Factors affecting perceived change in physical activity in pregnancy

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ABSTRACT

Objective: reduction of physical activity (PA) during pregnancy is common but undesirable, as it is associated with negative outcomes, including excessive gestational weight gain. Our objective was to explore changes in five types of activity that occurred during pregnancy and the behavioural determinants of the reported changes in PA.

Design: we performed a secondary analysis of a cross sectional survey that was constructed using the ASE-Model – an approach to identifying the factors that drive behaviour change that focuses on **A**ttitude, **S**ocial influence, and self-**E**fficacy.

Participants: 455 healthy pregnant women of all gestational ages, receiving prenatal care from midwifery practices in the Netherlands.

Findings: more than half of our respondents reported a reduction in their PA during pregnancy. The largest reduction occurred in sports and brief rigorous activities, but other types of PA were reduced as well. Reduction of PA was more likely in women who considered themselves as active before pregnancy, women who experienced pregnancy-related barriers, women who were advised to reduce their PA, and multiparous women. Fewer than 5% increased their PA. Motivation to engage in PA was positively associated with enjoying PA.

Key conclusions and implications for practice: all pregnant women should be informed about the positive effects of staying active and should be encouraged to engage in, or to continue, moderately intensive activities like walking, biking or swimming. Our findings concerning the predictors of PA reduction can be used to develop an evidence-based intervention aimed at encouraging healthy PA during pregnancy.

Introduction

Physical activity (PA) in pregnancy has been associated with 1) *decreased* levels of pre-eclampsia, gestational diabetes, varicose veins, lower back pain, Caesarean section, post-partum anxiety and depression, adverse birth weight and 2) *increased* incidence of appetite control, fitness, pain coping during birth and healthy gestational weight gain (Adamo et al., 2012; Buschur and Kim, 2012; Downs et al., 2012; Ferraro et al., 2012; Melzer et al., 2010; Mudd et al., 2013; Aune et al., 2014; Bain et al., 2015; Hinman et al., 2015; Harrison et al., 2016; da Silva et al., 2017). Some have criticized studies showing the benefits of PA for pregnant women, citing a lack of rigour, and there is conflicting evidence about the value of PA for reducing nausea, heartburn, round ligament pain (pain related to the stretching of ligamentum teres), leg cramps, the duration of labour, and problems with sleep (Buschur and Kim, 2012).

Canada, the United States of America and the United Kingdom have published national guidelines for PA by pregnant women, based on World Health Organisation (WHO) recommendations (ACOG, 2015; Artal et al., 2003; Buschur and Kim; 2012; Evenson et al., 2014). In the Netherlands the WHO guidelines have been used to develop guidelines for PA for the general population, but there are no specific guidelines for PA for pregnant women (Evenson et al., 2014). In this paper, we use the Dutch guideline for activity in the general population – 30 minutes per day of moderately intense activity (described as "activity where the person needs to breath more and heart rate increases but the activity is not exhausting") at least five times a week – as the definition of healthy PA for healthy pregnant women (NISB, 2015).

According to the WHO (2014), 34% of women over 15 years of age were insufficiently active in 2008. When pregnant, many women cut back on their PA (Adegboye et al., 2010; Cohen et al., 2013; Gaston and Cramp, 2011; Poudevigne and O'Connor, 2006; Coll et al., 2015; Bacchi et al., 2016). Depending on time, sample, and method of measurement, this reduction in PA in pregnancy occurs in as few as 7% and as many as 69% of pregnant women. Only a few women increase their PA over the gestational period (Poudevigne and O'Connor, 2006).

A review of 25 studies of the patterns and determinants of PA in pregnancy found that a low level of PA in pregnancy is associated with low income, low education, more children in the home, ethnicity other than white, lower pre-pregnancy activity (Gaston and Cramp, 2011), physical complaints (Weir et al., 2010), lack of resources in social environment (Laraia et al., 2007), and lack of social support (Clarke and Gross, 2004). The literature is inconsistent regarding the influence of parity, employment, pre-pregnancy BMI, age, and smoking on PA (Gaston and Cramp, 2011). Higher self-efficacy expectations and positive beliefs are associated with increased PA in pregnancy (Gaston and Cramp, 2011). Levels of PA are also associated with the information provided in pregnancy (Cannella et al., 2010; Weir et al., 2010), and beliefs about the risks and benefits of PA in pregnancy (Da Costa and Ireland, 2013; Evenson and Bradley, 2010; Johnson et al., 2013). Although it is likely that women reduce their PA because of increased tiredness, a growing belly, and the advice from others to stop their participation in sports (such as contact sports), reducing PA is undesirable, especially for women with already low levels of PA before pregnancy (WHO, 2014).

Studies of PA in pregnancy use both self-reported levels of activity and reports of *change* in activity during pregnancy (Althuizen et al., 2009). While the first approach provides a more consistent measure, the latter is more valuable for prenatal care. In a previous study, for example, we discovered that women who perceived a decrease in their PA during pregnancy were more likely to have a higher gestational weight gain (Merkx et al., 2015a). In this paper we describe a secondary analysis of the data collected in that earlier study, aiming to understand changes in various type of PA in pregnancy. Our ultimate goal is to identify what is needed to develop and intervention that will prevent the reduction of PA and perhaps even stimulate an increase in PA.

Methods

We performed a secondary analyses of data collected in a cross-sectional survey of a sample of healthy pregnant women – defined as pregnant women not needing specialist obstetric care – of all gestational ages (Merkx et al., 2015a).

Procedure

The study was part of a larger research project "Promoting Healthy Pregnancy" that was designed to develop an evidence-based intervention to increase the number of women achieving healthy gestational weight gain. We worked together with the "Promoting Healthy Pregnancy" Consortium, a group of midwives, other health professionals, and researchers. Between September and November 2012, healthy pregnant women of all gestational ages were recruited via 30 midwife-led community practices across the Netherlands. Women who expressed an interest in participating in the study were telephoned by the researcher, who explained the study aim and procedures. Women agreeing to participate were asked to return a written completed consent form, after which a questionnaire was sent via email. A more detailed description of participant recruitment is described elsewhere (Merkx et al., 2015a). The Research Ethics Committee of Atrium-Orbis-Zuyd reviewed and approved the study protocol, because the non-invasive character of the study (Merkx et al., 2015a).

Hypothetical model

We used the Attitude-Social influence-self-Efficacy (ASE)-model (Norman and Abraham, 2000), to explain the change in PA reported by the participants. The ASE model is an extension of the frequently used Theory of Planned Behaviour (Ajzen, 1991, 2011; Norman and Abraham, 2000). According to the ASE model, a particular behaviour is explained by a person's intention to perform the behaviour, which, in turn, is determined by attitudes (beliefs about the particular behaviour), social influences (perceptions of social norms, social support or pressure and role models) and self-efficacy (a person's expectations regarding her capability to perform that behaviour) (Ajzen, 1991, 2011; Norman and Abraham, 2000). We defined women's "intention to perform" as "motivation to engage in healthy PA" (Weinstein et al., 2008). We hypothesized that women with higher scores on "motivation to engage in healthy PA" would reduce their PA to a lesser extent. Based on existing research (Cannella et al., 2010; Clarke and Gross, 2004; Evenson and Bradley, 2010; Gaston and Cramp, 2011; Johnson et al., 2013; Laraia et al., 2007; Weir et al., 2010) we hypothesized that (self-reported) pre-pregnancy PA and the degree of eagerness to seek information about pregnancy would influence the reported change in PA as well. Our hypothetical model is shown in Fig. 1.

Questionnaire

We developed our questionnaire in consultation with midwives, other health professionals, and student midwives. In order to enhance the face validity of our instrument, we pilot tested it with a different set of midwives, health professionals and students, adjusting questions when necessary (Merkx et al., 2015a).

Demographics/characteristics

We calculated *age* using date of birth and date of completing the questionnaire. Using a government definition, *ethnicity* was "Dutch" if both parents were born in the Netherlands and otherwise "non-Dutch" (CBS, 2014). *Family income* was "low" when it was below national modal income (33,000 euro/year) and high if it was above the mode (CPB, 2015). *Education* was "low" for women without a high school diploma, "medium" for women with high school diploma and "high" for women with a university degree. *Work* was "part-time", "full time" or "no paid job". *Parity* was "nulliparous" or "parous". *Gestational Age* (in weeks) was calculated using the expected date of birth and the date of completing the questionnaire. *Pre-pregnancy Body Mass Index* (BMI) was calculated by dividing self-reported pre-pregnancy weight by the self-reported squared height. *Having a weight gain goal* was "yes" or "no". *Smoking* was "non-smoking", "stopped" or "continued". We asked participants to report the extent to which they *sought*
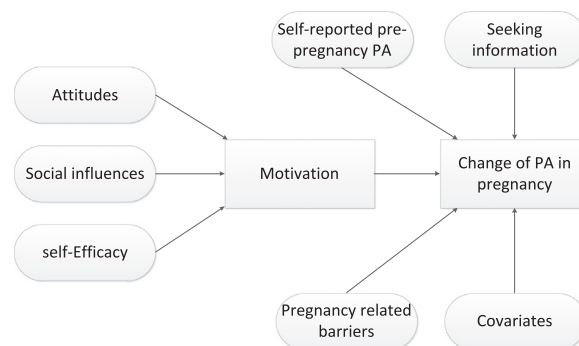
Fig. 1. Hypothesized model. Our hypothesized model is based on Attitude-Social Influence-self-Efficacy-Model: Motivation to have healthy Physical Activity (PA) (central in figure) is predicted by attitudes, social influences and self-efficacy. Change in PA in pregnancy is predicted by motivation, self-reported pre-pregnancy PA, activity in seeking information about pregnancy, pregnancy related barriers and covariates.