# The use of e-mental health tools in the perinatal context

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## SUMMARY

E-mental health tools are a promising solution to reducing the high prevalence of perinatal mood and anxiety disorders and addressing barriers faced by women seeking professional help. This article summarises the main e-health tools used in perinatal mental healthcare, including examples of evidence-based tools for assessment, prevention and treatment of such disorders. We also highlight the main characteristics of the development process of e-mental health tools, which are based on cognitive–behavioural therapy, as well as the ethical concerns to be considered with their use and integration in healthcare systems.

## LEARNING OBJECTIVES

After reading this article you will be able to:

- understand why the perinatal context may be suitable for the application of e-health tools targeting maternal mental health
- identify how e-mental health tools can be used for psychological assessment and the prevention and treatment of perinatal mood and anxiety disorders
- reflect on the development process and ethical constraints concerning the use of e-mental health tools in the perinatal context, particularly for perinatal mood and anxiety disorders.

## KEYWORDS

Cognitive–behavioural therapy; e-mental health; perinatal mental health; screening; treatment.

The transition to motherhood is often described as a time of joy and fulfilment but also constitutes a major life transition, with several intra- and interpersonal changes and challenges, ranging from identity and physical changes and the need for physical recovery after childbirth and infant caretaking to changes in partner relationships, social networks and financial security (Kanotra 2007). The array of demanding changes and stressors may negatively affect women's mental health, with the postpartum period being recognised as a time of increased vulnerability to the development of psychological problems. Perinatal mood and anxiety disorders (PMADs) affect an estimated 15–21% of pregnant and postpartum women and have a negative long-lasting impact on mothers' health and children's overall development (Slomian 2019). PMADs are a public health problem, making it imperative to think of global approaches to reduce their impact.

## E-mental health tools in perinatal care: are they suitable?

Despite the negative consequences of PMADs for the entire family system and society, they remain largely untreated. On the one hand, few women proactively seek professional assistance for their mental health problems, mainly because of knowledge (e.g. lack of mental health literacy), attitudinal (e.g. stigma) and practical barriers (e.g. childcare, professional and financial constraints) (Button 2017). On the other hand, women have limited access to specialised perinatal mental health services, owing to lack of service capacity and long waiting times, with many women never receiving any treatment (Tyokighir 2022). With the rapid growth of information and communication technologies (ICTs) and their massive societal adoption, there has been increased recognition of how the internet and related technologies can be used to deliver or enhance mental health information and services, which we refer to as e-mental health (Christensen 2002) (Box 1).

E-mental health interventions were shown to be particularly beneficial during the COVID-19 pandemic, when access to face-to-face support was limited (Wind 2020). In the past decade, e-health interventions, including the use of websites and pregnancy apps for medical information, lifestyle interventions during pregnancy and interventions targeting women's mental health have been widely used in the perinatal care field (van den Heuvel 2018). Generally, e-health interventions targeting perinatal mental health were found to be acceptable to women in terms of accessibility, anonymity, usability and helpfulness of support, particularly for women who present an actual need for help (i.e. have clinically relevant depressive symptoms). Specifically, e-mental health tools are perceived by perinatal women not only as useful for overcoming shame and fear of stigma, but also for meeting the difficulties associated with new mothers' restricted time and offering immediate support, as opposed to long waiting lists for face-to-face treatments

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> **BOX 1** Definition of e-health and e-mental health
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> E-health refers to the emerging field combining medical informatics, public health and business, which includes the delivery of health services and information through the internet and related technologies. In particular, e-mental health aims to support and improve mental healthcare through the use of information and communication technologies (e.g. smartphones, computers, emails). So, e-mental health can be applied to health promotion and screening, prevention, early intervention, treatment and relapse prevention for mental health problems.
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> **Top three advantages of e-mental health**
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> *Efficiency* – Although there are costs associated with development, e-health tools can decrease costs associated with mental healthcare, for example by optimising or removing in-person contact with a health professional. In addition, if self-referral is allowed, e-mental health tools can improve access
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> to evidence-based interventions without having to endure long waiting-lists.
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> *Accessibility* – These tools have the potential to increase access to mental health services (e.g. by decreasing barriers associated with geographical distance, scheduling issues, lack of time and professional limitations). Additionally, there is still a stigma associated with mental illness, and e-health allows people to access services providing anonymity and privacy.
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> *Ease of use and flexibility* – E-mental health tools are usually developed to be easily used by anyone and include interactive and attractive elements. They also have the potential to allow a self-determined rhythm of use and asynchronous communication (i.e. not taking place in real time, e.g. by email) with health professionals. Patients have then a more active role, contributing to a greater perception of self-efficacy.

(Schmidt-Hantke 2023). Despite the growing access to effective e-mental health interventions addressing perinatal mental health (Lee 2016), there is also evidence of poor implementation and low adoption rates for such interventions. In a recent study conducted during the COVID-19 pandemic, one-quarter of perinatal women still reported hesitancy with e-mental health tools, giving as their main reasons a preference for in-person therapy and being uncomfortable with virtual therapy (Gonzalez 2022). In fact, in addition to the recognised benefits, women also highlighted disadvantages related to lack of human support/guidance, lack of tailoring/personalisation and concerns about the effectiveness of interventions (Schmidt-Hantke 2023), which should be accounted for when designing and offering interventions to women.

## E-tools for perinatal psychological assessment

Given the significance of risk identification and early prevention of perinatal mental disorders, digital assessment, which could also be defined as e-screening, serves as a foundation for its broader application and dissemination. These tools might serve to facilitate timely identification and ongoing monitoring of women at risk or already exhibiting symptoms of PMADs; moreover, they offer opportunities to address mental health challenges in low- and middle-income countries, thereby broadening access to care (Vanderkruik 2021). However, it should be noted that the appropriateness and foreseeable applicability of different digital assessment tools and approaches (e.g. blended versus app-based versus web-based screening and assessment) are related to their application context.

In this regard, much attention has been given to smartphone/app-based screening tools because of their accessibility (Hussain-Shamsy 2020; Martin-Key 2021; Blackmore 2022); these self-assessment tools are well suited for preventive contexts, such as large-scale assessments within public services and healthcare systems. The use of brief and validated tools, such as the Edinburgh Postnatal Depression Scale (EPDS), can foster the identification of at-risk individuals within the primary preventive context (Vanderkruik 2021). However, it is pivotal for such digital assessment tools to be culturally sensitive and to account for diverse expressions of distress and help-seeking behaviours (Reynolds 2013); this may require advanced technologies such as machine learning to enable increasing levels of personalisation (Reynolds 2013). Relatedly, ecological momentary assessment (EMA) techniques, leveraging mobile devices such as smartphones and tablets, offer real-time data collection on women's feelings, thoughts and behaviours in their own environment (Newham 2013). Using such an approach, it could be possible to implement more specific and useful tools, allowing a more fine-tuned evaluation, thereby counteracting a 'one-size-fits-all' approach. Such an approach might be particularly valuable in the context of secondary prevention to monitor and signal worsening symptoms in women who are vulnerable to developing PMADs (Lazarides 2020).

Interestingly, a recent study reported that, compared with web-based assessments, app-based assessments were well accepted by women, resulting in higher response rates (Martinez-Borba 2019). However, although drop-out rates remain an issue of the present research field (Martinez-Borba 2019), hindering the evaluation of the real-life application and acceptability of the different digital

assessment modalities, app-based assessments do not seem preferred over blended approaches that maintain some level of direct professional involvement (Martin-Key 2021).

Indeed, unlike more autonomous web- or app-based assessments, a blended remote assessment via telephone or video calls might be particularly suitable in clinical contexts that require greater contact with clinical professionals. For example, it might be particularly valuable when it would otherwise be difficult to evaluate the risk of harm to both mother and baby, such as in patients with postpartum depression with suicidal ideation or infant harm. This blended approach should thus favour both the monitoring and identification of high-risk cases compared with a purely self-reported assessment, making it better suited for clinical contexts than preventive ones. However, challenges related to organisational matters, such as finding a fit between the clinician's and the woman's availability, as well as concerns related to confidentiality and privacy during the call, particularly when women participate from their homes, have been reported (Houser 2023). Overall, women have reported a desire for and the ability to use digital tools for psychological screening and assessment without these affecting their willingness to disclose their emotions (Kingston 2017; Martin-Key 2021).

Despite the potential of and desire for digital assessment tools, current research primarily consists of proof-of-concept, pilot and codesign studies (Hussain-Shamsy 2020; Martin-Key 2021; Blackmore 2022). In this regard, although much work still needs to be done, the ultimate goal would be to integrate these tools into routine healthcare practice, promoting collaboration and information sharing between women and clinicians. An example of such an application of screening tools within healthcare, bridging clinical professionals and patients, is the one proposed by the Australian Centre of Perinatal Excellence (COPE), the iCOPE (icope.org.au) (Blackmore 2022). The iCOPE is a preventive interactive digital screening app created to support screening for both perinatal depressive and anxiety symptoms. It is presented as an easy-to-use tool that gives the women easy-to-understand feedback on the results of the screening questionnaires and also sends the related report to their clinician. Digital tools of this type have the potential to empower women, while saving time and resources for both women and clinicians, further overcoming the above-mentioned barriers to help-seeking. Indeed, these tools have the potential to support health equality while potentially reducing the incidence of PMADs by acting preventively. This would benefit women, their children and the whole family nucleus, while simultaneously lessening the burden on clinicians and the entire healthcare system. However, to the best of our knowledge there is limited research on clinicians' perspectives regarding the implementation of such screening tools (Blackmore 2022), although initial evidence from midwives suggests their interest in using digital mental health screening tools (Martin-Key 2021). Further studies are necessary to explore and understand healthcare professionals' attitudes and experiences in integrating these tools into routine care. Furthermore, larger-scale studies investigating the applicability and potential benefits and challenges of the different digital screening and assessment tools are warranted.

## E-tools for the prevention and treatment of perinatal mental illness

The use of e-mental health tools for prevention purposes may reduce risk factors for PMADs and help individuals develop psychological resources, prior to the need for clinical intervention. E-mental health can be included in a stepped-care model from prevention to intervention in perinatal mental health conditions (Novick 2022). These tools may be used complementarily to face-to-face healthcare or as sole options for accessing psychological interventions. A systematic review including 44 studies concluded that both preventive and treatment interventions produced significant positive effects in mental health-related outcomes during pregnancy and the postpartum period (Stentzel 2023). There are different types of e-mental health tool that can be found in different stages of development and have proven efficacy. Here we give a brief description of the types used in perinatal mental health: telepsychology, web-based interventions, mobile health, virtual reality and artificial intelligence.

### Telepsychology

Telepsychology or online psychotherapy consists of online consultations and direct contact with the patient through videoconferencing tools such as computers or smartphones. Interestingly, the therapeutic alliance in telepsychology has been found to be equivalent to face-to-face therapy, and some patients seem to participate more and feel more comfortable disclosing their emotional problems in videoconferencing consultations (Berger 2017). This type of intervention is particularly useful for perinatal women, since they do not have to leave the house or their newborn to go to appointments, which can also be scheduled more flexibly. In telepsychology, interventions are facilitated by a mental health professional using manualised programmes, mostly based on cognitive–behavioural therapy (CBT), and delivered individually or to

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**BOX 2** Therapeutic principles underlying perinatal e-mental health tools

The cognitive–behavioural therapy (CBT) model is one of the most effective models for the prevention and treatment of perinatal mood and anxiety disorders (PMADs). The CBT model assumes that individuals' emotions and behaviours are influenced by their perceptions and interpretations of situations. The CBT model is the most common evidence-based intervention approach delivered through e-health, and perinatal e-mental health tools developed using CBT principles have the following characteristics.

**Problem oriented and focused on the present**

- Designed to improve the women's current functioning and well-being by focusing on their present needs and emotional experience during the perinatal period (e.g. diversity of emotions felt during this period) and targeting specific problems and difficulties (e.g. postpartum depressive symptoms, social isolation, poor marital relationships).
- Designed to have clearly defined goals and cover specific topics and contents tailored to the women's problems and needs (e.g. to help women identify clear and specific therapeutic goals related not only to the their individual well-being but also to the mother–infant relationship and to relationships with significant others).

**Educative**

- Designed to teach the women how to become their own therapist, by providing rationale about their current patterns of thinking and behaviours, and by delivering therapeutic strategies and tools to address their difficulties; the use of interactive exercises with personalised feedback can facilitate women's learning of new skills.

- Designed to present the information and exercises in various formats (e.g. text, videos and audio) to increase engagement and the probability of completing the intervention, as well as using examples that can be relevant to women's experience.
- Designed to instruct and promote the practice of techniques and strategies throughout the intervention, by providing homework assignments, encouragement and feedback that are personalised to each woman's experience.

**Structured and time limited**

- Designed based on evidence-based programmes or interventions with a set number of sessions (e.g. by adapting face-to-face manuals to a web-based format).
- Designed to have predetermined content and duration. The duration typically ranges from 10 to 20 weeks, and individuals can either replicate the duration of 'traditional' CBT or reduce it.

**Collaborative**

- Designed to promote the active role of women in their therapeutic change. For example, interactive tools and exercises with an intuitive and easy-to-use design can be used to increase women's use and adherence and to help them obtain skills and manage their problems, particularly by addressing the specific needs and difficulties of the perinatal period.
- Designed to include clinical guidance or supportive feedback at some level, since these reduce drop-out from the intervention and can increase the intervention's effects.

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groups (e.g. Parameswaran 2022) in a similar manner to face-to-face therapy. It is important to be aware that initial willingness to use videoconferencing (e.g. familiarity), access to and comfort with the technology (and ability to tolerate and troubleshoot technical problems) and good patient fit (e.g. perception of videoconferencing as viable, absence of home disturbances during appointments) may be important drivers of women's engagement with telepsychology (Hensel 2020).

### Web-based interventions

Web-based interventions are mainly self-guided interventions delivered through a web-based platform or website and are often adapted from evidence-based psychological interventions (Barak 2009). They can be accessed from computers, smartphones or other mobile devices and can access information and online interactive elements. Interaction with a therapist or coach is not required or is limited, and it usually occurs through a communication channel (synchronous or asynchronous) to

provide guidance or feedback to the woman (Novick 2022). Research has shown that most web-based interventions for the perinatal period are based on CBT, and a large number of studies have demonstrated their effectiveness in preventing and treating PMADs (Lee 2016) (Box 2 and Box 3). Be a Mom is an example of a web-based intervention designed for the prevention of postpartum depression (among high-risk women) and the promotion of positive mental health (among low-risk women). It is a short-term, self-guided and structured programme composed of five modules that provide psychoeducation and strategies to help women deal with their emotional difficulties. Data from a large randomised trial including approximately 1000 women at high-risk for postpartum depression showed a significant reduction in depressive and anxiety symptoms from baseline to post-intervention in women assigned to the intervention group compared with those assigned to the waiting-list group, and the results demonstrated that symptom reduction occurred through improvements in psychological resources such as emotion

**BOX 3** Development of cognitive–behavioural interventions delivered via e-mental health tools

The development of cognitive–behavioural therapy (CBT) interventions delivered through e-mental health tools should combine a framework for the development of CBT interventions, such as the Stage Model of Behavioural Therapies Research (SMBTR) (Rounsaville 2001), with a framework for the development and uptake of e-health interventions, such as the CeHRes (Center for eHealth Research, University of Twente) Roadmap (Gemert-Pijnen 2011).

The SMBTR defines three stages of a rigorous scientific process that starts from initial clinical innovation and intervention development (stage I) and proceeds through efficacy research (e.g. randomised controlled trial, stage II) to effectiveness research (e.g. implementation research, stage III) (Rounsaville 2001).

The CeHRes Roadmap is a holistic framework to improve the uptake and impact of e-health interventions. It is based on persuasive technology design, human-centred design and business modelling, and it proposes the structured development of the intervention content, the system (technology) and the service (its implementation) with continuous and systematic evaluation involving stakeholders throughout the entire process (Gemert-Pijnen 2011).

Both models emphasise the importance of the early phases of intervention development. According to the SMBTR, stage I research is conceptualised as a series of research activities (e.g. needs assessment surveys, focus groups, manual development, content development, feasibility testing) aimed at obtaining an operationalised set of treatment procedures (i.e. intervention protocol) (Rounsaville 2001). Whenever possible, these research activities should involve stakeholders such as health professionals and end users (women in the perinatal period), who can provide information and feedback during early developmental stages. On the other hand, the CeHRes Roadmap values three dimensions in the development of the technological features of the intervention: contextual inquiry (gathering information from intended users and their environment to assess whether there is a need for technology and how it might fit into the daily routines of the intended user), value specification (determining and ranking the values/features of the technology by the key stakeholders) and design (elaborating a prototypical version of the technology based on the pre-identified requirements and assessing the quality of the design in terms of content, system quality and service quality) (Gemert-Pijnen 2011).

regulation and self-compassion (Carona 2023). MumMoodBooster is another example of an effective web-based CBT intervention for the treatment of postpartum depression, composed of six sessions and guided low-intensity therapist support by telephone. A randomised controlled trial demonstrated the effectiveness of this intervention in reducing symptoms of depression, anxiety and stress compared with standard treatment (Milgrom 2016).

### Mobile health (mHealth)

Mobile health (mHealth or m-health) consists of using mobile devices (e.g. smartphones) to support perinatal healthcare. It may include apps or wearable devices and it is particularly useful for monitoring or early recognition of symptoms, preventing PMADs and reducing moderate symptoms of PMADs (Novick 2022). In general, mHealth tools for perinatal mental health include psychoeducation about normative emotional experiences during this period and platforms for interaction and peer support. There is evidence that perinatal women find these tools acceptable, and several have been developed in the past decade (Hussain-Shamsy 2020). A recent review suggested that mHealth tools are effective in reducing depressive and anxiety symptoms and in promoting self-efficacy and social support among perinatal women in high-income countries (Dol 2020), although their efficacy is less clear in studies conducted in

middle- and low-income countries. For example, 7 Cups of Tea is an mHealth tool developed to provide emotional support and self-help exercises (e.g. psychoeducation, mindfulness, acceptance of thoughts) to women with postpartum depression, and a pilot study conducted with 19 participants in the USA revealed that this intervention was feasible and acceptable, and potentially effective as an adjunctive treatment (Baumel 2018).

### Virtual reality (VR)

VR consists of an online virtual world that attempts to replicate real-world characteristics, creating an immersive three-dimensional environment. When users enter this virtual world, they can learn and practise skills and deal with stressful stimuli in a safe environment, and then transfer that knowledge to real-life situations. VR has been proven to be clinically useful in the treatment of various psychological problems, particularly anxiety disorders and specific phobias, although its use in the perinatal context has been less explored (Stamou 2021). In the perinatal period, VR can be particularly useful for exposure to trauma symptoms related to birth complications or to prepare for birth procedures. For example, Noben et al (2019) tested the effect of a VR video on pregnant women's levels of anxiety undergoing a planned Caesarean delivery. A randomised controlled trial was conducted to compare a group of women

receiving only conventional information about the Caesarean delivery and a group receiving the conventional information and also watching a VR video. Although there was no decrease in anxiety levels, the participants who experienced VR mentioned feeling more prepared for the surgery (Noben 2019). Other researchers applied VR combined with CBT in the treatment of postpartum depression, where women were exposed to stressors through VR (e.g. a newborn baby crying, a fire in the kitchen or a toddler being in a highchair) and had sessions focused on CBT strategies such as psychoeducation and cognitive restructuring. The results revealed a significant decrease in both depressive and anxiety symptoms (Stamou 2021), suggesting the promising use of these tools for treatment and prevention of PMADs.

### Artificial intelligence

Artificial intelligence refers to computer programs that can replicate human intelligence and learn automatically. This new type of e-health tool is being increasingly used in different fields, including perinatal mental health, and has the potential to be available to an unlimited number of patients (Hussain-Shamsy 2020). A recent study assessed women's perceptions of the use of artificial intelligence in mental healthcare and found that the participants were able to use this type of technology but had concerns about medical harm and data sharing (Turchioe 2023). For example, Healthy Moms is a new CBT-based intervention for depression that uses an artificial intelligence system to create conversations with pregnant and postpartum women through text messages. The results of a usability study with a sample of 41 women showed that they reported positive feedback about the chatbot and improvements in their mood (Green 2020).

### Ethical concerns in digital assessment and intervention

The use of e-mental health tools in psychological assessment and intervention in the perinatal context comes with the responsibility of determining appropriate ethical standards for their use and integration in the healthcare system (Wykes 2019). For example, one important concern relates to privacy, confidentiality and data security. It is essential to create standards and regulations concerning data storage and transmission – the type of data that is stored and how (e.g. deidentified, encrypted), as well as who will have access to it (e.g. if any data is being sold and to whom). End users should be clearly informed about these topics and give their consent (Wykes 2019). In fact, the data sharing

and privacy of e-health data is a concern for citizens, who perceive themselves the owners of their own health information and who need to consent to what information is shared and with whom (Jokinen 2021). Another important issue relates to regulation, to face the increasing number of e-health tools targeting mental health that are being released, with most of them lacking evidence for their efficacy. Health professionals traditionally wait for regulatory approval before prescribing new medications or therapeutics, but e-mental health tools can be available to consumers with little to no content oversight or evidence-based studies. Within this context, many health professionals lack the ability to clearly distinguish evidence-based e-mental health tools and recommend/refer perinatal women, leaving them to fend for themselves (Wykes 2019). Clinicians should have clear guidance from regulatory bodies and/or professional associations about the safety, effectiveness and appropriateness of different e-mental health tools targeting perinatal women, and women should be made aware of where and how they can access evidence-based and safe e-mental health tools that can be helpful for their mental health management (Wykes 2019).

When considering psychological assessment using e-mental health tools, it is important to recognise constraints related to test accuracy (e.g. difficulty in attesting the test taker and the information given) and ensure the minimum conditions for a rigorous, transparent and reliable assessment process, including the need to perform parallel tests to ensure data accuracy or, at least, to explain to patients the differences between the results obtained in online versus face-to-face assessments (Montalto 2014). Additionally, when considering psychological interventions delivered through e-mental health tools, anonymity may impose important ethical concerns. Patient anonymity is possible in the context of interventions delivered through e-mental health tools (e.g. by registering an email in a different identity to log into a web-based intervention), but it may result in pitfalls related to the clinician's ability to competently assess the individual's initial difficulties or the effects of the treatment plan and to address the risk of harm (Montalto 2014). Health professionals should assess whether it is appropriate to allow the patient anonymity and, if so, clearly discuss the limitations of this option. Additionally, it is important that information about the possible benefits, effectiveness, risks (to privacy or health) and limitations/constraints of the use of e-mental health tools can be given to perinatal women in a clear and comprehensible manner so that they can give informed consent on these different aspects, as they are

ultimately responsible for the use of such tools. Terms of service and end-user licence agreements of perinatal e-mental health tools should be clear, short and simple, to guarantee women's understanding (Wykes 2019). Finally, it is important to promote equity and equality across different perinatal populations, guaranteeing that social inequalities or digital literacy inequalities do not limit the women's access to e-mental health tools to promote their mental health and that those tools are accessible to everyone who needs them (Jokinen 2021).

## Conclusions

The use of e-mental health tools for screening and the prevention and treatment of perinatal mental disorders may be a way of overcoming existing barriers to treatment and increasing these women's access to effective mental healthcare, consequently improving the rates of diagnosis and treatment of PMADs. In fact, e-mental health tools can bring together screening and treatment responses and combine different modalities (e.g. web-based interventions, virtual reality, mobile apps) to create a model of care that fits each woman's needs and availability (Feldman 2023). However, to encourage their implementation and incorporation into routine care, it is important to understand when and for whom e-mental health tools can be an acceptable and effective approach and when face-to-face care is needed (Schlief 2022). Although e-mental health tools can be a valuable complement to existing healthcare solutions, we do not follow a one-size-fits-all approach advocating that these tools are the best solution for everyone.

It is also important that women and professionals in the field of perinatal mental health are able to identify good digital resources (Feldman 2023), that is, those that are grounded in a theoretical and empirical background, adopt the principles of patient-centred design and provide evidence of effectiveness. We advocate creating an independent review system in which e-mental health tools can be classified based on systematic criteria (e.g. developer credibility, development process, background evidence, efficacy evidence) and making it available to stakeholders, which may be particularly helpful in this context.

Finally, if we truly want to increase perinatal women's access to mental healthcare through e-mental health tools, we should listen to their needs and perceptions from the earliest conception phases of these tools, to favour successful implementation. In addition, developers and stakeholders should work together as a team in the development and assessment of such tools.

## Data availability

Data availability is not applicable to this article as no new data were created or analysed in this study.

## Author contributions

A.F. was responsible for the conceptualisation and structure of the article. A. F., E.M. and M.B. contributed to the writing of the article and its final revision.

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## MCQs

Select the single best answer for each question stem.

**1 The use of e-screening for mood and anxiety disorders in perinatal mental healthcare:**

a might overburden clinicians and delay help-seeking among women

b can empower women as regards more active self-care and encourage communication between women and clinicians

c is not particularly relevant to prevention

d is known to be desired by both women and clinicians

e has been shown in many studies to be feasible and acceptable.

**2 Overall, e-health tools for perinatal mental healthcare:**

a are not considered acceptable by women

b can increase treatment accessibility, flexibility and efficiency

c can be used in prevention and treatment, but not for screening

d include an asynchronous communication channel with a health professional

e are the best solution for all women.

**3 E-health tools used in preventing and treating perinatal mental health problems include:**

a mobile health, digital screening, artificial intelligence

b virtual reality, artificial intelligence, face-to-face CBT

c artificial intelligence, telepsychology, web-based interventions

d web-based interventions, virtual reality, telemonitoring

e telepsychology, pharmacological therapy, mobile health.

**4 Cognitive–behavioural strategies that can be applied with e-mental health tools for the treatment of perinatal mood and anxiety disorders (PMADs) include:**

a psychoeducation about PMAD symptoms by providing information in various formats (e.g. text, graphics, animations, video)

b exercises to enhance cognitive restructuring

c exposure to stressors (e.g. childbirth) in a simulated and safe environment

d all of the above

e none of the above.

**5 As regards the use of e-mental health tools in the perinatal context:**

a privacy and data protection are not important issues

b terms of service and end-user licence agreements should be complex to account for all the legal information that is related to e-mental health

c e-mental health tools can bring together screening and treatment responses in a model of care that can fit each woman's needs and availability

d it is easy for professionals and women to identify evidence-based and safe e-mental health tools targeting perinatal women

e equity and equality across different perinatal populations are definitively achieved with e-mental health tools.