

Level of exercise and physical activity among pregnant women in Saudi Arabia: A systematic review

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ABSTRACT

The current study aimed to clarify the health benefits of physical activity on the mother and fetus in the Saudi women population. Besides, it is intended to provide recommendation based on the literature and results of studies from Saudi Arabia for exercise in pregnancy to improve the general health of women in Saudi Arabia. Prenatal physical exercise enhances physical and mental health of pregnant women. It can also reduce the risk of multiple pregnancy-related complications such as; lower back pain, fluid retention and risk of gestational diabetes. All these factors can affect fetal development and life later. Multiple studies showed that prenatal exercise could reduce the risk of fetal macrosomia with no effect on other perinatal or postnatal complications. The study followed the systematic literature review approach where it included multiple medical search Databases using PICOS eligibility criteria up to January 2019. The review was based on the following keywords: pregnancy, gestational, or prenatal) and (physical exercise, exercise, or physical activity. There are only two studies that dealt with physical exercises among Saudi women. The results indicated a relation between prenatal physical exercise on improving or decreasing risks on the mother and child during pregnancy.

Keywords: Exercise, physical activity, pregnancy, saudi arabia

Introduction

It is well established that physical exercise can improve the quality of life and prevent chronic diseases from progressing. Exercise during pregnancy can reduce the risk of lower back pain, fluid retention, gestational diabetes, venous thromboembolism and eclampsia.^[1-5] It also enhances tissue oxygenation, controls blood pressure and weight gain.^[4] It affects psychological stability and reduces the risk of postpartum depression.^[6,7] All these factors can affect fetal development and life later. Maternal overweight or obesity is associated with increased risk of neonatal complications. Such as high or low gestational age, intrauterine growth retardation and prematurity.^[8] Studies showed

that prenatal exercise could reduce the risk of fetal macrosomia with no effect on other perinatal or postnatal complications.^[9]

Since 1990, the American College of Obstetrician and Gynecologist recommended routine exercise for women with uncomplicated pregnancy.^[10] Despite that, less than 15% of women comply to the recommended physical activity per week, with most having concerns regarding exercise and fetal wellbeing.^[11-14,71] Those concerns might be related to controversy in the literature, as a direct relation between prenatal physical activity and perinatal and postnatal maternal, and fetal morbidity is not well established.^[15-18]

It can be stated that the postural changes associated with pregnancy can adversely affect the health of women and can result in various musculoskeletal issues and musculoskeletal dysfunction during the prenatal and postpartum periods unless proper care and treatment are offered to pregnant women. Many

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of the pregnancy related back pain theories stem from these postural variations which alter the equilibrium of pelvis and spine as pregnancy progresses through the third trimester.

During pregnancy, due to the rise in blood volume, increase in body weight and the growth of the fetus, women lean backward in order to maintain their body balance and as a result of which the spinal curve loses its genuine curvature. In their efforts to amend their pattern of walking to maintain stability they come across considerable foot changes or foot problems associated with pregnancy. Similarly, the low-back pain experienced by women during pregnancy also needs timely attention. Physical activities have been proved to be beneficial during pregnancy to manage various postural changes. An effective and efficient physical therapist can bring about solutions to most of the musculoskeletal problems through client centred treatment approaches. All these stress the need to have proper guided maternal exercises and physical activities during pregnancy and most of the adverse effects of postural changes associated with pregnancy can be eliminated through proper care, posture and exercises.

Considering the above-mentioned, the current study aims to systematically review and analyze all Saudi scientific papers related to physical activities and exercises within the period from 1980 to 2019. The focus has been on occupational activity related to women occupation or housework, and leisure activity; which involve health promotion exercise or simple leisure activity.

Materials and Methods

Search strategy

As part of a systematic review, the electronic databases, PUBMED/MEDLINE, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Scopus and Web of Science Core Collection, SPORTDiscus, ClinicalTrials.gov, were searched using the MeSH terms “pregnancy,” “gestational,” “or prenatal,” and “physical exercise,” “exercise,” “or physical activity”. The search was limited to original articles reporting randomized controlled trials or controlled clinical trials. These trials should report the effectiveness of physical activity interventions or lifestyle interventions that contain a physical activity component on one or more of the following outcomes: (1) Exercise self-efficacy, (2) Physical activity levels, (3) Depression, (4) Lumbopelvic pain, and/or (5) Gestational weight gain, among pregnant women. The review included all studies conducted in the Saudi context in the period between 1980 and 2019. Following the research ethical considerations, the researcher cited all references and applied a systematic referencing approach.

Inclusion and exclusion criteria

The selected studies focus on trials that report the extent of influence of the interventions between physical activities and lifestyle of

pregnant women such as Randomized Controlled Trials (RCT) or Controlled Clinical Trials (CCT). The studied interventions include a physical activity that appears in at least one output such as self-efficacy exercise, levels of physical exercises, depression, pain in lumbopelvic region and or gestational weight gain. The pregnant participants in these studies should be healthy, aged 18 or above, pregnant with a singleton fetus and free from any medical problem to practice pregnancy exercises. This review contains all the studies that meet with the criteria and are published between 1980 and 2019.

The criteria also include studies about pregnant women without absolute or relative contraindication to exercise (according to the SOGC / CSEP and the American College of Obstetricians and Gynecologists guidelines; see online supplementary materials for more details).^{1,2,20}

The excluded studies in this article are the ones that are non-English, case reports, Article reviews, or experimental articles, articles that do not fulfill the primary outcome of our study and articles involve pregnant women with contraindication for exercise.

Data extraction and summary

The category of the “design of the study” assesses the design whether it is of a randomized controlled design or if the methodology of randomization is sound. As for the “blinding”, it focuses on: if the assessors of the outcomes are blinded to the allocation of the group, and if the outcomes assessed were shown to the participants of the study. The “controlling selection bias” evaluates how much representation of the sample recruited for the study to the intended population. Besides, it evaluates the percentage of the possible participants who have agreed to be part of the intervention.

As for the category of “confounders”, it assesses the similarity between the participants’ baseline characteristics in the intervention and the control group. Also, it evaluates how much controlled are the confounders.

The “dropouts and withdrawals” category evaluates the percentage of the withdrawal among the participants in the reported intervention by which the interpretation of intervention effectiveness might be affected. The “data collection methods” category assesses how suitable, valid, and reliable are the instruments in collecting the data.

Each study was targeted to the global methodological quality rating and it was assigned according to every category as instructed. A “strong methodological quality rating” would be given to a study if none of the previously mentioned categories were rated as weak. A “moderate” methodological quality rating would be assigned to a study if one of the categories received a weak rating. A study gets a “weak” methodological quality rating if it has two or more categories assigned as “weak”. One author performed the appraisal and a second author verified the ratings independently.

Results

Table 1 presents the research strategy used to retrieve 2985 citations. A number of 1129 citations were selected to test their eligibility for inclusion after removing 1793 duplicates. 965 citations were removed such as those that were neither published in English language nor original in reporting CCT or RCT. Other citations were subjected to the eligibility test in which 198 out of 227 citations were excluded as they violated eligibility criteria, while 29 citations were reviewed as they met it.

Pain

The impacts of physical activity interventions were shown by ten involved studies on two pain measures including pain experience prevalence within the participants' sample and intensity of pain. In general, the studies provided irregular results for intervention impacts on intensity of pain, whereas, they regularly reported that intervention did not have a great effect on the participants who report their experience in lumbopelvic pain.^[29,45,47,59] For instance, the intensity of childbirth pain,^[58] lumbopelvic pain^[23] and lower back pain^[27,39,40] were among the significant between-group differences ($p \leq 0.017$) observed after the intervention. In contrast, the intervention did not affect these parameters significantly as the outcomes of other studies failed to show. Therefore, although physical activity interventions did not affect pain prevalence among intervention participants, their impacts on pain mitigation among pregnant women cannot deduce a solid conclusion easily.

Gestational Weight Gain

The impact of physical activity interventions on maternal/gestational weight gain was presented by 14 of the involved studies. Generally, eight out of the fourteen studies indicated that weight gain did not significantly affect by the reported interventions,^[22,35,52,57] while five of them succeeded to show that at post intervention ($p \leq 0.043$), a significant low in maternal

or gestational weight gain appeared among the intervention participants.^[26,42,48,55,56] Interestingly, Haakstad and Bo mentioned that their results varied since they used several approaches in analyzing their data.^[45] They used intention-to-treat (ITT) approach and found that level of pregnancy weight gain between treatment groups had no great variations ($p = 0.31$). However, when a per-protocol analysis of data was used, it showed a significant low ($p = 0.01$) of pregnancy weight gain among the intervention women by only involving those who showed full compliance with the intervention protocol in the analysis. Therefore, the variety in the results of the included studies prevented to state a solid conclusion to determine the effectiveness of physical activity interventions on weight gain reduction among the participants, while they sought to reduce weight gain by a positive impact of interventions.

Psychological Outcomes

The impact of physical activity interventions on psychological outcomes including depression and anxiety was tested by seven of the involved studies. Irregular outcomes of some of these studies showed that the observed interventions affected the participants who suffered from severe perceiving depression and anxiety. In contrast, the levels of depression and/or anxiety between groups after intervention stage had no great variation in three of the included studies,^[34,50,60,61] at post intervention ($p \leq 0.005$) in three other studies, depression levels among intervention pregnant women were significantly lower.^[37,48,42] In addition, Haakstad *et al.* illustrated the differences in their results related to what participants frequently felt negative moods due to the reported interventions, when several approaches were adopted to analyze the data.^[46] However, by using intention-to-treat approach, this parameter showed insignificant between-group difference ($p = 0.4$). When per-protocol analysis was used, negative mood feelings were expressed by a number of intervention pregnant women ($p = 0.01$). Generally, studies that focused on psychological issues such as depression and anxiety showed that physical activity interventions had general positive influence on treating them among the participants, whereas, number of the involved studies did not succeed in reporting any considerable impact on this result.

Quality of Life

Only two studies specified to report how the physical activity interventions influenced the life quality among the involved studies. Montoya Arizabaleta *et al.* indicated that there was considerably higher elevation in health-related quality of life compared to controls among the intervention participants according to what their reported intervention showed.^[36] On their intervention on the parameter of this outcome, Haakstad *et al.* did not record any important impact.^[46] The impact of physical activity interventions on the improvement of pregnant participants' life quality is difficult to achieve as the results of only two included studies pointed out the contrastive effect of such interventions on these individuals.

Table 1: Research Strategy Used to Retrieve 2985 Citations

| |
|---|
| 'Pregnant women' OR 'Pregnancy' OR 'Prenatal' OR 'Antenatal' OR 'Gestation' OR 'Maternal' |
| AND |
| 'Intervention' OR 'Program' OR 'Program' OR 'Therapy' OR 'Education' OR 'Web-based' OR 'E-health' |
| AND |
| 'Physical activity' OR 'Exercise' OR 'Land-base exercise' OR 'Nurse-led' |
| AND |
| 'Weight gain' OR 'Weight control' OR 'Self-efficacy' OR 'Depression' |
| OR |
| 'Psychological' OR 'Pain' OR 'Sleep disturbance' OR 'Sleep difficulties' |
| OR |
| 'Functional ability' OR 'Functional status' OR 'Sick leave' |
| AND |
| 'Saudi Arabia' OR 'Saudi' OR 'KSA' |

The Level of Physical Activity or Self-Efficacy in Physical Activity

The impact of physical activity interventions on the level of pregnant physical activity or how their self-efficacy elevated these levels were reported by nine of the included studies. After the intervention ($p \leq 0.027$), physical activity level among the intervention women was considerably higher in most ($n = 6$; 66.7%) of these studies,^[23,54,55] or by comparing this parameter to control counterparts ($p = 0.0002$), it had an importantly greater growth among intervention participants.^[28] Noteworthy, Miquelutti *et al.* succeeded to explain how their intervention on participants in various groups had contrastive impact, in which there was increase in the levels of physical activity intervention pregnant women and decrease in these levels among controls post intervention.^[34] Moreover, Huang *et al.* explained that self-efficacy recorded a considerably higher rise in participants' physical activity among the intervention participated women in comparison to control counterparts,^[42] proposing that the pregnant women are encouraged to practice physical exercises by the influence of researchers' intervention. Otherwise, a greater impact of intervention was not observed by Kinnunen *et al.* regarding the increase in the levels of physical activity among the participants.^[22] Also, Haakstad *et al.* studied self-efficacy in physical activity and failed to report a significant difference between groups in the decline range of recognized barriers to physical activity.^[44] However, the included studies reported overall consistent impact of physical activity interventions on the levels of physical activity among the participants. The majority of the studies demonstrated that the interventions influenced this parameter positively.

Discussion

It is known that pregnant women experience symptoms that are related to pregnancy including gaining weight, depression, and anxiety, and satisfaction of body image is associated with the latter two symptoms.^[63] In this light, such symptoms need to be alleviated by developing strategies so that it would improve the women's life quality. As indicated in previous studies, the physical activities benefit in improving both the physiological and physical outcomes. The intervention of physical activity that are particularly designed for the pregnant women proved to be of great effect on addressing the symptoms mentioned above that are related to pregnancy.

Our review showed in the finding that the intervention of physical activity positively affects the women who are pregnant, and such effect is reported in the included studies generally as a consistent finding. Results were notably reported in one of the studies by which outcomes were found contrasting between the participants in the control groups and the intervention at post intervention. The participants in the control group exhibited a reduced physical activity level while the participants in the intervention group showed increased levels of physical activity.^[34] Therefore, the effectiveness of the interventions of the physical

activity was suggested by previously mentioned data to encourage the women who are pregnant to regularly do physical exercises more which potentially help in improving their physical fitness.^[64] Classes of group exercise that are supervised and/or information provision on the level of physical activity that is recommended via information and counselling booklets for the pregnant women are the components of which the interventions generally consist, suggesting the necessity of these strategies' sufficiency in order to encourage the increase of physical activity levels' among pregnant women.

Indeed, the increase in the levels of the physical activity should be beneficial especially for the women who are pregnant. This is because, as previously illustrated, the conferring benefits to the fetus' health, potentially via the placenta vascular function maintenance would be a result to the physical activity during pregnancy.^[65] The improving self-esteem and satisfaction of body image^[66] and reducing the risk of depression development, at both the postpartum and antenatal stage^[67] would be achieved during pregnancy by the help of physical practice. Furthermore, pregnant women's implementation of exercise programs would help them the enhancement of their cardiorespiratory fitness^[68] is shown in previous studies. It is suggested that the quality of life that is health-related is positively correlated with this indicator.^[69]

All of the above highlight the importance of pregnant women's commitment to regular exercises on the fetus and women's health via physical activity programs implementation. However, the increase in the level of women's physical activity at post-intervention as recorded in the studies was because of self-efficacy increase to do more physical activities.

Different assessment instruments of the same outcome were utilized in different studies [Tables 1]. While, for example, the visual analogue scale was used in some studies for perceived pain levels assessment, KEBK questionnaire or questionnaire that are author-developed were utilized by some studies which has drawn different conclusions. Only when the same outcome assessment instrument is utilized by all the included studies, the findings of study will be targeted to reliable comparisons.^[70]

Furthermore, a possible factor for the inconsistent study findings would be the methodologies' variations that are used to analyze data between the studies. Indeed, a significant effect of the interventions that are reported on certain outcomes was recorded when data analyses followed a per-protocol manner, and not when following an intention-to-treat approach.^[45] Therefore, a need of caution is indicated by these observations in findings' interpretation of the included studies concerning the significant of intervention effect on various outcomes.

It is required to carry out further studies targeting the interventions of the physical activity on the life quality of pregnant women in order to have more data generated for drawing a firmer conclusion concerning their effects on this finding. The limitations of our review should be acknowledged.

Firstly, this review included only CCTs and RCTs. It does not consider data from studies that have other designs of study like one-group pretest-posttest design. As further data concerning the significance of the physical activity intervention effect on the outcomes that are involved in the review, may be contributed by these studies, comprehending this review may have been limited by such studies' exclusion. Secondly, a general overview is provided in this review on the effect of intervention of the physical activity on the outcomes and not the effect of a particular type of intervention of physical activity.

A group exercise program, for example, was primarily included in some interventions, while information provision and counselling on the recommendations of physical activity and/or various pregnancy-related symptoms management. Findings' variety between studies hamper firm conclusions drawn may have resulted from multiple confounding characteristics' heterogeneity in the interventions that are recorded in the studies included. Thirdly, lifestyle interventions that contain components of both physical and dietary activity were reported in the studies that are included in this review.

As a result of the difficulty in attributing each intervention component's positive effects to each outcome that is examined, it may not be necessary to attribute the effectiveness reported of the interventions of the outcomes to the physical exercises effect that is involved in these interventions. Fourthly, it was observed between groups that there are different rates of the dropouts, as Tables 1 indicates, among some of the studies that are included. By this, the bias in the extent interventions effects reporting could exist.

Findings' interpretation should be cautiously performed owing to these limitations of the review.

Conclusions

Physical interventions, particularly the interventions incorporated as an integral component like compulsory activity classes, are demonstrated in our review to be effective among pregnant women in the physical activity level enhancement. In addition, they are possibly useful for reducing gestational weight gain, enhancing self-efficacy in the physical activity, and alleviating symptoms that is related to pregnancy including pain related to pregnancy and depression.

Therefore, the previously mentioned interventions may potentially be of help to address the barriers to increase the levels of physical activity among pregnant women. Nevertheless, the reported interventions heterogeneity causes the finding' variations among studies made it impossible to draw firm conclusions concerning the outcomes of the reported interventions. The studies in future may focus on investigating the Saudi context and the physical activity intervention effect on both life quality and aforementioned outcomes between women who are pregnant and further data contribution on the possibility

of such interventions to promote these individuals' wellbeing via improving the symptoms that are related to pregnancy.

Highlights

- The current study aims to systemically review and analyze all Saudi scientific papers related to physical activities and exercises within the period 1980 to 2019.
- The study followed the systematic literature review approach.
- The study included multiple medical search Databases using PICOS eligibility criteria up to January 2019.
- The results indicated a relation between prenatal physical exercise on improving or decreasing risks on the mother and child during pregnancy.
- We clarify the health benefits of physical activity on the mother and fetus among Saudi women.
- Prenatal physical exercises are improving the healthy state of mother and fetus.
- Prenatal physical activities are decreasing the complications that related to pregnancy.
- Limited studies about the relationship between prenatal physical activities in Saudi Arabia

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Nil.

Conflicts of interest

There are no conflicts of interest.

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