International Journal of Women's Health

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Open Access Full Text Article

REVIEW

Exercise in obese pregnant women: positive impacts and current perceptions

This article was published in the following Dove Press journal:
International Journal of Women's Health
2 July 2013
Number of times this article has been viewed

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Abstract: Overweight and obesity have significant implications during pregnancy and childbirth. The objective of this review was to provide a comprehensive overview of the effect of physical activity on pregnancy outcomes, the change of physical activity during pregnancy, and women's perception of being physically active during pregnancy, with a particular focus on women who are overweight or obese. Many studies have investigated the beneficial effect of exercise during pregnancy, including reduced risk of gestational diabetes, preeclampsia, and operative birth, in addition to improved cardiovascular function, overall fitness, psychological well-being, and mood stability. Benefits for the infant include reduced risks of prematurity and improved fetal growth, although there is more limited information about longer-term health benefits for both women and infants. The existing literature examining physical activity patterns during pregnancy has generally focused on women of all body mass index categories, consistently indicating a reduction in activity over the course of pregnancy. However, the available literature evaluating physical activity during pregnancy among women who are overweight or obese is more limited and contradictory. A number of studies identified barriers preventing women from being active during pregnancy, including pregnancy symptoms, lack of time, access to child care, and concerns about their safety and that of their unborn baby. Conversely, significant enablers included positive psychological feelings, family influence, and receiving advice from health professionals. Very few studies have provided insights about perceptions of being active during pregnancy in the overweight and obese population. There is a need for a detailed description of physical activity patterns during pregnancy in women who are overweight or obese, and more randomized trials evaluating exercise interventions for women who are overweight or obese, with a focus on clinical outcomes.

Keywords: pregnancy, exercise, physical activity, overweight, obesity

Introduction

Obesity is a significant contributor to chronic disease worldwide.[1] Body size can be assessed using a variety of measures, including weight, height, and waist circumference. A widely utilized tool to assess overweight and obesity is body mass index (BMI). The World Health Organization (WHO) defines normal weight as a BMI of 18.5–24.9 kg/m^2, overweight as a BMI of 25–29.9 kg/m^2, and obesity as a BMI of 30 kg/m^2 or greater.[1] Obesity is further subcategorized into class I (30–34.9 kg/m^2), II (35–39.9 kg/m^2), and III (40 kg/m^2 or higher).

The prevalence of overweight and obesity is escalating worldwide. Australian data indicate that 63.4% of Australian adults are overweight or obese, comprised of 35.0% overweight and 28.3% obese.[2] It is predicted that by the year 2025, 7.2 million

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Australians will be obese.[3] Worldwide figures are similar. In the US, 66% of the population is overweight or obese.[4] The most recent data from the UK show similar trends, with the prevalence of obesity increasing significantly from 13% to 25% between 1993 and 2008.[5] China's National Health Survey also reported an increased prevalence of obesity, particularly among upper socioeconomic groups, with estimates that 11.44% of Chinese youth are overweight or obese.[6]

Overweight and obesity have significant implications during pregnancy and childbirth. In Australia, it was estimated that 34% of pregnant women were overweight or obese in 2002.[7] More recent population data from South Australia indicate that approximately 50% of pregnant women are overweight or obese, including 10% who are severely or morbidly obese.[8] Figures from the US and the UK are similar. In the US, between 1993 and 2003, the prevalence of maternal obesity increased from 13% to 22%,[9] while there was a doubling in the UK between 1996 and 2006, with approximately 27.5% of pregnant women overweight, and a further 10.9% obese.[10]

Being overweight or obese may result in changes in hormone concentrations, adversely affecting reproductive health.[11] Obesity increases estrogen concentrations and hence the risk of menstrual dysfunction, polycystic ovarian syndrome, and infertility.[12,13] Both spontaneous rates of conception and outcomes following assisted reproductive techniques are poorer among women of high BMI when compared with women of normal BMI.[12,13] The effect of obesity on risk of early pregnancy loss is less clear, with some studies reporting an increased risk of miscarriage, while others do not.[13,14] It is well documented that even a moderate degree of weight loss can improve menstrual regularity and fertility among women who are overweight or obese.[13]

There are well-documented risks associated with obesity during pregnancy, the risks increasing with increasing maternal BMI.[7,15,16] Well-recognized risks include gestational diabetes, hypertensive conditions (including preeclampsia), and preterm birth.[7,15] There are also considerable risks for the infant, including an increased risk of perinatal death, congenital anomalies, shoulder dystocia, birth injuries, and macrosomia.[7,15,17,18] The risks associated with overweight and obesity during pregnancy are summarized in Table 1.

While the precise factors contributing to overweight and obesity are complex, these conditions essentially represent an imbalance between energy intake and energy expenditure. The total amount of energy an individual expends on a daily basis is a function of the amount of energy required to maintain basic bodily functions (resting energy expenditure), digest food eaten (thermic effect of food), maintain posture and spontaneous activity, and support voluntary bodily movement (physical activity).[19] Reflecting its voluntary nature, physical activity is the most variable component of total daily energy expenditure. It comprises 20%–30% of total energy expenditure in sedentary adults, and the proportion is notably higher among active individuals.[19] Domains of physical activity include leisure-time pursuits (exercise), occupation, transportation, self-care, volunteer work, nonexercise leisure-time activities, and domestic-related activity.[19] Although each of these domains may have a significant influence on energy expended in physical activity and consequently total daily energy expenditure, until recently leisure-time physical activity was the focal point for research on energy expenditure in relation to obesity and public health efforts aimed at obesity treatment and prevention.[19] The beneficial outcomes of being physically active are well recognized, including improving cardiovascular condition and glucose tolerance, building bone and muscle mass, and reducing risks of obesity and its complications.[20,21]

Physical activity has been identified as an important factor for healthy pregnancy in women of all weight ranges. Current Australian physical activity guidelines suggest adults, including pregnant women, be active with moderate-intensity exercise for 30 minutes on most days.[22] Both the Royal College of Obstetricians and Gynaecologists and American College of Obstetricians and Gynecologists recommend

Table 1 Risks associated with overweight and obesity during pregnancy

Maternal risks	
Pregnancy	– Gestational diabetes[16]
	– Hypertensive disorders[16]
	– Difficulty with ultrasound scanning and amniocentesis[7]
Labor and birth	– Preterm birth (iatrogenic)[16]
	– Induction of labor[15,16]
	– Cesarean section[15,16]
	– Anesthetic complication[7]
	– Risk of thromboembolism[7]
Postpartum	– Infection[7]
	– Prolonged hospital stay[7]
Infant risks	– Perinatal death[16]
	– Congenital anomalies[16]
	– Shoulder dystocia and birth trauma[7]
	– Macrosomia[16]
	– Low Apgar score[7]
	– Hypoglycemia[15]
	– Hyperbilirubinemia[7]
	– NICU admission[16]

Abbreviation: NICU, neonatal intensive care unit.

that all pregnant women be encouraged to participate in exercise, with an aim of maintaining fitness throughout pregnancy.[23,24] While previously inactive women and women with pregnancy complications may benefit from exercise, recommendations suggest evaluation on an individual basis.[24] It is important to recognize that these activity guidelines for pregnant women are based on low-level evidence, and do not specifically address the issues facing women who are overweight or obese.

Research over the past 25 years has generated a large amount of information about exercise during pregnancy. However, the evidence has not been summarized to provide a full story about the benefits of antenatal exercise, current physical activity patterns during pregnancy, and women's perception of exercise during pregnancy. The objective of this review was to provide a comprehensive overview of the effect of physical activity on pregnancy outcomes, the change of physical activity during pregnancy, and women's perception of being physically active during pregnancy, with a particular focus on women who are overweight or obese.

Impact of exercise on pregnancy

Many studies have investigated the effect of exercise during pregnancy and maternal and neonatal health outcomes. A literature review was conducted to evaluate the effect of physical activity on pregnancy. The search identified articles published in PubMed and Scopus between 1990 and February 2013 using the following keywords: "exercise" or "physical activity" or "lifestyle" and "pregnancy". The search resulted in 373 publications, of which the authors considered 81 after full-text review.

As outlined in Table 2, although studies utilized different research designs, a beneficial effect of exercise during pregnancy on maternal and neonatal health outcomes has been consistently identified. In particular, maternal health benefits include reduced risk of gestational diabetes,[25–27] preeclampsia,[28–30] and operative birth,[31] in addition to improved cardiovascular function,[32] overall fitness,[33] psychological well-being, and mood stability.[34,35] Benefits for the infant include reduced risks of prematurity[36,37] and improved fetal growth,[38] although there is more limited information about longer-term health benefits for both women and infants. However, these studies have limitations, including the inclusion of women of all BMI categories, failure to control for the effect of maternal BMI, and lack of standardization of methodology relating to assessment of physical activity, in addition to the limitations of specific study design. In addition, though a study that analyzed the intensity of physical activity during pregnancy suggested particularly beneficial effects from vigorous physical activity,[30] it is difficult to draw conclusions, as studies (see Table 2) have utilized very different definitions[43] to describe the intensity of exercise during pregnancy and are hence hard to compare.

There are three relevant Cochrane reviews relating to exercise in pregnant women.[39–41] Kramer and McDonald[39] evaluated the role of exercise in pregnancy, while Ceysens et al[40] and Han et al[41] focused on exercise in women with gestational diabetes and the preventive effect of physical activity during pregnancy. Kramer and McDonald's Cochrane review of aerobic exercise included women of all BMI categories during pregnancy, and included eleven randomized controlled studies, involving 1014 women.[39] Outcome measurements included maternal physical fitness, infant anthropometric measures, and adverse maternal and infant birth outcomes. The included trials varied considerably in the nature of the intervention provided, the timing and duration of the intervention, and the assessment of compliance. The sample sizes of the individual studies were relatively small, and all were considered to have methodological flaws. While regular exercise was associated with maintained or improved physical fitness (defined as aerobic capacity, cardiopulmonary measures, and physical work capacity), the effect on clinical pregnancy outcomes was uncertain.

Ceysens and colleagues focused on exercise for women with gestational diabetes.[40] The authors utilized data from four randomized controlled trials, involving a total of 114 pregnant women with gestational diabetes. The exercise programs generally included three 20- to 45-minute sessions per week of approximately 6 weeks' duration. The meta-analysis did not identify a significant effect of exercise on measures of perinatal or maternal morbidity, although the available sample size was well underpowered to be able to detect differences in outcomes of clinical relevance. Similarly, Han and colleagues focused on the effect of physical activity in prevention of gestational diabetes.[41] The findings indicated no significant differences in the incidence of gestational diabetes between women receiving additional exercise intervention and routine care.

In the overweight and obese pregnant population, several systematic reviews and meta-analyses have assessed the effect of antenatal exercise interventions on pregnancy outcomes.[42–44] These meta-analyses of randomized trials indicate that while antenatal exercise interventions do not appear to be associated with harm, the effect on limiting

Table 2 Studies describing exercise and maternal and neonatal health outcomes

Study and location(s)	Design	n	Outcomes	Findings
Barakat et al[71] Spain and Sweden	Randomized controlled trial	83	Maternal glucose tolerance and prevalence of gestational diabetes	Exercise during pregnancy was associated with better maternal glucose tolerance ($P < 0.01$), but not with the incidence of gestational diabetes.
Carmichael et al[72] US	Case control	831	Neural tube defects	In women who did not use folate supplements, leisure-time physical activity was associated with a 30%–50% lower risk of neural tube defects compared with women who were inactive during pregnancy.
Clapp et al[38] US	Randomized controlled trial	46	Antenatal placental growth rate and neonatal and placental morphometric measurements	Exercise was associated with increased infant birth weight ($P = 0.05$), length ($P = 0.05$), and lean body mass ($P = 0.05$). Exercise was also associated with increased placental growth rate ($P = 0.04$) and indexes of placental function ($P < 0.05$).
de Barros et al[73] Brazil	Randomized controlled trial	64	Insulin requirement and glycemic control	Resistance exercise was associated with a reduced number of women who required insulin ($P = 0.005$).
Dempsey et al[25] US	Case control	541	Gestational diabetes	Physical activity during the first 20 weeks of pregnancy was associated with a 50% reduction in risk of gestational diabetes (OR 0.40, 95% CI 0.23–20.68).
Dempsey et al[26] US	Retrospective cohort	909	Gestational diabetes	Recreational physical activity before pregnancy was associated with a risk reduction of 56% for gestational diabetes. Physical activity during pregnancy only did not reduce risk of diabetes, although physical activity both before and during pregnancy reduced risk of diabetes compared with inactive women (RR 0.31).
Evenson et al[36] US	Prospective cohort	1699	Prematurity	Vigorous leisure activity during the first trimester (OR 0.80, 95% CI 0.48–1.35) and second trimester (0.52, 0.24–1.11) had protective effect against preterm birth.
Fortner et al[74] US	Prospective cohort	1043	Hypertensive disorder	Higher level of sports/exercise in early pregnancy was associated with decreased risk of hypertensive disorders ($P_{trend} = 0.04$).
Haakstad and Bo[75] Norway	Randomized controlled trial	105	Birth weight, incidence of low birth weight and macrosomia, and Apgar score	Supervised aerobic exercise was not associated with difference of birth weight or incidence of low birth weight and macrosomia, but higher Apgar score at 1 minute ($P = 0.02$).
Hatch et al[37] US	Retrospective cohort	557	Prematurity	Vigorous leisure-time physical activities were associated with a reduced risk (RR = 0.11) of preterm birth.
Hui et al[76] Canada	Randomized controlled trial	190	Excessive gestational weight gain	Higher physical activity during pregnancy was associated with reduced excessive gestational weight gain ($P = 0.01$).
Ko et al[77] US	Randomized controlled trial	1196	Incidence of gallbladder sludge or stones	Vigorous physical activity did not decrease the incidence of gallbladder sludge or stones during pregnancy at 18 weeks (RR = 0.89) and 36 weeks (RR = 1.31).
Latka et al[78] US	Case control	346	Miscarriage	Leisure-time physical activity during pregnancy was a protective factor against miscarriage (OR = 0.6, 95% CI 0.3–0.9).
Lynch et al[33] Australia	Prospective cohort	23	Cardiovascular function	Exercise was associated with improved aerobic fitness, as measured by physical work capacity ($P = 0.003$), and also decreased maternal heart rate ($P = 0.041$) and mean fetal heart rates ($P = 0.001$).
Martin and Brunner Huber[29] US	Retrospective cohort	3348	Hypertensive complications	Higher level of physical activity during pregnancy was associated with a lower risk of hypertensive complications (physical activity for 1–4 days per week: OR = 0.63, 95% CI 0.45–0.90; physical activity for 5+ days per week: OR = 0.46, 95% CI 0.20–1.02).
Mattran et al[79] US	Retrospective cohort	300	Offspring size at 18–24 months	Leisure-time physical activity was associated with lower toddler weight ($P = 0.06$) and weight-for-height ($P = 0.06$).
May et al[80] US	Case control	61	Fetal cardiac autonomic control	At 36 weeks of gestational age, fetal heart rate was significantly lower in the exercise group ($P < 0.001$). Heart-rate variability was also higher in the exercise group.

(*Continued*)

Table 2 (*Continued*)

Study and location(s)	Design	n	Outcomes	Findings
Melzer et al[31] Switzerland	Retrospective cohort	71	Mode of birth, resting metabolic rate, total energy expenditure, activity-related energy expenditure, maximal oxygen uptake, sleeping heart rate, and movement (accelerometer)	Active women were fitter, with lower sleeping heart rate when compared with inactive women. Active women had shorter duration of second stage of labor ($P = 0.05$). Inactive women were at higher risk of operative birth (OR = 3.7, 95% CI 0.87–16.08).
Nascimento et al[81] Brazil	Randomized controlled trial	82	Gestational weight gain, blood pressure, perinatal outcome, and quality of life	There was no difference in gestational weight gain, blood pressure, perinatal outcome, or quality of life in pregnant women who had supervised exercise intervention or routine care.
Oken et al[27] US	Retrospective cohort	1805	Gestational diabetes or abnormal glucose tolerance during pregnancy	Vigorous physical activity before pregnancy was associated with a reduced risk of 44% for gestational diabetes (OR = 0.56, 95% CI 0.33–0.95) and 24% for abnormal glucose tolerance (0.76, 0.57–1.0).
Polman et al[34] UK	Case control	66	Mood states before and after exercise sessions	Aqua class and gym class, but not parentcraft class, resulted in enhanced mood in women in 2nd and 3rd trimester when compared with the controls ($P < 0.01$).
Poudevigne and O'Connor[35] US	Prospective cohort	24	Energy expenditure and psychological well-being	Increased fatigue and vigor scores in pregnant women from 12 to 16 weeks and from 32 to 36 weeks gestational age. Above average level of physical activity during the 2nd and 3rd trimesters was associated with mood stability.
Stutzman et al[32] Canada	Quasirandomized controlled trial	22	Blood pressure, heart rate variability, and baroreflex sensitivity	Exercise lowered resting systolic blood pressure and diastolic blood pressure ($P < 0.05$).
Sorensen et al[30] US	Case control	584	Preeclampsia	Regular activity during early pregnancy was associated with a 35% reduced risk of preeclampsia (OR = 0.65, 95% CI 0.43–0.99). This risk was further reduced in women performing vigorous physical activity (0.46, 0.27–0.79).

Abbreviations: OR, odds ratio; CI, confidence interval; RR, relative risk; US, United States.

gestational weight gain was moderate (mean difference −0.36 kg, 95% confidence interval −0.64 to −0.09 kg, $P = 0.008$, $I^2 = 0\%$[43]; mean difference −0.72 kg, 95% confidence interval −1.2 to −0.25 kg, $P = 0.003$, $I^2 = 30\%$[44]). However, the available evidence is limited by small sample sizes and lack of consistent reporting of clinically relevant outcomes.

Change of physical activity during pregnancy

There is considerable literature indicating that pregnant women are less active than nonpregnant women, with activity declining over pregnancy.[45,46] The existing literature examining physical activity patterns during pregnancy has generally focused on women of all BMI categories,[47–54] consistently indicating a reduction in activity over the course of pregnancy[45] from early pregnancy to birth[49–52] (Table 3). This decline in activity was apparent across all categories and intensity of activities (household, leisure/exercise, work-related, and transportation).[49–52]

The available literature evaluating physical activity during pregnancy among women who are overweight or obese is more limited. While some authors report an increase in activity from early to midpregnancy, followed by a decline in the third trimester,[54] others report a constant reduction in activity across gestation[53] (Table 3). Furthermore, there is little information reported in the literature evaluating the relationship between high maternal BMI and patterns of physical activity, in addition to the effect of gestational weight gain.

A prospective survey by Clarke and Gross[46] reported that the decline in physical activity during pregnancy might be explained by a variety of social and psychological factors, as women perceived resting and relaxation as significantly more important than maintaining an active lifestyle. Major sources of information about physical activity advice included books, magazines, and family and friends, rather than health professionals. The findings of such studies indicate the importance of health professionals in improving the quantity and quality of health education about physical

Table 3 Studies describing physical activity pattern during pregnancy

Study and location	Design	n	Outcomes	Findings
Women of all weight categories				
Borodulin et al[47] US	Prospective cohort	471	Physical activity	Physical activity declined during pregnancy.
Duncombe et al[48] Australia	Cross-sectional	158	Time in physical activity	There was a significant reduction in both the prevalence of exercise and time spent exercising during pregnancy.
Fell et al[49] Canada	Retrospective cohort	1737	Physical activity	There was a decline in physical activity in early pregnancy. Obesity was associated with discontinuation of sport.
Mottola and Campbell[50] Canada	Prospective cohort	529	Physical activity	During pregnancy, all activities declined, with the exception of walking, which increased in the 3rd trimester.
Schmidt et al[51] US	Cross-sectional	233	Total energy expenditure	No significant difference identified in the median total energy expenditure over 1st, 2nd, or 3rd trimester of pregnancy.
Watson and McDonald[52] New Zealand	Prospective cohort	197 women	Physical activity	Activity declined throughout pregnancy ($P = 0.002$).
Overweight and obese women				
McParlin et al[53] UK	Retrospective cohort	55 overweight and obese	Time in physical activity	There was a significant reduction of physical activity from 1st to 2nd trimester ($P = 0.018$).
Renault et al[54] Denmark	Cross-sectional	163 obese and 175 overweight	Physical activity	Obese women had fewer step counts when compared with women of normal weight ($P < 0.05$). In obese women, there was an increase in activity from early to midpregnancy, followed by a decline in the 3rd trimester.

Abbreviations: UK, United Kingdom; US, United States.

activity during pregnancy, including where possible the involvement of women's family and friends.

Women's perceptions of active lifestyle during pregnancy

While there are potential opportunities to implement interventions during pregnancy to improve health outcomes, success requires an understanding of women's attitudes and perceptions, particularly their willingness to make behavioral changes.

While many interventions aim to promote healthy eating and active lifestyle in women who are overweight or obese during pregnancy,[43,55–57] it is constantly reported that adherence to interventions remains problematic. While a previous study has demonstrated that women's attitudes toward weight-control interventions during pregnancy are generally positive,[58] there is an increasing need to recognize and address individual psychological aspects and the impact they may have on successful behavioral change.[59,60]

A number of studies have investigated women's perceptions of being active during pregnancy, identifying a number of enablers and barriers. As outlined in Table 4, these studies utilized a variety of tools, including self-reported questionnaires, telephone interviews with open-ended questions, focus groups, and semistructured face-to-face interviews, many utilizing mixed methods to gather both qualitative and quantitative data.[46,61–65] The most notable barriers identified preventing women from being active during pregnancy were pregnancy symptoms, lack of time, access to child care, and concerns about their safety and that of their unborn baby.

Conversely, significant enablers included positive psychological feelings, family influence, and receiving advice from health professionals. Many of these studies are limited by their small sample size, and involved women of all BMI categories with no specific information available for pregnant women who were overweight or obese.

There are few studies that have explored the beliefs and experiences of exercise among women who were overweight or obese during pregnancy. Tovar et al's study involved four focus groups[66] to evaluate knowledge and beliefs regarding weight gain during pregnancy among a group of Hispanic women in the US. The results confirmed that while the majority of women felt negatively about weight gain, it was supported by family members in the belief that this would lead to a healthier baby. While women had awareness of the benefits of a healthy diet, traditional beliefs remained strong.

Table 4 Studies describing enablers and barriers of active lifestyle during pregnancy

Study, location	Design	n	Findings
Clarke and Gross[46] UK	Interviews and questionnaires	57	Enablers: receiving advice and education. Barriers: concerns about safety, physical limitations, low motivation, and limited facilities or spaces.
Duncombe et al[48] Australia	Questionnaire	158	Enablers: feeling of fitness, tone, and strength; relieving stress; enjoyment; having a regular routine. Barriers: tiredness, lack of time, dislike of exercise, and concern about safety.
Evenson et al[62] US	Short telephone interview	1535	Barriers: pregnancy complications and other health problems, personal reasons, social and cognitive reasons, and environmental factors.
Pereira et al[63] US	Questionnaire	1442	Barriers: work commitment, pregnancy complications, and feelings of depression.
Symons Downs and Hausenblas[64] US	Questionnaire	74	Enablers: feeling that exercise improves mood, increases stamina, staying fit, feeling that weight is under control, and influence from family. Barriers: physical limitations and restrictions, tiredness, lack of time, gaining weight, caring for other children, worry about safety, weather, and low motivation.
Thornton et al[65] US	Interviews	10 pregnant and postpartum and 8 family members	Enablers: partner's advice and support, cultural norms, health professional's advice, friends' support and companionship, and access to child care.

Abbreviations: UK, United Kingdom; US, United States.

Weir et al evaluated beliefs about physical activity among overweight and obese pregnant women using semistructured interviews.[67] Overall, women considered healthy eating of greater importance for maternal and infant health than participation in physical activity. Furthermore, while there was awareness that physical activity during pregnancy impacted on weight gain, women expressed a preference to defer weight management to the postnatal period.

Studies have identified a range of barriers preventing women from leading a healthier lifestyle during pregnancy, including physical, psychological, external, and environmental factors. In particular, a lack of advice was considered significant, with women expressing a lack of information relating to the benefits of physical activity on maternal and infant health. While most women who were overweight or obese recognized their weight as an issue, there was concern that health professionals in particular did not address women's individual expectations.[68]

Our previous mixed-methods study in an overweight and obese pregnant population generated detailed information about women's views of making healthy diet and lifestyle changes during pregnancy.[69] Women completed questionnaires as well as a smaller number of face-to-face interviews, with results indicating that approximately half of women did not consider excessive gestational weight gain to be a concern during pregnancy. Although many women were aware that high BMI and high gestational weight gain were associated with adverse maternal health outcomes, knowledge of neonatal outcomes was less evident, as were perceived benefits of healthy change. While a range of barriers to change were identified, the strongest motivator reported was concern about maternal and neonatal health. Engaging in a healthy routine prior to conception, positive influences from family, and health professionals addressing individual expectations were all reported to be effective strategies to make healthy behavior changes during pregnancy.

The extant literature indicates that while women accept the occurrence of weight gain as a "normal" outcome of pregnancy,[70] they report receiving a lack of and often inconsistent information from health professionals about high BMI and associated pregnancy risks, and about exercise during pregnancy.[66,67,70] In contrast, advice from family relating to optimal gestational weight gain and physical activity was considered to be highly influential.[66]

Conclusion

Being overweight or obese during pregnancy is associated with an increased risk of maternal and infant health complications. While there are documented beneficial effects associated with exercise in pregnancy, recommendations to date are based on low-quality evidence and do not specifically address exercise in pregnancy for women who are overweight or obese. Furthermore, little is known about women's perceptions of making healthy change during pregnancy.

There is a need for a detailed description of physical activity patterns during pregnancy in women who are overweight or obese, and more randomized trials evaluating exercise interventions for women who are overweight or obese, with a focus on clinical outcomes. Further research also needs to identify effective strategies to increase physical activity among women who are overweight or obese during pregnancy, particularly at an individualized level.

Disclosure

The authors report no conflicts of interest in this work.

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