Leisure time physical activity among pregnant women and its associations with maternal characteristics and pregnancy outcomes

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ABSTRACT

Background: Physical activity during pregnancy is generally considered safe and beneficial for both the pregnant woman and her foetus. The overall aim was to investigate pregnant women's pre-pregnancy and early pregnancy physical activities and their associations with maternal characteristics and pregnancy outcomes.
Methods: This cross-sectional study combined data from the Maternal Health Care Register in Västerbotten (MHCR-VB) and the Salut Programme Register (Salut-R). Data were collected from 3868 pregnant women living in northern Sweden between 2011 and 2012.
Results: Almost half of the participants (47.1%) achieved the recommended level of physical activity. Compared to the women who did not achieve the recommended level of exercise, these women had lower BMI, very good or good self-rated health, and a higher educational level. No significant associations could be established between physical activity levels and GDM, birth weight, or mode of delivery.
Conclusions: Positively, a considerably high proportion of Swedish pregnant women achieved the recommended level of physical activity. Factors associated with recommended physical activity level were BMI ≤30 kg/m², very good or good self-rated health, and higher educational level. Our findings emphasize the need for healthcare professionals to early detect and promote fertile and pregnant women towards health-enhancing physical activity, especially those with low levels of physical activity and overweight/obesity, to improve overall health in this population.

Background

Physical activity during pregnancy

Globally, physical inactivity is the fourth leading risk factor for mortality and is considered a major threat to public health [1–3]. Physical activity during pregnancy is generally safe and beneficial for both the pregnant woman and her foetus and does not increase the risk of adverse pregnancy outcomes [4]. Physical exercise during pregnancy can maintain or improve fitness and may further improve pregnancy outcomes [4–6]. For obese pregnant women, physical activity reduces the risk of pre-eclampsia [6], decreases pelvic pain and back pain [7], reduces gestational weight gain during pregnancy [8], and increases well-being [9]. There is, however, insufficient evidence to conclude that physical exercise prevents pregnancy glucose intolerance or gestational diabetes mellitus (GDM) [10]. Although healthcare providers advise pregnant women to maintain or increase their physical activity, pregnant women tend to lower their physical activity [11].

Guidelines regarding physical activity

Considering physical activity as a preventive factor, national guidelines in many countries recommend specified levels of physical activity during pregnancy [12,13]. For the ages 18–64 years, the World Health Organization (WHO) recommends levels of physical activity to be at least 150 minutes of moderate-intensity aerobic physical activity per week or 75 minutes of vigorous-intensity aerobic physical activity per week, or a combination of these [14]. These recommendations are endorsed by the Swedish Professional Associations for Physical Activity and are also applicable for pregnant women [4]. These recommendations are in line with guidelines on

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health promotion developed by the Swedish National Board of Health and Welfare (NBHW) [15] .

Rationale of the study

Few studies have been investigating the prevalence of self-reported physical activity during pregnancy in Sweden in relation to the national recommendations and their associations with pregnancy outcomes. Furthermore, the literature is limited regarding the associations between maternal background characteristics and level of physical activity during pregnancy.

Aims

The overall aim was to investigate pregnant women's pre-pregnancy and early pregnancy physical activities and their associations with maternal characteristics and pregnancy outcomes.

The specific objectives were to 1) investigate prevalence of self-reported physical activity during leisure-time in early pregnancy, 2) investigate associations between pre-pregnancy and early pregnancy physical activities during leisure time and to investigate maternal background characteristics, mode of delivery, birth weight, prevalence of gestational diabetes mellitus, and self-rated health.

Methods

This population-based, cross-sectional study combined data from the Swedish Maternal Health Care Register (MHCR) and the Salut Programme Register (Salut-R) for 2011–2012.

The study sample

In MHCR (2011–2012), we identified a sub-set of participants from the county of Västerbotten (MHCR-VB), located in northern Sweden, who also participated in the Salut-R from 2011 to 2012. All pregnancies, irrespective of single birth or multiple births, were included in the study sample. The final dataset consisted of 3868 pregnant women. If cases were not identified in both registers, they were excluded (n = 979). The following variables retrieved from the MHCR-VB were included in the dataset: country of origin, maternal age, parity, maternal height, maternal weight, body mass index at first visit to ANC, smoking, level of education, self-rated health, GDM, oral glucose tolerance test (OGTT), gestational age, mode of delivery, and birth weight. The variables extracted from the Salut-R were self-reported data on pre-pregnancy and early pregnancy physical activities during leisure time.

Information on physical activity levels was available from the Salut-R, and all other variables of background characteristics and pregnancy outcomes were retrieved from the MHCR. The sample size was estimated for different outcomes under study. With the power of 90% at a significant level of 5%, it would be possible to detect a difference of 0.5 in BMI (SD = 4.5) between two groups with a sample size of 1800 in each group. Achieving the power of 90% at a significant level of 5%, it would be possible to detect a difference in proportion of 0.03 between two groups with a sample size of 1500 in each group for self-rated health: "very good" and "good" and "neither good nor poor" or "very poor".

The Maternal Health Care Register

The Nordic countries have a unique opportunity to perform register-based research due to their population-based national registers [16]. The Swedish Maternal Health Care Register (MHCR), a national health quality register, is characterized by a satisfying internal validity for the majority of the variables that have been collected since 1999 by midwives in antenatal care (ANC) [17]. The

coverage in the MHCR is to be considered high. In 2011, 2012 and 2013 the MHCR monitored around 81%, 85%, and 89% of all pregnant women in Sweden, respectively [18]. MHCR data are collected on two occasions: first during the pregnant woman's first visit to an ANC and then during a visit within the first 16 weeks postpartum.

The Salut Programme and its register

The Salut Child-Health Promoting Intervention Programme (Salut Programme) is headed by the County Council of Västerbotten [19]. The Salut Programme Register (Salut-R) includes data collected through a questionnaire from early pregnancy (around gestational week 10) from the woman and her partner at their first visit to an ANC. The pregnancy questionnaire contains information on obstetric and medical history, living conditions, and lifestyle habits.

Ethical approval

Ethical approval from the Ethical Review Board in Umeå was granted for The Salut-R (Dno 2010-63-31) and MHCR and MHCR-VB (Dno 2012-407-31M and 2014-152-32M).

Definitions and categorizations of variables

Some variables acted both as independent and dependent variables. See the descriptions below.

Independent variables

Maternal age was defined as age (years) at delivery. *Parity* was defined as the total number of children born (including the index pregnancy in the MHCR). *Maternal height* (cm) and *maternal weight* in early pregnancy (kg) were self-reported. *Gestational age* was divided into pre-term, term, and post-term. *Early pregnancy body mass index (BMI)* was calculated with the formula BMI kg/m^2. The different BMI groups were defined according to the WHO's definition of BMI: underweight: <18.5 kg/m^2; normal range: 18.5–24.99 kg/m^2; overweight: 25–29.99 kg/m^2; obesity class 1: 30–34.99 kg/m^2; obesity class 2: 35–39.99 kg/m^2; and obesity class 3: ≥40 kg/m^2 [20]. *Smoking* at three months before pregnancy and at the first antenatal visit was self-reported. *Level of education* was defined as elementary school, high school, and university. *Country of origin* was categorized into Sweden, other Nordic countries, and other countries. *Employment status* was categorized into employed, student, parental leave, unemployed, sickness leave, and other status. *Pre-pregnancy and early pregnancy self-reported physical activity during leisure time* (LTPA) (included as a dependent variable) was based on the following question: "How often do you perform any kind of physical activity during leisure-time? Please have the last 12 months in mind when responding to the question". There were three groups of physical activity levels: low (not breathless or sweaty), moderate (warm, possible to have a conversation), and vigorous (high pulse, breathless, and sweaty). The respondent assessed the number of days they were physically active on each level. To calculate activity minutes, the reported number of days in the second group (moderate) was multiplied by 30 minutes and the third group (vigorous) was multiplied by 60 minutes. Group one (low) was defined as <150 activity minutes. Finally, the variable was dichotomized as <150 physical activity minutes (i.e., not achieving the recommended level) and ≥150 physical activity minutes (i.e., achieving the recommended level) during leisure time.

Dependent variables

Self-rated health (SRH) was reported by the woman during early pregnancy and divided into five categories: "very good", "good", "neither good nor poor", "poor", and "very poor" health. The