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Virtual reality for the treatment of perinatal mental health: a rapid scoping review

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ABSTRACT

Objectives To evaluate the available virtual reality (VR) applications for treating perinatal mental health disorders, focusing on their effectiveness in reducing symptoms such as anxiety and depression, which are common during the perinatal period.

Design Rapid scoping review adhering to the Joanna Briggs Institute guidelines and Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Review (PRISMA-ScR), with adjustments based on the Cochrane Rapid Reviews guidelines.

Data sources Medline, PsychInfo, Embase, Evidence-Based Medicine (EBM) Reviews using Ovid and Web of Science were searched through 20 February 2024.

Eligibility criteria Studies were included if they were written in English or French, provided details on the VR technology, described the assessment of perinatal mood disorders and specified the outcomes measured and the methodological approach used. Review and editorial articles were excluded as well as abstracts and posters.

Data extraction and synthesis One reviewer extracted study characteristics (eg, design, participants, VR components, outcomes) and a second reviewer verified accuracy; study quality was assessed using the National Institute of Health (NIH) Quality Assessment of Controlled Intervention Studies tool, and findings were synthesised narratively and in tabular form.

Results A total of 425 records were identified. After removing duplicates, 308 records were screened by title and abstract. Of these, 74 full texts were assessed for eligibility, resulting in 10 studies being included for data extraction. These final studies were primarily conducted in high-income countries from 2019 to 2024. 8 of 10 (80%) were randomised controlled trials, employing VR through head-mounted displays. Studies predominantly targeted non-severe cases of anxiety and depression, with VR environments ranging from nature scenes to therapeutic content. Results suggest a positive impact of VR interventions on reducing anxiety and depression levels among participants.

Conclusions Studying VR appears to be a promising avenue for developing options to manage perinatal mental health. The immersive nature of VR may provide opportunities for emotional relief and support during this critical period through engaging experiences which can reduce symptoms of anxiety and depression. However, the body of research remains limited, indicating a need for further studies to explore the long-term benefits

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study results are reported following the established guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Review (PRISMA-ScR), ensuring all essential reporting items for systematic reviews were included.

⇒ A thorough search across five major databases was conducted to capture relevant studies related to VR and perinatal mental health.

⇒ Stringent eligibility criteria were set to ensure the relevance and quality of the selected studies.

⇒ The focus on primarily medical and psychological databases may have excluded studies from other fields, such as computer science, which could provide additional insights into VR technology.

⇒ The restricted examination of grey literature, confined to citations within included studies, may have missed relevant but unpublished or non-peer-reviewed research that could provide additional context or data.

and potential integration of VR into perinatal healthcare practices. The promising results from initial studies encourage continued exploration and development within this innovative therapeutic field.

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INTRODUCTION

Mental health struggles are common during the perinatal period, defined as the time frame from 1 year before birth to 24 months after,[1] based on growing evidence that mental health challenges frequently persist beyond the first year.[2] In fact, approximately 23% of mothers in Canada report experiencing symptoms of postpartum depression or anxiety disorders,[3] two distinct conditions that often co-occur.[4] Specifically, prevalence rates of symptoms for prenatal depression range from 20% to 40% and are around 17% for postpartum depression.[5] Similarly, prevalence rates range from 13% to 21% for prenatal anxiety symptoms and from 11% to 17% for

postpartum anxiety.[6] These rates increased during the COVID-19 pandemic,[6–12] with meta-analyses reporting symptoms of postpartum depression around 26% and those of prenatal and postnatal anxiety exceeding 32% during the pandemic period.[13] In fact, a population-based cohort in Ontario found postpartum individuals were 2.6 to 3.3 times more likely to screen above threshold levels for depression during the early pandemic compared with pre-pandemic.[14]

If left untreated, maternal and paternal mood disorders can have long-term negative effects on the parents, the child and thus the family as a whole.[15] Since perinatal mood disorders are heterogenous and of varied severity, a variety of treatments exist. Current treatment methods include psychotherapies (most notably cognitive–behavioural therapy (CBT)[16]), psychopharmacology (though pregnant individuals frequently express a strong preference to avoid taking medication due to potential fetal and neonatal risks, although a minority are willing to consider antidepressant medication[17]), well-being enhancement (such as exercise, behavioural activation and mindfulness),[18] larger systems approaches (such as community therapy and peer support therapy)[19] and eHealth programs.[20] eHealth offers promising treatment modalities consisting of technology-based therapies including app-based or web-based psychoeducation modules, video or phone sessions, and text messages. Burgeoning evidence points to the effectiveness of eHealth programs to support perinatal mental health and the well-being of new parents.[21] In fact, a recent meta-analysis[22] indicated that there is a small effect of eHealth interventions for depression and anxiety, and a moderate effect for insomnia, during pregnancy.

One of the eHealth modalities that has been growing in popularity is virtual reality (VR), defined as a 'set of technologies that enables people to immersively experience a world beyond reality'.[23 24] VR is commonly used with head-mounted displays (HMDs) which create an immersive experience that allows someone to interact with a computer-generated world.[24] Alternatively, semi-immersive VR exists in the form of cave automatic virtual environment systems (ie, projector screens) or non-immersive VR in the form of monitor screens. These latter two methods have been proven to be less effective than fully immersive VR when eliciting feelings of presence compared with HMDs.[25 26] In fact, immersion in a VR environment elicits a sense of presence that allows the user to experience the generated environment rather than the actual physical one,[27] which in VR-based therapy is positively correlated to a decrease in symptoms of anxiety and depression.[28 29] Furthermore, having a higher immersion increases the emotional impact for the user.[26] There is substantial evidence regarding the effectiveness of immersive VR in the treatment of anxiety and depression symptoms for non-pregnant populations across a range of settings,[30 31] with emphasis on social anxiety, general anxiety and public speaking anxiety.[30]

However, the effectiveness of VR to treat mood disorders and improve mental health during the perinatal period is relatively unexplored. A previous scoping review of nine studies that used VR to help people during their pregnancy and delivery found that VR is effective in the treatment of pregnancy-related anxiety and delivery pain management.[32] Suggested mechanisms include providing information about what to expect during delivery, through experiential exposure, and distraction from stressful pregnancy and childbirth-related events. However, the review was limited to VR being used to treat symptoms of anxiety and pain reduction, or as an exercise tool. VR has mainly been used in the perinatal period for assisting during specific procedures such as during labour or surgery, as well as during various assisted reproductive procedures. This has provided evidence on how VR may be able to mitigate anxiety symptoms and stress related to a specific event. As a result, three systematic reviews and meta-analyses have been conducted, all of which found VR to be an effective and safe way to reduce labour-related pain and anxiety.[33]

Nonetheless, there is a lack of evidence summarised in one review that focuses on the overall mental health of new and expecting parents. Given that poor perinatal mental health can lead to poor health outcomes for the child and the parent,[11] there is a high importance in identifying treatment options for perinatal mood-related disorders and improving the overall mental health of parents. There is thus a clear need to synthesise and evaluate the research conducted to date using fully immersive VR to treat symptoms related to perinatal mood disorders and to support mental health during the perinatal period. Considering the novelty of the field of VR and the limited literature available, a rapid scoping review presents the most feasible option to summarise the available evidence. Particularly, it is important to understand what kind of VR technology has been used, how it has been used and what the outcomes have been, in order to comprehensively present the available knowledge and guide future development and testing.

Study aims
To thoroughly investigate the literature available about VR in supporting perinatal mental health, we conducted a rapid scoping review, which aims to answer the following research question: *What virtual reality (VR) applications are available for the treatment of perinatal mental health?* Our synthesis focused on the following key objectives: (1) determining the types of VR technology employed in perinatal mental health treatment and the various ways they have been implemented; (2) identifying specific mental health symptoms that have been evaluated following VR interventions for perinatal mental health; (3) examining the characteristics of research studies that employ VR for perinatal mental health, including study settings, participant characteristics and research designs; and (4) highlighting the principal findings of VR outcomes (feasibility

and acceptability, mood or mental health symptom change) from the literature on this topic.

METHODS
Study design and registration
To appropriately answer the research question and the objectives in our scoping review, we followed the guidelines set by the Joanna Briggs Institute[34] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Review (PRISMA-ScR);[35] we also followed the interim guidance from the Cochrane Rapid Reviews Methods Group.[36] As such, we conducted the rapid scoping review in the following stages: pilot search, pilot screening, search strategy update, search, screening, extraction, synthesis. The review was registered with OSF[37] on 6 March 2024. This review method is an established methodological approach that combines the broad mapping purpose of a scoping review with methodological streamlining typical of rapid reviews.[38] It was selected due to the emerging nature of the intervention and therefore limited body of literature available. The rapid approach allowed for an efficient mapping of key concepts and identification of knowledge gaps, providing an overview of the current evidence base.

Eligibility criteria
The inclusion and exclusion criteria for studies can be seen in table 1.

Information sources
Five databases were searched: Medline, PsychInfo, Embase, Evidence-based Medicine (EBM) Reviews using Ovid and Web of Science. The search was done on 20 February 2024 (CZ). The search strategy was drafted in consultation with a psychology and psychoeducation librarian of the Université de Montréal, who also advised on the review type. Following a preliminary review of the topic and existing indexing terms, three key conceptual domains were identified to structure the search: "virtual reality", "mental health", and "perinatal period". These concepts were selected to capture the intersection of immersive technologies with psychological well-being during the perinatal period. The final search strategy can be found in the online supplemental material.

Table 1 Eligibility criteria based on study population, concept, context and types of evidence

	Inclusion criteria	Exclusion criteria
Population	▶ Participants must be in the perinatal period (pregnant or up to 24 months after birth of the infant)[1]	▶ Evaluation of the technology without human participants ▶ Evaluation of the technology with human participants not in the perinatal period
Concept	▶ Studies that refer to the concept of immersive VR for the treatment of perinatal mental health or its derivatives (ie, pregnancy-related anxiety and postpartum depression) ▶ Studies that provide information on the VR technology including the hardware (ie, standalone HMD, phone-based HMD or PC-powered HMD) and programme content (ie, virtual environment design) ▶ Studies that provide information on what symptoms of perinatal mood disorders (ie, anxiety or depression) were assessed and how these were assessed (ie, quantitatively, qualitatively or mixed-method)	▶ Studies that do not refer to the concept of immersive VR for the treatment of perinatal mental health or its derivatives (ie, pregnancy-related anxiety and postpartum depression) ▶ Studies that do not provide information on: the VR technology including the hardware (ie, standalone HMD, phone-based HMD or PC-powered HMD) and programme content (ie, virtual environment design) ▶ Studies that do not provide information on what symptoms of perinatal mood disorders (ie, anxiety or depression) were assessed and how these were assessed (ie, quantitatively, qualitatively or mixed-method)
Context	▶ Any geographical location or setting of any nature where participants use VR technology in person	▶ Studies in which participants did not try the VR technology
Type of source	▶ Primary empirical research studies (eg, RCTs, non-RCTs, quantitative, qualitative and mixed-method studies) ▶ Protocols for planned studies ▶ Full-text articles ▶ Full-text conference proceedings ▶ Study registrations ▶ Dissertations	▶ Reviews (eg, systematic reviews, narrative reviews) ▶ Editorial articles (eg, perspective pieces, position statements) ▶ Abstracts or posters ▶ Articles for which we cannot obtain the full text
Language	▶ Written in English or French	▶ Non-English and non-French papers

HMD, head-mounted display; PC, personal computer; RTC, randomised controlled trials; VR, virtual reality.

Selection of sources of evidence

Following the search, all identified studies were collected and uploaded into EndNote 21 (Clarivate Analytics, Pennsylvania, USA). Records were then imported to the Covidence platform, where duplicates were removed, for the screening of the articles. The screening was conducted following all the steps set by PRISMA-ScR[35] for scoping reviews, with adjustments regarding the number of screeners per step based on the recommendations from Cochrane Rapid Reviews.[36] Step 1: one screener (CZ) screened for titles and abstracts. All the excluded studies, as well as 20% of the included studies, were screened by an additional independent screener (JJ). Step 2: one screener (CZ) screened the full texts. All the excluded studies were screened by the additional independent screener (JJ). Any disagreements that arose between the screeners at each round of the selection process were resolved through a consensus discussion, or with a third reviewer (ALM). The reference list of the studies included for full text in the review was also scanned to identify any relevant grey literature; however, none was found.

Data extraction and quality assessment

The following data were extracted: study title, year of publication, country, study design, sample size and participant characteristics, VR components (hardware and software), time between data collection sessions if applicable, mental health condition being investigated, quantitative data collected related to mental health or VR, qualitative data if applicable, and study outcomes (such as information on usability, acceptability and VR's effect on mental health results). One extractor (CZ) independently extracted all the data required, and a second extractor (JJ) checked for correctness.

Study quality was assessed with the National Institute of Health (NIH) Quality Assessment of Controlled Intervention Studies tool[39] by a single reviewer (CZ), with an additional reviewer verifying the judgements (JJ). The tool includes 14 questions answered with yes, no, cannot determine, not applicable and not reported. The tool is designed to assist reviewers in the critical appraisal of internal validity, including risk of bias and methodological flaws, without focus on a numeric score. After answering the 14 questions, the studies are judged to be good (considers results to be valid), fair (acknowledges the results may contain some bias but not enough to be deemed invalid) or poor (indicates significant risk of bias or flaws). Any studies included in the form of a registration or protocol were not assessed.

Synthesis of results

To answer the research question, all the information found was synthesised both narratively and in tabular form so that the available VR treatments can be comprehensively presented. Results were categorised and reported based on the included studies' general characteristics (author's name, year of publication, country, type of study, sample size, participant characteristics, study objective) in online supplemental table 1, and specific characteristics (VR hardware and software, mental health measures, time between data collection and reported findings) in online supplemental table 2.

Patient and public involvement

None.

RESULTS

A total of 425 records were found. After removing all duplicates, a total of 308 records were left for title and abstract screening. Out of these, 74 records were assessed for full-text eligibility, out of which 10 records were included for data extraction (figure 1).

General study characteristics

As seen in online supplemental table 1, the included studies (k=10) were published between 2019 and 2024, with most in 2023 (k=6, 60%).[40–45] The majority of the studies (n=8, 80%)[40–44 46–48] were randomised controlled trials (RCTs), while one was a pilot trial[45] and one was a laboratory experiment.[49] Out of the included studies, some (k=3) have not yet been conducted at the time of our search; one was a registration of a RCT that is still in the process of recruiting participants,[41] and two were study protocols.[42 45] The included studies were conducted across several countries, including Turkey (k=3),[40 44 48] Spain (k=2),[42 47] the USA and China (k=1),[49] Korea (k=1),[43] Denmark (k=1),[41] Switzerland (k=1)[41] and the Netherlands (k=1).[46] Out of the studies already conducted (k=7),[40 43 44 46–49] there was an average of 130.3 participants (N=912 total), with an average age of 30.3 years old (two studies[43 47] did not mention an age limit criteria) and an average of 31.6 weeks' gestation among those who were pregnant.

Most studies only investigated the effects of VR with the pregnant person (k=9),[40–45 47–49] while one also investigated the effects with their partner.[46] The objectives of the included studies were varied, with some measuring aspects beyond mental health. The included studies targeted non-severe mental health cases including symptoms of anxiety (k=5, 50%),[40 44 46–48] stress (k=2, 20%)[44 49] and depression (k=1, 10%).[41] As seen in the data extracted (online supplemental table 2), most studies measured multiple mental health symptoms outcomes. Most studies (k=9)[40 42–49] used validated questionnaires to measure mental health symptoms, with only one study not mentioning the questionnaires to be used.[41] Anxiety was most commonly assessed (k=8)[40 42 44–49] through the State Anxiety Inventory (STAI) (k=5, 62.5%),[40 42 44 47 48] which is a 40-item questionnaire that measures both state anxiety (ie, experienced in that exact moment and experienced generally) and trait anxiety (ie, persistent, affecting the person long-term).[50] This is followed by depression (k=5),[41–45] which was most frequently measured with the Edinburgh Postnatal Depression Scale (EPDS) (k=2, 40%),[42 43] which assesses depressive symptoms experienced in the previous
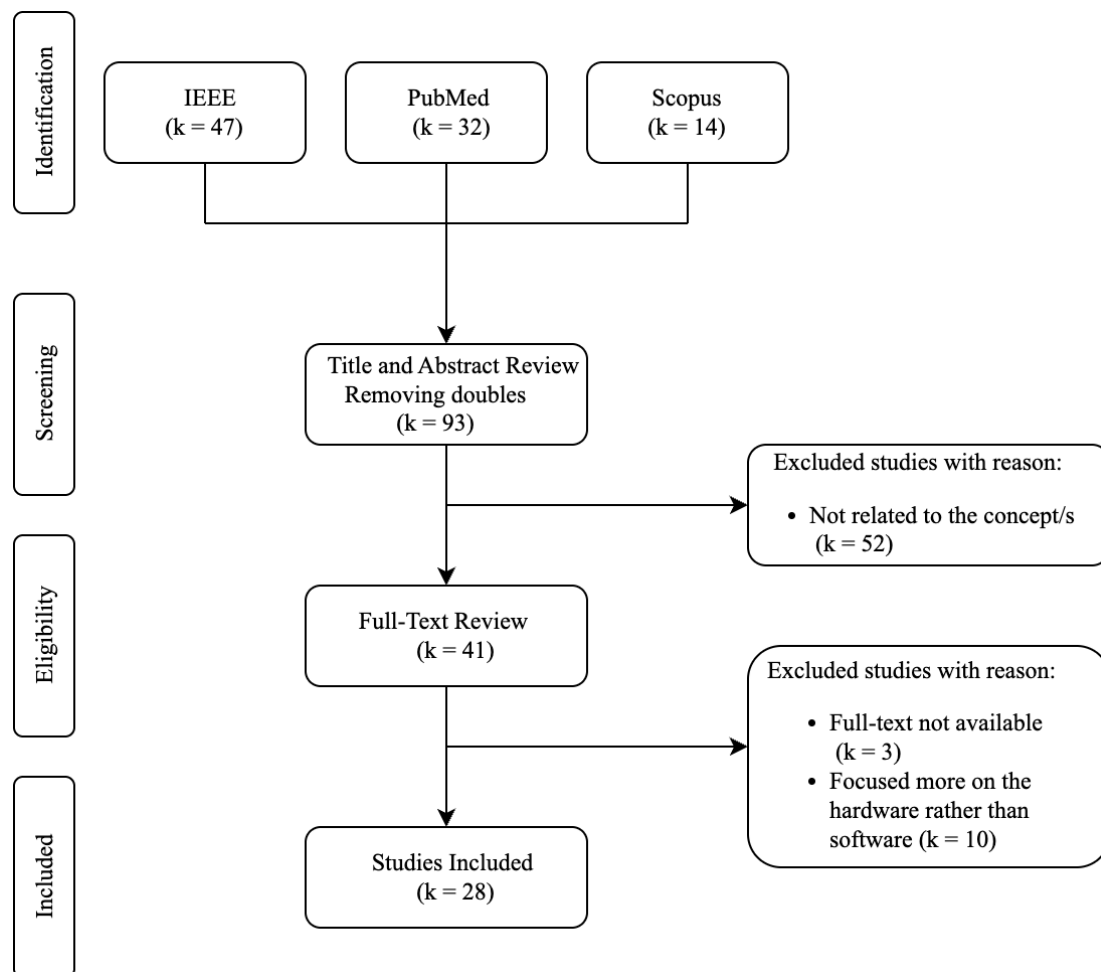
Figure 1 PRISMA flowchart used to identify relevant studies. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; VR, virtual reality; EBM, Evidence-Based Medicine.

week.[42] One registration (k=1, 10%)[41] did not report their planned measure for depression. Most of the instruments used in the included studies to evaluate the effectiveness of VR were not specifically validated or adapted for perinatal populations. However, some perinatal-specific measures were applied, such as questionnaires addressing childbirth and pregnancy, and these are listed in online supplemental table 2.

Specific study characteristics

As seen in online supplemental table 2, the studies used different VR hardware. Half of the studies (k=5)[40 43 46–48] used a VR device compatible with a smartphone, whereas the other half[41 42 44 45 49] used standalone VR headsets. Half of the studies (k=5, 50%)[40 44 47–49] had nature environments as the visual stimuli in VR with the aim of aiding the participant to relax, whereas the other types of stimuli were fetal/baby images (k=2, 20%)[43 45] to help the bonding experience between parent and baby, cesarean delivery informative videos (k=1, 10%)[46] and activities such as mindfulness/breathing exercises (k=1, 10%)[42] and cognitive exercises (k=1, 10%).[41] The interventions and data collection were carried out over different periods of time, ranging from one session to daily sessions over a

period of 16 weeks depending on the study, with almost half (k=4, 40%)[40 47–49] only requiring one VR session. The time in between VR sessions for the studies that administered more than one session is reported in online supplemental table 2 under 'Time between data collections'. Most studies (k=8, 80%)[40 42–44 46–49] collected pre and post VR intervention data relating to the mental health symptoms of the participants. Out of these, a minority (k=3, 37.5%) also conducted follow-up assessments after the VR intervention had been administered (1 week and 1 month after birth,[45] 1–2 weeks after birth[46] and up until 10 months after birth[41]).

Of the studies that were already conducted and thus reported findings (k=7, 70%),[40 43 44 46–49] the outcomes of the VR interventions were positive. Regarding anxiety, studies (k=6, 85.7%) found a decrease in symptoms after VR intervention.[40 44 46–49] Specifically, it was found that VR environments with more green spaces, such as parks, were associated with decreased anxiety symptoms and increased happiness compared with urban VR environments without green spaces.[49] It was also found that a VR intervention showing fetal images led to lower self-reported depression scores compared with participants

receiving no VR intervention.[43] Undergoing VR intervention was also associated with a decrease in self-reported stress.[44] Results were positive for the subjective experience of VR interventions, with studies reporting participant satisfaction and willingness to recommend VR to other pregnant women.[40 44 48]

Quality assessment

Study quality was assessed using the NIH Quality Assessment of Controlled Intervention Studies tool,[39] except for the registrations and protocols. Thus, 7 out of the 10 studies included (70%) were assessed, and both reviewers (CZ and JJ) agreed on the outcomes. Four out of seven (57%) were rated as fair[40 46 48 49], while the other three (42%) were rated as good[43 44 47]. Thus, the results of the included studies can be considered valid.

DISCUSSION
Summary of evidence

Perinatal mood disorders can have long-term negative effects on the parent and the child if left untreated.[11] Among the treatment options, more eHealth approaches are now being offered including VR, which has been shown to be an effective tool to treat symptoms of social anxiety, general anxiety and other forms of anxiety and depression in the general population.[30 31] However, little is known about whether VR can be used to support mental health during the perinatal period, beyond interventions that focus on mental health changes arising due to fear of childbirth or medical procedures related to pregnancy. Thus, this rapid scoping review aimed to identify the current literature available that uses VR in supporting perinatal mental health by answering the following research question: *What virtual reality applications are available for the treatment of perinatal mental health?*

We found limited literature in the field, with the earliest study being published in 2019 and most studies being published in 2023. This indicates how novel the research is to date and that this field is growing in popularity. Thus, it may be possible that in the upcoming years, more research will be available. All of the included studies provided fully immersive VR experiences by using HMDs as their VR hardware. The type of HMD varied among the studies, with half of included studies using HMDs compatible with a smartphone. These latter types of HMDs work by inserting a smartphone in front of the headset, thus allowing users to view the VR environment through the HMD lenses played on the smartphone. These types of HMDs are a more affordable alternative to other headsets, but often lack direct user interaction and strong computing power.[51] In fact, all the studies that used this device showed images or videos, often of nature environments,[40 43 46-48] and did not allow interaction with the environment. Contrarily, two of the studies using standalone HMDs described more interactive VR experiences, with Jimenez-Barragan *et al*[42] using mindfulness techniques and Miskowiak[41] conducting cognitive exercises. Out of

the studies that developed their own VR environment, one[49] created urban spaces (with different levels of green nature spaces) and found that green spaces increased happiness and decreased symptoms of anxiety, whereas another study[43] that developed VR images of the fetus specific for each participant found greater attachment between the mother and the fetus. One study[46] found their developed VR environment, a cesarean delivery information program, to have no significant effect on the anxiety symptoms of the patients or their partner compared with the control group, except for those with a history of emergency cesarean delivery. No study compared the effectiveness of different VR interventions, or different environments within the same intervention, which would be helpful to determine whether one VR intervention can be more beneficial over another or differential effects by outcome.

VR interventions were most commonly used to mitigate symptoms of non-severe cases of anxiety, which was often measured through questionnaires such as the STAI, as well as non-severe cases of depression, which was most frequently measured with the EPDS questionnaire. Although symptoms of anxiety and depression were measured, mitigating these was not always the primary objective of the study. In fact, only five out of the eight studies measuring anxiety aimed to test the effect of VR on decreasing anxiety symptoms and only one out of the five studies measuring depression aimed to test whether VR has the potential to decrease symptoms of postpartum depression. Furthermore, all studies monitored symptoms of the pregnant person but only one study also included the partner, even though it has been observed that symptoms of paternal mental illness have a negative effect on child development.[12]

Overall, the results of the studies were positive for the effects of VR on mental health, with studies showing lower anxiety[40 44 46-49] and depression[43] symptoms after the intervention. Participants also indicated a willingness to recommend VR to other pregnant people. While other treatment methods for perinatal mood disorders are considered well established and credible, the evidence base for VR's effectiveness is promising but still in its infancy. However, VR enables more flexibility with various ways in which it could be employed and explored as a mental health treatment modality. The trend noticed while conducting this review is that research in this field is growing, implying that the next years will bear more evidence about VR's use for perinatal mood disorders. The increase in research may lead to the development of standardised treatments using VR, which could thereby establish its credibility as a treatment modality.

Quality assessment suggested that all included studies were deemed to be of fair to good quality. The number of participants included was appropriate for all the studies, as well as the participant randomisation method. This may be attributed to most studies being RCTs and thus sample size was determined based on power analyses. Most studies explicitly set the inclusion criteria for

pregnant participants to not have a history of mental health illness; however, one proposed study[41] purposely included participants with a history of mental illness to compare their outcomes to those without a history. As this is a registration, its findings are yet to be published. Almost half of the studies[40 47–49] already conducted and one study protocol[45] administered VR in one session only, and their interventions still showed positive results. Being able to successfully implement VR in one session may increase its feasibility, as it could be offered for therapy during in-patient visits without requiring each participant to own a headset for at home use. Furthermore, most studies only assessed the outcomes of the VR immediately post-intervention, with only three conducting follow-up assessments (1 week and 1 month after birth,[45] 1–2 weeks after birth[46] and up until 10 months after birth[41]). Thus, most studies are only able to determine the immediate effects of VR. These results may also be skewed by the excitement of trying the new technology, a concept known as the 'novelty effect',[52] especially for the studies which only had one VR session, and may not accurately represent the long-term effectiveness of the intervention. Future research should consider evaluating mental health over a longer period and implementing VR across multiple sessions to assess long-term and dose-response effects. Psychotherapy typically requires 12–16 sessions to show meaningful change in treating postpartum depression,[53] with some cases requiring fewer; therefore, VR therapy may need similar standards to ensure efficacy. Additionally, the VR interventions included in this review were standalone; it would therefore be beneficial for future studies to explore the benefits of using VR as an adjunct to treatment such as CBT, third-wave psychotherapies or interpersonal psychotherapy. Considering the potential long-term effects of perinatal mood disorders on infant development, it may be interesting to evaluate how VR interventions for parents may influence outcomes among their children.

Limitations

Our review focused on synthesising existing evidence on the use of VR to support perinatal mental health. Given the emerging nature of this field, a rapid scoping review was determined as the most feasible approach to capture the breadth of research within a limited timeframe. While comprehensive, this methodology might not provide the depth of insights that a systematic review conducted over a longer period could offer, especially as relevant studies continue to emerge. Additionally, our search was primarily concentrated in medical and psychological databases. Important contributions catalogued in different databases from fields like computer science or engineering discussing more in-depth technological aspects of the VR technology could have been overlooked. The search of grey literature was limited and examined only citations within included studies in adherence to rapid review protocols, which might have restricted our access to some pivotal works. It must also be noted that

although the search terms used to identify the studies for this review were broad and encompassed all aspects of mental health, the results predominately focused on anxiety and depression. In this regard, the review focuses on individuals experiencing low-to-moderate symptoms of anxiety and depression, rather than those with clinically diagnosed disorders. This distinction is important, as symptoms do not necessarily equate to a formal diagnosis, and our review may therefore exclude populations with severe conditions. As a result, it must be emphasised that the effectiveness of VR to support individuals suffering from clinically diagnosed anxiety and depression cannot be determined. Additionally, the reliability of findings may be limited as most studies included in this review relied on self-report questionnaires of symptoms rather than standardised clinical assessments. While not all of these tools were validated specifically for use in perinatal populations, many have been used reliably during this period.[54–57] Language barriers also pose a limitation; most included studies were conducted in non-Anglophone and non-Francophone countries, raising the possibility that other relevant studies were conducted in these countries however not published in English or French and thus were not included.

CONCLUSION

This rapid scoping review highlighted the growing interest in VR technologies in the treatment of mental health problems during the perinatal period, particularly for anxiety and depression. Despite the limited body of literature, the available studies, published between 2019 and 2024, indicate that VR interventions are being explored as supportive tools for individuals experiencing non-severe cases for conditions such as perinatal anxiety and depression, which are prevalent during this sensitive period. However, the research remains in its beginning stages, lacking comparative analyses to establish the effectiveness of different VR approaches. The positive outcomes reported in these initial studies, such as reduced anxiety and depression symptoms, as well as subjective satisfaction with VR interventions, offer a hopeful perspective on the potential role of VR in perinatal mental health and warrant further systematic investigation.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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