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INPATIENT VS OUTPATIENTS LABOR INDUCTION : A COMPREHENSIVE SYSTEMATIC REVIEW

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ABSTRACT

Background: *Labor induction can take a long period, anywhere from a few hours to several days, especially in nulliparous women. Worldwide, the use of mechanical or pharmaceutical treatments for outpatient cervical ripening is becoming more and more common.*

Aims : *This systematic review is to review the comparison of outpatient with inpatient labor induction.*

Methods: *By comparing itself to the standards set by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. So, the experts were able to make sure that the study was as up-to-date as it was possible to be. For this search approach, publications that came out between 2014 and 2024 were taken into account. Several different online reference sources, like Pubmed and SAGEPUB, were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.*

Result: *In the PubMded database, the results of our search brought up 83 articles, whereas the results of our search on SAGEPUB brought up 605 articles, our search on SCIENCE DIRECT brought up 470 articles. The results of the search conducted for the last year of 2014 yielded a total 17 articles for PubMed, 155 articles for SAGEPUB and 122 articles for SCIENCE DIRECT. In the end, we compiled a total of 8 papers, 4 of which came from PubMed, 2 of which came from SAGEPUB and 2 of which came from SCIENCE DIRECT. We included eight research that met the criteria.*

Conclusion: *In summary, in modern obstetrics, when labor is being induced in an increasing percentage of pregnancies, outpatient induction for low-risk women offers a safe, practical, and successful alternative to hospital induction. This is especially true in places with abundant resources. It should be given more widespread consideration.*

Keyword: *Labor induction, outpatient, inpatient*

INTRODUCTION

One typical obstetric technique is induction of labor (IOL), which uses artificial means to induce labor. Since 1990, labor induction rates have almost doubled. Worldwide IOL rates vary significantly, and this can be linked to inconsistent recommendations and a lack of agreement on clinical practice standards. These days, the percentage of newborns delivered after IOL in high-income nations is thought to be around 25%. In contrast, low- and middle-income countries (LMIC) often have lower equivalent rates. The indications, contraindications, consequences, and techniques for labor induction (IOL) are reviewed in this article.[1]

Depending on a patient's obstetrical and medical history, there are reasons for late preterm, early term, late-term, and post-term timing of birth. When it is believed that the outcomes for the woman, the fetus, or both are preferable to expectant management—that is, waiting for the labor to start on its own—IOL is recommended. Logistically, labor may also be induced for other reasons, such as the likelihood of an early labor, the distance to the hospital, or psychological signals. Fetal lung maturity should be determined in such cases. Before 39 weeks of gestation, a developed fetal lung test result is not indicative of birth in the absence of suitable clinical conditions.[2]

In as many as one in four pregnancies, labor induction—the artificial start of labor when the advantages of delivery are judged to outweigh those of expectant management—occurs before labor. However, labor induction can take a long time—from several hours to a few days—especially in nulliparous women and when an unfavorable cervix needs to be primed or ripened. In theory, outpatient cervical ripening can shorten the duration of the prenatal hospital stay, relieve the burden on healthcare resources, improve mother comfort and satisfaction, and perhaps save expenditures. Consequently, the use of mechanical or pharmaceutical treatments for outpatient cervical ripening is becoming more and more common worldwide. Nonetheless, there are still a lot of cultural and resource-related barriers to its widespread adoption, along with doubts about its effectiveness and safety.[3]

METHODS

Protocol

The author of this study ensured that it complied with the standards by adhering to Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines. This is done to guarantee the accuracy of the results that are derived from the investigation.

Criteria for Eligibility

In order to complete this literature evaluation, we looked at published research that discusses the comparison of outpatient with inpatient labor induction. This is done to enhance the patient's therapy management and to offer an explanation. This paper's primary goal is to demonstrate the applicability of the issues that have been noted overall.

To be eligible to participate in the study, researchers had to meet the following requirements: 1) English must be used to write the paper. The manuscript must fulfill both of these conditions in order to be considered for publication. 2) A few of the examined studies were released after 2013 but prior to the time frame considered relevant by this systematic review. Editorials, submissions without a DOI, already published review articles, and entries that are nearly exact replicas of journal papers that have already been published are a few examples of research that are prohibited.

Search Strategy

We used "labor induction", "outpatient" and "inpatient" as keywords.The search for studies to be included in the systematic review was carried out using the PubMed and SAGEPUB databases by inputting the words: (("labor, induced"[MeSH Terms] OR ("labor"[All Fields] AND "induced"[All Fields]) OR "induced labor"[All Fields] OR ("labor"[All Fields] AND "induction"[All Fields]) OR "labor induction"[All Fields]) AND ("inpatient s"[All Fields] OR "inpatients"[MeSH Terms] OR "inpatients"[All Fields] OR "inpatient"[All Fields]) AND ("outpatient s"[All Fields] OR "outpatients"[MeSH Terms] OR "outpatients"[All Fields] OR "outpatient"[All Fields])) AND ((clinicaltrial[Filter]) AND (2014:2024[pdat])) used in searching the literature.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and can't have been seen anywhere else.

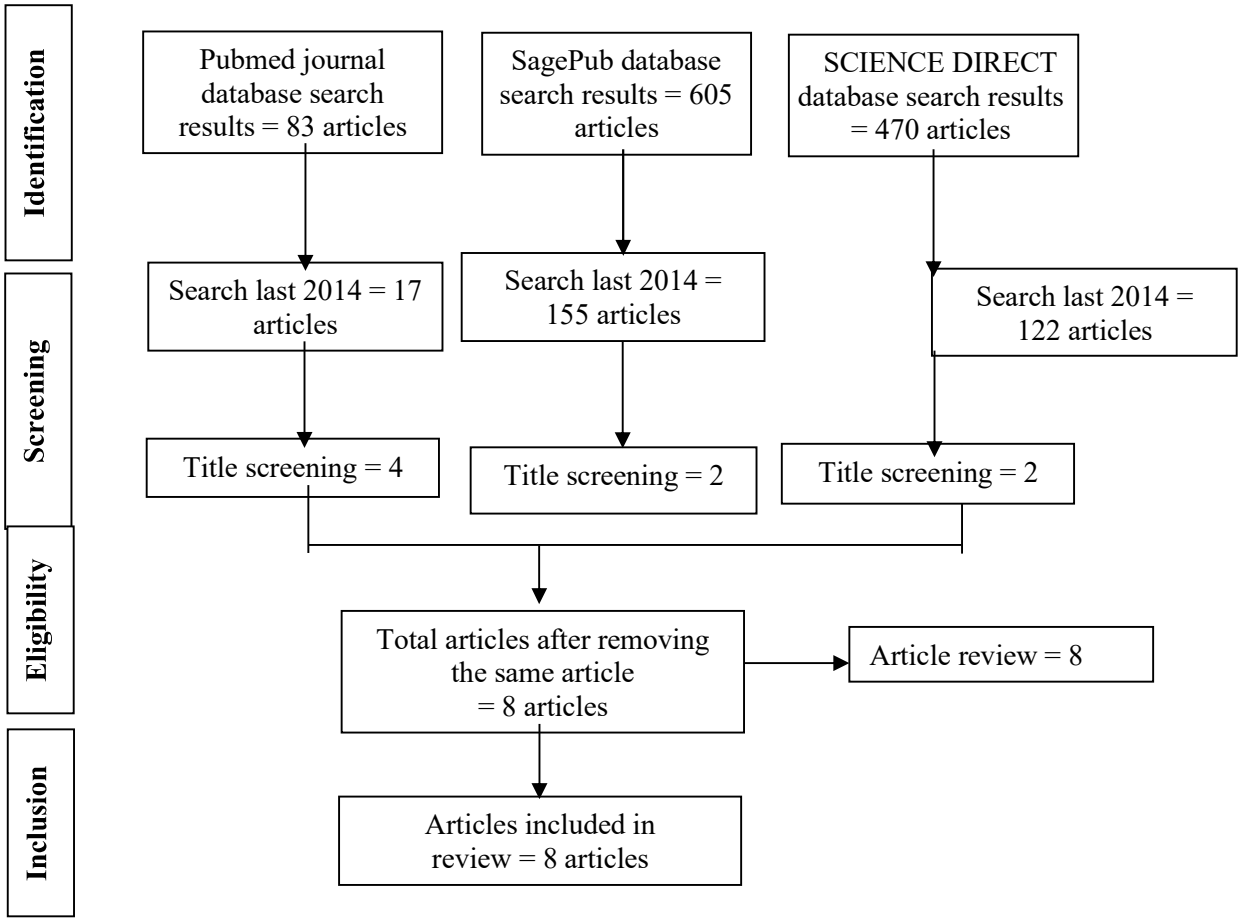

Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

In the PubMed database, the results of our search brought up 83 articles, whereas the results of our search on SAGEPUB brought up 605 articles, our search on SCIENCE DIRECT brought up 470 articles. The results of the search conducted for the last year of 2014 yielded a total 17 articles for PubMed, 155 articles for SAGEPUB and 122 articles for SCIENCE DIRECT. In the end, we compiled a total of 8 papers, 4 of which came from PubMed, 2 of which came from SAGEPUB and 2 of which came from SCIENCE DIRECT. We included eight research that met the criteria.

Wilkinson, et al[4] (2015) showed that at sending women home with a catheter rather than prostaglandins was a more pleasant choice for outpatient catheter ripening. Although women's discomfort during insertion was very momentary, it could be possible to reduce pain that lingered overnight by adjusting the balloon capacity and providing moderate analgesic medication. Although the catheter ripening procedure could take longer than using medication, it might potentially produce superior results based on fetal discomfort and hyperstimulation. In an appropriately powered experiment, the feasibility of cervical ripening using catheters in an outpatient clinic should be investigated.

Hallen, et al[5] (2023) showed that starting the induction at home shortened hospital stays without influencing the rate of vaginal births. This study did not find significant differences in unfavorable maternal and perinatal outcomes between inpatients and outpatients, despite being underpowered to evaluate safety. To assess the safety of using misoprostol for outpatient labor induction, more investigation is required.

Hamdan, et al[6] (2021) showed that when compared to inpatient induction of labor with a Foley catheter in parous women with an unripe cervix, the experiment did not show the expected increase in deliveries during working hours. The outpatient group's hospital stay and membrane rupture to delivery time were both considerably reduced. There were no appreciable variations in the two groups' high rates of mother satisfaction.

Howard, et al[7] (2014) showed that outpatient priming was marginally more preferable than either enhanced inpatient priming or basic care; more research in various clinical contexts is necessary to validate these findings. Given that preferences differed depending on the features of the services offered and the woman's sociodemographic background, it could be beneficial to tell women about both possibilities in the future.

Table 1. The litelature include in this study

Author	Origin	Method	Sample	Result
Wilkinson et al, 2015[4]	Australia	Randomized controlled study	47 patients	The perinatal and clinical results were comparable. Oxytocin was needed by most women. In either group, there were no instances of induction failures, catheter-related infections, or uterine hyperstimulation. The majority of women in both groups said that the catheter was uncomfortable to put and wear, but they were also equally happy with their treatment and thought the baby was safe. Women who were in treatment said they didn't feel as alone emotionally or socially.
Hallen et al, 2023[5]	Lund Sweden	Retrospective study	282 patients	Both inpatients and outpatients experienced vaginal births at comparable rates. Both the overall length of hospital stay and the time from hospital admission to birth were much shorter in the outpatient group than in the inpatient group. Maternal or newborn outcomes did not significantly differ across the groups. An unanticipated home delivery occurred in one of the patients receiving outpatient induction.
Hamdan et al, 2021[6]	Malaysia	Randomized trial study	163 patients	When comparing the inpatient and outpatient arms, the median mother satisfaction visual numerical rating score was 9 vs. 9 and the number of deliveries made during working hours was 54/82 vs. 48/81, respectively. The outpatient arm had a considerably shorter duration of hospital stay and a shorter gap between membrane rupture and delivery. There was no discernible difference

				in any secondary outcomes for mothers and newborns.
Howard et al, 2014[7]	Australia	Randomized trial study	362 patients	While waiting for the priming to take effect, women were prepared to put up with an additional 1.4 hospital trips and a 73.3-minute total journey time in order to be able to go back to their own homes. Women were prepared to put up with a total travel time of 54.7 minutes for better inpatient care in exchange for a private room and private restroom while they waited for the priming to take effect.
Beckmann et al, 2019[8]	USA	Multicenter randomized controlled trial	695 patients	The primary result (comparing balloon with PG), cord arterial pH <7.10, nursery hospitalizations, usage of newborn antibiotics, and method of birth did not show any statistically significant differences. The primary result was less common among nulliparous women in the balloon group, and parous women were less likely to give delivery vaginally without assistance.
Policiano et al, 2016[9]	Portugal	Randomized trial study	130 patients	The inpatient and outpatient groups did not exhibit a statistically significant difference in the average Bishop score change. The inpatient group had a longer hospital stay of 10 hours on average, while the outpatient group saw a shorter catheter application to delivery time. The vaginal birth rate was comparable in each group. When labor induction attempts failed, the outpatient group's rate of cesarean births was statistically significantly lower.
Wise et al, 2023[10]	New Zealand	Randomized trial study	1.087 patients	Randomization was used to inpatient prostaglandin induction in 548 individuals and outpatient balloon catheter induction in 539 people. Among patients assigned to outpatient balloon induction, the rate of cesarean delivery was 41.0%, whereas among those assigned to inpatient prostaglandin induction, it was 35.2%. Women who underwent outpatient balloon catheterization had a higher likelihood of receiving an

				epidural and oxytocin, as well as artificial rupture of the membranes. The frequencies of adverse events in mothers or newborns did not differ.
Kuper et al, 2018[11]	Oklahoma	Randomized controlled study	743 patients	One hundred and twenty nine of the 743 examined women gave their permission and were randomized between May 2016 and October 2017. The groups' baseline characteristics were equal. The period from labor ward admission to delivery did not substantially decrease with outpatient cervical ripening.

Beckmann, et al[8] (2019) showed that for nulliparous women, balloon catheters could be a better way to prime the cervical cavity; however, this might not be the case for parous women. After starting balloon catheter IOL, nulliparous women may return home, and the risk of complications is minimal.

Policiano, et al[9] (2017) showed that with a shorter hospital stay and fewer cesarean births for unsuccessful induction, outpatient priming with a Foley catheter is just as safe and effective as it is in an inpatient environment.

Wise, et al[10] (2023) showed that when comparing outpatient balloon catheter induction to inpatient vaginal prostaglandin E2 induction, there was no discernible difference in the rate of cesarean deliveries. In an outpatient context, balloon catheter usage may be routinely administered and does not appear to raise the likelihood of adverse outcomes for moms or newborns.

Kuper, et al[11] (2018) showed that if inpatient transcervical catheter implantation and oxytocin are started at the same time, outpatient cervical ripening in parous women does not reduce the amount of time from labor ward admission to birth.

DISCUSSION

With the exception of a greater frequency of abnormal fetal heart rate tracings and a shorter mean length of hospital stay in the outpatient induction arm, there were no overall differences between the groups in any of the outcomes. Negative outcomes for newborns or an increase in cesarean births did not correspond with the greater prevalence of questionable fetal heart rate tracings. The subgroup analysis revealed that the group induced as outpatients had shorter admission-to-delivery and induction-to-delivery intervals, as well as fewer caesarean births. However, this subgroup analysis was limited to trials comparing labor induction using balloon catheters in both arms.

Despite the growing acceptability of outpatient labor induction, several centers continue to avoid this technique due to insufficient data supporting its safety. In terms of maternal, neonatal, and resource-related outcomes, outpatient induction is at least as safe and effective as hospital induction, according to this comprehensive analysis of randomized controlled studies. Differences of these independent proportions demonstrated that patients undergoing outpatient ripening experienced much less discomfort and were more likely to select the ripening procedure again, even though all patient-reported outcomes only had a sample size of one trial. It should be highlighted that while the outpatient group had more worrisome fetal heart rate tracings, they were not assessed similarly in the two groups.

Fetal heart rate tracking, for instance, was documented in one research at 12 hours in the hospital arm and 24 hours in the outpatient arm. Interpreting this conclusion also requires taking into account the function of an outcome assessor in assessing a subjective outcome, such a suspicious heart rate tracing. Lastly, it should be highlighted that the difference was only observed for "suspicious" tracings, not pathological tracings, and that there was no increase in cesarean births or unfavorable outcomes for newborns as a result of this.

Wilkinson et al, in their studies of comparing the inpatient with outpatient that got the labor induction showing the results that 77% of women required oxytocin and 24% less likely requred oxytocin. Women who were in treatment said they didn't feel as alone emotionally or socially. Ninety percent of midwives and physicians felt that sending a woman home with a catheter is a more pleasant option than prostaglandins, and ninety percent of them agreed that suitable women should be offered outpatient ripening.[4]

With the same theme of studies from Hamdan et al, showing that the working hours of delivery in outpatient vs inpatient were 65.9% vs 59.3% with the median maternal satisfaction of visual numerical rating score was 9 vs 9. But this trial

failed in demonstrating whether there are increase of births during the working hour with outpatient compared with inpatient labor induction. The outpatient group's hospital stay and membrane rupture to delivery time were both considerably reduced. There were no appreciable variations in the two groups' high rates of mother satisfaction.[6]

The comparison of inpatient and outpatient also studied by Howard, et al and showing that outpatient slightly more prefered thatn the inpatient priming or basic care. The results indicate that outpatient priming is somewhat more preferred, with an overall benefit score of 3.63 for outpatient priming, 3.59 for improved inpatient treatment, and 2.89 for standard inpatient care. When compared to alternative off-site accommodations, women's preferences for outpatient priming increased when they could return home, and they declined when they had to make more hospital trips and spend more time traveling.[7]

Beckmann et al in their studies showed that primary outcome comparisons between balloon and PG (18.6% versus 25.8%; relative risk = 0.77, 95% CI 0.51-1.02; P = 0.070), cord arterial pH <7.10 (3.5% versus 9.2%; P = 0.072), nursery admissions (12.6% versus 15.5%; P = 0.379), neonatal antibiotic use (12.1% versus 17.6%; P = 0.103), and mode of birth did not show statistically significant differences. The main outcome was less common in nulliparous women in the balloon group (20.4% vs 31.0%; P = 0.032); parous women were less likely to give delivery vaginally without assistance (77.6% versus 92.3%; P = 0.045).[8]

The comparing of efficacy between outpatient and inpatient cervix priming with foley catheter showing by Policiano et al, The outpatient group spent an average of 10 hours less in the hospital than the inpatient group and had a shorter catheter application-to-delivery time (38.2 vs. 44.9 hrs., p=0.01) than the inpatient group. The vaginal birth rate was comparable between groups (72% outpatient vs. 62% inpatient). When labor induction attempts were unsuccessful, the outpatient group had a statistically significant reduced rate of cesarean births (2/65/3%) compared to 11/65 (17%), p=0.02. For every group, there were three occurrences of chorioamnionitis, but there was no appreciable morbidity among the mothers or newborns.[9]

Wise, et al determine if women under outpatient labor induction with ballon catheter will have lower caesarean delivery rate thatn inpatient induction with prostaglandin E2. Among patients assigned to outpatient balloon induction, the rate of cesarean delivery was 41.0%, whereas among those assigned to inpatient prostaglandin induction, it was 35.2% (adjusted odds ratio, 1.27; 95% confidence range, 0.98-1.65). Women who underwent outpatient balloon catheterization had a higher likelihood of receiving an epidural and oxytocin, as well as artificial rupture of the membranes. The frequencies of adverse events in mothers or newborns did not differ.[10]

Kuper, et al also determine if outpatient cervical ripening with foley catheter trans cervical. In an ambulatory context, women were randomized to receive either an inpatient transcervical catheter implantation and concurrent oxytocin infusion in the labor ward, or an outpatient transcervical catheter placement (with immediate implantation). In the event of labor, women in the outpatient group were directed to return to the hospital no later than the next day. Oxytocin was started as soon as participants were admitted, and induction of labor was handled in accordance with institutional policy. 129 of the 743 examined women gave their permission and were randomized between May 2016 and October 2017. The groups' baseline characteristics were equal. The period from labor ward admission to delivery did not substantially decrease with outpatient cervical ripening (12.4±7.4 vs 13.5±7.0 hours, P=.38).[11]

This systematic review of randomized controlled trials comparing outpatient vs. inpatient labor induction shows that, when compared to inpatient inductions, outpatient labor induction in resource-rich settings is at least as safe and effective, if not more so, in carefully chosen patient populations. The cost-effectiveness of inducing labor in an outpatient context cannot be determined with certainty due to a lack of evidence. To ascertain the cost-effectiveness of outpatient labor induction, bigger multi-centered randomized controlled trials in various contexts could be necessary, along with a more practical approach to trial conduct.

CONCLUSION

In summary, in modern obstetrics, when labor is being induced in an increasing percentage of pregnancies, outpatient induction for low-risk women offers a safe, practical, and successful alternative to hospital induction. This is especially true in places with abundant resources. It should be given more widespread consideration.

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