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Citation:

Trevorrow, P (2016) Mii and MiiBump: Supporting pregnant women to continue or commence an active lifestyle. *Loisir et Société / Society and Leisure*, 39 (1). 145 - 155. ISSN 0705-3436 DOI: <https://doi.org/10.1080/07053436.2016.1151226>

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Document Version:

Article (Submitted Version)

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This is an Accepted Manuscript of an article published by Taylor & Francis in *Loisir et Société / Society and Leisure* on 06 April 2016, available online: <http://www.tandfonline.com/10.1080/07053436.2016.1151226>

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## RESEARCH ARTICLE

# Mii and MiiBump: Supporting pregnant women to continue or commence an active lifestyle

### Abstract

The purpose of this study was to investigate how women perceive exercising during pregnancy and whether existing technologies could be used to support active behaviours. Information for pregnant women who wish to continue or start exercising is limited and not readily offered. With the ever growing capability and accessibility to technologies research is warranted to investigate whether it could be used to help support exercising during pregnancy. An interpretative phenomenological approach was used to conduct in-depth interviews with five women, via purposive sampling. The data revealed that the participants perceived a number of barriers to active behaviours, such as the lack of a pregnant buddy with which to exercise. A lack of provided information was evident with the women claiming to have sought appropriate information themselves. Findings highlighted the potential for existing technologies to be utilised in order to support and enhance exercise behaviours during pregnancy.

**Keywords:** pregnancy; exercise behaviours; technology; qualitative methods

# Mii and MiiBump: Supporting pregnant women to continue or commence an active lifestyle

## Introduction

It has been reported that 'approximately half of the pregnant women in Ireland, the United Kingdom and the United States of America are classified as overweight or obese' (O'Brien *et al.* 2014 p.760). This has serious implications, in particular for those who are considered as obese, as they will have an increased risk of pre-eclampsia, delivery complications and gestational diabetes, amongst other pregnancy related health issues (Ferraro *et al.* 2011, Brown and Avery 2012, Kader and Naim-Shuchana 2013). An obvious way to control weight gain is via exercise; although in the past women were advised against exercise during their pregnancy due to the belief that it caused negative effects on the development of the foetus and early labour. However these concerns have not been founded within 'normal' healthy pregnancies and the guidelines have since changed (Duncombe *et al.* 2009, Melzer *et al.* 2010). The American College of Obstetricians and Gynaecologists (ACOG) have revised their guidelines to state that pregnant women, who are free of any health and pregnancy complications, can partake in moderate exercise up to 30minutes per day on most, if not all, days of the week (Artal *et al.* 2003, Chasan-Taber *et al.* 2011). Women who were previously classed as sedentary who wish to start exercising are recommended to build up to the stated amount gradually by starting with 15 minutes three times a week (Melzer *et al.* 2010).

Pregnancy can be a time of emotional, physical and behavioural change which can add to what is already considered as a challenging behaviour in exercising regularly (Gaston and Cramp 2011). It is therefore perhaps not unexpected that the majority of pregnant women are classed as inactive and do not meet the ACOG exercise guidelines (Haakstad *et al.* 2009, Chasan-Taber *et al.* 2011, Jackson *et al.* 2011, Gaston *et al.* 2012). Despite this, it could be that pregnancy is an opportune time for women who are classed as sedentary to change their exercise behaviours (Artal *et al.* 2003), this is a time when they will potentially be in contact with the health system the most in their lives to date and could be motivated to change for the benefit of their growing child (Wadsworth 2007, Jackson *et al.* 2011, O'Brien *et al.* 2014). However, it is still perceived that active promotion of exercise during pregnancy is lacking by health professionals (Symons Downs and Hausenblas 2004, Ferraro *et al.* 2011).

Research on women exercising during pregnancy is limited with the majority focusing on the health effects of exercise on the mother and unborn child (Symons Downs and Hausenblas 2004). There is a need for more research into the tools that could help women to improve or maintain their exercise behaviours during pregnancy (Jackson *et al.* 2011).

## Barriers to exercising during pregnancy

*'Pregnancy is one of the most common reasons why women stop exercising and gain weight'* (Kader and Naim-Shuchana 2013 p.6)

As pregnancy develops in women any exercise conducted is seen to reduce in frequency and intensity over the gestation period (Clarke and Gross 2004, Gaston and Cramp 2011). Perceived barriers to exercise was seen to increase as the pregnancy developed (Cramp and Bray 2009).

Perceived barriers to exercising for pregnant women included how safe exercise was believed to be to their pregnancy in general (Clarke and Gross 2004, Duncombe *et al.* 2009). Common physical symptoms of pregnancy such as feeling too tired, feeling uncomfortable, feeling nauseous or being sick, were seen as contributing factors for reducing or not partaking in exercising (Symons Downs and Hausenblas 2004, Cramp and Bray 2009, Duncombe *et al.* 2009, Haakstad *et al.* 2009, Melzer *et al.* 2010, Foxcroft *et al.* 2011). Discouragement from family members was also reported as a barrier to continuing exercise as the pregnancy progressed (Clarke and Gross 2004).

### **Technology availability**

Electronic media is 'dominating and changing our society' (Fleming *et al.* 2014 p.240) however, technology specific to exercising during pregnancy is limited. There are apps for Pilates, i.e. 'Pilates for Pregnancy', or yoga apps, i.e. 'Pregnancy Care (Prenatal Yoga)' and an app for a body work out, i.e. 'Pregnant and FIT!' (Efron 2013, Garcia 2014, Roth 2014). However all of the apps viewed offered stretching and strengthening rather than anything more aerobic or higher impact.

For the individual who is used to running or more strenuous workouts, strengthening and stretching exercises might just not cut it. Or indeed for individuals new to exercise, such activities may not be motivating enough to encourage them to start the behaviour. In addition, why should an individual have to seek a specific pregnancy related app rather than everyday technologies, which some individuals may already have been using. For example, an active video game (AVG) or sports tracker apps are well used technologies but do not (yet) have pregnancy settings.

### **Technology as an intervention**

A study conducted in the United States found that when searching for pregnancy and birthing information, 64% of pregnant women used a mobile phone and 82% used a computer (Declercq *et al.* 2013). However, technology led interventions for exercising whilst pregnant were difficult to find in the research literature, this was iterated by O'Brien *et al.* (2014) more widely with regard to lifestyle interventions:

*'Although communication technology holds potential as a safe therapeutic tool for the support of lifestyle interventions in pregnancy, there is a paucity of data on its effectiveness' (p.760)*

A study conducted by Jackson *et al.* (2011) was one of the limited pieces of completed research found. The study involved the use of a Video Doctor which delivered tailored counselling on exercise, diet, and, weight gain to pregnancy women, the technology was entitled 'Keep Fit'. A laptop counselling session was delivered to the participant with clips that were tailored to the participants BMI, exercise habits, diet and willingness to change their behaviours. The participants stated that they liked the program and were highly satisfied with the ease of use and privacy element. Participants were seen to improve their dietary habits and exercise habits. Two smart phone application trials are currently on-going related to weight management (ClinicalTrials.gov 2012) and physical activity (ClinicalTrials.gov 2011) whilst pregnant, no results have yet been published.

Despite the advantages that technology offers as a potential tool to support and maintain physical activity behaviours during pregnancy there is little qualitative research on women's experiences of physical activity during pregnancy and whether existing technologies could be adapted to this purpose. The current study was designed to fill this gap in the literature. The general research question was: how do pregnant women perceive exercising during their pregnancy and could existing technologies be used to support and encourage physical activity behaviours?

## **Interpretative phenomenological approach**

### ***Methodology, sample and setting***

Working within the Leeds Metropolitan University ethics code of practice the research followed an interpretative phenomenological approach (IPA) in order to generate meaning from common experiences of pregnant women (Larkin 2013). Meaning is applied to common experiences that are collated via in-depth interviewing (Smith *et al.* 2009). IPA benefits from small sample sizes (3-6 participants), personal accounts and understanding the participants within their own context. Thus the research resulted in an analysis of meaning through interviews with five women who had just had their baby or were close to their due date.

Purposive sampling was adopted, as a principle of IPA, in order to identify and recruit participants who will be able to give meaningful data to the study (Smith *et al.* 2009, Larkin 2013). The participants ranged from inactive during pregnancy to very active in order to give a full picture of experiences to the study. The women were interviewed in their own homes or in coffee shops, privacy was maintained at all times with secluded spaces being selected for the interviews conducted in public spaces.

A semi-structured interview guide was adopted to investigate their physical activity behaviours and perceptions during pregnancy. The main topics explored included: 'How do pregnant women receive or access information about exercise during pregnancy?', 'How do they perceive exercising during their pregnancy?' and 'Could technology place a role in supporting and encouraging physical activity behaviours during pregnancy?' The participants were encouraged to talk and to pursue alternative avenues in order to gain a full and rich account of their experiences (Bryman 2004). Probes and follow up questions were asked to add clarity and elaborate on the discussion if necessary (Vandermause and Fleming 2011). The interviews took between 60 to 90 minutes in length and were transcribed verbatim.

All names used within the paper are pseudonyms; no revealing characteristics are included in order to maintain the participants' anonymity.

### ***Data analysis***

IPA involves generating meaning and understanding of the first person perspective from the third person perspective; thus the researcher aims to understand the experience of the participants through their descriptions (Smith *et al.* 2009, Larkin 2013). The interview scripts were read in detail in order to fully understand the participants' accounts. Patterns emerging within the data were identified and themes attributed (Larkin 2013). Once all of the interviews had been coded, the scripts were re-read to verify the codes and themes developed. Colleagues working in similar fields of interest were approached in order to verify the themes identified.

## **Reflexivity**

As part of the IPA principle, the researcher needs to be aware of the concepts, values and potential preconceptions that they may bring to the process (Larkin 2013). This needs to be clearly stated in order to make sense of the interpretations derived from the data captured. The researcher is a middle-class, white woman who has always been physically active. She has been through two pregnancies within the last four years and kept physically fit throughout. The researcher is fully aware that issues can arise in pregnancy that have a debilitating effect on how much, if any, exercise can be taken. She is also fully aware that information is not readily given and any information received by the researcher during her pregnancy was personally sought from credible sources. Thus she went into the interviews with an open mind about exercising whilst pregnant.

All of the participants knew the researcher which aided the interviews in that they felt happy talking about their own experiences. Conversely they knew that the researcher had been very active during both pregnancies which could have influenced how they portrayed their own experiences and actual behaviours.

## **Results**

As had been expected, all participants had reduced their activity levels to some extent as their pregnancies had progressed. This ranged from the most extreme case where one participant, whose previous exercise had consisted of walking, stopped all exercise completely. To a lesser extent where one participant had continued all of her previous activities, at a reduced duration and had adjusted some of the exercises as appropriate.

Three underlying themes emerged from the interview data with regard to exercising whilst pregnant. These were perceived barriers to physical activity, perceived motivators and support systems, and information receiving and seeking.

### ***'I felt too fat': perceived barriers to physical activity***

A recurring theme from the interviews was that of barriers to physical activity. Body perception was an interesting outcome from the interviews, weight gain and the bump were considered as factors in reducing or stopping exercising; Sasha stated that *'I felt a bit weird about running with the bump, I was conscious of running with the bum'*, as a result of this she had stopped running altogether. Two other women had stopped doing particular exercises because they *'felt too fat'*. One of the women added another factor to this issue of being *told* she was fat, she had been using the Wii Fit for yoga and Pilates exercises, but *'the Wii Fit made me sad every time I went on it; it was sole destroying as it told me I was overweight and had eaten too much'* as a result she had stopped using the Wii Fit and stopped her yoga and Pilates exercises. Conversely, lack of weight issues or concerns was also seen as a limiting factor for exercising by two of the women; Hannah, who had recently had her baby, commented that *'I wasn't overweight and I didn't worry about needing to shift the weight afterwards, I think if I had weight issues before I might have considered exercise more'*.

Common pregnancy ailments played a role in all of the women's reasons for reduced or no activity levels. Hannah mentioned that she *'was tired from work and when I got home I just wanted to eat and lie down'*. All of the women stated that the pregnancy was making them feel too tired to

either exercise at all, or to exercise at normal levels. Hip flex pains and bleeding from the pregnancy were serious factors for two of the women and had made them stopped the exercise (walking and running respectively) altogether.

Feeling that they had to reduce the amount or type of exercises that they could do due to the increasing bump was another factor for two of the women. Bianca was *'bored'* by the fact that *'I couldn't do what I normally would'* and Sasha stopped going to circuit training because *'I felt that I couldn't do too much of the activities'*. Related to this was an issue about the types of exercises available or promoted for pregnant women, Jean was annoyed that *'there is not much out there for already active women, those who want to do a bit more than yoga or Pilates'*.

Other people were mentioned by three of the women as factors influencing exercise. One woman had received criticism from strangers when she had been out running; she had not let this affect her and had continued the activity for as long as she could. For two of the other women they were reluctant to go to classes because they had no one to go with: *'it's hard to go somewhere on your own when you don't exercise, if I had someone to go with I probably would have done it'*.

A couple of the women mentioned time as a factor with regard to activities, one stated that the *'times of the classes didn't work for me'*. This compliments the factor of tiredness and suggests that these women needed activities that fit in with their daily patterns at their convenience.

#### ***'I thought it would be good for me': perceived motivators and support systems to stay active***

The women also mentioned factors that actually encouraged or motivated them to continue exercising. Body and stamina reasons were highlighted in a more motivating sense than the previous theme where the women *'didn't want to put on too much weight'* but more positively three of the women had just wished to *'keep my physical fitness and stamina and didn't see any reason not to'*. Specifically related to the pregnancy three of the women had thought that continuing exercising would *'help me to deal with the birth and pregnancy better'*.

Friends with related experiences were classed as motivators and encouragers to exercise. Sasha was *'assured by a friend that I could do it [exercise] as they had exercised all the way through their pregnancy'*. Bianca used exercise as a means to socialise and thus had been encouraged to continue her exercise habits. Technology was mentioned by two of the participants from a motivating factor; Sasha liked to see where she had been after her run and used an app to track her running route. Gemma also used an app to track her walks and used the Wii Fit for yoga and Pilates and could see the potential benefits that it could have; *'if there was a pregnancy setting on it it would have been great. If it had exercises for pregnant people I bet more would do that, that would be great'*.

#### ***'I asked': information receiving and seeking***

The lack of information received was a predominant theme emerging from the interview data. The women had received very little advice with regard to physical activity: *'I received information about the pelvic floor but nothing else from the midwife'*. The most freely given advice was to one of the participants who was told to *'keep active and not stop walking'*.

The most used phrase that occurred in relation to this theme was *'I asked' or 'I researched'*. Four of the women had been motivated to seek the information out themselves. The midwife was one utilised source of information, for example Gemma had *'asked my midwife about doing zumba whilst pregnant'*. Other people such as a *'the Pilates teacher was doing a course on pregnancy teaching at the time'*, and a friend who *'had exercised all the way through her pregnancy'* were used for advice and information about exercising during pregnancy. Sasha and Gemma had also used the powers of 'Google' to help them in their search for information. The overarching conclusion from these ladies was that *'there is not too much out there for already active women'*

One of the women who had not sought any advice and did not receive any was worried *'about the health of the baby when exercising, especially because I hadn't done any exercise before I was concerned about starting it when pregnant'*. Lack of the right advice meant that the fears of exercising took over and she stopped all exercise as a result.

## **Discussion**

The purpose of the study was to investigate how pregnant women perceive exercise during their pregnancy and whether existing technologies could be used to support and encourage physical activity behaviours. Overall the findings stressed perceived barriers to exercising, perceived motivators and support systems, and information receiving and seeking.

Pregnancy ailments were mentioned by some of the participants as reasons for stopping or reducing exercising (Duncombe *et al.* 2009, Melzer *et al.* 2010, Foxcroft *et al.* 2011). Tiredness and body complaints such as feeling too fat (Fell *et al.* 2009, Haakstad *et al.* 2009) were reasons used to not attend exercise classes or to stop an activity altogether. Such symptoms will be ever present in some individuals, the dilemma is to find a way that individuals can exercise at any point when they feel able; for example as stated by one of the women, the Wii Fit has the added bonus of being present in the home which encouraged use.

None of the participants discussed negative views from family members or close friends as a reason for stopping or reducing exercise (Clarke and Gross 2004), in fact the lack of a buddy to exercise with was considered a limiting factor something which has not been mentioned in previous studies.

Motivating factors to remain physically active included a desire to maintain fitness levels and the belief that being physically fit would help to cope with the birth and general pregnancy better (Kader and Naim-Shuchana 2013). One woman mentioned support from a close friend in encouraging her to remain active (Symons Downs and Hausenblas 2004, Field 2012). She also stated that if she had a pregnant friend who could have run with her that she may have continued running further into the pregnancy. This point was reiterated by another woman who found it difficult to go to classes on her own. This takes previous studies (Symons Downs and Hausenblas 2004, Field 2012) a step further and suggests that perhaps exercising with someone in the same situation could encourage maintaining or building exercise levels for some individuals. The idea of having a buddy to exercise with has not come out in previous data; this is something very interesting to consider in relation to technology and the design of a virtual friend who is in the same pregnancy stage as the individual.



The lack of actively provided information on exercising during pregnancy (Brown and Avery 2012) was dominant in the discussions, four of the women had researched themselves for the right information to remain active and all four continued to exercise as long as they felt able. The one woman who had not sought any information was the only one to have stopped all exercise immediately upon becoming pregnant. This shows that when provided with the right information these women were happy to continue exercising.

### ***Implications for the use of technologies***

Simple elements could be included within existing technologies in order to help encourage and support women to exercise whilst pregnant. Tailored exercises were seen as an encouraging factor and were highlighted in both the literature and primary data. Entering personal data into the technology could result in an appropriate individualised exercise plan or information perhaps with a choice of alternative exercises in order to address the feeling of frustration linked to a reduced physical ability. The technology could include appropriate information relevant to the exercise in order to dispel any fears about conducting the activity in addition to reiterating a 'safe' exercise routine. A pregnancy community could be included where advice can be offered and sought as well as exercise information shared between the groups.

Body perception and limitations are difficult to overcome, however the use of an AVG or app could include the element of a pregnant virtual buddy, or coach, in order to encourage the individual that the exercise is safe and may also help them to view how to do the exercise with the ever increasing bump present. Pregnancy ailments and time could also be addressed by the use of something that is ready to hand and fits with the requirements of the user.

### ***Limitations***

A potential limitation is the sample for the study. Participants in this research were limited to a geographical range of volunteers already known to the researcher. The participants did span a wide age range (27-40) however they were all middle-class, highly educated and predominantly white. Future research should include a more diverse group of women.

### **Conclusion**

An interpretative phenomenological approach was used to investigate the physical activity behaviours and perceptions during pregnancy. The themes emerging from the study were: perceived barriers, perceived motivators, and information. This study illuminated the potential that technology could have to influence these themes in a positive manner and encourage and support exercising whilst pregnant to already active women as well as inactive women (Gaston and Prapavessis 2014). Active Video Games (AVGs) or exercise apps have the potential to overcome some of the barriers outlined previously to exercising whilst pregnant in addition to enhancing the motivating factors identified to encourage activity.

Future studies should include the design of pregnancy settings within existing technologies and some feasibility testing in order to ascertain any impact this may have on a sample of pregnant women.

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