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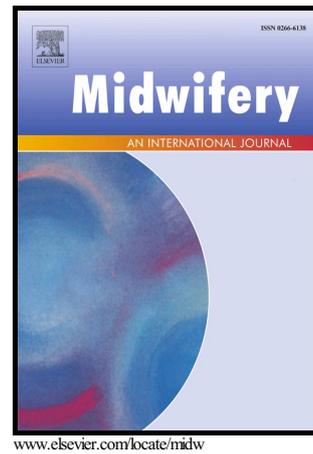
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## Author's Accepted Manuscript

Higher Facebook use predicts greater body image dissatisfaction during pregnancy: The role of self-comparison

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# Higher Facebook use predicts greater body image dissatisfaction during pregnancy: the role of self-comparison

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## **Abstract**

### **Objective**

Poor body image during pregnancy is a growing issue. Similarly, emerging evidence is suggesting that social media use may increase the risk of poor wellbeing e.g. depression, anxiety and body image concerns amongst users. Research has not examined how social media use may influence women during pregnancy. The aim of this study was to therefore to explore the relationship between body image during pregnancy and Facebook use.

### **Design**

A cross sectional self-report questionnaire

### **Participants**

Two hundred and sixty nine pregnant women

### **Setting**

Community groups and online forums

### **Measurements**

A self-report questionnaire exploring maternal body image, use of Facebook and how mothers perceived Facebook affected their body image. Descriptive statistics were used to explore body image perceptions. Partial correlations (controlling for maternal age, education, parity and gestation) were used to explore the association between Facebook use and body image during pregnancy.

## Results

Negative body image was common in the sample, increased with gestation and was unrelated to pre pregnancy weight. Mothers with a Facebook account had higher body image concerns than those without a Facebook account. Of those with an account, increased Facebook use was associated with increased body image dissatisfaction, particularly in terms of postnatal concerns for how their body would look with 56.5% reporting that they frequently compared their pregnant body to other pregnant women on the site. Facebook access was frequent with 85% of participants checking it at least once per day and the average participant spending over an hour per day on the site.

## Key Conclusion

Although causality cannot be fully explained, Facebook use may increase mother's risk of poor body image dissatisfaction during pregnancy. Mothers with already poor body image may also be drawn to the site in order to make comparisons of their appearance.

**Implications for practice:** The potential impact of Facebook on increasing the risk of, or promoting existing poor body image is an important message for those working to support mothers during pregnancy and the postnatal period. Care should be taken when directing mothers to use the site.

**Keywords:** Body image; Pregnancy; Postnatal; Social Media; Facebook; Maternal

## Introduction

Body image describes the cognitive, affective and behavioural aspects of one's body (Cash et al. 2002). Body image dissatisfaction, particularly amongst women, is common with some studies suggesting that up to 85% of women experience these feelings to some extent (Pruis & Janowsky, 2010). Indeed, dissatisfaction is considered normative now due to its frequency (Ricciardelli & McCabe, 2004). For women, focus often centres around three main issues: idealisation of a slender figure, irrational fear or fat and belief that appearance determines one's identity (Levine & Smolak, 2006).

In recent years, growing numbers of women appear to be concerned about their weight gain and appearance during pregnancy (Skouteris, 2011). Whereas the mantra 'eating for two' used to be common (Feig and Naylor, 1998), women now face increasing social pressure to not gain weight during pregnancy (Orbach & Rubin, 2014). In particular women hold concerns for what their body will look like after pregnancy and whether they will be able to lose weight gained (Watson et al. 2015).

Pregnancy is a time of changes in weight gain and in bodily appearance, rarely experienced to such an extent at any other time in a woman's life. Although women understand the need for weight gain during pregnancy, and some feel liberated by this (Duncombe et al. 2008; Goodwin et al. 2000), pregnant women can be keen to limit the impact on their body (Skouteris, 2015). Feeling like they have lost control over their appearance (Warren & Brewis, 2004) and side effects of pregnancy such as heartburn, fatigue and tender breasts can enhance feelings of dissatisfaction (Kamysheva et al. 2008). Pregnancy can also trigger or intensify existing negative feelings about the body or disordered eating (Conrad et al. 2003).

Body image during pregnancy is an important issue for maternal wellbeing during pregnancy due to its association with increased risk of depression and anxiety (Andrewartha et al. 2015). Negative body image during pregnancy has also been associated with an unhealthy diet, attempts to lose weight and unhealthy eating patterns (Conti et al. 1998) which increases risk of low infant birth weight, premature delivery, miscarriage and caesarean delivery (Olafsdottir et al., 2006). Conversely, poor body image can increase risk of excessive weight gain due to comfort eating (Mumford et al. 2008), in turn increasing risk of infant macrosomia, caesarean section and childhood overweight (Olson, 2008). Mothers with poorer body image during pregnancy are also less likely to breastfeed (Brown et al. 2014).

Media representations of desirable body shapes and appearance are a key source of body image dissatisfaction throughout the lifespan (Andrew et al. 2015; Grabe et al. 2008). A key issue is that whilst body image ideals actually represent a maladaptive ideal that is so slender and without imperfections that it is impossible for many to achieve (sometimes even the models themselves due to high levels of digital editing), over representation has made these normative (Smolak & Murnen, 2007). These images of youthful, non-pregnant women are rife across global media. However, the media portrayal and interest in the appearance of pregnant women and desired body shape has rapidly grown (Orbach and Rubin, 2014). Focus

is often based on how little weight celebrities gain during pregnancy or how quickly they lose weight after the birth. Idealised images of very slender women with a neat bump are common, despite this shape being difficult to achieve (Mills et al. 2013). Concepts of glamour and attractiveness are celebrated with the creation of the ideal of the 'yummy mummy' hailed for her slender shape and ability to maintain attraction throughout pregnancy and the postpartum period (Krisjanous et al. 2014).

Moreover, in recent years, concepts of media have changed. Whereas television and magazines were once the most popular form, social media networks such as Facebook and Twitter have now rapidly grown in popularity. Immediately accessible via personal computers and smart phones, access to social media is now constant and pervasive (Perloff, 2014). In particular, Facebook membership has grown rapidly, with over 655 million active daily users worldwide (Facebook, 2013). Pregnant and new mothers are a large user group of Facebook (De Choudhury et al. 2013).

Facebook can be a useful tool for social contact (Burke et al, 2010), providing information and advice (Morris et al, 2010) and social support, which are critical elements of wellbeing during pregnancy (Meadows, 2011). However, growing research is suggesting that social media may have a negative impact upon wellbeing including increasing the risk of low self esteem (Ellison et al. 2007), poor life satisfaction (Kross et al. 2013), anxiety (McCord et al. 2014) and depression (Jelesnick, 2013;). Social media use may also increase the risk of poor body image. Statistics suggest that over 10 million photographs are uploaded onto Facebook worldwide every hour (Mayer – Schonberger & Cukier, 2013), offering an immediate availability of new images that far surpasses that found in any magazine or television show. Increased time on social media has been associated with body dissatisfaction (Fardouly & Vartanian, 2015), potentially due to the significant opportunity for social comparisons. Unrealistic images, often carefully selected, filtered or altered in some way, can increase dissatisfaction (Williams & Ricciardelli, 2014).

However research has not explored the specific association between body image during pregnancy and social media use. Given the high use of Facebook amongst this demographic and the potential for negative influence upon maternal and infant health, the aim of the current study therefore was to explore body image and eating behaviour during pregnancy and to examine the relationship between these factors and social media use.

## Method

### *Participants*

Pregnant women (4 weeks + gestation) aged 18+ completed a questionnaire examining their body image and social media use. No limit was placed on parity or gestation. Decision was made to include all stages of gestation as different body image concerns may arise at different stages. Mothers were resident in the UK and indicated this by giving the first three letters of UK postcode. Exclusion criteria included inability to give consent, multiple pregnancy, previous history of eating disorders and known significant infant or maternal health problems. Ethical approval for the study was granted by a University ethics committee. The study adhered to all elements of the declaration of Helsinki. All participants gave informed consent and data remained anonymous and confidential.

Participants were recruited through online forums for pregnant women and social media. Non NHS antenatal and pregnancy, mother, and baby classes were also used for recruitment. Snowball sampling was used with mothers encouraged to pass on details of the questionnaire, particularly to recruit women who did not use social media or any type of internet forum.

For the online questionnaire, study adverts were placed on online forums aimed at pregnant mothers (e.g Mumsnet and Netmums). These forums have specific boards for advertising research and only these boards were used. The adverts described the study background, process and participation criteria. Participants could read information about the study and if interested click on a link which took them to the questionnaire hosted by SurveyMonkey. The questionnaire would then open, giving a full participant information sheet and consent questions including information about how to contact the researcher. Participants had to respond to consent questions for the remainder of the questionnaire to open. At the end of the questionnaire a debrief loaded thanking the participant and directing them to relevant health professionals if they had any health concerns, or the researcher if they had any further questions about the research. The study was also advertised through Facebook groups (e.g. those aimed at pregnant women). Permission was sought from the group administrator to

place the advert on the group. Participants again followed the link to the SurveyMonkey questionnaire and process.

For the face to face groups, local mother and baby groups were approached. The group leader acted as gatekeeper informing members of the study and passing on an information leaflet containing details of how to access the study online. Paper copies of the questionnaire were also available on request. These groups also typically had a Facebook group online and the study advert was advertised by the group leader on these.

### ***Measures***

Mothers completed a self-report questionnaire examining

- a) Demographic background (maternal age, education, occupation, parity and gestation, pre pregnant weight and height)
- b) Maternal body image during pregnancy
- c) Facebook use
- d) Perceived impact of Facebook use upon maternal body image during pregnancy

Although a number of validated tools exist for measuring body image in the general population (e.g. Body Esteem Scale [Franzoi & Shields, 1984], Body Shape Questionnaire [Cooper et al. 1987], Body self-relations questionnaire (Brown et al. 1990)) no specific tool has been validated and published for use with pregnant women. Pregnant women are likely to experience different pressures and emotions and unique changes to their body shape compared to non-pregnant women. Issues such as stretch marks, weight loss and the impact of pregnancy upon breast appearance do not apply to general body image. The validity of using questionnaires designed for non-pregnant populations during pregnancy has therefore been questioned (Fuller-Tyszkiewicz et al. 2012). Moreover, the study aimed to explore pregnancy specific body image rather than more generalised behaviours, thus needing a specific tool.

Therefore a body image tool was designed specifically for this study. A series of questions identifying body image were designed. These were based on themes in the existing literature examining body image during pregnancy (e.g Skouteris et al. 2005; Duncombe et al. 2008;

Clark et al. 2009 ). A previous pregnancy body image tool designed by the researchers (that showed good validity and reliability) was also used as a basis (*insert reference after review*). This tool was designed after discussion of body image with pregnant and new mothers. However further questions were added to this based on further review of the literature. The questionnaire was piloted with a small group of pregnant women (n = 4) for readability. A copy of the body image items can be found in table 1.

For Facebook use participants indicated whether they had a Facebook account [yes/no] and if so how often they typically accessed it [several times a day, once or twice a day, a few times a week, once a week, rarely, never]. Those who used Facebook were asked to estimate how much time they typically spent on Facebook each day. Finally, those who held a Facebook account answered a series of items examining directly the perceived impact Facebook had on their body image during pregnancy (For items see table 2).

### **Data Analysis**

Data was analysed using SPSS version 20. Data was downloaded from SurveyMonkey into SPSS and any uncompleted responses removed. Participants were only included if full participation in the questionnaire was present. For example, participants who started completing the questionnaire and simply stopped, leaving latter parts blank were removed.

To give greater validity to the questions examining body image, and to compute factors to make the data more manageable, Factor analysis was used to reduce the questions. Factor analysis is a statistical method that explores whether large numbers of items can be grouped statistically into smaller numbers of factors. It examines the variability and relationships between the observed variables (e.g. the questions in a questionnaire) and whether a lower number of unobserved factors (e.g. not directly asked) can explain these better. For example it looks at response patterns between items and if a pattern of similar responses (e.g. always strongly agree) emerges across items, it groups those items together. This allows a large number of questions to be reduced to a small number of representative factors for analysis (For more details see Field, 2009). A separate exploratory factor analysis was conducted for body image items and Facebook specific body image items. To undertake the factors analyses, SPSS was used to conduct a principal components factor analysis, using varimax rotation on

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each of the three sets of questions. Factors with eigenvalues over 1 were retained. A threshold of 0.3 was used to determine which variables should be retained. Further analyses performed on split samples of the data for confirmation found similar structures. The factor scores computed were saved as regression scores and used for the data analysis (for more details see Tabachnik & Fidell, 2007).

Cronbach's alpha was computed for each factor, to examine internal consistency of the factors produced. Cronbach's alpha examines the correlation between items that have been grouped together (e.g. within a factor). For example if 5 items were grouped together, it looks at how strongly these correlate together and the variance of these correlations. A higher correlation suggests that they are measuring a similar theme (Field, 2009). Cronbach's alpha is therefore a good test of reliability of the factors that have been produced.

Descriptive statistics were used to examine maternal demographic background, body image and Facebook use (e.g. means, range, frequency). Pearson's r correlation and t tests were used to explore the association between demographic background and Facebook used and body image factors. Finally, partial correlations (controlling for maternal age, education, parity and gestation) were used to explore the association between Facebook use and body image during pregnancy.

## **Results**

Three hundred and fourteen women completed the questionnaire. After removing incomplete responses, two hundred and sixty nine women had full data and were considered in the analysis. The mean age of participants was 30.50 years (SD: 5.61) with a range from 18-44 years. Mean years in education were 15.12 (SD: 4.12). Mean gestation of pregnancy was 26 weeks (SD: 14.2) with a range from 4 – 44 weeks. Further demographic details of the sample are shown below in table two.

### ***Body Image***

Participants completed a series of items exploring their body image during pregnancy. The proportion strongly agreeing or agreeing with each statement is shown in table one. Body

image dissatisfaction was common in the sample with a minority concerned about gaining too little weight.

Principal components factor analysis was performed on all statements examining body image producing 5 factors and explaining 58.99% of the variance (Table 3). Factors were labelled 'positive' (e.g. enjoying the changes, feeling happy about their shape), 'negative' (e.g. feeling under pressure not to gain weight, disliking changes), 'proud' (e.g. enjoying attention her changing shape brings), 'concern for postnatal image' (e.g. concerns for how her body will look after pregnancy and losing weight) and 'concern for growth' (e.g. concern for not gaining enough weight or that her bump was too small). Two items did not load ('I love my family touching my bump' and 'I love strangers touching my bump'). Three items loaded onto more than one factor. Only items reaching the threshold of more than 0.30 are shown in the table to enable easy illustration of key groupings.

Regression scores for each factor were computed and used for comparison. Descriptive means were also computed by calculating the mean score for items grouped together based on the factor groupings. These were used for analysis as they are more illustrative of responses than a factor score. Cronbach's alpha was also computed for each factor, ranging from .73 to .84 and is also shown in Table 3.

Using Pearson's correlations, significant associations were found between maternal age and body image. Mothers who were older felt significantly less negative (Pearson's  $r = -.30$ ,  $p = .00$ ) more positive (Pearson's  $r = .14$ ,  $p = .015$ ) and more proud (Pearson's  $r = .13$ ,  $p = .03$ ) about the changes to their body. Mothers with a higher level of education were significantly more positive (Pearson's  $r = .12$ ,  $p = .028$ ) and more anxious about growth (Pearson's  $r = .11$ ,  $p = .04$ ). Maternal pre pregnancy BMI was associated with postnatal concerns (Pearson's  $r = .15$ ,  $p = .01$ ) but no other body image variable

Gestational age was also significantly related to body image. The greater maternal gestation the less proud mothers felt about their body (Pearson's  $r = -.13$ ,  $p = .03$ ). However, the further into their pregnancy mothers were, the less worried about growth (Pearson's  $r = -.12$ ,  $p = .04$ ). Finally, the more children a mother had, the more positive they felt about changes to their body (Pearson's  $r = .15$ ,  $p = .01$ ) and the less concerned they felt about postnatal changes to their body (Pearson's  $r = -.11$ ,  $p = .05$ ). No significant associations were found between

number of children and positive or pragmatic feelings or anxiety about growth. Maternal age, education, parity, pre pregnant BMI and gestational age were therefore controlled for throughout analyses.

### **Facebook Use**

Mothers were asked whether they had a Facebook account (yes/no), how frequently they visited the Facebook site and to estimate how long they spent on average per day on the site. Two hundred and five mothers (76.2%) had a Facebook account whilst 64 (23.8%) did not. In terms of how frequently participants who had an account checked it, 60.6% did so several times a day, 24.6% once or twice a day, 12.8% a few times a week, 1.5% once a week and 0.5% did so rarely. The average time spent on Facebook per day by those who did have an account was 67.20 minutes (SD 56.77) with a range from zero to 300 minutes.

Maternal background, gestation and number of children and Facebook use was explored using t tests. Mothers who had a Facebook account were significantly younger [ $t(266) = -.38, p = .00$ ] and had fewer years in education [ $t(266) = -.32, p = .01$ ] than those who did not. Mothers who were younger spent significantly more time on Facebook (Pearson's  $r = -.23, p = .00$ ). No further significant relationships were found between maternal background and the number of times they checked or the time they spent on Facebook.

### **Facebook and body image**

The relationship between Facebook use and the body image factors of positive, negative, proud, postnatal concerns and concerns for growth was explored. A MANCOVA controlling for maternal age, education, parity and gestation showed that mothers who did not have Facebook felt significantly more positive about their pregnant body than those who did [ $F(1, 257) = 11.53, p = .00$ ]. No further significant differences were found.

For those who had a Facebook account, two further sets of analyses were performed exploring frequency of checking Facebook and the time spent on Facebook. In terms of frequency of use, partial correlations controlling for maternal age, education, parity and gestation showed that mothers who checked their Facebook more frequently had greater

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concerns for their postnatal body (partial correlation = .12,  $p = .026$ ). No further significant correlations were found between behaviours and frequency of checking Facebook.

In terms of time spent on Facebook, partial correlations showed the greater amount of time mothers spent on Facebook, mothers had greater concerns for their postnatal body (partial correlation = .20,  $p = .00$ ) and greater concerns for their baby's growth (partial correlation = .24,  $p = .00$ ).

### **Facebook specific body image**

Participants who had a Facebook account were asked a series of questions directly exploring how they felt Facebook made them feel in terms of their pregnant body. The proportion of participants who agreed or strongly agreed to each item is shown below in table 2.

Principal components factor analysis was performed on all statements examining body image producing 4 factors and explaining 67.39% of the variance (see table 1). These were labelled 'positive', 'negative', 'competitive' and 'anxious'. Two items did not load: 'Anxious about my pregnant body' and 'negative about my pregnant body'. Two items loaded on more than one factor. Cronbach's alpha was computed and ranged between .74 and .87.

The association between length of time spent on Facebook and Facebook specific body image was examined. No significant association was found between how often mothers checked their Facebook account and Facebook specific body image. However, the more time they spent on Facebook, the more negative they felt Facebook made them feel about their body image (Pearson's  $r = .18$ ,  $p = .01$ ), the more competitive they felt about their pregnant body image (Pearson's  $r = .22$ ,  $p = .01$ ) and the more anxious they felt about their weight gain (Pearson's  $r = .17$ ,  $p = .00$ ).

Finally, participants were asked specifically how often they compared their pregnancy to others on Facebook [Response options: Very frequently, frequently, sometimes, rarely, never]. 56.5% of participants responded that they very frequently or frequently did so.

In a series of partial correlations (controlling for maternal age, education, parity and gestation), the more frequently participants checked Facebook (partial correlation = .18,  $p = .01$ ) and the more time they spent on Facebook (partial correlation = .24,  $p = .000$ ) the more they compared their pregnancy. Moreover, the more mothers compared their pregnancy, the

more negative (partial correlation = .20,  $p = .00$ ), less proud (partial correlation = -.18,  $p = .01$ ) and more concerned about their growth (partial correlation = .26,  $p = .00$ ) they felt. Finally, the more they compared their pregnancy on Facebook, the Facebook made them feel negative about their body (partial correlation = .39,  $p = .00$ ), anxious about their body (partial correlation = .33,  $p = .00$ ) and competitive about their body (partial correlation = .18,  $p = .01$ ).

## Discussion

The purpose of this study was to examine the link between maternal body during pregnancy and Facebook use. The results showed that body image dissatisfaction was common during pregnancy, although not experienced by all women. Moreover, Facebook use, specifically in terms of how much time was spent on Facebook had a significant negative impact upon body image during pregnancy, particularly related to postnatal concerns about her body. Mothers were aware of this influence, specifically agreeing that Facebook made them feel more negative about their body image through comparison with other pregnant women.

Firstly, body image concerns were common amongst the sample, particularly amongst younger women and first pregnancies, and were greater as pregnancy increased. More than half of women were worried about gaining too much weight in pregnancy compared to less than 10% who were concerned about gaining too little. Over half of women felt pressure to have the 'perfect bump' of a large bump and little weight gain elsewhere. Concerns about how their body would look postnatally were particularly strong with over two thirds of women anxious about this element and over half concerned about the pressure on them to lose their baby weight postnatally. These findings reflect previous work in the area highlighting the growing concerns of body image dissatisfaction and the pressure to conform to a certain idea during pregnancy (Clark et al. 2009; Mills et al. 2013; Watson et al. 2015).

Secondly, the findings highlighted a link between Facebook use and negative body image, particularly in relation to postnatal concerns. Mothers who had a Facebook account were significantly more negative about the changes to their body during pregnancy. Of those who had an account, the more time they spent on Facebook the more concerns they had for their postnatal body. These findings support research with adolescents suggesting that time spent on Facebook increases body image concerns (Mabe et al. 2014; Smith et al. 2012; Tiggemann

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& Miller, 2010; Tiggemann & Slater, 2013), and add to growing literature showing a link between Facebook use and low self esteem (Ellison et al. 2007), poor life satisfaction (Kross et al. 2013), anxiety (McCord et al. 2014) and depression (Jelechnick, 2013; Moreno et al. 2011). Given the cross sectional nature of the study, these findings could be interpreted in two different ways. Either time spent on Facebook (or on the internet more generally) increases body image concerns or women with negative body image are drawn to Facebook.

Considering the hypothesis that time spent on Facebook may increase negative body image in pregnancy, we know that exposure to other forms of media can negatively impact on women's body image in general (Grabe et al. 2008; Andrew et al. 2015) through increasing levels of negative self comparison (Tiggemann & McGill, 2004) and this is likely to affect images seen through digital media too. Self-comparison increases feelings of body image awareness and dissatisfaction when individuals cannot meet these idealised images (Levine & Murnen, 2009). In a longitudinal study, Aubrey (2006) followed college-age women, finding that exposure to sexually objectifying media increased levels of self-objectification, particularly for those with low self-esteem. Increased exposure to Facebook is also known to increase the risk of negative social comparison (Blease, 2015), negative self-evaluations and rumination about not being 'good enough' ( Feinstein, 2013). Indeed, time spent on Facebook can induce low mood in users (Fardouly et al. 2015), and increase feelings of loneliness (Kim, LaRose & Peng, 2009). These factors can impact directly on body image, causing users to make negative comparisons between their body and pregnancy, and others.

Limited research has directly considered the impact of Facebook exposure on body image. In non-pregnant women, engaging in Facebook has been associated with increased risk of body image dissatisfaction (Mabe et al. 2014) and disordered eating (Smith et al. 2012). In two studies of teenage girls, the more time spent on Facebook, the higher body image concerns, slender idealisation and drive for thinness (Tiggemann & Miller, 2010; Tiggemann & Slater, 2013). Female high school students who used Facebook also had higher levels of self objectification than those who did not (Meier & Gray, 2014). Self comparison is likely to occur, as happens with traditional media, enhanced by the volume of photographs and images available on Facebook. Experience of how users interact with Facebook also plays a key role. Findings suggest that it may be exposure to photographs on Facebook rather than Facebook use itself that increases greater body dissatisfaction (Meier & Gray, 2014). Others

suggest that comparisons made may play the key role; those who compare themselves negatively after using Facebook are at increased risk of body dissatisfaction rather than Facebook use itself (Fardouly & Vartanian, 2015). This impact can be potentially enhanced by the significant use of digital tools that individuals use to alter the appearance of photos they post on Facebook (Mabe et al. 2014) and the frequency and ease of access of Facebook on smart phones and other devices (Junco, 2011; Junco, 2013). In the current sample, of those with a Facebook account, nearly two thirds checked their account repeatedly during the day, with 85% doing so at least once or twice a day. This is likely to give significantly more access to such images compared to traditional forms of comparative media such as magazines.

Considering the specific findings of this study, this is the first study as far as we are aware to explore Facebook use and body image during pregnancy. Indeed, little is known at all about the use of Facebook at this time in general. We know that pregnant women are at risk of poor body image due to significant changes in their body during pregnancy and concerns for their postnatal body (Clark et al. 2009; Mills et al. 2013; Watson et al. 2015). We also know that pregnant women turn to the internet, often to seek advice and information from web pages and forums (Lagan et al. 2010). Pregnancy is also increasingly carried out in the public spotlight, with increased focus in the media and news stories (Fox et al. 2009). Growing numbers of entertainment websites and online news stories now discuss changes in celebrity weight and appearance at this time (Gow et al. 2012). The increased use of social media may enhance exposure to this as social media is checked more frequently than print media (Galarneau, 2009).

The limited research conducted on Facebook use amongst new mothers after birth suggests that they may turn to Facebook for advice (Gray, 2013) and social support (Holtz et al. 2015) but that increased use is associated with parenting stress (Bartholomew et al. 2012). The direction of this relationship is unknown but potentially social comparisons play a role. It is likely that pregnant women are exposed to the same pressures and social comparisons in relation to body image and Facebook exposure as non-pregnant women. However these may well be exacerbated due to a combination of rapid new changes in body shape, significant discussion regarding pregnancy and celebrity in the media and pressure on new mothers to get it 'right'. Women feel under increasing pressure to lose weight and regain their pre pregnancy appearance (Riley, 2011). Indeed, when asked specifically in our study, pregnant

women who compared themselves to their pregnant friends more frequently on Facebook had significantly poorer body image.

However it is also possible that those individuals who are drawn to Facebook, are already at greater risk for body dissatisfaction. In student populations, those with low self-esteem typically spend more time on Facebook (Mehdizadeh, 2010; Ellison et al. 2007). Low self-esteem is a strong predictor of poor body image (Mellor et al. 2010). Depression and anxiety are associated with both increased body image dissatisfaction during pregnancy (Downs et al. 2008.) and Facebook use (Hetzl-Riggin & Pritchard, 2011). Trait neuroticism is also associated with both poorer body image (Dalley et al. 2009) and social media use (Ehrenberg et al. 2008). Body image concerns may also be indicative of social anxiety, a disorder higher amongst those with body image concerns (Cash et al. 2004). Social media can be attractive to those with social anxiety as it allows them to interact with others from a distance and portray a certain image (Seidman, 2013). As we do not understand the causality of these relationships it is possible that mothers with lower wellbeing (and who also have poor body image) are more likely to spend time on social media compared to face to face socialising as it allows a controlled portrayal to others and limited interactions (Gonzales & Hancock, 2011).

A longitudinal study would be needed to tease out the direction of this relationship more clearly. However, stepping aside from causality, our findings show that significant numbers of pregnant women are experiencing negative body image during pregnancy, particularly in relation to concerns about their postnatal body. This concern correlates directly with Facebook use, with mothers who recognise that they compare themselves with other pregnant women on Facebook, having higher body image concerns. Aside from the issue of the importance of maternal well being during pregnancy (Brand & Brennan, 2009), a key issue is that body image concerns are occurring at such a high level and are not simply explained by pre pregnancy overweight. Healthy levels of weight gain and body changes during pregnancy are healthy and important aspects of a healthy pregnancy and reduce the risk of either excessive or reduced weight gain for both mother and baby (Viswathan et al. 2008; Kothari et al. 2011; Hill et al. 2013).

Healthy eating and weight gain are now routine issues for public health midwives but body image is not routinely considered in antenatal care, despite its potential significance for maternal wellbeing and subsequent weight gain (Leddy et al. 2009). Health professionals

should be aware that body image concerns, and not just weight itself should be an important element for discussion, given its potential implications for both physical health and wellbeing. A mother may be a healthy weight but have significant negative cognitions. When discussing the issue of weight gain, health professionals should be aware of the potential risk to a mothers body image and balance this with the need to support women not to gain excessive weight. This is of course a potentially difficult conversation to be had and further research on how to approach the issue of body image during pregnancy, and subsequent professional training should be invested in.

Moreover, given the popularity of social media, health professionals should be aware of potential implications for body image. The internet holds significant opportunity for signposting to health information and support opportunities. Many local 'mums groups' have Facebook pages. Although, the strengths offered by these sites may well out weigh the risks to body image, consideration should be given when signposting mothers. Given that professionals cannot stop the exposure of mothers to unrealistic body types, further research is needed in understanding how resilience against the potential negative influences of social media can be built.

There were a number of limitations to the findings. Firstly, participants were self-selecting. This meant that only the most motivated participants may have taken part, perhaps those with the strongest body image concerns. Participants were also on average older and had a higher level of education than the population average. However this is typical of social research (ONS, 2012). Online adverts were utilized as part of the recruitment process. Critics of this approach suggest it may lead to sample bias as internet users may be more educated and informed (Drentea & Moren-Cross 2005). However internet recruitment is growing in popularity in health research (e.g. Alcade & Cristina, 2011; Hamilton et al. 2012; Ferguson & Hansen, 2012) as it allows access access to a targeted sample in a cheap and effective way (Koo & Skinner, 2005). It is particularly useful in recruiting pregnant and new mothers due to high use of internet forums amongst this sample (Hall & Irvine 2008, Plantin & Daneback 2009). Such forums are now typically used by a wide spread of demographic groups (Sarkadi & Bremberg 2005; Quan-Haase et al. 2002). A wide range of responses was seen across demographic groups for those who completed the research online.

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Finally, the study used a body image questionnaire developed for the purpose of the study rather than an existing body image tool. This could raise issues of validity. However, existing tools may be inaccurate for use in a pregnant sample, not least because they do not include items exploring pregnancy specific concerns such as stretch marks and changing shape (Fuller-Tyszkiewicz et al. 2012). Moreover, the tool used was based on previous work of the team (insert reference after review) and statistical reliability was enhanced through tools such as Factor analysis and Cronbach's alpha.

In conclusion the findings revealed a novel relationship between Facebook use and negative body image during pregnancy. Increased time spent on Facebook was associated with increased body image dissatisfaction and although this relationship may be bidirectional or explained by moderating variables, mothers who explicitly noted comparing their pregnant body to others on Facebook reported higher body image concerns. The findings are important to those working with mothers during pregnancy and the postpartum period both due to the impact of negative body image upon maternal wellbeing, but also through pathways to potential negative impact on maternal weight, complications during pregnancy and infant feeding outcomes. Further research is needed to explore how the impact of this influence can be reduced.

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#### **References**

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**Table One: Body image items and % of participants who strongly agreed / agreed with each statement (n=269)**

Item	% Strongly agree / Agree	Mean (SD)
I feel more attractive during pregnancy than usual	18.2	3.89 (1.02)
I feel pressure to have the perfect bump	55.4	2.86 (1.11)

I feel more confident about my pregnant body than my non pregnant body	19.3	3.76 (1.04)
I love how I look during pregnancy	32.0	3.54 (1.21)
I feel pressure to look like I am glowing	49.8	2.67 (1.34)
I love people commenting on my bump	36.1	3.42 (1.22)
I love my changing shape	33.5	3.54 (1.01)
I love the attention my pregnant body gets	30.9	3.48 (1.19)
Pregnancy makes me feel more attractive	20.1	3.90 (1.10)
I feel confident about my body	37.9	3.67 (1.12)
My partner loves my changing shape	35.3	3.75 (1.01)
I feel pressure to have a small bump	4.1	4.57 (.54)
I compare my body negatively to pregnant celebrities	40.1	2.98 (1.22)
I compare my body negatively to other pregnant women	46.5	2.84 (1.10)
I feel pressure not to put on too much weight	40.1	2.65 (1.20)
I feel competitive with other pregnant women to look good	38.3	2.89 (1.45)
Other peoples comments about my body have upset me	39.8	2.95 (1.04)
I worry about what my body will look like after pregnancy	68.0	1.98 (1.32)
I worry that my partner finds me unattractive	53.9	2.34 (1.67)
Pregnancy has not changed how I feel about my body	23.4	3.86 (1.22)
I am worried I am gaining too much weight	55.8	2.36 (1.22)
I worry about the effect of pregnancy upon my body	66.9	1.86 (1.64)
I feel pressure returning to my pre pregnant weight once born	58.4	2.05 (1.34)
I worry that my partner will find me unattractive after pregnancy	40.1	2.87 (1.11)
I am too in awe to think about what my bump looks like	17.8	3.68 (1.22)
I love my partner touching my bump	58.4	2.87 (1.01)
I love my partner commenting on my bump	57.9	2.83 (1.04)
I love my family and friends commenting on my bump	55.4	2.78 (1.12)
I love strangers commenting on my bump	19.7	3.78 (1.14)
I worry about the effect of pregnancy upon my breasts	54.3	2.34 (1.13)
I am worried about stretch marks	56.9	2.03 (1.45)
I worry what my body will look like after pregnancy	62.5	1.87 (1.32)
I worry about losing the weigh after pregnancy	57.8	1.98 (1.03)
I am worried my bump is too small	15.6	3.96 (1.09)
I don't mind if my body changes as a result of pregnancy	17.8	3.87 (1.11)
I feel pressure to have a big bump	20.1	3.45 (1.04)
I am worried I am gaining too little weight	8.9	4.21 (.85)

**Table 2: Facebook specific body image items and % of participants who strongly agreed / agreed with each item (n = 269)**

	% Strongly agree or agree	Mean score (and SD)
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Happy to show photos of my bump on Facebook	17.9	3.67 (1.12)
Confident about my pregnant body	7.6	4.21 (.08)
Proud of my pregnant body	14.7	4.10 (.09)
Normal about my changing shape	21.7	3.86 (1.10)
Positive about my pregnant body	15.2	3.76 (1.21)
Anxious about how my body will look after pregnancy	45.7	2.65 (1.33)
Anxious about losing the baby weight	58.7	2.45 (1.12)
Under pressure to look a certain way	66.8	2.12 (1.45)
Worried I'm gaining too much weight	45.1	2.34 (1.60)
Worried my bump is too big	40.8	2.56 (1.12)
Competitive about my pregnant body	30.4	2.98 (1.34)
Jealous of how my friends look when pregnant	67.4	2.10 (1.32)
Jealous of how other people like celebrities look when pregnant	60.9	2.11 (1.39)
Worried my bump is too small	7.6	4.10 (0.9)
Worried I'm not gaining enough weight	10.9	3.98 (1.11)
Anxious about my pregnant body	46.7	2.34 (1.24)

**Table three: demographic background of participants (n = 269)**

Indicator	Group	N	%
Age	< 19	6	2
	20 – 24	42	16
	25 – 29	70	26
	30 – 34	89	32
	35 >	61	23
Education	School	1	0.4
	College	41	15
	Higher	99	37
	Postgraduate	107	40

Marital Status	Married	172	64
	Cohabiting	75	28
	Partner	16	6
	Single	4	1.5
	Widowed	2	0.7
Maternal occupation	1	19	7.1
	2	81	30
	3	91	34
	4	62	23
	5	16	6
Parity	First baby	107	40
	Second or more	162	60

**Table Four: Factor loadings and groupings for the body image questionnaire**

	Positive	Negative	Proud	Postnatal concerns	Concerned for growth
I feel more attractive during pregnancy than usual	.907				
I feel pressure to have the perfect bump	.838				
I feel more confident about my pregnant body than my non pregnant body	.837				
I love how I look during pregnancy	.796				
I feel pressure to look like I am glowing	.794				
I love people commenting on my bump	.743				
I love my changing shape	.722				
I love the attention my pregnant body gets	.718				
Pregnancy makes me feel more attractive	.701				
I feel confident about my body	.618				
My partner loves my changing shape	.506				
I feel pressure to have a small bump		.564			
I compare my body negatively to pregnant celebrities		.836			
I compare my body negatively to other pregnant women		.774			
I feel pressure not to put on too much weight		.737			

I feel competitive with other pregnant women to look good	.687			
Other peoples comments about my body have upset me	.564			.762
I worry about what my body will look like after pregnancy	.507		.642	
I worry that my partner finds me unattractive	.505			
Pregnancy has not changed how I feel about my body	-.470			
I am worried I am gaining too much weight	.461		.539	
I love my partner touching my bump		.765		
I love my partner commenting on my bump		.759		
I love my family and friends commenting on my bump		.705		
I feel pressure returning to my pre pregnant weight once born		.697		
I am worried about stretch marks			.794	
I worry that my partner will find me unattractive after pregnancy			.658	
I worry about the effect of pregnancy upon my breasts			.635	
I worry about the effect of pregnancy upon my breasts			.635	
I worry about the effect of pregnancy upon my body			.635	
I worry what my body will look like after pregnancy			.588	
I worry about losing the weigh after pregnancy			.582	
I am worried my bump is too small			.494	
I don't mind if my body changes as a result of pregnancy				.715
I feel pressure to have a big bump				.664
I am worried I am gaining too little weight				.583
<b>Cronbach's alpha</b>	<b>.842</b>	<b>.801</b>	<b>.786</b>	<b>.798</b>
			<b>.734</b>	

**Table 5: Showing factor loadings and groupings for Facebook body image questionnaire.**

	Positive	Negative	Competitive	Anxious
Happy to show photos of my bump on Facebook	.895			
Confident about my pregnant body	.798			
Proud of my pregnant body	.774			
Normal about my changing shape	.482			
Positive about my pregnant body	.466	-.757		
Anxious about how my body will look after pregnancy		.859		
Anxious about losing the baby weight		.848		
Under pressure to look a certain way		.837		

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Worried I'm gaining too much weight		.705		
Worried my bump is too big	.	.580		
Competitive about my pregnant body		.435	.688	
Jealous of how my friends look when pregnant			.471	
Jealous of how other people like celebrities look when pregnant			.412	
Worried my bump is too small				.907
Worried I'm not gaining enough weight				.902
<b>Cronbach's alpha</b>	<b>.867</b>	<b>.834</b>	<b>.742</b>	<b>.787</b>

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Accepted manuscript