

Virtual reality as a strategy for labour pain relief: scoping review protocol

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Introduction

During labour, pain can affect the health of the mother and the foetus, and its relief is a right of the mother and a duty of the professionals. In the promotion of a positive experience of labour, it is crucial that nurses specialised in maternal and obstetric health give priority to pain assessment and the use of non-pharmacological methods for pain relief, providing the necessary resources and empowering parturients to use them. Among said methods, virtual reality stands out due to its ease of use and for allowing the reduction of pain levels by diverting attention from the real world, using computers and other devices. Since it is a new approach that is not yet implemented in delivery rooms in Portugal, it is important to map the facilitating factors and barriers associated with its use, so that the dissemination of existing knowledge and its transfer to skilled nursing care during the first stage of labour can be planned.

Objective

To map the research evidence on the facilitating factors and barriers in the use of VR as a non-pharmacological strategy for pain relief during labour in hospital settings.

Methods

This protocol follows the guidelines published by the Joanna Briggs Institute. The databases MEDLINE, CINAHL, Cochrane Database of Systematic Reviews and MedicLatina through the EBSCOhost platform, the Joanna Briggs Institute EBP Database, through the Ovid platform are considered for the search and, the grey literature is also included. As inclusion criteria, qualitative, quantitative and mixed studies that address virtual reality as a pain relief strategy during labour in hospital settings (based on the mnemonic PCC - Population, Concept and Context), published in Portuguese, French, Spanish or English language between 2017 and 2022 are considered. The titles and abstracts of identified references will be independently reviewed and assessed for eligibility by two reviewers. In the event of a tie, a third reviewer will be used. Full text studies and data will be extracted using a form. The data extraction table will show the mapped data in a descriptive way answering the research questions.

Discussion

The results will allow summarising the barriers and facilitating factors in the use of Virtual Reality for pain relief during labour and thus contribute to decision making in planning the dissemination of this strategy to pregnant women and health professionals and its implementation in delivery rooms.

Systematic Review Record

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Virtual Reality; Pain in Labour; Obstetric Nursing; Parturient.

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Introduction

Pain during labour is an individual experience.¹ The way pain is experienced by the parturient includes physiological and psychosocial processes² that depend on prepartum and intrapartum factors.³ These include physical, psychological (fear, anxiety, confidence), prenatal education, parity, the position adopted by the woman, genetic and clinical factors, the mother's level of education, socioeconomic and cultural level, and the model of care during childbirth (e.g. presence of a caregiver).⁴ Although pain during labour is a natural and physiological condition, it can affect the well-being and health of the woman and the foetus, the woman's emotional relationship with the new-born, as well as her prospects for future births.⁵

National and international guidelines on the positive birth experience or respected motherhood advocate that pain relief is crucial to the provision of quality care. The World Health Organization⁶ states that pain relief should be based on scientific evidence and made available in a timely manner, according to the woman's choices, its culture and its needs. In this context, non-pharmacological pain relief strategies that do not entail the risk of adverse effects of pharmacological strategies such as increased duration of labour and the need for instrumental deliveries, are highlighted.^{1,7} These strategies have the potential to reduce the side effects of epidural analgesia, increase the rate of adherence to breastfeeding, increase shared decision-making and control over labour, facilitate interaction with professionals, and ultimately increase the satisfaction of the parturient woman and its family.⁸⁻⁹

Among the non-pharmacological strategies for pain relief during childbirth, virtual reality (VR) stands out as a non-invasive method, presenting several benefits (increased satisfaction and decreased pain, duration of labour and anxiety), being effective and easy to use.^{4,10-11} Musters et al.¹² consider that there has been an increase in scientific evidence that VR is effective in reducing pain during childbirth, and that its use may contribute to reducing the use of pharmacological pain control methods and, concomitantly, the side effects associated with them.

VR is a new technology that uses computers and other devices, which allows the parturient to experience a sense of presence in an immersive three-dimensional and interactive environment, which contributes to reducing the perception of pain, diverting attention away from the real world.¹³ This abstraction and sensory experience can also be used simultaneously with other techniques, which is an advantage that should be taken into consideration.¹⁴

Pain perception is (in part) related to the attention paid to painful stimuli¹⁵ and distraction techniques take the attention away from a noxious stimulus, requiring limited attention from the user. Although distraction through watching movies, listening to music, and having non-clinical conversations has become more common during medical procedures, VR systems may provide a more effective alternative. Distraction may be a very promising analgesia technique that can be used safely and effectively for the reduction of pain and discomfort during medical procedures.¹⁶ In recent years, several researches have

explored the effectiveness of immersive VR distraction in reducing pain related to different medical procedures and also labour.¹⁵

Some of the most recent distraction techniques use advanced audio-visual technology, which combines visual and auditory stimuli in two- or three-dimensional videos. These techniques are called audiovisual VR systems, goggle systems or simply audio visual distraction and do not use kinetic stimuli. VR uses sophisticated equipment such as 3-D monitors (*Head Mounted Displays*) placed on the head, which have a large field of view, and motion detection systems which allow users to interact with the virtual environment. There is a multiplicity of features and components that can be added to or removed from the equipment, which translates into the costs involved for its use.¹⁷

The use of VR as an analgesia technique offers more immersive images due to occluding headsets that project the images right in front of the user's eyes and, depending on the model used, block real-world stimuli (visual, auditory or both).¹⁶ McCaffery and Pasero¹⁷ have designated this phenomenon as sensory shielding. In the latter, the user is protected from pain by the distraction resulting from immersion, which is particularly increased in VR through the use of *Head Mounted Displays* that direct the focus of attention to what is happening in the virtual world.¹⁶

In the first phase of labour, VR is of particular interest due to its non-invasive nature, its contribution to pain relief and the absence of significant side effects.¹¹

In the studies conducted by Baradwan *et al.*⁴, Akin *et al.*¹, and Carus *et al.*¹⁸, the benefits of VR were highlighted as being: the reduction in the perception of pain in parturients, the decrease in anxiety levels, the increase in the satisfaction of women and significant others, the absence of adverse effects, as well as the decreased risk of complications for the foetus and postpartum disorders for women. In this context, it is also important to mention the qualitative study conducted by Wong *et al.*¹⁹, in which the perceptions of parturients during the use of virtual reality were analysed and in which they concluded that women felt calmer and more relaxed, with decreased levels of anxiety and more focused on breathing. This study also showed significant improvements in self-efficacy through the use of VR.

Health professionals, with their knowledge and skills, remain the most important factor in promoting a labour that meets women's expectations²⁰, ensuring a safe environment, designing, implementing and assessing interventions for pain prevention and control.²¹⁻²² During pregnancy and childbirth, pain relief stands out in the professional practice of obstetric nurses and is based not only on medical reasons, but also on human reasons.²³

The sharing of knowledge for the innovation of nursing care, strategies and interventions is essential, as well as the acquisition of resources and the training of professionals to provide safe, accessible and effective alternatives²⁴ for the relief of pain in parturients.²⁵ The implementation of VR in the first stage of labour requires obtaining information on the preferences of parturients and how they perceive pain.¹² In prenatal care, these aspects can be clarified and the

development of the birth plan can be a good opportunity to do so.

Despite its effectiveness in pain relief and the safety that its application allows,²⁶ VR is still not used in delivery rooms in Portugal. In this context, it is essential to identify the facilitating factors and barriers to the dissemination of the available know-how, in order to promote its dissemination during pregnancy in childbirth preparation courses and its accessibility to parturients.

Methods

A search of MEDLINE (EBSCOhost), the Cochrane Database of Systematic Reviews (EBSCOhost), and the Joanna Briggs Institute EBP (Ovid) was performed and no scoping reviews or systematic reviews on the topic were identified.

Objectives and Research Questions

The aim of this scoping review (ScR) is to map the evidence on the facilitating factors and barriers in the use of VR as a non-pharmacological pain relief strategy during labour in hospital settings.

The research questions are:

What are the barriers to using virtual reality as a pain relief strategy during labour?

What are the facilitating factors in the use of virtual reality as a strategy for pain relief during labour?

Following the methodology proposed by JBI, this scoping protocol is presented according to the guidelines for systematic review protocols provided by the Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) checklist ([Appendix 1](#)).²⁸ The planned review will be presented according to the PRISMA Extension for Scoping Reviews (PRISMA-ScR) Checklist ([Appendix 2](#)).²⁸

This protocol will be conducted to include all studies that address virtual reality as a non-pharmacological strategy for pain relief during labour. Ensuring a systematic and replicable work, the structure of this ScR protocol, will follow the following steps: define and align the objective with the questions for the review, develop and align the inclusion criteria with the objectives/questions; describe the planned approach for the search, selection, data extraction and presentation of evidence; search and select the evidence; extract and analyse the evidence; present the results and summarise the evidence in relation to the review objective, reach conclusions and note any implications of the results.²⁹

This protocol has been registered in the Open Science Framework (registration no. osf.io/4b2sj)

Eligibility Criteria

Participants: this ScR protocol includes studies on the use of virtual reality for pain relief during labour.

Concept: the phenomenon of interest defined for this ScR concerns the facilitating factors and barriers to the use of virtual reality as a non-pharmacological strategy for pain relief during labour. The identification of these aspects will

make it possible to prevent the impact of barriers and promote the successful implementation of this strategy in birth units in Portugal.

Background: hospital (Delivery Rooms).

Types of Studies

This protocol includes primary (quantitative, qualitative and mixed) or secondary (systematic literature reviews and ScR) studies and grey literature. Studies published in Portuguese, French, Spanish and English will be considered, since they are the languages of the researchers. The timeline considered will include the last 5 years of publication, starting in 2017.²⁹

Information sources

To identify potentially relevant documents for the ScR two types of information sources will be used.

Electronic databases through the EBSCOhost platform: CINAHL Complete, MEDLINE Complete, MedicLatina and Cochrane Database of Systematic Reviews, and through the OVID platform: JBI EBP.

Other documents from sources such as the Open Access Scientific Repository of Portugal and from organisations issuing guidelines on health care during childbirth.

Research strategy

The research strategy defined for this ScR will involve three stages.

An initial search in relevant databases: MEDLINE, CINAHL. Through this search, the most commonly used descriptors (natural and indexed language) in the titles and abstracts of the searched articles and the indexing terms used to identify the articles related to the facilitating factors and barriers in the use of virtual reality as a non-pharmacological strategy for pain relief during labour are defined.

The natural language search expression to be used in the MEDLINE database includes truncation and wild cards and will be: (Parturient OR Pregnant* OR Woman in Labour) AND (Virtual Reality OR User-Computer Interface) AND (Pain Management OR Pain Measuring OR Pain Relief OR Labour Pain) AND (Hospital OR Obstetric Units).

The search expression in indexed language to be used in the same database will be: (MH "Labour, Obstetric" OR "Pregnancy") AND (MH "Virtual Reality" OR MH "User-Computer Interface") AND (MH "Pain Management" OR MH "Pain Measurement" OR MH "Analgesia, Obstetrical" OR MH "Labor Pain") AND MH "Hospital Units".

As limiting factors, the date of publication (from 2017 to 2023) and language (English, French, and Portuguese) will be used.

Secondly, a search will be conducted by adapting the terms described in the previous section for each of the sources mentioned. The search strategy will be based on the mnemonic "PCC" according to the JBI recommendations. The Participants were the parturient women; the Concept was virtual reality as a non-pharmacological strategy for pain relief and the Context was the hospital (delivery rooms).³⁰ The reading of the titles and abstracts by both reviewers

independently (using previously established questions) will allow them to select those that meet the eligibility criteria and that will be chosen to be read in full.

For refinement, the bibliographic references of all identified articles and studies will be reviewed to include additional studies.³⁰

Data mapping process

After the search, all selected studies will be sent to the Mendeley reference management program and duplicates will be removed. Subsequently, a detailed assessment of the studies will be performed, and their selection will be based on the inclusion criteria and the guiding questions of the review. Two reviewers independent of each other will be used for identification, selection, eligibility and inclusion criteria. In case of doubt, divergent issues will be discussed, and a third reviewer will be contacted for clarification.

Selected articles will be downloaded into the Covidence programme, which, in partnership with Cochrane, allows interaction between reviewers and optimises the systematic review process, based on JBI recommendations. The extracted data will include specific details on population, concept and context, study methods and key findings relevant to the study question.

Summary of Results

The results will be presented in the PRISMA flowchart ([Annex 3](#)). The data extraction table will show it in an organized and descriptive way, considering the review questions. Thus, it is essential to identify the facilitating factors and barriers in the use of VR in pain relief during labour. These results will be presented in a descriptive and analytical way, in a table where the characteristics of the studies and documents considered in the ScR will be described.

Discussion

VR is a non-pharmacological alternative for pain relief³¹ and mapping the facilitating factors and barriers to its use during labour allows planning interventions for the dissemination and transfer of the knowledge produced involving nurses, physicians and women/companions so as to promote the use of this strategy by enhancing the facilitating factors and minimising the barriers.

Authors' contributions

Coelho, M: Rationale for the protocol, methodological options and writing the manuscript.

Tereso, A: Rationale for the protocol, methodological options and writing the manuscript.

Conflicts of interest

The authors declare that there is no conflict of interest.

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