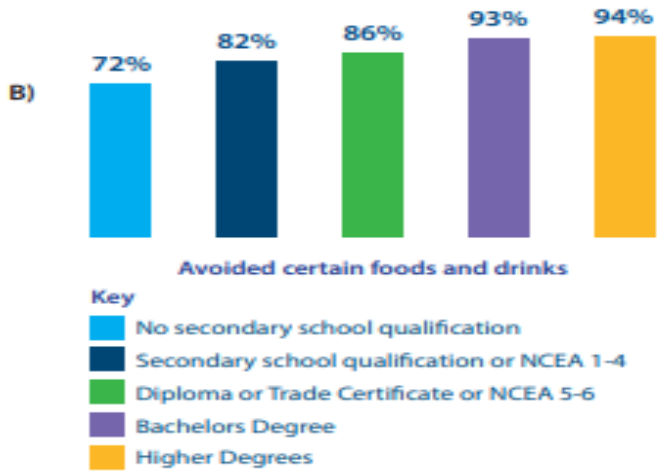

Figure 1: Avoidance of specific foods during pregnancy.

Evidence regarding the most common source of information about nutrition in pregnancy is important to consider when designing programmes to target early nutrition, and when evaluating the effectiveness of existing Food and Nutrition campaigns. Nearly 72% of all the pregnant women within the Growing Up in the study reported that they had changed their diet specifically because of information they had received during or around the time of their pregnancy.

The most common source for dietary information (for three-quarters of women) was their midwife. Other frequently cited sources of dietary information were family doctors (GPs), printed media, and friends and family.

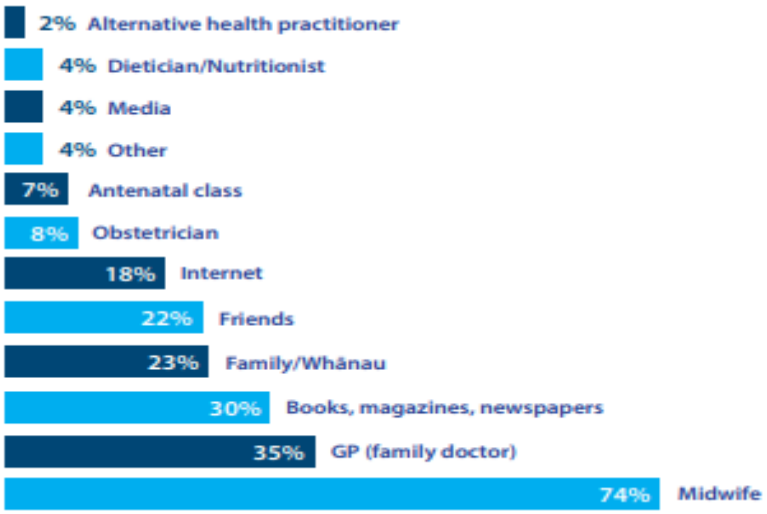

Figure 2: Sources of nutrition information for pregnant women.

This gives health care providers an opportunity to utilize exercise as adjunctive therapy to many health conditions, including gestational diabetes. However, safety issues need to be observed to ensure that optimum benefits are reaped from the exercise.[29]

In a survey conducted by Adeniyi et al. (2014) to assess physical activity and energy expenditure pregnant women, about half [222(49.0%)], of the participants were classified as sedentary based on their performance on the Pregnancy Physical Activity Questionnaire (PPAQ). Those who presented a moderate physical activity level were 46 (10.2%) while 40.8% presented within light physical activity level. None of the women could be classified as having vigorous physical activity level. Women expended energy in all the physical activity domains including household, occupational and sports activities through the highest amount of energy in this study was expended on household activities.

Household activities consistently emerged as the major. The level of physical activity reported in the studies from Africa was low. However, women in low-income countries are generally considered to have a high physical workload that is sustained throughout pregnancy. There are a few published studies on physical activity among pregnant women in low-income countries and most are based on questionnaires. In a meta-analysis of doubly labeled water studies conducted by Dugas et al. (2011) to assess energy expenditure in adults

living in developing compared with industrialized countries findings revealed that women from developing countries have similar physical activity levels to those from developed countries.

It could, therefore, be a misconception that women from developing countries have high levels of physical activity considering that physical activity in the studies was measured using the most objective method. Low levels of physical activity have also been reported in the developed world. A study conducted in the United States reported that only 15% of women engaged in physical activity at the recommended level.

In another study done on health Irish pregnant women, only 21.55 women met the current recommendations for exercise in pregnancy.

Physical activity tended to decrease as the pregnancy progressed in the African studies reviewed. The risk of being sedentary increase with advancing pregnancy probably because most women are careful to avoid injuries to themselves and the unborn baby and that there is a general distortion of body frame with a backward sway that makes it difficult to perform physical activity.[30] Even studies conducted in developed countries have reported a declining physical activity level with advancing pregnancy.[31]

These findings might mean that low levels of physical activity are prevalent in both developing countries and there is a need to promote physical activity even in developing countries.

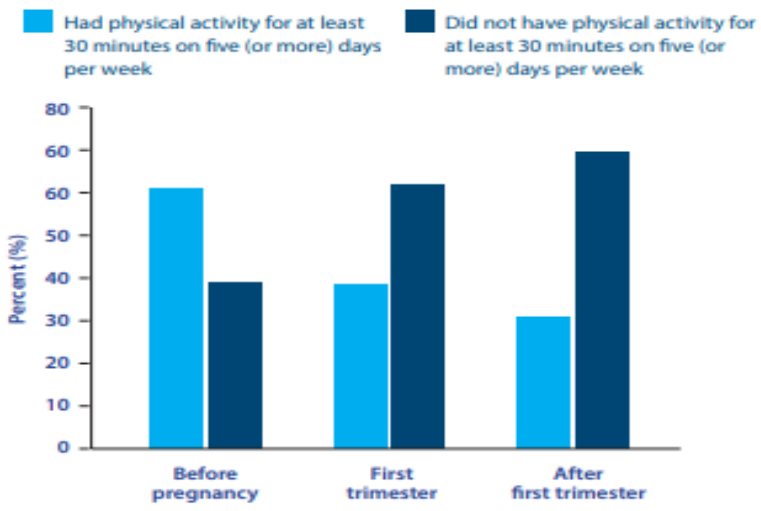

Figure 3: Physical activity levels before and during pregnancy.

CONCLUSION

Recommendations for physical activity in pregnancy Women with no medical or obstetric complications should be encouraged to participate in aerobic and strength-conditioning training at moderate intensity on most or all days of the week. The goal should be to maintain a good fitness level throughout the pregnancy. Activities such as jogging and hiking that minimize the risk of loss of balance and fetal trauma should be encouraged.

However high-risk activities such as contact and collision sports, vigorous racquet games, gymnastics and horseback riding among others should be avoided.

Women should be advised that exercise does not increase the incidence of adverse pregnancy and neonatal outcomes neither do moderate exercise during lactation affect the quantity or composition of breast milk or infant growth.

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