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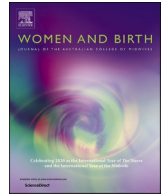
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An exploration of pregnancy and postpartum content on Instagram: A content analysis of health and exercise focused accounts

Helen M. Jones^{a,*}, Jemma Orr^b, Maxine E. Whelan^c, Oyinlola Oyebode^d

^a School of Life Sciences, Coventry University, UK

^b School of Biosciences, University of Nottingham, UK

^c Centre for Healthcare and Communities, Coventry University, UK

^d Wolfson Institute of Population Health, Queen Mary University of London, UK

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ABSTRACT

Problem: Although social media can be an accessible option for women to receive support, there is increasing awareness of the negative mental health impacts of social media use during the postpartum period. Idealistic portrayals on social media have been shown to lead to body dissatisfaction and low mood.

Background: The beginning of a child's life is a period of significant physical, mental and social adjustment for a mother. Women often resort to online sources of information to navigate this time period.

Aim: This study explored the content featured in prominent health and exercise Instagram account posts targeting pregnant and postpartum women.

Methods: Popular individual health and exercise focused accounts targeting pregnant and post-partum women were identified on Instagram. Data about the account holder and content of posts were extracted. Data were analysed using inductive content analysis.

Findings: Most included accounts belonged to American women aged 35–44 who were slim. Content analysis of 317 posts from 43 Instagram accounts unveiled six themes: reasons to exercise, weight management, guidance on doing exercise, eating well or not so well, fitting it all in, and comparison of body image.

Discussion /conclusion: Content analysed was not representative of the general population. Included posts could shape beliefs that may lead to intrapersonal weight stigma. Consideration must be given to actions that could promote individuals of all body sizes being represented in the media relating to pregnancy and the postpartum period.

Statement of Significance

Problem

The potential negative mental health impact of social media use during the postpartum period are increasingly apparent. Idealistic portrayals on social media have been shown to lead to body dissatisfaction and low mood.

What is Already Known

Individuals are increasingly exposed to content that portrays thinness as the norm, which is likely to have a negative impact on body image.

What this Paper Adds

The current study explores popular health and fitness Instagram accounts targeting pregnant and postpartum women. Our findings highlight how popular, highly visible Instagram posts (most often posted by American women who were slim and aged 35–44) may lead to more intrapersonal weight stigma and ableism within this group of women.

Introduction

The first thousand days (conception to two years old) is a critical time to lay the foundations of optimum health and development for the remainder of that child's life. This period is a source of substantial adjustment for the mother, with significant changes happening not just

* Correspondence to: School of Life Sciences, Alison Gingell Building, Coventry University, Whitefriars Street, Coventry CV1 2DS, UK.

E-mail address: ad2183@coventry.ac.uk (H.M. Jones).

¹ Orcid ID: 0000-0002-8600-7101

physically, but also socially and psychologically. New mothers can experience sleep disturbances, fatigue, pain, depression, and anxiety [2, 32,39]. Many women feel challenged to accept the consequential physical changes to their body, leading to increases in body dissatisfaction [6,22,37]. In response, women often seek information and advice, with social media a popular choice for child health, pregnancy and parenting advice [1,4]. Social media can be a useful way to connect, share information and receive support at a time where many women experience loneliness and isolation [7,9,17,21]. In a survey of 117 mothers across the USA, 89 % recalled using social media for pregnancy and parenting-related advice [1]. In another survey 86 % of mothers noted daily Instagram use [38].

Unfortunately, there is growing recognition of the negative consequences of using social media. Social media use has been associated with negative mental health in the postpartum period [11]. Individuals are increasingly exposed to content that portrays thinness as the norm [8, 20], which is likely to have a negative impact on body image [33]. Idealistic versions of motherhood may be depicted on social media [15]. This has been shown to lead to social comparisons decreasing mothers' perception of parenting competence [12]. This social comparison can lead to significantly higher levels of anxiety and envy [18]. In addition, USA-based research that explored online news media articles found that pregnant and postpartum women frequently experience weight stigma in the media [25]. Weight stigma is associated with harmful psychological and physiological outcomes such as obesity, diabetes, depression and body image dissatisfaction [35,36]. Weight stigma has been associated with gestational weight gain, inability to lose weight postnatally, and depressive episodes [16]. The authors identified that women with larger bodies are rarely used in media images and the topic of weight during pregnancy was often negative [25]. Furthermore, systematic reviews have highlighted the prevalence of misinformation on social media generally [34], and in the pregnant and post-partum period [7].

Much of the research that explores social media in the pregnancy and postpartum period focuses on searching hashtags only such as '#postpartum' [22] and #Postpartumbody [40]. With a need for more research that centres around this important stage in life, this study explored the content featured in prominent individual health and fitness Instagram account posts targeting pregnant and postpartum women.

Participants, ethics and methods

Study design, sample and data collection methods

Content analysis of social media posts was used for this observational, exploratory study. Popular pregnancy and postpartum Instagram accounts were purposefully identified through online search engines for top health, exercise and fitness accounts [41] on pregnancy, postnatal or the fourth trimester. This search was conducted using an incognito private browsing window. Several search terms were used (see Supplementary Material 1). Results from the first webpage of Google, Bing and Yahoo were catalogued then listed Instagram accounts catalogued. Two authors (HMJ, JO) screened individual Instagram accounts. Accounts had to have $\geq 50,000$ followers and, in total, ≥ 100 posts on the account. To ensure relevant and recent content, ≥ 1 post had to have been made in the two weeks prior to time of sampling and have an overall focus on health, fitness or exercise. Visible content had to be related to obesity, weight, weight gain, weight loss, body positivity, body neutrality, postpartum or pregnancy. Current content on the accounts had to relate to pregnancy or the postnatal period with the youngest child up to 2 years of age, and posts had to be in English language. Accounts were ineligible if they represented large organisations (e.g., companies) or posted about less relevant content (e.g., mental health, recipe and meal planning, medical advice, or focused on male experiences of the postpartum period). Large companies were ineligible because we were

seeking to examine user generated content from individuals rather than larger companies that already contribute to traditional media, e.g. Television. The 20 most recent posts for each eligible account were identified, working backwards from 23rd November 2022. Only posts posted by the account holder were analysed, with follower posts not incorporated. Ethics was not required as all data were in the public domain however, we have decided not to report account holder names.

Data extraction

Extracted data were recorded in Microsoft Excel, with the form initially piloted (HMJ, OO, JO). Data extraction across all included accounts was equally split and undertaken (HMJ, OO, JO, MW). Data were extracted on the profile holder (estimated age [18–25, 26–34, 35–44, 45–54 years], nationality, physique [underweight, very slim, slim, slim athletic, overweight or obese]) and from the sampled post (type [e.g., image or reel], date, summary description of the post [including text embedded within image or reel, and context/setting of post], captioned text [including hashtags used]).

Data analysis

A descriptive analysis was undertaken of account characteristics (age, nationality, and physique). Data extracted from the posts (e.g., post captions) were exported into NVivo v1.5. Inductive content analysis was used to generate categories systematically. Content analysis was chosen as it is an objective and systematic way of describing phenomena [42]; it has also been used in other Instagram analyses [3,41]. After data familiarisation, analysis began with organising the data through open coding (HMJ). Codes were initially grouped together to form sub-categories (HMJ, JO, OO), which were then abstracted into categories (HMJ, JO, OO). Categories were named using words that closely represented the data. MW was a second reviewer who audited the grouping of data. Quotations from Instagram posts that best represented each subcategory were selected. Hashtags included within the included sampled posts were entered into a word cloud generator for analysis (OO & JO).

Results

Descriptive analysis

A total of 1172 Instagram accounts were identified through the search engines. After removing duplicates ($n=507$), 665 Instagram accounts were selected for screening. Forty-three Instagram accounts were eligible. Reasons for excluding Instagram accounts included: not pregnancy/postpartum-related ($n=297$), not health/exercise focused ($n=50$), $<50k$ followers ($n=208$), unable to locate the account ($n=3$), male account holders that focused on their experience of pregnancy/postpartum ($n=9$), no posts in the two weeks preceding ($n=4$), and irrelevant posts ($n=6$). Of the 43 account holders, 13 were aged 26–34 and 26 were aged 35–44, with four accounts including multiple people of various ages. Twenty-four of the account holders were American and the remaining were Australian ($n=8$), British ($n=3$), Canadian ($n=1$), Irish ($n=1$), New Zealand ($n=1$) and French ($n=1$). Nationalities for the remaining four were unknown (due to multiple people). Finally, account holders were mainly slim ($n=15$) or slim athletic ($n=21$), with one account holder considered very slim, two overweight and the four accounts including multiple people generally being slim. The five most used hashtags (total 695 recorded) were #postpartum ($n=52$), #postpartum fitness ($n=44$), #pelvic floor ($n=34$), #diastasisrecti ($n=33$) and #pregnancyworkout ($n=28$). A visual representation of hashtags used is provided (Fig. 1).



Fig. 1. A visual representation of hashtags used from the included posts.

Content analysis

From the 43 included accounts, 317 (of a possible 860; 36.9 %) posts were relevant and subsequently coded. Of those posts 259 (81.7 %) were videos/reels, 57 (18 %) were images, and one (0.3 %) was a live recording. A total of 1047 codes were generated before abstracting into six categories and 26 sub-categories (Table 1).

Reasons to exercise

Deserving of exercise

Postpartum mothers were informed they ‘deserved’ to make time to exercise, and that this was a way to become the best version of yourself. It was suggested that exercising was a way to demonstrate self-love and worthiness.

Exercise to cope physically with children

Exercise was thought to be important to keep up with the physical demands of young children. There was a focus on specific body parts, such as arms and core strength, to improve mother's ability to pick children up and engage in more active play. Exercising to take care of oneself, both physically and mentally, was highlighted as important for the family.

Feeling positive about exercise

Posts highlighted the physical benefits of exercising postnatally and had a particular focus on improving strength. Strength was seen as more important than aesthetics, with many posts stating they felt stronger because of exercise participation after having children than they did before. Posts emphasised the importance of mental health benefits from exercise and it being a way to feel like yourself again after childbirth. Movement was seen to rehabilitate and nourish the body postnatally, with a sense of pride and excitement felt from returning to exercise.

New positive phase of life

Posts shared how having young children shouldn't reduce a mother's ability to take part in competitive sport and many posts spoke of mums trying new activities for the first time (e.g., gymnastics). Although priorities may change in this life phase, there is a realisation that you need to enjoy life, have fun and it's never too late to take part in exercise or sport.

Weight management

Exercise isn't just to burn calories

Posts emphasised the importance of not focusing on exercise as a task to burn calories. Exercise was seen as a task that should make someone feel good and not to compensate for food/drink consumed. There was a focus on holidays and celebratory events, with reassurance that food/drink consumed during these occasional events should be enjoyed and should not impact on long-term progress towards fitness or weight loss goals.

Gaining and losing weight

Many posts focused on weight management, particularly weight gain during pregnancy and weight loss in the postpartum period. Posts referred to plans for weight loss and discussed getting back to a pre-pregnancy body with a particular focus on the stomach area. There was some recognition that this process can take time and is an individual journey. This contrasts with the focus on strength highlighted in category one, recognising the different perspectives on why to exercise. Both a healthy diet and exercise were recognised as important for weight management.

Breastfeeding

Posts highlighted the difficulty and common misconception of weight loss whilst breastfeeding. Several posts referred to how women can sometimes start to reduce weight when they stop breastfeeding, perhaps in part due to feeling increased hunger while breastfeeding. The importance of waiting until milk supply has stabilised before attempting weight loss was mentioned, as well as the importance of a new bra to improve body confidence.

Guidance on doing exercise

Demonstration tips and descriptions

Posts shared an array of ways of doing particular exercises. Exercises were demonstrated with and without equipment, including birth balls and rowing machines, and with others around (e.g., a dog or baby). Many were exercising or demonstrating exercises in a range of environments including dedicated spaces at home, home gyms, commercial gyms, outdoor settings (e.g., beaches, gardens, swimming pools or on balconies) and in group classes. Many of the dedicated home environments were in clean, tidy, well designed/styled spaces free from large obstructions and mess. Some posts shared environments in more “normal” settings such as kitchens, bathrooms or in rooms with

Table 1
Main categories and sub-categories.
































Main category	Subcategory	Example Instagram posts
Reasons to exercise	Deserving of exercise	<p>Postpartum mamas, you need this</p>  <p>It's like giving yourself a little hug for all you do. You deserve it</p>  P1 Every pregnant woman deserves the time to slow down and move their body in a way that feels restorative. P2 This is going to kill your arms...like killer shark, white tiger kill them  but don't worry rainbows are coming when your arms are strong picking up kids, carrying groceries and so much more! P3 But just remember that taking care of yourself (mind and body) IS one of the best things you can do for your family. P4
	Exercise to cope physically with children	<p>Eff the bounce back, mamas. Let's train to get strong and feel good. Motherhood is hell a demanding. Birth is a major freaking event and yet we don't teach women how to heal or protect their core and pelvic floor for all the demands we have after! It blows my mind. But hey, it is why I do what I do now. P5 They said babies would ruin my body & I'd never get my body "back". I didn't want it back though, I wanted to be better, fitter & stronger & I did it! P6 It's never too late to try something you've always wanted to try. It's never too late to start MOVING! P6 Ending summer with a bit of fun. A mom of two, I still try to do things that bring me joy. That bring out my inner child. That keep me active, smiling and fostering my identity outside of just "mom". Challenging my body and knowing my age is just a number. Don't forget to play and keep doing things that make you feel young and like yourself P7</p>
	Feeling positive about exercise	<p>We DO NOT exercise to "make up" for what we ate</p>  I have seen these charts floating around for years and I HATE them.....I venture to say not knowing how to enjoy things you love without shame/guilt because you're trying to be perfect, then "giving in" and OVER doing it cause you think you already failed -THEN creating a negative connection with exercise and food is 100000 times worse and is actually the real culprit!!!!
	New positive phase of life	 ,  ,  We have to shift our minds to a lifestyle. A lifestyle enjoys holidays and moves on guilt free. It puts you in control to pick what we really want and move on and not get crazy on treats. Again pick what you want and enjoy it!! We can't be perfect and we have to stop putting the pressure on people to be because it's hurting them!! P3 I've made some gains and gosh darn it, it feels really really good
Weight management	Exercise isn't just to burn kcal	 We have to shift our minds to a lifestyle. A lifestyle enjoys holidays and moves on guilt free. It puts you in control to pick what we really want and move on and not get crazy on treats. Again pick what you want and enjoy it!! We can't be perfect and we have to stop putting the pressure on people to be because it's hurting them!! P3 I've made some gains and gosh darn it, it feels really really good
	Gaining and losing weight	 We have to shift our minds to a lifestyle. A lifestyle enjoys holidays and moves on guilt free. It puts you in control to pick what we really want and move on and not get crazy on treats. Again pick what you want and enjoy it!! We can't be perfect and we have to stop putting the pressure on people to be because it's hurting them!! P3 I've made some gains and gosh darn it, it feels really really good

Table 1 (continued)

Main category	Subcategory	Example Instagram posts
Guidance on doing exercise	Breastfeeding	 it didn't take 6 weeks or even 6 months. It took damn near 2 years. KEEP GOING. Keep chipping away even if it feels you've gone backwards... small incremental baby steps over time lead to impactful changes. It's a lifestyle. Not a race. P7 'some women who breastfeed struggle to lose weight due to hormones, increased hunger and interrupted sleep. There are so many variables that go into postpartum weight loss, check the caption!' P8 'outfit of the day' P9
	Demonstrations, tips and descriptions	<p>I'm not kidding when I say this band move is one of my favorites right now. The band is from my DFH set of five bands. I highly suggest getting a set for Christmas</p>  You will not regret it! My app is going to have a full band program in it that's going to rock your bodaaaay! P3 My [account holder name] 12 month plan is currently over 60 % off!! - Join in my bio & let's get stronger together! P6
	Advertising	<p>Remember, if you are pregnant please listen to your body and always get your health care professionals approval before starting any new exercise program. P10 8 steps to transform your "Mom Bum" P11 There are so many benefits of staying active during pregnancy:  improve your mood + energy.  help prepare your body for birth + recovery postpartum  decreases & can help prevent aches + pains  the right techniques during pregnancy can help in minimizing + prevention of diastasis recti & pelvic floor dysfunction!!!!AND so much more!! P12 </p>
	Exercise during pregnancy	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant
Eating well or not so well	Target areas	<p>8 steps to transform your "Mom Bum" P11 There are so many benefits of staying active during pregnancy:  improve your mood + energy.  help prepare your body for birth + recovery postpartum  decreases & can help prevent aches + pains  the right techniques during pregnancy can help in minimizing + prevention of diastasis recti & pelvic floor dysfunction!!!!AND so much more!! P12 </p>
	Research benefits of physical activity	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant
Fitting it all in	Food suggestions and cravings	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant
	Importance of a healthy diet in pregnancy	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant
Fitting it all in	Consistency	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant
	Only a short time is needed	<p>I'm weirdly craving grapefruit iceblocks and anything citrus. Also I've been eating like 100 kiwi fruits....?!</p>  Tell me your weird pregnancy cravings?? I love reading these, some peoples are SOOO random hahah. Let me know below!! P10 So instead of stressing about your weight, focus on implementing a balanced diet and most importantly TRUST & EMBRACE YOUR BODY!  P13 Make the effort, plan & commit & stay consistent! P14 3 exercises, 10 minutes, that's all you need! complete each exercise for 1 minute (complete the first 2 exercises on each side then go to the next exercise) 1 round will take 5 mins! currently #28weekspregnant

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Table 1 (continued)





Main category	Subcategory	Example Instagram posts
Comparison of body image	Exercise with partners and others	workouts)! It's also great for beginners, pregnancy and postpartum. P16
	Exercise with baby	tough things are always easier if you aren't going through them alone. P17 I get a lot of questions about how I fit in my workouts around having kids... and I'm going not going to lie it is hard. P18 This is your little reminder to let your kids see you exercising so they grow up & have a great relationship with movement P19
	Rest	The toxic parts of fitness culture can push the rhetoric of "no days off" and can encourage guilt for experiencing times when we need breaks from movement-but it's important to push back against this narrative. P20 I felt off today so I listened to my body & did an infrared sauna & some breath work then went home & did a yoga session from my FIT app. P6
	Challenges and difficulties	I take my hat off to any mums who manage to work out, finding the time (and motivation) is so hard. I always said I'd get back into working out as soon my body was physically ready, but the truth is I just don't have the energy or time to leave the house for PT sessions or classes. P21 Don't let someone who is in a season of their life where they have the accessibility and free time to hit the gym hard tell you, "you don't want it bad enough". P7
	Self-discipline	If you have goals for yourself, if you want to start making change... this is what needs to happen. There is no other way around it. P4
	Self-care	It takes time. ♥ Don't compare to others. ♥ Focus on your own journey. ♥ Don't be too hard on yourself. ♥ Try to enjoy the process. Ignore people who try to put you down - they're everywhere! P6
Body confidence/acceptance	Before/after	6 months ago...excited to start working out after labour. Now feeling fitter and stronger everyday. P9 25 weeks V 10 weeks!!!  Bubba & I are growing strong  P10 FIND THAT PEACE WITHIN  ♥... Body confidence and body image is a complicated funny thing. I've learnt to push it aside and focus on the bigger picture. In a world where everyone wants to look like the girls they see on social media. Take yourself away and just focus on YOU  P22
	Body dysmorphia	Well mama, let me tell you something. The number on the scale is not the only indicator of health during your pregnancy!! P13 Lately, simply being in my underwear in a room with a mirror has been triggering a lot of anxiety in me about my rapidly changing pregnant body. I've gained almost as much weight at 25 weeks pregnant this time around as I gained in 40 weeks during my first pregnancy and my brain is making a

Table 1 (continued)

Main category	Subcategory	Example Instagram posts
		WAY bigger deal out of that than it should be. I'm genuinely struggling to recognise myself, it's a bizarre experience after being so confident for such a long time, and it's frustrating to feel like I'm wasting energy being anxious about my body when there are so many things that are far more important. P23 I didn't ask my body to respond to life this way. I didn't wish it. Actually, I wished it away. P24
	Miracle of pregnancy	"Mothers are freaking strong. We do not know our own strength until we dance face-to-face with unimaginable challenges. We are capable of so much more than we know!" P5

obstructions such as toys on the floor.

Several account holders shared images posing in exercise clothes ranging from bikinis to exercise gear (e.g., leggings, crop tops). Account holders were demonstrating exercises or doing everyday tasks such as making a cup of tea or doing housework. Some account holders shared images of their muscles and toned stomachs. Many images were with babies/young children.

Demonstrations focused on various body parts, such as hips and core, and included a range of activities (ranging from yoga, barre and gymnastics to squats, running, building strength, stretching and rowing). Tips offered helped motivate readers to do exercise (e.g., use of 'catchy' songs when working out) as well as in how to do certain exercises (e.g., how to maintain good posture, correct technique).

Advertising

Many posts advertised paid exercise programmes and workouts for pregnancy and postpartum. There were a variety of fitness programmes advertised including pregnancy and postpartum workouts, baby wearing exercise programmes and programmes that focussed on specific target areas (e.g., pelvic floors, core exercises, low impact exercise, breathing and pregnancy yoga).

Posts advertised exercise clothing, equipment (e.g., exercise bands), diet/meal plans, protein shakes as well as free resources such as podcasts, blogs and websites. Some offered free trials of programmes or apps as well as discounts and competitions.

Within this subcategory there was a mixture of posts suggesting you needed specific equipment to exercise such as dumbbell weights whilst other posts suggested you don't need any specific equipment to exercise. Helpful posts shared useful items that can be used from around the home rather than buying specific equipment.

Exercise during pregnancy

An emphasis was noted around posts reassuring women that exercise is safe during pregnancy and that exercise will not hurt a baby. Several posts stated that exercise during pregnancy would help to maintain good posture, aid childbirth, and recover from c-section/vaginal birth more quickly. Of note, there was caution around the intensity of exercise being suggested (e.g., to avoid high intensity exercise postpartum), to seek healthcare professional guidance if unsure, and emphasised the importance of listening to the body.

A key factor that was identified in these posts was around how the exercises were suitable for pregnancy or the postpartum period. In particular, modifiable exercises which were suitable for instances where there was limited time or equipment available, and were described as 'pregnancy safe'. Some posts specifically referred to exercises that were

suitable for the second trimester of pregnancy or for women with prolapse.

Target areas

Posts related to six key target areas: back, bottom, core, diastasis recti, leakage and pelvic floor. Posts discussing core strength were most common and these reassured women that these exercises were safe and will help the full cycle of pregnancy (i.e., labour, delivery, recovery) and quality of life. Back-related posts focused heavily on exercises to prevent back pain and address good posture. Posts mentioned how women often want to improve glute strength to address the 'flat bum', stated as a consequence of pregnancy, and how this can be achieved through squats. Posts highlighted benefits to improving pelvic floor function through stronger glutes. For diastasis recti, posts suggested simple exercises to address it without surgical intervention. Posts often emphasised how leakage does not need to be normal with pelvic floor exercises, breathing and good posture important to help reduce leakage. For pelvic floor, posts mentioned avoiding stresses on the pelvic floor (despite the pressures caused by a baby on the pelvic floor), and the role of breathing properly, hip squeezes and other pelvic floor-related exercises. Posts reflected on how these exercises can be done despite a c-section and can help with numbness, back pain, and even speed up the labour process.

Research benefits of physical activity

Posts discussed the benefits of exercise and not being sedentary. Posts commented on how these behaviours not only benefited the mother (e.g., improved cognitive development), but also the baby's health through the mother's actions.

Eating well or not so well

Food suggestions and cravings

The notion of cravings during pregnancy was often discussed, with citrus fruits and homemade sandwiches reported. Posts shared images of plates of food and women making food with examples including a healthy lunch or a salad in a jar, as well as recipes. Other posts highlighted how women will eat anything and everything during pregnancy when not feeling nauseous and how it can help refuel post-workout, such as coconut water and turmeric latte protein shake.

Importance of healthy diet in pregnancy

Posts focused on emphasising the importance of eating nutritious foods and the need for mothers to have knowledge about healthy eating. One post showed a child walking with the mother whilst talking about the importance of nutrition in pregnancy; highlighting the idea of sharing insight and involving others in the topic. The posts eluded to how eating healthily can support a healthy baby and how pregnancies went well due to dietary intake. One post noted the need to focus on diet rather than weight gain in pregnancy.

Fitting it all in

Consistency

Many accounts expressed the belief that consistency was key to achieving various outcomes including postpartum weight loss, increasing strength, changing body shape and improved wellbeing. This included account holders demonstrating their ability to maintain their exercise routines while on holiday or busy with other things. Messages motivated the audience not to skip a workout. There were various recommendations for what consistency meant. These included "exercise daily", "aim for 30 minutes of exercise per day", "exercise 5 days a

week", "exercise 5–6 days per week" and "2–3 days a week of exercise is all that is needed".

Only a short time is needed

Complementing the theme on consistency, many account holders communicated how exercise can fit into a short amount of time. Along with posts suggesting that you only need 10 or 10–15 minutes to see the benefits of exercise, or making recommendations for short workouts to try, there were many suggestions that this could be accomplished while a baby was napping.

Exercise with partners and others

Women shared photos of themselves exercising with friends and with their partner with some explicitly stating that exercising can be easier when it is done with others. Some posts indicated that they earned respect from their partners who took part in their workouts and realised how fit they must be.

Exercise with baby

Many posts showed women exercising with their babies, either baby wearing or with prams, or in the presence of children. Some posts suggested that by incorporating the baby into the exercise programme it was more possible to fit into the daily routine. This could have been through using a baby as a weight. Other posts suggested/demonstrated role modelling, in which children were copying exercises. Challenges were also shown around exercising with children, distractions and unpredictable behaviour.

Rest

Rest or days off from exercise were described as natural, necessary and a way to balance competing priorities. The idea that it was "ok" not to exercise, that there are times when breaks are needed, and that a few days of rest won't undo consistent exercise training were circulated. Sometimes posts expressed a reaction to "toxic fitness culture" that might make someone feel they can't have a day off. There were vastly different ideas as to what a rest might mean, from doing a low intensity work out, "some movement" or nothing at all.

Challenges and difficulties

Some posts talked about challenges to exercise while pregnant and in the postpartum period including both mental and physical challenges (e.g., exhaustion, sleep deprivation). Several posts talked about challenges maintaining a healthy diet. Some account holders posted about guilt, blame and shame associated with adjusting to pregnancy/motherhood, or accepting that expectations of pregnancy and motherhood may not be met and supporting those who experience negative feelings.

Many posts mentioned the unwanted advice or judgment that is associated with being pregnant or post-partum including suggestions that "babies will ruin your body", comments on food choices, and women being unhappy when asked if they were pregnant, based on body shape. Some account holders expressed that people who hadn't experienced pregnancy, parenting a small baby or birth trauma may make incorrect assumptions about a woman's motivations or priorities when the woman does not meet their expectations in terms of lifestyle or body size.

Self-discipline

There was reference to self-discipline, self-efficacy and goal-setting among the analysed posts. These were all tools that could be used to motivate individuals to achieve physical activity.

Comparisons of body image

Self-care

Within this subcategory posts included self-care advice. There was an emphasis on the importance of not comparing yourself to others and not listening to those that may, intentionally or unintentionally, belittle you. Posts highlighted the importance of ‘nourishing’ your body and mind during the postnatal period. Importance was placed on focusing on your own journey and accepting both the highs and lows of that period.

Before/after

Many accounts shared posts comparing “before and after” photos in relation to pre-pregnancy and postpartum body image. Posts focussed on body transformations and changes to body shape comparing pregnancy and postpartum images as well as up to 2.5 years postpartum. These posts compared weight loss or improvements in fitness, with some emphasising changes to the stomach area.

Body confidence/acceptance

Many account holders shared similar messages around acceptance of postpartum bodies including self-love for your new body, that bodies are not the same postpartum, to respect your new body and that your body is for you. Account holders shared messages not to compare and wishing away bodies akin to removing memories of babies carried. There were posts suggesting exercise isn’t just for aesthetics but to improve confidence and overall health. Some posts discussed that health is about more than weight and checking the weighing scales.

Body dysmorphia

In contrast to the above, several account holders struggled with the increase in size and weight during pregnancy. One account holder talked generally that mums worry about pregnancy-related weight gain. Some account holders discussed treatment or ways of coping with body dysmorphia during pregnancy, with one account stating, “Please just hurry up and come out” (P23). There was a sense of disappointment in themselves postpartum and compared lack of weight loss postpartum to death or long-term misery.

Miracle of pregnancy

This subcategory emphasised how women’s bodies are amazing, strong and capable of growing babies. Posts discussed how mothers go through various changes but are capable of challenges and highly resilient.

Discussion

The present study aimed to explore the content featured in prominent health and fitness Instagram accounts targeted towards pregnant and postpartum women. This study identified key categories and subcategories that generate knowledge around what pregnant and postpartum women are being exposed to through the Instagram platform. Categories related to reasons to exercise as well as guidance on doing exercise, a focus on weight management, eating well or not so well, fitting it all in, and comparison of body image. The analysis showed that most account holders were perceived as slim or slim athletic perpetuating unrepresentative norms around weight. This concurs with previous research that highlighted a limited range of body sizes being featured on social media [3,5,30,33,40]. This finding has also been seen in more traditional media sources [25]. Although it is in a more subtle way, this can unconsciously lead women to believe what is the norm. This only serves to drive comparison, which again has been positively

associated with body image dissatisfaction [13]. In a qualitative study involving 50 pregnant or postpartum women, 65 % described images of pregnancy in the media as unrealistic, creating “impossible standards” for women [19]. Although there was no obvious weight stigma or weight bias found in analysed posts, the nature of the posts included can shape beliefs that may lead to intrapersonal weight stigma.

One main category titled ‘reasons to exercise’ suggested that exercise was undertaken or promoted to take part in self-care and that mothers ‘deserved’ to take time to exercise. Exercise was deemed important to cope physically with children, creating the view that physicality is central to motherhood, something that may be seen to promote fat-phobia and ableism [31].

Posts focused on weight management, with some recognition that exercising shouldn’t be just about burning calories, although other accounts were focused on weight-loss. An analysis of #postpartum found a focus on weight loss and appearance related body changes [22]. Account holders shared anecdotal evidence of experiences in which breastfeeding and weight loss were not correlated. In a systematic review of observational studies (n=37), 63 % of included studies found little or no association between breastfeeding and weight change [24]. Although no misinformation was highlighted in this study, this has been noted elsewhere particularly with the lack of evidence being used to support Instagram posts [7].

Many of the posts included demonstrations, tips or guidance on how to exercise, with a focus on aesthetic (e.g., flat stomach) and functional (e.g., pelvic floor). A large majority of posts involved advertising, including exercise programmes, blogs, clothing and equipment. Posts that included a demonstration of exercise generally took place in sunny locations and in clear spaces with no clutter; which may not be a typical representative of an average household. A discourse analysis of pregnant women’s personal accounts on Instagram acknowledged spotlessly clean homes and exotic locations as the norm [23]. This gave the sense that the account holders were relatively privileged women.

The category ‘fitting it all in’ found that women emphasised the importance of being consistent with exercise, and having self-discipline, often failing to examine reasons outside of an individual’s motivation that some might not prioritise health and fitness. Only a short amount of time was needed to fit in a workout. Account holders often gave examples of how you could exercise with your baby present. Rest was recognised as important although some account holders did consider low intensity exercise as rest. Challenges and difficulties of exercising during this phase were highlighted by a few account holders, supporting often impractical suggestions regarding weight loss for pregnant and postpartum women [25]. MacPherson et al. [22] in an analysis of the #postpartum reported that women in the postpartum period often applied pressure to be the perfect parent. Our findings around consistency, self-discipline, and being able to exercise with your baby or while they are napping- and general invisibility of wider determinants of being able to prioritise health and fitness exacerbate this feeling.

Posts displayed before and after images and many included photos of account holders posing in tight-fitting exercise gear. Many account holders shared images posing in exercise clothing and sharing images of their muscles and toned stomachs. In an analysis of the #postpartum-body, 40 % of women wore fitness attire and 10 % of images were before and after images of women that had experienced a reduction in their weight [40]. There were posts on accepting one’s body in pregnancy and postpartum, and some recognition of body dysmorphia, although many praised the miracle of a woman’s body. Posting publicly about body dysmorphia and struggling to come to terms with bodily changes has been found elsewhere [22]. Viewing before and after weight loss photos identified in this study may create a pressure to get back to a pre-pregnancy size quickly, which has been reported previously in a qualitative study [14]. Participants in this study referenced influencers on social media as a leading cause of that pressure. Findings from another qualitative study of pregnant women demonstrated that almost half of participants felt negatively about their body due to pregnancy

and postpartum images in the media. This study again identified pressure to 'bounce back' after birth [19]. Roth et al. [29] suggest this expectation to return quickly to a pre-pregnant figure stems from societal expectations. Petersen [27] points towards bodily appearance being associated with social prestige and self-control. A mother who has kept their postpartum weight may be depicted as lazy or gluttonous receiving pressure by friends, family members, partners, medical professionals, as well as the media [26,28,37]. Becoming a parent is a significant transformative period of life and invisibility of the range of postpartum changes in appearance may make those with bodies that don't conform to pre-pregnancy ideals feel inadequate.

Although this study did focus on exercise-related accounts, an analysis of the #postpartum did find that most images and content related to this hashtag were related to physical activity. Some posts did highlight the benefits of physical activity, however the focus was more so on changing body shape and certain areas of the body. Our current study may reveal how social media can influence body dissatisfaction, common in the postpartum period [10].

Strengths and limitations

A strength of this study was the large number of initial Instagram accounts that were initially catalogued to ensure a variety of relevant accounts were targeted. Our approach identified relevant Instagram accounts through searches rather than hashtags (e.g., #postpartum) with an initial scope of popular Instagram accounts for pregnant/postpartum women not using #postpartum. However, there is a speculation that structural weight bias has led to algorithms disproportionately removing content by larger bodied account holders, leading to repeated and concentrated exposure of slimmer account holders [9]. There is therefore a chance that because of this algorithm, posts from accounts with a wider range of body sizes were not captured. It is worth noting that 36.9 % of posts from eligible accounts were included. Although these holders posted about pregnancy/postpartum, they did post other content. An added strength of this study is having in-depth involvement at all stages from all four authors, reducing bias in the results. Nonetheless, seeking qualitative data from the account holders, or from women with a lived experience of viewing this content during the postpartum period, would have created a more balanced and informative picture; something that needs to be considered for future research.

Conclusion

The current study is novel in its exploration of popular health and fitness Instagram accounts targeted towards pregnant and postpartum women, rather than searching by hashtags as has been undertaken more frequently. Instagram is a source of support for women; however, this study found posts that may increase intrapersonal weight stigma and ableism. Findings from this study can be used by relevant stakeholders to inform messaging in maternity and postpartum services to advise new mums exposed to social media. Women could also be encouraged to take part in media literacy programmes and be encouraged to consider unfollowing certain social media accounts to improve mental well-being. This alongside strict bullying and harassment policies by social media companies might encourage individuals of all body sizes to be better represented in the media.

Author contribution

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Ethical statement

No ethics application was submitted as the social media posts were publicly available in the public domain therefore consent from creators was not required. Instagram requires consent from users to a service agreement that states that user's data may be accessed by third parties for research purposes.

Declaration of Competing Interest

The authors declare no conflicts of interest.

Data Availability

The datasets analysed during the current study are publicly available but are also available from the corresponding author on reasonable request.

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