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#diastasisrecti: a mixed-methods analysis of Instagram posts and their influence on women's exercise and sports participation

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Abstract

Background Emerging literature indicates that women increasingly turn to social media for medical information, including on diastasis recti abdominis (DRA). However, the quality of this information remains unclear. This study evaluated Instagram (IG) content related to DRA, exercise, and sports, and explored its perceived impact on the behaviours of women with DRA.

Methods A convergent parallel mixed methods design was used. Public IG posts were analysed using the QUality Evaluation Scoring Tool (QUEST) and exercise and sports suggestions for women with DRA were extracted. A global survey and semi-structured interviews with women diagnosed with DRA explored their IG experiences and its impact on exercise and sports participation. Descriptive and thematic analyses were performed.

Results Among the 1,000 posts screened, 28 were included. The majority (61%, $n=17$) provided non-evidence-based suggestions; only 7.1% ($n=2$) mentioned a scientific source. QUEST scores highlighted poor information quality. Twenty women with DRA participated in the interviews, from which six themes emerged: (1) Navigating DRA information; (2) Contrasting perceptions of DRA, exercise, and sports content on IG; (3) Disparities in exercise and sports suggestions on IG; (4) The influence of IG content on exercise and sports participation: a range from fear and avoidance to empowerment; (5) Beyond IG: information on DRA, exercise, and sports; (6) How women select and evaluate their information sources. Suggestions supported by literature positively influenced the lives of 20% of women ($n=4$). Conversely, women reported experiencing confusion, misinformation, and nocebo effects due to assertive, non-evidence-based content. Both quantitative and qualitative findings highlighted the presence of prescriptive do/do not exercise and sports lists.

Conclusions IG plays a complex role in disseminating health information about DRA, exercise, and sports, offering valuable support, but can also pose significant risks of misinformation. Collaboration among healthcare and fitness professionals, and researchers is essential to enhance the accuracy and reliability of information on social media, thereby improving overall health outcomes and sports engagement.

Keywords Diastasis recti abdominis, Digital health, Social media, Sports medicine, Women

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Introduction

Diastasis Rectus Abdominis (DRA) is defined as the presence of divergence between the rectus abdominis muscles along the linea alba [1–3]. This condition predominantly affects women, with prevalence rates reported to be 45% and 33% of postpartum women at 6 months and 1 year, respectively [4]. Beyond its physical implications, DRA significantly impacts emotional and social aspects of life, often disrupting day-to-day activities and overall well-being [5, 6], and frequently leading to fear-avoidance behaviours and withdrawal from physical activities [7].

Despite the prevalence and burden of this condition, emerging literature suggests that few women seek out healthcare professionals for advice, instead turning to social media platforms such as Instagram (IG) to gather medical information [8, 9]. IG is one of the most popular social media platforms for sharing biomedical information [10, 11] and its content is rapidly disseminated by an ever-growing user base, providing easily accessible information that often lacks expert supervision and validation [10–12]. This unfiltered material, while widely consumed as a seemingly credible source, carries the inherent risk of spreading misinformation and influencing user behaviours [12].

In the fields of urogynaecology and women's health, several authors have examined social media content [13–19], but the specific discourse surrounding DRA on IG has not been researched and explored. To address this gap and capture the complexities of how IG content influences women's perceptions and behaviours regarding exercise and sports participation, we conducted a convergent parallel mixed methods study design with the following objectives: (a) to evaluate the content and quality of health information related to DRA, exercise, and sports on IG posts through an observational study design and (b) to explore how women with DRA perceive IG content and understand its impact on their exercise and sports participation using a qualitative study design.

Materials and methods

Study design

This study employed a convergent parallel mixed-methods design to facilitate the collection of rich, detailed data and to provide a comprehensive understanding of the research problem. This design allows simultaneous but independent collection and analysis of quantitative and qualitative data, ensuring robust triangulation and integration of findings [20–22].

Information and details are reported into two parts as "Part 1: IG posts about DRA, exercise and sports" and "Part 2: Experiences of women with DRA" for quantitative and qualitative design, respectively. This study is reported according to the Good Reporting of a Mixed Method Study (GRAMMS) guidance [23]. The protocol of this study was approved by the Cardiff Metropolitan University Ethics Committee, UK (Project Reference Number: Sta-7673; 30/06/2023). Full methodological details are provided in the registered protocol [24]. The flow-diagram of the study is presented in Supplementary File 1.

The evidence base

The evidence-based framework on DRA, exercise and sports used for this mixed-methods study was developed through a narrative synthesis of the most recent and methodologically robust studies on DRA [25–38]. Selection criteria were based on the level of evidence and publication date, considering the continuously expanding body of research on this topic. When available, priority was given to randomized controlled clinical trials and systematic reviews. Supplementary File 2 provides the complete rationale.

Equity, diversity, and inclusion statement

The author team comprises four women and three men, including clinicians, senior and junior investigators from various specialties and nationalities representing Italy, Spain, the USA, and the UK. While the team reflects diversity in professional backgrounds and geographical representation, all researchers are white. This study addresses the need for more research in women's health and exercise. We empowered women to express their perspectives on a sensitive post-pregnancy topic. By conducting online interviews, we ensured accessibility and convenience, allowing participation via mobile devices or computers worldwide. This approach facilitated global engagement and inclusivity, but only those fluent in English could participate.

Part 1

An observational study was conducted using a convenience sample of posts in the English language related to DRA, exercise, and sports content on IG.

IG post selection criteria

Only public social media posts containing content related to exercise and sports suggestions for women with DRA, along with any proposed exercise and/or sports related indications and contraindications were eligible for inclusion. Posts were excluded if they contained live registrations, stories, reels, or information not relevant to the study objectives. Posts in languages other than English and duplicate posts containing the same content were also excluded.

IG post screening process

Through the use of the online IG Hashtag Scraper, a comprehensive search for the hashtag "#diastasisrecti" was

conducted independently by two authors (SG, SS). This search was performed on June 1, 2023, to minimize possible inconsistencies between the searches. To capture the most relevant and popular discussions, the first 1,000 tagged posts were screened for eligibility by the same two authors. Any discrepancies or disagreements during this screening process were resolved by consulting a third author (IM). To further ensure the reliability of the data collection method, a pilot search was carried out on March 31st, 2023 by SG and SS, which confirmed the absence of any inconsistencies.

Data extraction

Data were systematically extracted from posts and related accounts that met the eligibility criteria. Information regarding the accounts' characteristics, publication format (e.g. picture/text/video) and content (exercise and sports suggestions offered for women with DRA) were collected.

Content assessment of IG post

IG content related to exercise and sports suggestions was synthesized and systematically compared by SG and SS with the framework outlined in Supplementary File 2. Based on this comparison, content was categorized as *"evidence-based"* or "*non-evidence-based"*. Due to ethical restrictions, verbatim transcripts of posts could not be provided to prevent traceability to specific accounts. The quality of post content was assessed using the QUality Evaluation Scoring Tool (QUEST) criteria [39]. QUEST is a recently developed tool that enables health care professionals and researchers to evaluate online health information against a short set of criteria. Scores in the individual sections are weighted and summed to generate a total score of up to 28.

Statistical analysis

Frequencies, percentages and descriptive statistics (median, interquartile range [IQR]) were calculated using Statistical Package for the Social Sciences Inc. (SPSS software Chicago, IL, USA).

Part 2

Recruitment and participants

In July 2023, a worldwide social media campaign was launched on the first author's IG account (SG; @silviagiagio.physio). Women were eligible for inclusion if they had a diagnosis of DRA by a clinician, were 18 years of age or over, active Instagram users, have had one or more pregnancies, have not undergone or are currently undergoing any medical/physical therapy for DRA, and were able to understand spoken and written English. We used the principles of purposeful sampling [40], which consider identifying and selecting information-rich cases, or people who have particular expertise or experience with the phenomenon under investigation. All participants provided informed consent after being thoroughly informed of the study's purpose and procedures, including risks and benefits, the right to withdraw, and confidentiality and privacy regulations. Participants were not compensated for participation.

Process, data collection and interviews

Using a Qualtrics (Qualtrics, Provo, UT) link, participants were required to confirm eligibility criteria, complete the consent form before participating in the study, fill in basic demographic data, and complete The Diastasis Rectus Abdominis Questionnaire [41]. The DRA questionnaire was integrated to better characterize participants, providing contextual information to interpret interviews and quotes through the lens of their individual experience. Participants were then invited to schedule and take part in one-to-one semi-structured and open-ended question interviews via Microsoft Teams™ conducted by one of the study authors (GD), who is a physiotherapist and researcher with expertise in DRA management and training in qualitative methodology. Outline interview questions were developed by a group of experts (SG, IM, TR, GD) and are reported in Supplementary File 3. Data collected via interview discussions were recorded via Microsoft Teams™, verbatim transcribed (GD) and then deleted. Identifiable data were de-identified using alphanumerical values ("ID1, ID2, etc"). No a-priori sample size calculation is expected for qualitative designs. Interviews were concluded when data saturation was reached [42].

Thematic analysis

Analysis was conducted through constant comparison process [43] using Braun & Clarke's thematic content analysis [44]. The participant interviews were coded by two independent authors (SG, SS). In particular, the content related to exercise and sports, as recalled and reported by women during interviews, was reviewed by SG and SS and compared against the framework outlined in Supplementary File 2. Based on this comparison, the content was coded as *"evidence-based"* or "*non-evidence-based"*. Themes and categories were identified and then discussed and agreed on a final thematic map. Finally, results were discussed with all authors with different expertise to obtain investigator triangulation [45]. We used qualitative techniques such as member checking, peer debriefing, thick descriptions, and code-recode procedures to achieve credibility, transferability, dependability and conformability [46, 47]. No data management software was used.

Patient and public involvement

Women with DRA piloted the interviews and validated the appropriateness of the interview transcriptions through member checking.

Results

Part 1

From the 1,000 posts, 28 were eligible for inclusion. Table 1 shows the main characteristics of the posts and related content creators. Six out of 28 accounts are verified accounts, while seven profiles have more than 50.000 followers. Most creators were wellness professionals or groups ($n = 14$; 50%), who posted picture-text contents ($n = 12$; 42.9%). Among these, 17 (60.7%) of the disseminated information and suggestions regarding exercise and sports practice for women with DRA were currently not supported by the literature. Table 2 provides a synthesis of suggestions provided by IG content creators and categorization along with the evidence base references. The median QUEST score was 10 out of 28 (IQR 4). Considering only the "Tone" item, 20 (71.7%) of IG creators fully and unequivocally supported their claims and information. One (3.6%) content creator reported balanced information with caution including, contrasting findings. A mention of an expert source and research findings were reported by 2 out 28 accounts ("Attribution" item; 7.1%). Supplementary Files 4 and 5a-c illustrate all the IG posts analysis and findings.

Table 1 PART 1: main characteristics of the content creators and Instagram posts ($n = 28$)

Variable [a]	*N* (%) Median (IQR)
Content creator qualification	
Wellness professionals or groups	14 (50)
Healthcare professionals	13 (46.4)
Other	1 (3.6)
Consumer/patient	0 (0)
Medical doctors	0 (0)
Account information	
Number of followers	2316 (42632.5)
Publication post format	
Picture-text	12 (42.9)
Text only	9 (32.1)
Video-text	7 (25)
Posts content related to suggestions for exercise and sports	
Non-evidence-based	17 (60.7)
Evidence-based	11 (39.3)
Posts content assessment	
QUEST score	10 (4)

[a] Publication post format. Text only (slide in the format of the picture containing only written text); Picture-text (single or multiple)

For posts content related to suggestions for exercise and sports, please refer to Fig. 2 and Suppl. Files

Part 2

The recruitment period lasted from July 2023 to May 2024, and interviews took place between September 2023 and May 2024. Recruitment, interviews, and interview analysis proceeded according to the chosen qualitative methodology. During this period, thirty-one women fully completed the online survey and provided their email addresses for follow-up contact. Eleven of these women did not respond to interview scheduling requests. Recruitment concluded when data saturation was achieved after conducting 20 interviews. The average interview length was 18 min, ranging from 9 min to 46 s (ID18) to 27 min and 14 s (ID20).

Participants median age was 34.5 years (IQR 6) from nine different nationalities. More than half of women's DRA ($n = 12$; 60%) was diagnosed by a pelvic health physical therapist. Seven women (35%) declared moderate to great extent of difficulties in sports practice/participation because of DRA. Sociodemographic and clinical characteristics are displayed in Table 3. Complete details are presented in Supplementary File 6a-b. The thematic analysis revealed six themes reflecting women's experience with DRA and IG content. Table 4 describes the themes within the main categories and additional supporting quotes. The conceptual map summarises themes and the referenced framework developed from the interviews (Fig. 1). Supplementary File 7 includes an example of an audit trail. Complete analysis, significant quotes, and additional comments are provided in Supplementary File 8.

Theme 1: navigating DRA information

Women often engaged with IG for DRA-related content through targeted searches using specific hashtags or direct Google searches. This active search was primarily driven by personal interest or dissatisfaction with healthcare information provided during medical visits, particularly postpartum care.

> *"Nobody tells you this... I had my GP 6-week, well, sort of 8-week check, and the GPs are not trained in it (...) And I find it scary because I'm looking for this information and I sort of know where I could look for it, but I know there are so many women out there that wouldn't, and yeah, so it's shocking." (ID2).*

Theme 2: contrasting perceptions of DRA, exercise, and sports content on IG

The platform is critiqued for promoting unrealistic expectations, oversimplifying medical conditions, and presenting misinformation. Many women felt the need to

Table 2 PART 1: synthesis of Instagram posts content related to DRA, exercise, and sports, alongside corresponding evidence-based references

Post #	Category of content	Synthesis of Instagram content	EB/ NEB	References
1	Abdominal strengthening exercises	Avoid planks, as this exercise will only worsen DRA	🔴	[26, 28, 30, 36, 37]
	Specific exercises for DRA	Perform only specific exercises for DRA		[26, 27, 29, 30, 38]
2	General exercise	Perform general and core-strengthening exercises with variations	🟢	[25, 26, 30, 38]
3	Abdominal strengthening exercises	Avoid exercises like planks and crunches	🔴	[26, 28, 30, 36, 37]
	Specific exercises for DRA	Perform specific exercises for DRA; call to action to follow the account for "safe" exercises		[26, 27, 29, 30, 38]
4	Specific exercises for DRA	Do/do not list: Perform certain exercises (side plank, seated knees to cheat, cat and cow, reverse crunch, bird dog, heel drop) and avoid others (planks, crunches twists; it-ups crossovers)	🔴	[26, 27, 29, 30, 38]
5	Abdominal strengthening exercises, specific exercises for DRA	Avoid push-ups and perform only modified exercises	🔴	[26, 27, 28, 29, 30, 36, 37, 38]
6	Abdominal strengthening exercises	Avoid high planks, one-hand planks, deep twisting poses, and any arm balance pose	🔴	[26, 28, 30, 36, 37]
	Exercises with spinal extensions	Avoid deep backbend poses that stretches the abdominal area	🔴	[30, 33]
7	General exercise	No need for a priori modification or avoidance of exercises if the individual is able to engage the core	🟢	[25, 26, 30, 38]
	Breathing exercises	Integrate breathing techniques		[29]
8	General exercise, abdominal strengthening exercises, high-impact and cardio activities	Stay active during and after pregnancy, perform progressive and individualised exercises that include wide range of functional activities. Get back to lifting again	🟢	[25, 26, 28, 30, 31, 32, 34, 36, 37, 38]
9	General exercise, abdominal strengthening exercises, high-impact and cardio activities	Integrate core strengthening, back and glute strength, have no fear of lifting	🟢	[25, 26, 28, 30, 31, 32, 34, 36, 37, 38]
10	Abdominal strengthening exercises, high-impact and cardio activities	Avoid planks, crunches, sit-ups, heavy lifting because of undue strain and excessive pressure	🔴	[26, 28, 30, 31, 32, 34, 36, 37]
11	Abdominal strengthening exercises, high-impact and cardio activities	Avoid traditional crunches, sit-ups, and heavy lifting, as they can worsen the condition. Instead, opt for gentle exercises and movements	🔴	[26, 28, 30, 31, 32, 34, 36, 37]
12	Exercises with pelvic floor engagement, abdominal strengthening exercises	Engage in proper core strengthening exercises, such as pelvic floor exercises, planks, and modified crunches. Avoid traditional sit-ups and other exercises that put too much pressure on the abdominal muscles	🔴	[26, 28, 29, 30, 36, 37]
13	Abdominal strengthening exercises, breathing exercises	There are no universally "diastasis-safe" exercises. Do not avoid exercise entirely, but do not neglect progressive overload. Various breathing techniques and strategies can be used	🟢	[26, 28, 29, 30, 36, 37]
14	Abdominal strengthening exercises	Avoid any exercises that generate pressure on the core	🔴	[26, 28, 30, 36, 37]
15	Abdominal strengthening exercises	Claiming for "safe and "unsafe" exercises	🔴	[26, 28, 30, 36, 37]
16	Abdominal strengthening exercises, exercises with spinal extensions, Yoga, Pilates	Do/do not list. Avoid crunches, high-impact cardio, yoga with spinal extension and chest opener exercises (e.g. full cobra), Pilates. Exercise categorization in "safe" and "unsafe". Example: "Pilates, does the exercise have you lift both legs off the floor simultaneously lying on your back (ex. double leg lifts)? Yes; not safe; No: safe".	🔴	[26, 27, 28, 29, 30, 35, 36, 37, 38]
17	General exercise, abdominal strengthening exercises	Discussion about the excessive caution. Adapt exercises rather than avoid them. Be aware of your body and listening to its cues, and take advantage of a wide range of exercises	🟢	[26, 28, 30, 36, 37]
18	General exercise, abdominal strengthening exercises	Strengthen the mind-muscle connection, progressively build core strength and capacity. Enjoy exercise	🟢	[26, 28, 30, 36, 37]
19	General exercise, abdominal strengthening exercises	Avoid crunches (and variations) and Barre classes	🔴	[26, 28, 30, 36, 37]
20	General exercise, breathing exercises, exercises with pelvic floor engagement	Exercise promotion: adapt exercise, if necessary. Connect the breath and the pelvic floor	🟢	[25, 26, 28, 29, 30, 36, 37, 38]
21	Abdominal strengthening exercises	Do not perform excessive or unsafe abdominal exercises	🔴	[26, 28, 30, 36, 37]
22	Abdominal strengthening exercises	Progressively load the core	🟢	[26, 28, 30, 36, 37]
23	General exercise, abdominal strengthening exercises	Encourage any movement and exercise while progressively loading the core	🟢	[26, 28, 30, 36, 37]
24	Abdominal strengthening exercises	Avoid any exercises that generate pressure on your core	🔴	[26, 28, 30, 36, 37]
25	Abdominal strengthening exercises	Improve the overall function of the abdominal muscles. Limited evidence suggests whether certain exercises, such as crunches, will worsen the separation	🟢	[26, 28, 30, 36, 37]
26	Abdominal strengthening exercises, specific exercises for DRA, exercises with spinal extensions/rotations	Do/do not list. Avoid anything involving twisting of the spine or the abdominal muscles working against gravity, including traditional abdominal exercises. Includes a list of exercises to perform	🔴	[26, 27, 28, 29, 30, 33, 36, 37, 38]
27	Abdominal strengthening exercises, exercises with spinal extensions/rotations, Yoga, Pilates	Avoid front planks, military push-ups or knees down pushups, forward crunches, downward dog yoga position, burpees into plank position, Pilates 100's, any sort of jack- knifing or twisting the core	🔴	[26, 28, 30, 33, 35, 36, 37]
28	Abdominal strengthening exercises, exercises with spinal extensions/rotations	Rebuild your core but avoid front planks, twisting moves such as a Russian twists, crunches and sit ups	🔴	[26, 28, 30, 33, 36, 37]

For more info and rationale of categorization please refer to Supplementary File 3.

🟢 = EB (Evidence-based content) 🔴 = NEB (Non-evidence-based content)

Table 3 PART 2: participants' sociodemographic, clinical and health characteristics ($n = 20$)

Variable[a]	*N* (%) Median (IQR)
Age, years	34.5 (6)
Weight, kg	65.5 (10.3)
Height, cm	161 (8.8)
Nationality	
American	6 (30)
British	4 (20)
Australian	2 (10)
Irish	2 (10)
Italian	2 (10)
Austrian	1 (5)
British pakistani	1 (5)
Canadian	1 (5)
Scottish	1 (5)
Race	
White	18 (90)
American Indian or Alaska Native	1(5)
Asian	1(5)
Ethnicity	
Non-Hispanic	19 (95)
Hispanic/Latino	1(5)
Education level	
University	19 (95)
High school/college	1(5)
Time since childbirth (last chidbirth if more than one pregnancy)	
< 6 months	4 (20)
6-8 months	2 (10)
> 12 months	14 (70)
Mode of delivery (last delivery if more than one pregnancy)	
Vaginal	11 (55)
Cesarean	9 (45)
Physical activity, n/week	
< 1/week	2 (10)
1–2/week	7 (35)
3–4/week	6 (30)
≥ 5/week	5 (25)
Physical activity, min/week	
< 149 min/week	11 (55)
≥ 150 min/week	9 (45)
Self-reported health	
Good	8 (40)
Very good	7 (35)
Neither good nor bad	5 (25)
Recti abdominis diagnoses by	
Pelvic floor/women's health physical therapist	12 (60)
Midwife	3 (15)
Uro/gynecologist	3 (15)
General practitioner	1 (5)
Physical therapist (sports field or others)	1 (5)

[a] Refer to Supplementary File 7 for complete participants' characteristics

rigorously and constantly vet content to discern credible information from misleading content.

> *"I wanted to believe all the messages but then you're like, okay, maybe I should check what they actually said." (ID5).*

On the other hand, some participants perceived IG as a valuable resource for disseminating empowering messages, advocating for physiotherapy, promoting sports participation, making complex information more accessible, and initiating crucial health discussions.

> *"Like, it's really digestible and you can find really specific topics… Instagram is the only place I've really seen DRA information." (ID2).*

Nearly half of the participants highlighted the controversial role of IG algorithms in selecting content to view.

Theme 3: disparities in exercise and sports suggestions on IG

The interviews revealed disparities in advice given by content creators, ranging from non-evidence-based suggestions (e.g. avoiding specific exercises), to evidence-based suggestions (e.g. promotion of progressive functionality and return to sports). Four women out of 20 (20%) recalled solely evidence-based content with indications to regain function and the promotion of exercise and sports participation.

> *"[The accounts I follow] they're really good about saying it's not a do's and a don'ts list. Um, it's all pertaining to you and what your body is able to handle. And (…) slow build those muscles back." (ID20).*

The majority (n = 8; 40%) remembered assertive content, including do/do not do lists.

> *"I would ignore it, but it's like, there's some sort of, there's some sort of tie with, if you have this, you can't run." [ID14].*

Six participants (30%) mentioned contrasting and opposing suggestions, including both evidence and non-evidence-based.

Theme 4: the influence of IG content on exercise and sports participation: a range from fear and avoidance to empowerment

IG content significantly influenced participants' exercise behaviours. Positive impacts were noted with content that promotes functionality and empowerment, helping

Table 4 PART 2: themes along the main categories and additional quotes supporting themes

Theme	Category[a]		Example Supporting Quotes
1 Navigating DRA information	Study recruitment	a) First author's page b) Other sources: pages resharing, professionals' recommendation c) Cannot recall	• *I found out about the post on Instagram. I believe it was in the page of [account]. (ID6)* • *I got an email about it. I had been on, I think it's because I was on [account]. I think I had downloaded her DRA manual or something in the past, and so I had received an email about it. (ID10)*
	DRA initial information gathering	a) Diastasis tag on IG b) Google c) Spotify d) Various sources (physical therapists, webinars, other people) e) Casual engagement on the internet	• *It was actually an Instagram post that I saw and I just clicked it (ID3)* • *I was looking for information. So, I followed these accounts to have more information about how to address this problem. (ID11)*
	Motivations for seeking DRA information	a) Personal interest: driven by personal interest in understanding of DRA b) Insufficient healthcare information: limited information available from healthcare providers	• *No one speaks about it. And I think that's a shame because then I am left with the internet. When you Google, it's a lot. The first things that come up are always anything that sells a package. (ID19)* • *I never, I don't think my doctor ever said anything about diastasis. I'm pretty sure I brought it up. (ID20)*
2 Contrasting perceptions of DRA, exercise, and sports content on IG	IG as a questionable information source	a) Credibility of Information: necessity to verify the validity of information b) Simplification of content: information is often oversimplified c) Unrealistic expectations: IG fosters unrealistic expectations, such as achieving a pre-pregnancy flat tummy line	• *You can't, you don't believe everything. (ID1)* • *[Cited accounts] like these, like these ass**** companies that like market stuff, there needs to be more people with educational backgrounds that can overtake those accounts that is getting to more of the masses. It shouldn't be after you've experienced something you then go looking for these type of accounts. (ID17)*
	Content influence by IG algorithm	Content and perception variation: women experiences and content visibility are significantly influenced by IG's algorithm	• *I'm very fortunate that I've ended up with these really good quality content creators who have very big backgrounds, who are qualified, who are really empowering and everything. However, someone else may have ended up down a completely different path, and it's just almost sheer luck and the algorithm. (ID16)* • *So, you've got your home page with the accounts you follow, and then your search page is basically also based on similar things. So, I was getting information overload about a lot of inaccurate accounts as well. (…) So, once I started to remove and filter out information, I saw a gradual change in my mindset, changing my mood and all of those things. (ID19)*
	IG as a positive information source	a) Conversation starter: facilitates the initiation of discussions and enhances topic awareness b) Accessibility of Information: provides digestible and easily accessible information c) Community and support: serves as a platform for finding others with similar experiences and seeking support related to health issues d) Professional engagement: encourages consultations with physiotherapists or other specialists	• *There's so much information on social media is because this is kind of a taboo topic. (ID10)* • *I appreciate going to Instagram (…) Sometimes it gets really complicated and I'm like I don't understand what I'm reading. So I do appreciate Instagram as well for making it easier and simplifying it. (ID20)*
	Limitations as a professional advice source	Instagram and professional advice: IG should not be considered a substitute for professional medical advice	• *It actually isn't informative (…) Instagram isn't the place where you go to for professional advice, right? (…) you're just left with more questions. (…) It's like click-bait, it just like says the buzzword and then there's no substance to it. (ID14)* • *There needs to be more (information). I found really poor information and not regular information. (ID11)*

Table 4 (continued)

Theme	Category[a]		Example Supporting Quotes
3 Disparities in exercise and sports suggestions on IG	Non-evidence-based suggestions		See Fig. 1 and Supplementary Files for reporting
	Evidence-based suggestions		See Fig. 1 and Supplementary Files for reporting
	Mixed and opposing information		• *It was entirely contradicting of each other (…) because they're complete polar opposite views (…) you can do more, you can strength train, definitely move, get stronger versus don't do too much, please wear belts, you know, sign on to this program. (ID19)*
	Neutral suggestions	a) Lack of recall: do not recall any specific recommendations b) Seek professional advice: suggests discussing exercise plans and participation with qualified professionals	• *Discuss it with other professionals (ID2)*
4 The influence of IG content on exercise and sports participation: a range from fear and avoidance to empowerment	Negative impact	a) Nocebo effect: fear-avoidance beliefs fostered by IG content b) Mental health impact: information that negatively affected mental health c) Inaccurate guidance: recommendations were unsuitable or incorrect d) Lifestyle limitation: IG information restricted personal lifestyle choices	• *I started to get stressed (…) I started to be more aware of the kind of movements and activities I could do. (…) I will avoid swimming now. (ID11)*
	Positive impact	a) Functional empowerment: IG messages motivated women to regain functional abilities b) Awareness enhancement: IG significantly increased awareness	• *[IG helped me] just with like being aware (…) like even just increasing my own proprioception like being more aware of my body (…) It has really helped me to understand that I can get back to whatever I want to get back to (…). Like I shouldn't be limiting my life because of my diagnosis. (ID16)* • *It has really helped me to understand that I can get back to whatever I want to get back to (ID20)*
	Transition from negative to positive	a) Evolution of perceptions: changes in Instagram content and accounts led to shifting perceptions and influence b) Belief reframing: IG information altered previously held beliefs	• *The general message previously was don't exercise, don't do too much. And now there seems to be more research saying, actually you should or you definitely can do more exercises. (ID5)* • *What I heard from doctors and everything was more, no, just don't do that. IG has really helped me to understand that I can get back to whatever I want to get back to. (…) Instagram accounts really helped to reiterate and kind of give me all of that information in different ways so that I could really understand what it was so that I can make more informed choices around what I do. (ID16)*
	Mixed impact and influence	a) Information disparity: contrasting and opposite information that caused confusion b) Empowerment with caution: messages that both empowered and simultaneously induced caution and fear, affecting the approach to exercise	*I think because it was entirely contradicting of each other, it just put me in a bit of a twilight zone of like, what I'm, am I doing what I'm doing, is that correct (…)? (ID19)*
	Insignificant impact		*I read one time that planks were not good for it, or if you're doing planks, do it in your arms. Again, I've given up and I just go ahead and do that. (ID13)*

Table 4 (continued)

Theme	Category[a]		Example Supporting Quotes
5 Beyond IG: information on DRA, exercise, and sports	Seeking individualised and qualified help		• *I was reluctant to do anything until I got expert advice because I thought that when I looked online, it was just not clear and conflicting. I better get expert advice." (ID14)* • *I also noticed is like when I do videos or Instagram posts and I would follow the exercises, they are explained really badly. (…), I only learned it with [physiotherapists' name]. (ID18)*
	Continuous learning process	a) Educational engagement: participation in specialised courses and educational programs to deepen understanding and expertise b) Diverse learning resources: utilising a variety of materials and platforms, including: books, E-learning, scientific articles, podcasts, webinars, infographics, blogs and alternative social media platforms (Facebook)	• *I think it [IG] is good for awareness. I want to know more or a book or a blog or whatever. I think Instagram is more of this remind awareness, maybe small snippet and hacks and tips, but not going any deeper. (ID18)*
6 How women select and evaluate their information sources	Accounts followed	a) Physiotherapists: selected for their trust and credibility b) Personal Trainers: followed for their fitness expertise c) Social media groups: engaged for community support and shared experiences	• *I really like when physiotherapists are involved because I just know that they tackle the whole thing from a very specific and professional angle, more than doctors even. (ID18)*
	Rationale of following accounts	a) Qualifications: professional credentials of the content creators b) Credibility indicators: research data, references, or ability to debunk myths c) Professional endorsements: recommendations or resharing by other reputable professionals d) Empowerment focus: accounts chosen for their role in personal empowerment e) Personal resonance: alignment with personal experiences or validation of such experiences and beliefs f) Positive messaging: accounts that predominantly share uplifting and constructive messages g) Educational content availability: presence of informative and freely available content h) Educational background non-priority: followership not primarily influenced by the formal education of the creators	• *I think I definitely have a fear of like getting bad information. (…) So I feel confident in what I'm seeing and that they're…the information is from people who are legitimate and, you know, experts in their field. (ID4)* • *I tried to take the advice, I think, is the most evidence-based (…) And then also the ones I ended up following were a little bit more scientific and then posting links to research, which then I could read the papers. (ID5)*
	Rationale for changing follows or unfollowing	a) Commercial focus: unfollowing creators who predominantly sell products or services b) Credibility issues: unfollowing due to perceived lack of credibility c) Inconsistent or contradictory Information: unfollowing accounts that provide conflicting information	• *They're [some IG creators] grabbing attention kind of accounts (…) then I stop following them (…) make women afraid of start working out. (ID6)* • *I need to be able to mould to all sorts of positions, but my body won't allow me to. But if I want to improve this, you Instagram or these various accounts were telling me I shouldn't be doing it. It basically completely contradicted the role I needed to take [as a mum], which is why I started removing everything, because I thought I can't see. (ID19)*

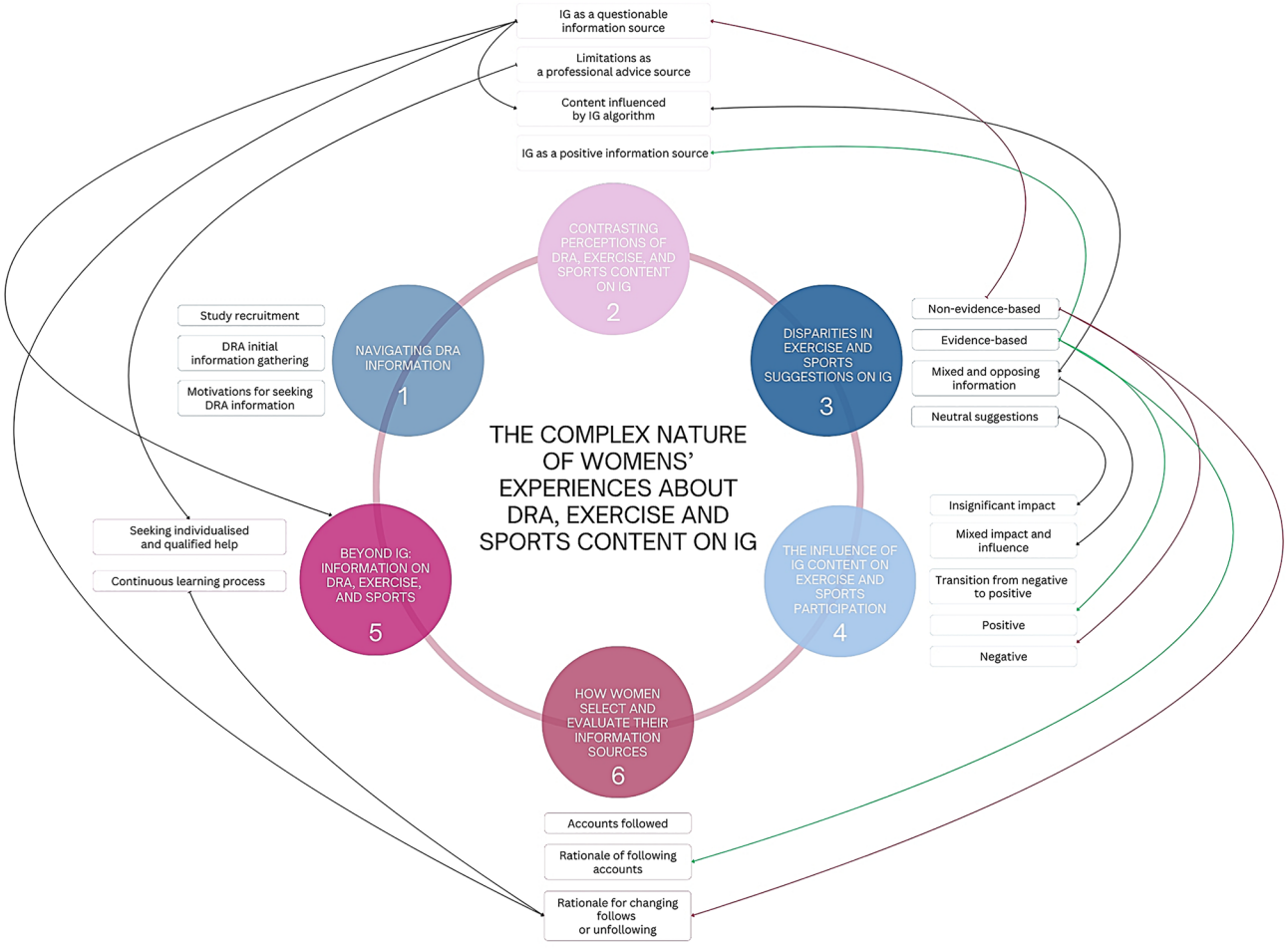
[a] DRA: Diastasis Rectus Abdominis; IG: Instagram

women regain confidence in their physical capabilities and encouraging a proactive approach to sports.

> *"They're very empowering. I'm stronger than I have ever been. I'm working out in my basement very confidently, very happily. I just ran a half marathon." (ID4).*

Conversely, negative impacts, including nocebo effects and fear, lead to the avoidance of specific activities, detrimentally affecting mental health by fostering an excessively cautious approach.

> *"Sort of almost like a paralysis of the mind where you want to do something, but you see something that tells you not to, and then you just sort of sit and stare and think, well, what's the point then? If I do it, I'm doomed; if I don't, I'm doomed... I certainly don't want to make things worse. And if they're tell-*



DRA= Diastasis Rectus Abdominis; IG= Instagram

Fig. 1 PART 2: Conceptual map

ing me it's gonna make it worse, then like, don't do it. And it definitely affected you mentally." (ID19).

For some women, the impact was mixed due to confusing and contrasting information, sometimes leading to unfollowing accounts. For others, content did not significantly influence their lives.

Theme 5: beyond IG: seeking information on DRA, exercise, and sports

Participants actively sought additional credible resources beyond IG, including books, podcasts, research, and professional consultations. For many women, physiotherapy guidance often helped to reframe misinformation and limiting beliefs. This multifaceted strategy was perceived as essential for a comprehensive understanding of DRA and aimed to counterbalance the mixed recommendations received on IG.

"[I collected lots of information] from internet, convention, clinics, hospital." (ID15).

Theme 6: how women select and evaluate their information sources

The credibility and qualifications of content creators significantly influenced participants' decisions to follow specific accounts and to follow their health advice. Participants favoured those who provided evidence-based information citing sources of information and scientific references, reflecting a discerning and selective approach to curating their IG feeds. Some women reported unfollowing content creators who tended to sell products or services, or due to an overwhelming amount of mixed and inconsistent information.

"(...) tend to find they're trying to sell a product or sell a program and I think that tends to get my red flags going a little bit. I did have to delete quite a lot because it was information overload with a lot of mixed information. (...) I've just narrowed it down to like one or two, which tend to be sort of evidence-based now." (ID19).

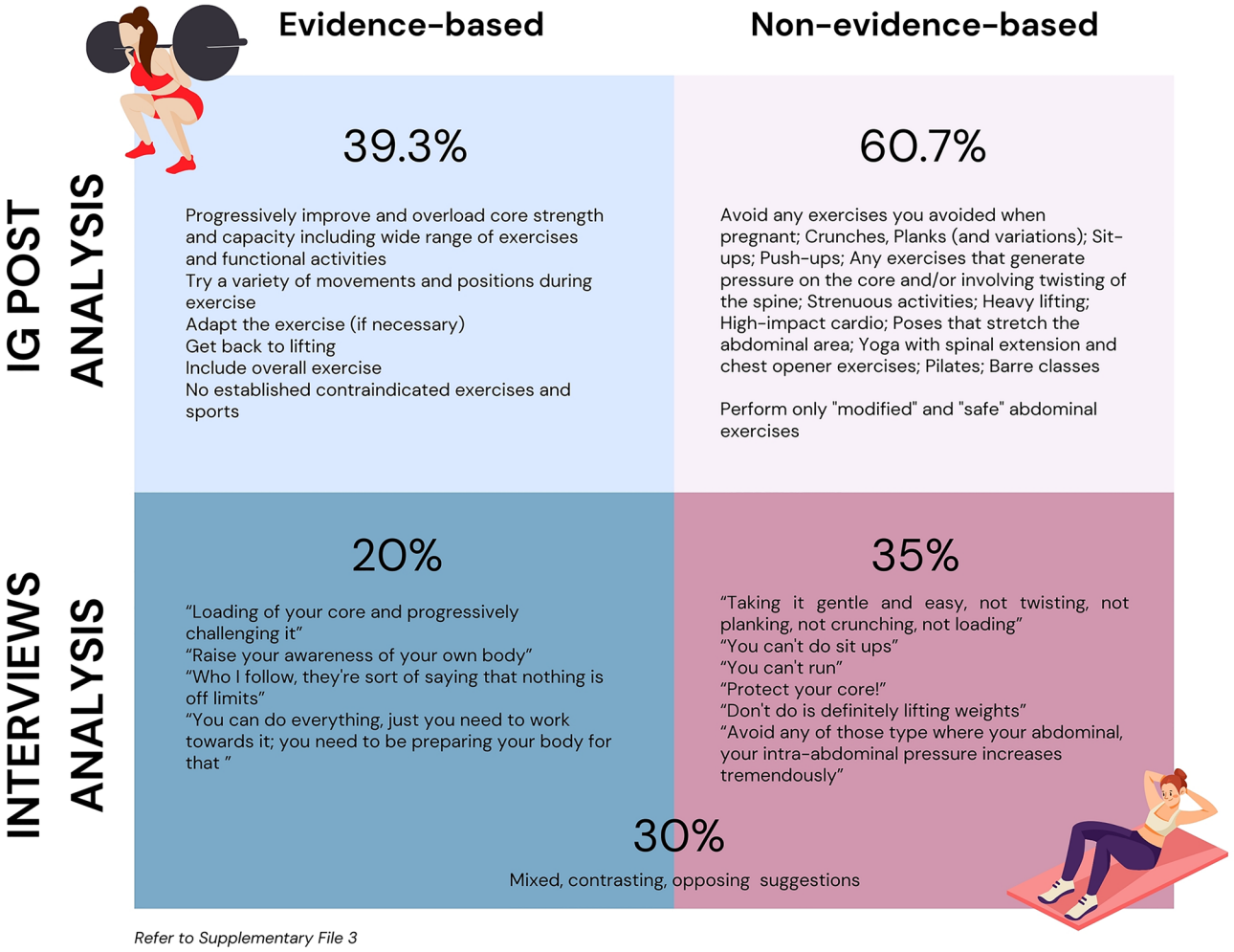


Fig. 2 Comparative summary of evidence-based and non-evidence-based content derived from both the analysis of Instagram posts and participant interviews

Part 1 and part 2

Figure 2 shows a comparative summary of evidence-based and non-evidence-based content derived from both the analysis of IG posts and participant interviews, along with their respective prevalence. This visual representation allows for a direct comparison between the types of information disseminated on IG and the content recalled by participants.

Discussion

This mixed-methods study enhances the current understanding of IG's complex role in disseminating quality content and how it is perceived by women with DRA concerning their exercise and sports participation. In the context of DRA, there is significant heterogeneity in the use of outcome measures, defined inter-rectus distance cut-off values, methods of measuring anatomical location(s), and management approaches [30]. Specifically, the lack of strong evidence and clear guidelines regarding exercise and sports practice in cases of DRA [8, 29, 38], along with discrepancies between clinical approaches [48, 49] relative to current literature [29] may explain the spread of diverse and conflicting information on IG. Interview analysis revealed a wide range of experiences, reflecting this uncertainty.

Complex nature and complex impact of IG content

Our findings corroborate recent research indicating a paradigm shift in how women gather medical information, driven by inadequate healthcare guidance and a lack of professional expertise on women's health [9, 50]. In particular, IG serves as an entry point for information and plays a complex role, as both a beneficial and problematic source of health information, regardless of the diverse sociodemographic profile of participants.

IG is perceived as a valuable resource that offers accessible, supportive community connections and motivational content. Specifically, evidence-based suggestions with encouraging messages were associated with more favourable perceptions and experiences. Empowerment

content is regarded as relevant component of the recovery phase, raising awareness about lesser-known health conditions like DRA and promoting healthy practices. However, not all the women interviewed encountered evidence-based suggestions that empowered them to engage positively in sports activities. Many discovered this information only after conducting extensive research and adjusting their social media followings.

In fact, significant portion of the content analysed on IG, accounting for more than half, consisted of prescriptive, non-evidence-based do/do not do exercise lists. This mirrors the recollections of many women in the interviews as depicted in Fig. 2. Based on the available evidence, current categorical assertions that label exercises or sports activities as "safe," "harmful," or "avoid" lack robust scientific support and should be approached with caution. It is reasonable to assume that these posts and the associated beliefs stem from literature that discourages core training during pregnancy to avoid DRA harm [34]. Hayman et al. [50] also found similar perceptions in the Facebook community showing that user comments imply misconceptions about pregnancy-safe exercises. The impact of such content ranges from confusion and misinformation to nocebo effects, where fear of potential harm inhibits physical activity and engagement. Notably, 20 of the included posts (71.1%) were characterized by assertive tones that claim absolute safety or potential harm, according to the QUEST score.

In musculoskeletal research and practice, the influence of language on patient outcomes and recovery is well recognized; "the words we choose (as professionals) can either contain the capacity to heal or have the potential to cause devastating and lasting harm" [51]. This was poignantly illustrated in our study. Many women discussed the negative impacts of such content on mental health. Two women became emotional during interviews and one described experiencing a "*paralysis of the mind*"—a state of emotional distress directly linked to fear. It is conceivable, that many content creators may not have awareness of the power and influence (negative) of the language they used. Assertive tones are often employed to generate greater social media traction and attention, rather than prioritising evidence-based and helpful content for women with DRA. Two other participants provided additional insights that highlight the impact of social media on mental health [52]. One reported the inability to escape from posts, noting that it was the last thing she saw before going to sleep, which she found distressing. Similarly, another participant recognised how looking at her phone late at night was detrimental to her mental health.

Credibility and quality of content

Despite the varied experiences of women using IG for DRA-related information, participants expressed doubts about the credibility and quality of content. Our findings supported this scepticism and are in accordance with previous literature [10, 13, 15, 50, 53–56]. The QUEST assessment showed that only two posts referred to a scientific source (The American College of Obstetricians and Gynecologists, ACOG and National Strength and Conditioning Association, NSCA). The paucity of verifiable source content might drive women to seek accounts that reference scientific evidence and offer a deeper understanding of health topics. This process included seeking individualized and qualified help, engaging in continuous learning, and, in some cases, modifying their content consumption habits by unfollowing certain accounts. Participants considered content creators credible based on their professional credentials (especially physiotherapists), the inclusion of research data, references, or the ability to debunk myths, and recommendations or resharing by other reputable professionals.

Moreover, our study found that aggressive marketing tactics, including the promotion of specific products or services, were present in approximately half of the analysed posts. For participants, these strategies contributed significantly to user distrust and disengagement. This issue not only undermines the potential educational value of the platform but also highlights the challenges users face in distinguishing reliable health information from commercially biased content. In addition, as women mentioned during interviews, social media feeds and algorithms are personally curated and tailored to individual beliefs, partisan bias, and identity, decreasing the likelihood of exchanging differing viewpoints and potentially amplifying misinformation [57]. While IG remained a source of information, participants highlighted the importance of applying critical thinking when interpreting its content.

Clinical implications

Women with DRA need comprehensive support, education, and information from professionals before seeking guidance on social media. Professionals should stay current with the latest research and ensure the accessibility of reliable information, effectively promoting exercise and sports participation post-pregnancy. Guidance should consider the psychosocial repercussions, exercise patterns or fear avoidance behaviours, beyond just focusing on the anatomical gap between recti [5, 9, 26]. Our findings reinforce these concepts. Women reported positive and empowering evidence-based narratives. Moreover, our analysis may help healthcare and wellness professionals better understand the widespread dissemination of information and its impact on social

media. It underscores the importance of being prepared to address and correct potential misconceptions during consultations.

A call to action for professionals in the women's health field and the global sports and exercise medicine community

The dissemination of health-related content on platforms like IG involves significant ethical considerations. Our findings highlighted the critical responsibility that content creators hold in communicating, especially to vulnerable populations such as new mothers [9, 50, 51]. We call upon professionals in the fields of women's health and the Sports and Exercise Medicine community to collaborate in enhancing the accuracy and reliability of disseminated information by contributing their expertise. The way information is conveyed can profoundly affect the healing journey [51], emphasizing the need for messaging that is not only accurate and informative but also empathetic and encouraging. Professionals should feel responsible for the impact of their content on exercise, sport patterns and overall health. IG and social media offer an opportunity to improve knowledge, education, and information dissemination by fostering an environment of informed content creation and consumption [57]. Using the full potential of social media in facilitating access to information, we can significantly enhance exercise and sports participation for women with DRA.

Strengths and limitations

We employed robust and reproducible methods, adhering to established methodological and reporting standards, which strengthens the overall quality of the research. We then reported all data to ensure research transparency. During recruitment for Part 2 of the project, we implemented measures to minimise potential biases. The author conducting the interviews, possibly known to some members of the public for her specialist interest in DRA and related research, refrained from posting or publicizing the recruitment call. This approach minimised the risk of skewing the sample by her own IG followers, thereby maintaining the integrity of the data collection process. It is worth mentioning that her clinical expertise on the topic is a significant strength of this research.

However, the study also presents limitations. While we screened a large sample of IG posts, offering valuable insights, the final included sample size may not encompass the entire diversity of content available on the platform. Adhering to ethics and regulations, our analysis was restricted to public accounts, potentially leading to the exclusion of data from content creators who require users to follow them to access their accounts. Further, by excluding IG posts in the form of 'stories' or 'reels' the data collected in relation to posts on about DRA may have been limited and not a true reflection of the content that is available given that the IG algorithm is understood to preferentially promote reels and videos [58]. These limitations could result in an incomplete picture of the information landscape related to DRA on social media. Moreover, despite launching a worldwide campaign to recruit interview participants, women from different nationalities were underrepresented or did not participate. This underrepresentation affects the generalizability of our findings across different cultural contexts, particularly in terms of how the content is perceived and its impact.

Conclusions

This study highlighted the complex role of IG in disseminating health information related to DRA in exercise and sports participation, emphasising both its potential benefits and significant risks. These disparities highlighted inconsistencies in content quality and underscored the broader challenge of navigating health information on social media.

While IG can offer valuable support, it also presents a considerable amount of non-evidence-based, potentially misleading information. Over half of the analysed posts consisted of prescriptive, non-evidence-based exercise lists. Women interviewed underscored the impact of such content, with only a minority encountering evidence-based suggestions that empowered them to engage positively in sports activities. Conversely, many women reported experiencing confusion, misinformation, and nocebo effects due to the overwhelming landscape of conflicting and non-evidence-based information, particularly regarding exercise avoidance or claims suggesting a potential worsening of the condition. To address these issues proactively, healthcare and fitness professionals should stay current with the latest research. At the same time, all content creators are called to promote evidence-based, transparent, and empathetic communication, thereby significantly improving overall health outcomes, exercise participation, and sports engagement for women with DRA.

Abbreviations

ACOG	The American College of Obstetricians and Gynecologists
DRA	Diastasis Recti Abdominis
GRAMMS	Good Reporting of a Mixed Method Study
IG	Instagram
NSCA	National Strength and Conditioning Association
QUEST	QUality Evaluation Scoring Tool

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03885-y.

Supplementary Material 1: Supplementary file 1 Study flow-diagram.

Supplementary Material 2: Supplementary file 2 Evidence base.

Supplementary Material 3: Supplementary file 3 PART 2: Interview guide.

Supplementary Material 4: Supplementary file 4 PART 1: Instagram dataset.

Supplementary Material 5: Supplementary file 5a-c PART 1: Instagram analysis, QUEST assessment.

Supplementary Material 6: Supplementary file 6a-b PART 2: Characteristics of women with DRA and "The Diastasis Rectus Abdominis Questionnaire": results from each participant.

Supplementary Material 7: Supplementary file 7 PART 2: Example of audit trail.

Supplementary Material 8: Supplementary file 8 PART 2: Complete thematic analysis, significant quotes, and additional comments.

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Author contributions
SG: Protocol/project development, Data collection and management, Data analysis, Manuscript writing/editing, Other: methodology, project administration. TR: Protocol/project development, Manuscript writing/editing. SS: Protocol/project development, Data collection and management, Data analysis, Manuscript writing/editing. TI: Protocol/project development, Manuscript writing/editing, Other: methodology. PP: Protocol/project development, Manuscript writing/editing. ISM: Protocol/project development, Manuscript writing/editing, Other: supervision and Institutional support, methodology. GD: Protocol/project development, Data collection and management, Manuscript writing/editing.

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Data availability
The datasets supporting the conclusions of this article are included within the article and its additional files.

Declarations

Ethics approval and consent to participate
All procedures adhered to the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All procedures were displayed to the participant in the consent form. Informed consent to participate was obtained from all of the participants. This study was approved by the Cardiff Metropolitan University Ethics Committee, UK (Project Reference Number: Sta-7673; 30/06/2023). All raw data were securely stored on Cardiff Metropolitan OneDrive for 10 years, in accordance with the university's ethics guidelines and the Data Protection Act 2018, after which they will be destroyed.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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