Review Article: Characterization of knee dysfunction, Knee surgery and related risk factors during pregnancy: systematic review

Ali Alahgholi[1], Ramesh Baradaran Bagheri[2]®

[1]Orthopaedics Surgen, Department of Orthopedics, School of Medicine, Shohada Medical Research & Training Hospital, Tabriz University of Medical Sciences, Tabriz, Iran. (Email: Alahgholi_ali@gmail.com/ ORCID: 0009-0003-1745-4298)

[2]Assistant Professor of Infertility & IVF, Department of Obstetrics and Gynecology, School of Medicine, Alborz University of Medical Sciences, Alborz, Iran. (Corresponding author / Email: R_Baradaran@yahoo.com- Orcid: 0000-0002-9853-6799)

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ABSTRACT

Introduction: The severity of the symptoms and the risk factors connected to them have not been described, but knee pain can be a common complaint during pregnancy. The purpose of this study was to identify knee-related dysfunction in a general obstetric population and to list risk factors. **Material and Methods:** In this systematic review, Patients in obstetric clinics completed the Pregnancy Physical Activity Questionnaire (PPAQ), a validated instrument to measure physical activity, as well as the International Knee Documentation Committee (IKDC) questionnaire to assess their knee function. To find independent associations with IKDC score and identify predictors of knee dysfunction, analyses of age, weeks of gestation, height, weight, and history of knee issues prior to pregnancy were performed. **Results:** A mean PPAQ score of 248 MET-h/wk, with a range of 40 to 805 MET-h/wk, was used to estimate physical activity in the study population. With no discernible differences between trimesters (7.3 percent, 6.3 percent, and 6.1 percent in the first, second, and third trimester groups, respectively), twenty (6.5 percent) women reported having a PPAQ greater than 500 MET-h/wk. Seventy-six (24%) of the women in this study reported a history of knee surgery, an injury, or other knee issue. **Conclusion:** A high level of activity, younger age, higher BMI, and a history of knee problems were all associated with severe knee dysfunction, which was reported by 26.1% of pregnant women. These findings might have consequences for pregnant women who want to stay active and fit during their training. Future research is advised to evaluate the need for intervention and to determine the best ways to prevent and treat symptoms in this population.

Corresponding Author: Ramesh Baradaran Bagheri (R_Baradaran@yahoo.com)

Introduction

One in four women who are pregnant report having musculoskeletal complaints, and these conditions can be widespread [1-3]. However, there is little information available on how to diagnose and treat these conditions. Thought to be multifactorial in nature, pregnancy-related knee pain has not yet been adequately described in terms of its severity and risk factor associations [4-6].

The development of knee pain can be influenced by a number of changes that occur during pregnancy . A biomechanical study has shown that the increased anterior mass and load on the trunk results in kinematic changes with increased joint moments at the knee, hip, pelvis, and trunk in the sagittal and coronal planes [7].

These changes are accompanied by changes in gait. Weight gain may be one of the main contributors, with a reported average increase during pregnancy of 0.29 kg per week in the lower trunk dot. Even though it's necessary for delivery, this can affect joint function if ongoing structural and biomechanical changes are present [8-10].

It has been found that the hormone relaxin, in particular, causes less collagen to be expressed and has also been linked to non-pregnancy-related knee injuries [11-13]. However, it is still unknown how hormone changes during pregnancy affect knee symptoms and when they occur. The kinematic and structural factors that affect the development of knee pain during pregnancy have been tried to quantify in numerous studies [14-16].

The goal of this study was to characterize the degree of knee-related dysfunction in a general obstetric population and describe risk factors associated with this condition. Very few clinical diagnostic and treatment pathways have been described with regard to knee pain during pregnancy [17-19].

Material and Methods

This study was a systematic review. The International Knee Documentation Committee (IKDC) score is a validated scale based on subjective assessment of knee symptoms and function. It is a self-reported 18-item questionnaire with a combination of yes/no questions, 5-point Likert scales, and 11-point numerical rating scales. This questionnaire addresses four areas: symptoms (seven questions), sports participation (one question), daily activities (nine questions), and current knee function (one question).

Total scores are a weighted sum with a range of 0 to 100. High levels of knee function are indicated by higher total scores. The IKDC assessment has been demonstrated to allow for comparison between multiple types of patients with various degrees and sources of knee symptoms. Patients were asked to complete the Pregnancy Physical Activity Questionnaire (PPAQ) to assess their level of physical activity.

Test-retest reliability states that a true "change in score" is reported to be 9.0 points. The PPAQ is a widely used, validated tool for evaluating pregnant women's physical activity. It is self-administered and contains 33 questions about time spent on various activities during the subject's current trimester, including household/caregiving, occupational, sports/exercise, transportation, and sedentary behaviors.

To determine the average weekly energy expenditure (MET-hours per week), the number of hours for each activity are multiplied by the metabolic equivalent of tasks (METs) used to measure activity intensity. Subjects were also asked to provide basic health-related data, such as their current age, weeks of pregnancy, height, and weight. The summation reflects total activity per week (sum of all intensity and type

scores). They were asked to list and describe any prior knee issues that they may have had.

Using the current self-reported height and weight, the body mass index (BMI) was calculated. With the aid of the Kruskal-Wallis test and a post-hoc Dunn test for multiple comparisons, the IKDC and PPAQ scores were calculated and compared based on age groups, trimesters, and individuals with and without a history of knee issues. Testing for significant and independent relationships between IKDC and PPAQ scores, age, and BMI was done using a univariate logistic regression analysis along with stepwise multiple regression. Both patients who have and do not have knee dysfunction, as determined by the IKDC score.

Results

The study group's average age was 30. At the time of completing the questionnaires, 68, 111, and 131 patients, respectively, were in their first, second, and third trimesters. Additionally, 77.5 percent of women in the first trimester, 77.0 percent (94/122) in the second, and 80.4 percent (135/168) in the third did not previously have any knee issues. IKDC scores varied from 84 to 88 across the entire study population. IKDC scores were 88 and 82 in the first, second, and third trimesters, respectively, with statistically significant drops between the first and second and first and third trimesters. IKDC scores were lowest in the youngest age group (18-24), when compared to the 25-34 and 35 and older age groups(Fig 1).

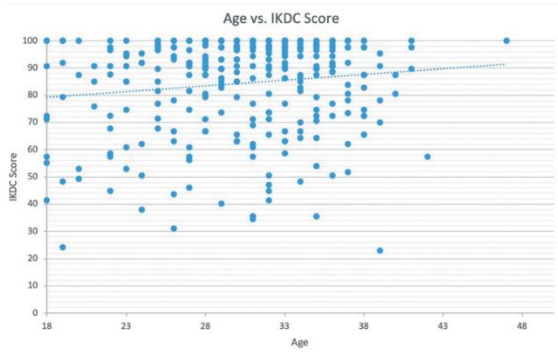

Figure 1: Age and IKDS Score results

A mean PPAQ score of 248 MET-h/wk, with a range of 40 to 805 MET-h/wk, was used to estimate physical activity in the study population. With no discernible differences between trimesters (7.3 percent, 6.3 percent, and 6.1 percent in the first, second, and third trimester groups, respectively), twenty (6.5 percent) women reported having a PPAQ greater than 500 MET-h/wk. Seventy-six (24%) of the women in this study reported a history of knee surgery, an injury, or other knee issues(Fig 2).

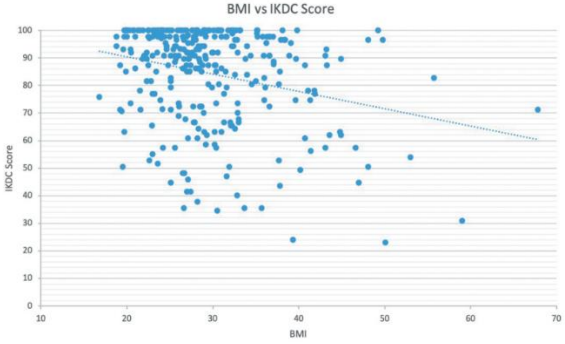

Figure 2: BMI vs IKDS Score results

Discussion

In our study, 26.1% of pregnant women had IKDC scores below 75, indicating a severe limitation in knee function [20-22]. The prevalence increased with gestation, rising from 13.2% in the first trimester to 33.6% in the third. Heckman and Sassard reported in a review of 126 postpartum patients that "virtually every woman had some degree of musculoskeletal discomfort" during pregnancy, and that as many as one in four had "at least temporarily disabling musculoskeletal symptoms of some type." Severe limitation was associated with high activity levels, a history of knee problems, age, and BMI [23-25].

Despite the fact that the current study was specifically concerned with knee symptoms, we discovered that the prevalence of knee dysfunction was comparable to what they reported. Our study also provides normative data that can be used as a guide for future research on knee function and pathology during pregnancy, as well as quantitative measurements of knee function based on severity. Kesikburn and others [26-28].

According to a prospective study of 184 pregnant women with a mean age of 30 point 9 years, in the third trimester, 86 point 8 percent, 29 point 9 percent, and 13 percent reported experiencing low back, hip, and knee pain, respectively [29-31]. This was based on interviews with these women, during which they were questioned about whether they experienced pain in specific body parts. However, the degree of pain, the type of symptoms, or joint-related function were not evaluated [32-34]. Through the use of validated functional scores and a description of the risk factors connected to them, the current study offers additional insight into the degree of pathology and affected joint function [35-37].

The study found that having a PPAQ score of 500 MET-h/week was one of the biggest risk factors for knee dysfunction [38-40]. The higher prevalence of knee dysfunction in this population emphasizes the need for improved diagnosis and management of these symptoms to support advised activity levels during pregnancy [41-43].

Although authors have discussed the connection between PPAQ and general health and quality of life, the link between activity and knee pain has not been investigated [44-46]. In one study of pregnant obese women, those who were classified as "exercisers" rather than "non-exercisers" based on PPAQ scores were less likely to experience symptoms like back pain. Knee pain was not specifically addressed by the authors [47-49].

According to a randomized controlled trial, pregnant women who engaged in 3 hours of vigorous exercise each week felt better about their physical stamina and overall health than those who did not, but once more, the presence of knee-related symptoms or function was not examined in this study [50-52]. The reason for the connection between increased activity and knee dysfunction in our study merits further research, as it has been shown in previous studies that increased activity is linked to fewer musculoskeletal symptoms [53-55]. Future research is required to determine the causal link between activity level and knee function as well as to pinpoint the precise aspects of activity that may be connected to the presence of symptoms youthful age, in particular [56-58].

Patients with a BMI of 33 kg/m2 or higher had lower KOOS scores than non-obese patients in the subscales of pain, activity of daily living, sport, and quality of life. After undergoing anterior cruciate ligament (ACL) reconstruction, patients with BMIs greater than 30 kg/m2 had worse knee function, according to an analysis of

IKDC scores. ACL injury on the opposite side or revision surgery were, however, less likely in people with higher BMI [59-61].

Further research is required to fully comprehend the temporal relationship between BMI, knee function, and activity levels in this context because BMI temporarily increases during pregnancy [62-64]. According to our research, women who admitted to having a previous knee issue during pregnancy were more likely to report lower knee functional scores. In the current study, it was not possible to determine whether the lower functional scores were caused by preexisting knee issues or whether pregnancy made them worse [65-67].

In earlier studies, it was mentioned that pregnancy could alter the symptoms of pre-existing musculoskeletal conditions. One illustration is rheumatoid arthritis, where two thirds of women with this diagnosis were said to experience less pain and joint swelling during and after delivery [68-70]. To the authors' knowledge, there are no reports in the literature that specifically address knee injuries or dysfunction [71].

Conclusion

A high level of activity, younger age, higher BMI, and a history of knee problems were all associated with severe knee dysfunction, which was reported by 26.1% of pregnant women. These findings might have consequences for pregnant women who want to stay active and fit during their training. Future research is advised to evaluate the need for intervention and to determine the best ways to prevent and treat symptoms in this population.

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