CURRENT TOPIC

Labour Pain Intervention: A Bibliometrics Analysis

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Abstract

Pain and anxiety during childbirth are significant concerns during labour, especially in first-time mothers. This can increase labour time, increase stress hormones and affect the condition of the mother and newborn. This study aimed to determine trends in the number of publications on labour pain interventions, the number of citations and the direction of future research topics. The research method applied in this study was Preferred reporting items for systematic reviews and meta-analyses (PRISMA) which uses 158,201 scientific articles or proceedings sourced from the *Dimensions* database. Articles were reviewed by using the *VOSviewer* application. The results of the research revealed that the number of publications on the topic of labour pain intervention had an upward trend, the number of citations on the topic of labour pain intervention had increased. Network visualisation on the topic of labour pain intervention provided information to find newness on topics that were not yet connected, there were 4 clusters reviewing it from co-occurrence, overlay visualisation on the topic of labour pain intervention provided a trend towards future research topics, density visualisation on a topic that was still rare. The conclusion from the results of this research is that it contributes to the development of a research roadmap on labour pain interventions.

Key words: Bibliometrics; Linear models; Research design; Methods; Labour pain.

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Introduction

The pain and anxiety during labour are significant, especially for first-time mothers. It could extend labour duration, increase stress hormones and affect the mother's and newborn's conditions.[1] Some strategies have been developed to deal with labour pain and enhance the satisfaction of the mother's birth experience.[2] The intervention for labour pain could be done through pharmacological and non-pharmacological techniques. The former group includes epidural analgesia, pain control gas and intravenous opioids. The later non-pharmacology techniques include waterbirth and immersion, transcutaneous electrical nerve stimulation (TENS), aromatherapy, acupuncture and acupressure and massage techniques. Nowadays, the neuraxial blockade has spinal technique, epidural and epidural-spinal combined technique, which is the golden standard for patients with labour pain. However, many patients use non-pharmacological techniques as they enable them to have more natural birth techniques.[3]

Pain is a physiological condition commonly experienced by pregnant mothers during labour[4] due to uterine muscle contraction as an effort to open the cervix and push the infant's head toward the pelvis.[5] Labour pain is a subjective experience
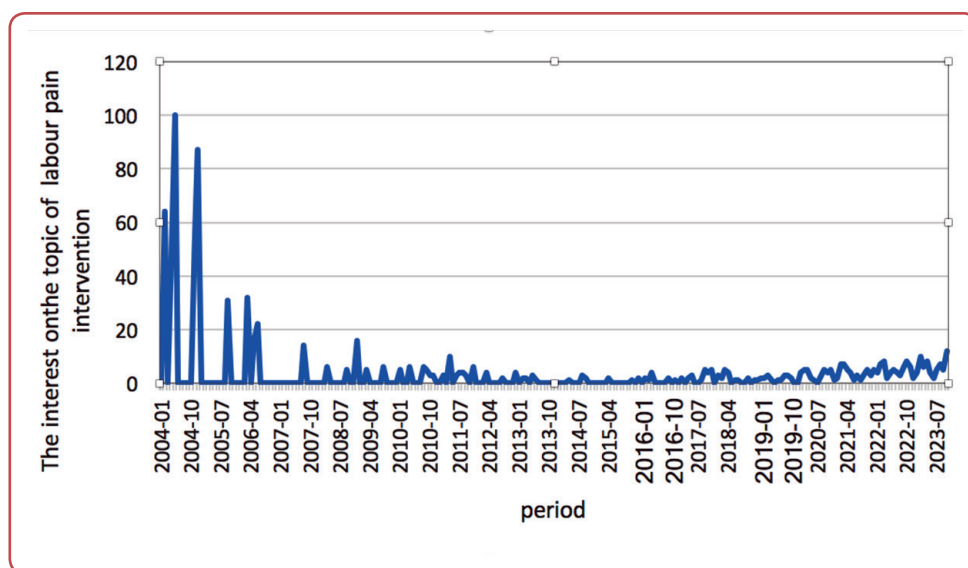
Figure 1: The interest in the topic of labour pain intervention over time (Data source: Google Trends)

caused by uterine muscle ischaemia, traction of uterine ligaments, traction of ovarium, fallopian tubes and enlargement of the lower part of the uterus, pelvic floor muscles and perineum.[6] The pain and stress control related to the labour and birth process is one of the crucial problems in the healthcare system.[7] With undeniable and intensive pain during the labour process, the pain level may vary according to the mother's physiological and psychological influence.[8] The pain impulse is transmitted when the defence is opened and stops when the defence is closed and the effort to close the defence is the basis for the pain killer.[9]

Labour is a critical yet significant period in a woman's life.[10] A companion by a midwife is required to go through a crucial period during the labour process.[11] For a women, giving birth could be the most challenging psychological history in her life. The case makes the role of a midwife very prominent in this process.[12] It has long-term negative or positive significant effects on a woman's life.[13] The difference in culture, religion and social economy could affect women's perspective on giving birth experience.[14] Giving birth is not only about the transition of becoming a mother but also related to the physical and emotional effects in a mother's life.[15] The management of midwifery service allows midwives to develop in performing the midwifery service.[16]

Public interest in labour pain interventions worldwide is declining. As stated in Figure 1,[17, 18] this interest can be tracked using Google Trends by typing in the keyword labour pain intervention. The search was carried out from January 2004 to December 2022 using web browsing in all categories showing the data presented in Figure 1. Data was taken on 28 October 2023.

Besides duration, there are differences in the interest between countries. According to the *Google Trends*, the Philippines is the country with the highest interest in the topic, followed by the United States. The data represent the interest in the general topic of labour pain intervention. On the other hand, researchers must discuss more particular issues, such as scientific publications, scientific articles and seminar proceedings about labour pain intervention. The researcher needs information about trends and novelty for the topic of labour pain intervention in the future in scientific journal articles. However, a bibliometric analysis of the publication of labour pain intervention to find its trend and novelty hasn't been found. The research questions in this study were: (1) is there growth on the topic of labour pain intervention, (2) what is the growth in the number of citations of the topic of labour pain intervention, (3) the network visualisation of the topic of labour pain intervention, (4) the publication cluster of the topic of labour pain intervention revied by its co-occurrence, (5) the overlay and (6) the density visualisation of the topic of labour pain intervention.

Bibliometric analysis is a statistical-based research approach to visualise academic institutions' contribution and development in the research hotspot.[19] Bibliometric analysis helps the researcher identify the future area and direction of the research domain using visualisation tools.[20] Bibliometric analysis has been used by many authors to evaluate the information theory

■ Damayanti et al. Scr Med. 2024 Jul-Aug;55(4):501-9.

503

registered in the *Scopus* database,[20] to evaluate the immigration and degradation of the environment[21] and to investigate the topic search trend of the labour pain intervention.[22] It means bibliometric analysis is a quantitative scientific method to assess published articles to help researchers identify the trends of development, updates and hotspots of particular research and contribute to research development in the future for researchers.[23]

The research aimed to find out the trend of the publication number of labour pain interventions, the number of citations and the future research direction.

Methods

Bibliometric analysis was used in the science of literature and information to evaluate the research performance.[24] Bibliometric analysis was used in assessing the research impact of which the study is graded based on the received citation.[25] Data was extracted from *https://app.dimensions.ai/* database on 28 October 2023. Preferred reporting items for systematic reviews and meta-analyses (PRISMA),[26, 27] was used to extract the article from the database. The flow chart of PRISMA is presented in Figure 2.

The PRISMA method consisted of three stages: identification, screening and inclusion. Stage 1 (identification) detected 434,117 citations by considering the term labour pain intervention published between 2010 and 2022, especially in the title and abstract. In stage 2 (screening), there were 158,201 citations. By choosing "article" as the publication type, 275,916 citations were excluded. In stage 3 (included), the final sample was 158,201 articles. The data was then analysed using *VOSviewer*. *VOSviewer* is a computer program to make and view bibliometric maps.[27] In this study, the analysis was reviewed from the co-occurrence.

The procedure to analyse the co-occurrence was: (1) type of data, on the option of creating a map based on test data. The option was to present an event map based on the textual data. (2) Data source on the option of reading data from reference manager files. The supported files were *RIS*, *EndNote* and *RefWorks*. (3) Choose *RIS* file type. (4) Fields from which term will be extracted on the title and abstract fields by ignoring the structured abstract and copyright statement labels. (5) Full counting method. (6) The minimum
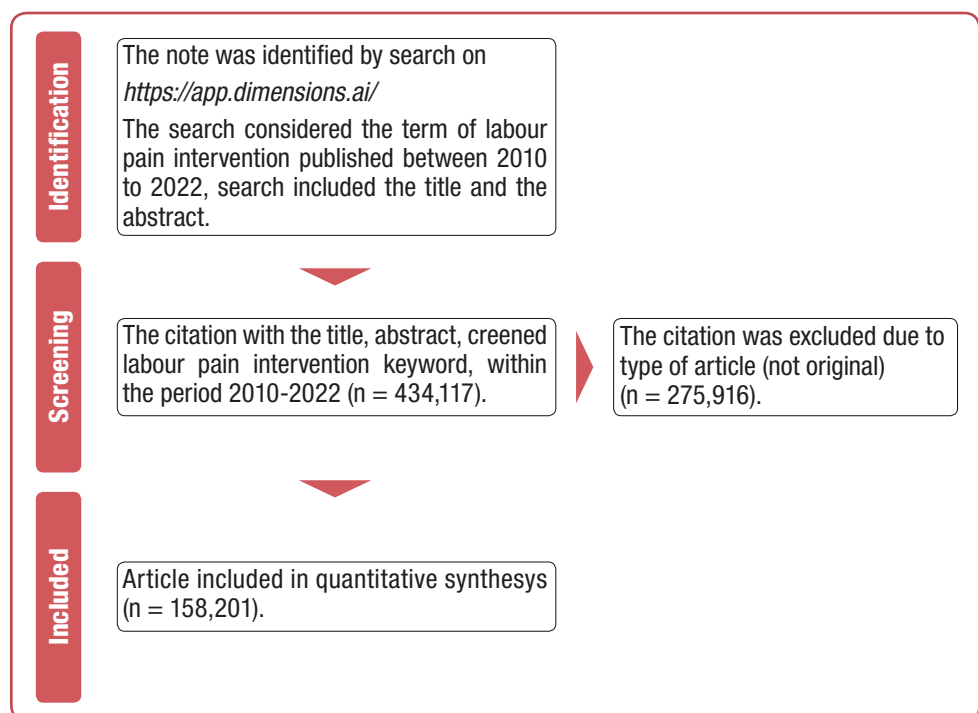

Figure 2: Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flowchart[26]

504

Damayanti et al. Scr Med. 2024 Jul-Aug;55(4):501-9. ■

grade for the citation emergence was 10. Out of 7368 terms, 170 terms passed the minimum grade with the calculated relevance score. Based on this score, the most relevant term were chosen. The default option chose 60 % of the applicable term. The number of the chosen terms was 102.

Results

The search between 2010 and 2022 provided 158,201 scientific article publications. The number of labour pain intervention publications per year is presented in Figure 3.

The number of labour pain intervention citations between 2010 to 2022 was 3,139,093. The number of citations per year is presented in Figure 4.

The network visualisation of the 102 terms is presented in Figure 5.

The 102 terms categorised in four clusters consist of Cluster 1 (38 terms), Cluster 2 (29 terms), Cluster 3 (23 terms) and Cluster 4 (12 terms). For more detail, the clusters are presented in Table 1.

VOSviewer also provided an overlay visualisation map. The overlay visualisation of 102 terms is presented in Figure 6.

Density visualisation of 102 terms is presented in Figure 7.
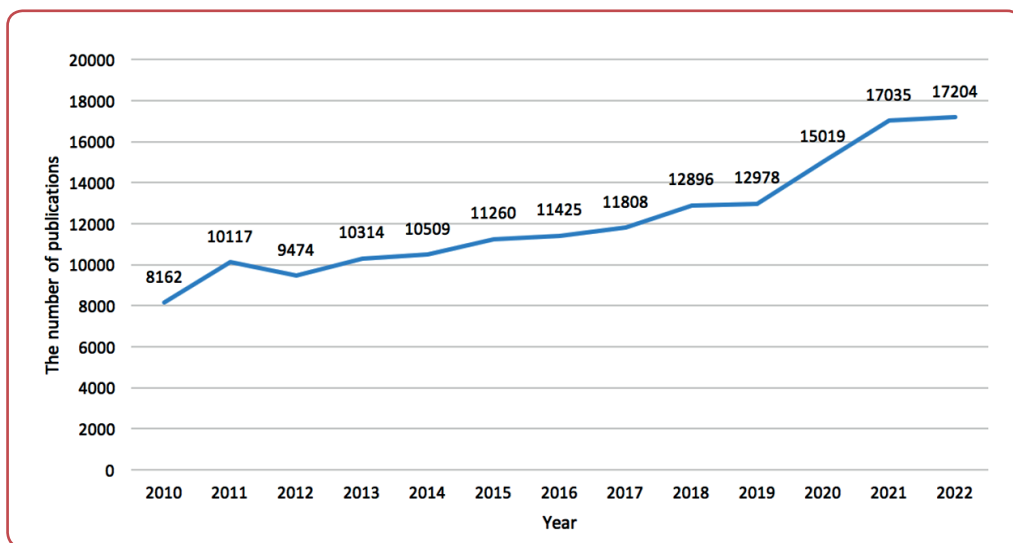

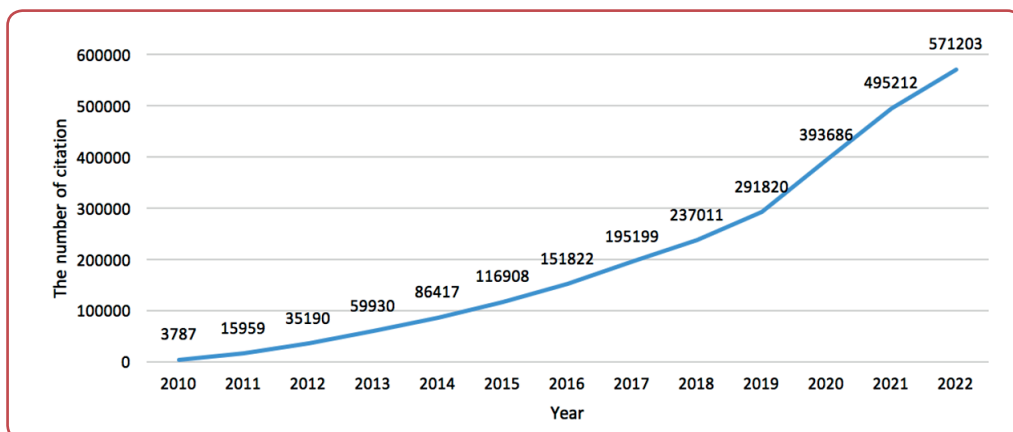*Figure 3:* *The number of publications about labour pain intervention between 2010 to 2022*

Figure 4: *The number of citations on the topic of labour pain intervention between 2010 to 2022*
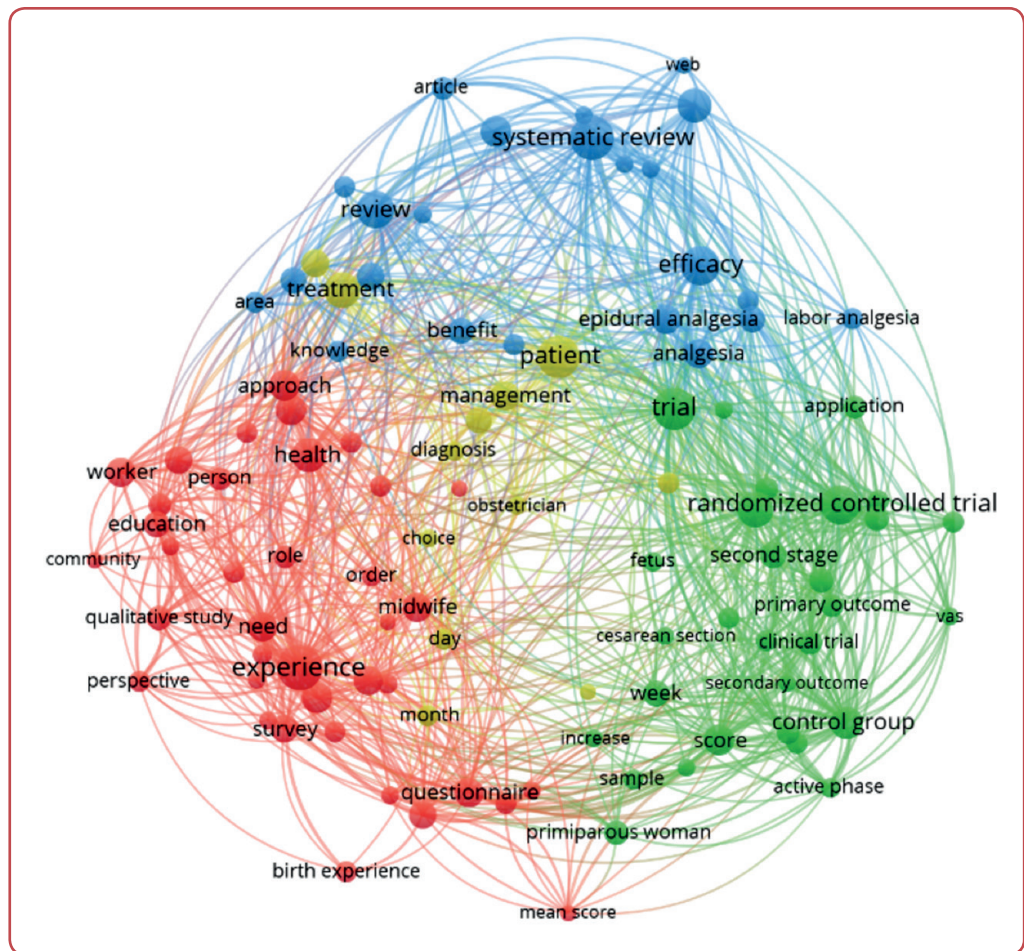
■ Damayanti et al. Scr Med. 2024 Jul-Aug;55(4):501-9.

505

Figure 5: Network visualisation in the topic of labour pain intervention (source: VOSviewer and https:// app.dimensions.ai/)

Table 1: Clusters for the topic of labour pain intervention

Cluster	N	Terms in the cluster member
1	38	Approach, barrier, birth experience, childbirth experience, community, country, cross-sectional study, education, experience, fear, health, hour, implementation, importance, individual, influence, Iran, labour pain, mean score, midwife, need, number, order, paper, part, perception, person, perspective, preference, presence, prevalence, qualitative study, questionnaire, reason, role, survey, work, worker.
2	29	Active phase, Apgar score, application, cesarean section, clinical trial, comparison, control group, duration, episiotomy, foetus, first stage, increase, intervention group, massage, min, pain score, positive effect, primary outcome, primiparous woman, randomised clinical trial, randomised controlled trial, sample, score, second stage, secondary outcome, significant difference, trial, vas, week.
3	23	Alternative, analgesia, area, article, benefit, body, depression, efficacy, Embase, epidural analgesia, knowledge, labour analgesia, literature, meta-analysis, pain management, parturient, PubMed, review, safety, science, systematic review, total, web.
4	12	Admission, case, choice, condition, day, diagnosis, incidence, management, month, obstetrician, patient, treatment.
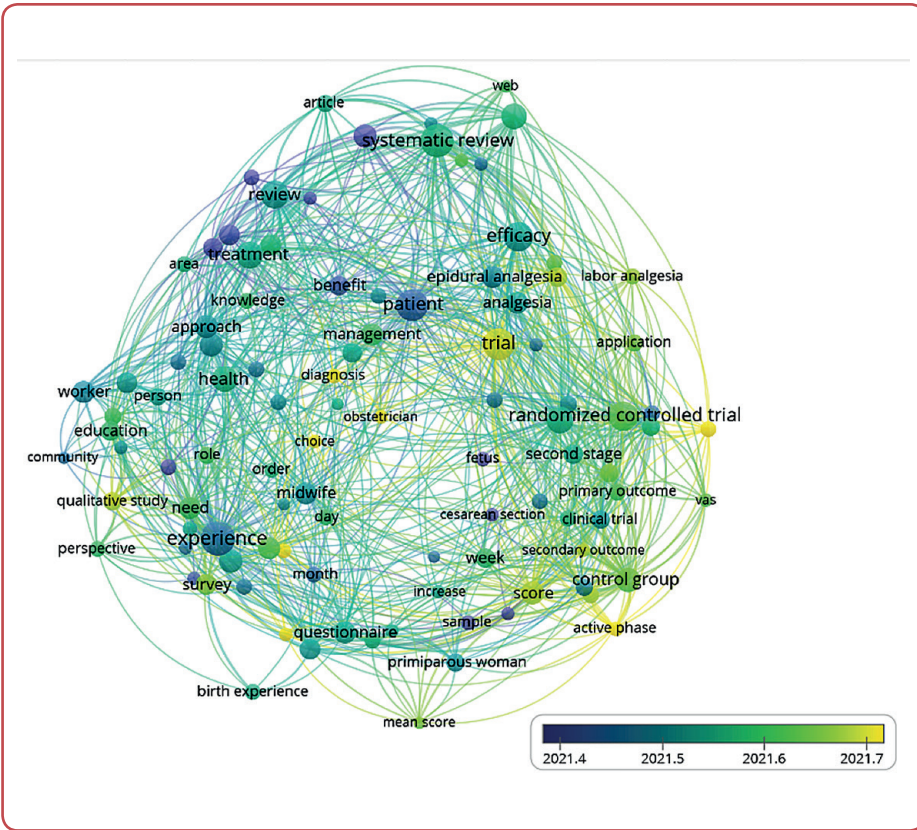
Figure 6: Overlay visualisation in the topic of labour pain intervention (source: VOSviewer and https://app.dimensions.ai/)
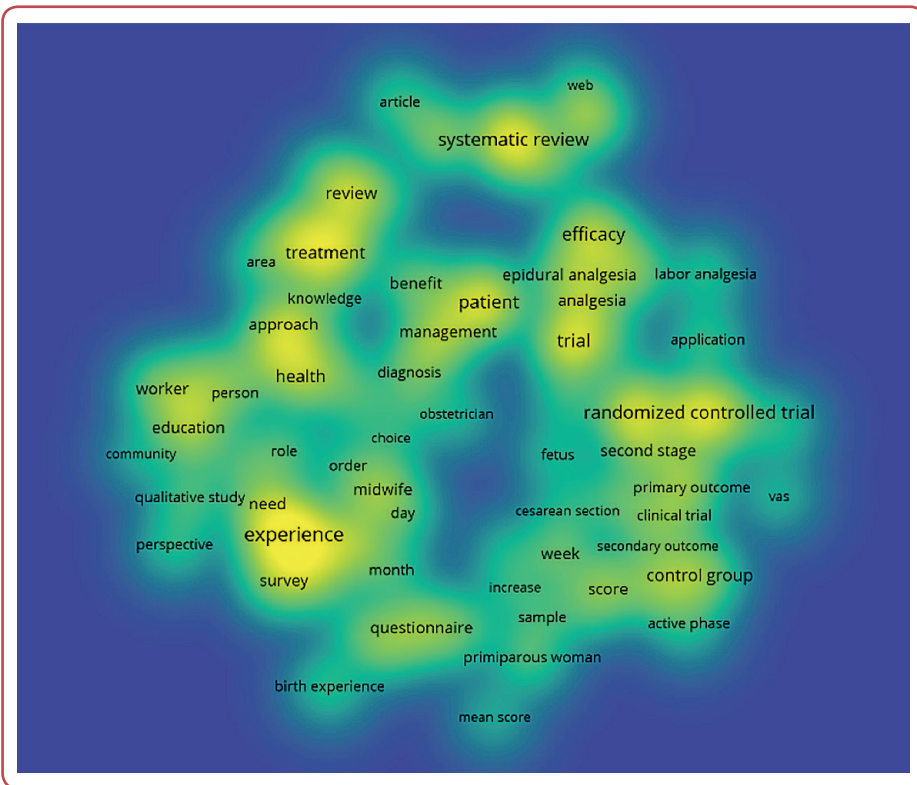
Figure 7: Density visualisation in the topic of labour pain intervention (source: VOSviewer and https://app.dimensions.ai/)

■ Damayanti et al. Scr Med. 2024 Jul-Aug;55(4):501-9.

507

Discussion

From the research results obtained, searches from 2010 to 2022 produced 158,201 scientific article publications, showed that the number of publications related to delivery pain interventions increased exponentially from year to year. The lowest publication was in 2010, with 8162 publications. Meanwhile, the highest publication was in 2021, with 17035 publications. The average publication number was 11,750. Of the 158,201 publications, "Labor analgesia: a systematic review and meta-analysis of non-pharmacological complementary and alternative approaches to pain during first stage of labor" was the most relevant.[28] It is essential to review the newest article to recommend a feasible and relatively safe method in the clinical management of labour pain management method.[29] Therefore, there is a need for the latest publication related to labour pain intervention.

The number of citations increased over time. The lowest number was in 2010, with 3,787 citations. Meanwhile, the highest number of citations was in 2022, 571,203 citations. The average citation number was 204,165. The research data revealed that from 158,201 publications, a publication entitled "Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010" was the most cited publication.[30] Other authors would frequently cite journals indexed in the reputationable database with higher citation index.

In the network visualisation (Figure 5), two terms linked with a line indicated that the terms were found at the same time in the title and abstract of a publication. In contrast, the two terms were not linked by a line, indicating that the terms weren't simultaneously found in the title and abstract. The research data revealed 102 terms, four clusters and 3302 links; the total link strength was 7945. Some authors researched women's preference for pain reduction methods during labour.[31] Therefore, a novelty for the researcher for the next topic of labour pain intervention could be done from the research on the unlinked terms, such as "relief" and "stage."

The overlay visualisation presented the analysis based on the keyword labour and intervention from 2010 to 2022 to observe the trend of the research title related to labour pain intervention. Based on the overlay visualisation, the yellow terms imply that the keyword represents the author's interest at present.[20] Today's interest in research mainly focuses on modern ideas and the influence of the Western method on pain, eventually changing the perception and willingness to deal with labour pain.[32] Therefore, the trend of research about pain in labour now focuses on the yellow-coloured terms, such as pain score and active phase.

The density visualisation showed the visualisation of the terms' density level, which is indicated by colour. Blue indicates the high density, while yellow indicates the low density. The high-density term means that the topic was frequently used in previous research, while the low-density term means that the subject was rarely used in previous research. Pain in labour is mainly ignored, especially in low and middle-income countries.[33] Therefore, the suggested research topics of intervention for labour pain from the low-density visualisation were experience, epidural analgesia and efficacy.

Conclusion

The research was completed using bibliometric analysis from the publications about labour pain intervention retrieved from *https://app.dimensions.ai/* from 2010 to 2022. This research showed some interesting findings, such as the trend of publications on the topic of labour pain intervention increased, as well as the number of citations on the subject of labour pain intervention. Network visualisation on the topic of labour pain intervention gave information to find the novelty on the unlinked topics, there were four clusters reviewed from the co-occurrence, overlay visualisation on the rarely discussed topic of labour pain intervention. The conclusion from the results of this research is the development of a research roadmap regarding labour pain intervention.

Ethics

Acknowledgement

Conflicts of interest

Funding

Data access

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509

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