

# Pregnant Women Positioning in Spinal Anesthesia for Cesarean Section: Integrative Review

REVIEW

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## Abstract

**Objective:** to analyze the scientific evidence on the positioning of pregnant women in spinal anesthesia for cesarean section.

**Method:** an integrative review of the literature in the Scopus, CINAHL, LILACS and PubMed databases using the descriptors "patient positioning", "spinal anesthesia" and "obstetrics" and their synonyms "patient position" and "spinal anesthetics".

**Results:** The sample of 8 articles showed that the fastest onset of blockade in pregnant women occurs in the lateral horizontal decubitus position and in the sitting position with legs downwards. Lateral decubitus with elevated head presented insufficient blockade. Lateral position was related to greater comfort, and its maintenance for 15 minutes before the supine position, after infiltration with the anesthetic was associated with lower incidence of hypotension.

**Conclusion:** Scientific evidence has shown that positioning influences the effect, potentiation and delay of anesthesia, comfort and the pregnant woman's blood pressure, being relevant to the perioperative and obstetric multidisciplinary practice.

## Introduction

Despite efforts to encourage normal childbirth, high rates of cesarean deliveries are a global epidemic. Latin America and the Caribbean have the highest cesarean rates (40%) and the largest increase in this type of delivery, which reaches 19.4% per year [1]. According to the

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## Keywords

Patient Positioning; Spinal Anesthesia; Obstetrics; Cesarean Section.

World Health Organization, Brazil has already recorded 55.6% of deliveries by caesarean section, which points to the need for scientific research on issues involving care to pregnant women who undergo this procedure [2].

In this type of surgical intervention, spinal anesthesia is performed, consisting of infiltration of the anesthetic in the subarachnoid space. It is one of the safest anesthetic techniques, whose main advantage is the dense, reliable and fast onset of blockade [3]. One of the factors that interferes with the success of spinal anesthesia is the positioning of the patient, which should allow easy identification of midline structures, contribute to the opening of the intervertebral space, produce minimal hemodynamic compromise and be comfortable for the patient and safe for the baby [4].

Correct positioning of the pregnant women who will undergo spinal anesthesia is attributed by the multidisciplinary team involved in the cesarean delivery care. Among the professionals that integrate such a team, nursing stands out, since the prevention of injuries related to the anesthetic procedure integrates nursing care in the perioperative period and the patient's positioning for anesthesia is part of the care performed by these professionals [5].

Given the relevance of the Evidence-Based Practice in health, scientific evidence about the positioning of pregnant women to perform spinal anesthesia should be analyzed. Thus, this might contribute to the access of health professionals to such scientific production and disclose the existing gaps that require more research, in order to support decision making in future studies on the subject.

In order to contribute to the construction of knowledge that can improve perioperative care in obstetrics, the present integrative review was proposed with the objective of evaluating the scientific evidence on the positioning of pregnant women in spinal anesthesia for cesarean section.

## Method

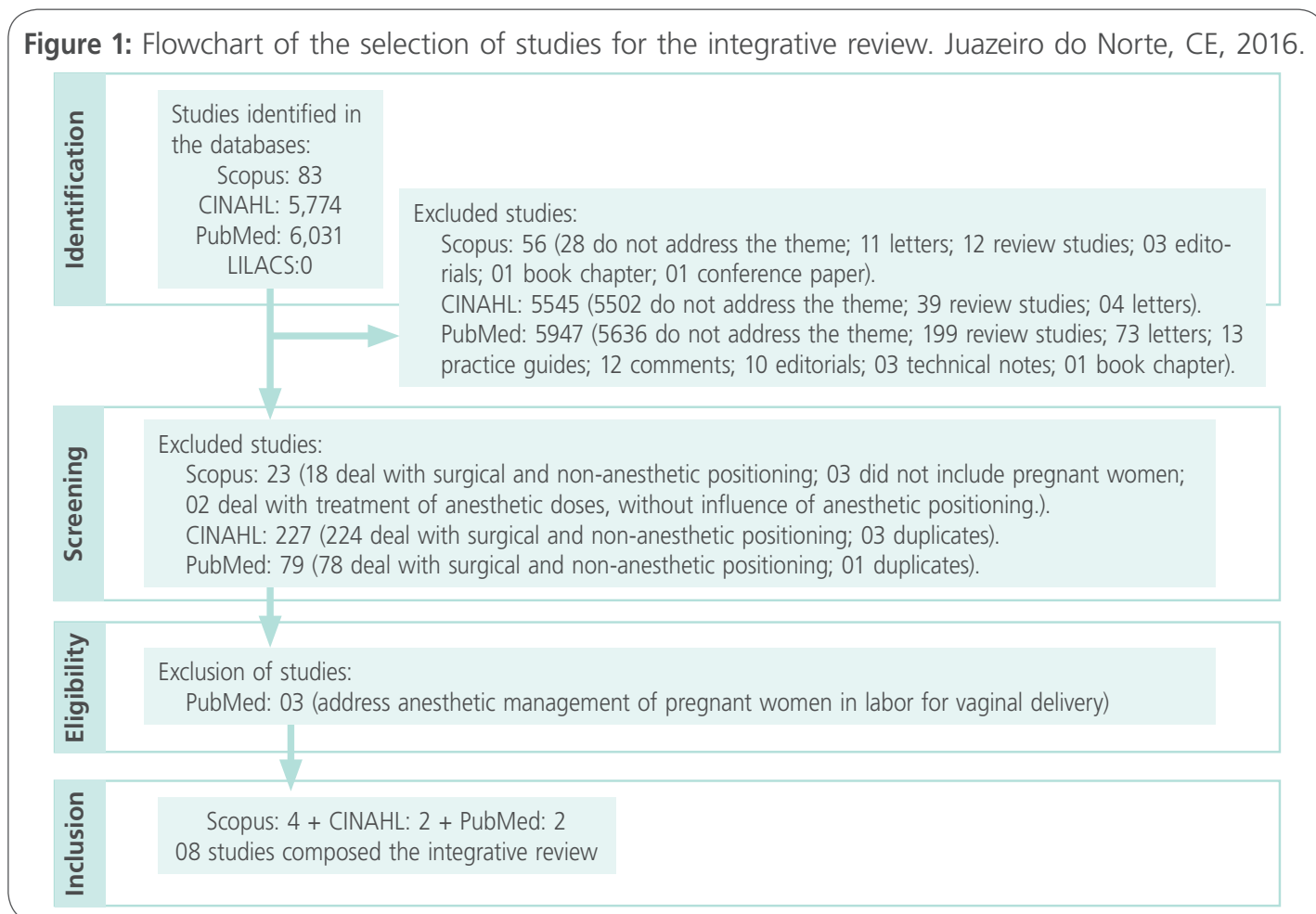
This is an integrative review that was performed with the following steps: 1- formulation of the guiding question; 2 - search in the literature of studies related to the proposed theme; 3 - categorization of studies; 4- evaluation of selected studies; 5- discussion and interpretation of results; and 6- knowledge synthesis.

The guiding question was elaborated according to the PICO strategy (P- patient/population, I- intervention, C- comparison, O-outcomes). P was determined as pregnant women; I- spinal anesthesia; C- does not apply; O- positioning for spinal anesthesia. Thus, the guiding question for the search was: "what is the scientific evidence about the positioning of pregnant women for spinal anesthesia?".

Data collection took place in January and February 2016 in the Scopus, PubMed/MEDLINE (National Library of Medicine National Institutes of Health), CINAHL (Cumulative Index to Nursing and Allied Health Literature) and LILACS (Latin American Literature and the Caribbean in Health Sciences) databases. The cross-over of the MeSH Terms "patient positioning", "spinal anesthesia" and "obstetrics" and their synonyms, "patient position" and "spinal anesthetics", with the Boolean connectors AND and OR, were used, so that the search strategy performed in each database was: [patient positioning OR patient position AND spinal anesthesia OR spinal anesthetics AND obstetrics]. Two researchers performed the searches separately, using the same strategy, and then compared the findings.

Inclusion criteria adopted were: being a full-text publication capable of being retrieved online and addressing the subject of interventions, procedures or care about the positioning of pregnant women for spinal anesthesia during cesarean delivery; classified as original article; published in English, Spanish or Portuguese languages and published in the last 15 years (January 2001 to December 2015). Editorials, reviews, letters to the editor, reflective studies,

**Figure 1:** Flowchart of the selection of studies for the integrative review. Juazeiro do Norte, CE, 2016.



as well as studies that did not address the investigated theme were excluded.

Information of the selected articles were extracted by using an instrument adapted from Ursi [6], which encompassed the identification of the study (article title, journal title, authors, country, language, year of publication); and methodological characteristics (type of study and level of evidence), in addition to the main results and conclusions. The classification of levels of evidence occurred in seven levels: level I - evidence from systematic reviews or meta-analysis of relevant clinical trials; level II - evidence derived from at least one well-delineated randomized controlled trial; level III - well-delineated clinical trials without randomization; level IV - well-delineated cohort and case-control studies; level V - systematic reviews of descriptive and qualitative studies; level VI - evidence derived from a single descriptive or

qualitative study; and level VII - weak, the opinions of authorities or report of expert committees [7].

Search in databases resulted in 11,888 articles. The LILACS database did not return any results in the initial search. The articles were read in their entirety and exhaustively and, based on the inclusion and exclusion criteria, a sample of eight articles was selected to compose the sample. **Figure 1** shows the information related to the search in the databases, according to PRISMA criteria [8].

## Results

The sample consisted of eight articles published between the years 2004 and 2015, of which 50% were published in the last 5 years. Researches were carried out in hospitals. Seven publications were in English and one in Spanish language.

Regarding origin, studies were predominantly originated in the Asian continent (62.5%), having been carried out in India, Korea, China and Israel. The other studies (37.5%) were carried out in Europe, specifically in Italy, Spain and the United Kingdom.

All studies were conducted by medical professionals and all articles were published in medical journals. Interestingly, no publication had a nurse among its authors. All studies were classified as level II, as they were experimental studies.

Regarding the objectives, all sought to evaluate the effects of changes in positioning during lumbar

puncture or immediately after anesthetic infiltration, related to the success of anesthesia and the adverse effects resulting from it. Studies were performed with the two main positions assumed during lumbar puncture, namely lateral position and sitting position, as well as the positions assumed after lumbar puncture, namely immediate supine position and maintenance of lateral or sitting position for a period before repositioning to the supine position.

**Table 1** shows the objective, year, population studied and the main results and conclusions of the articles

**Table 1.** Characterization of the articles regarding the objective, year, population studied and main results and conclusions. Juazeiro do Norte, CE, 2016.

Year	Objective	Main results and conclusions
2010	To evaluate blockade in relation to changing patient position immediately after the anesthetic injection in the subarachnoid space.	There was no difference in anesthetic spread with immediate or late change from sitting to supine position.
2011	To evaluate the effect of changing patient position in the level of blockade in combined epidural and spinal anesthesia with and without epidural volume extension (EVE).	With EVE, there was significantly higher sensory blockade when applied in the lateral position, compared to the supine position. Without EVE, there was no statistical difference in the maximum blockage height observed.
2015	To determine whether head elevation during anesthesia provides hemodynamic improvement and adequate height of sensory blockade.	Head elevation resulted in maximum levels of sensory blockade and more gradual onset of anesthesia than that achieved with lateral position, followed by supine position.
2014	To determine the influence of lateral decubitus position for 15 minutes after the use of combined anesthesia and to evaluate hemodynamic characteristics during spinal anesthesia.	Maintaining the patient in the lateral decubitus position for 15 minutes may significantly reduce the incidence of hypotension.
2013	To investigate the effect of lateral, modified lateral and sitting positions for spinal anesthesia on the characteristics of spinal blockade.	Lateral position is associated with more rapid and reliable onset of sensory blockade compared to modified lateral position and sitting position. Modified lateral position with single spinal dose leads to insufficient sensory blockade.
2009	To determine the incidence of paresthesia during lumbar puncture according to the position adopted by the patient.	The sitting position with heels placed on the table and legs flexed presented smaller incidence of paresthesia than the sitting position with legs swinging. The lateral decubitus position presented a higher incidence of paresthesia.
2004	To compare the onset times of spinal anesthesia performed with the woman in the left lateral position, in the supine position and in the bending position after the insertion of a combined anesthesia in the sitting position. To evaluate the distribution of the blockage according to the change of position.	The onset time of blockade in the lateral position was slower than in the supine position, and in the bending position. The combined technique in the sitting position and subsequent blockade in the left lateral decubitus position does not produce unilateral blockade and is suitable for caesarean section, but the onset is slower than in the supine position.
2004	To evaluate the incidence of puncture of blood vessels during epidural catheterization in three different positions among morbidly obese patients.	Unintentional venous cannulation was significantly lower in the group of patients in the lateral Trendelenburg position than in the sitting position.

The selected studies show that variations in positioning have direct influence on the effect of anesthesia, either to potentiate or to delay the onset of blockade and its level; as well as regarding changes in the woman, such as hypotension and nausea. They also evidence that variation of position during lumbar puncture for intrathecal infiltration led to the following responses: the fastest onset of blockade was achieved in both the lateral horizontal decubitus position and the sitting position with legs downwards when compared with the lateral position with elevated head. This position (lateral decubitus with elevated head) also presented an insufficient blockade response. On the other hand, the lateral decubitus position with the head lowered at between 25 and 30° presented a lower incidence of unintentional venous cannulation. The lateral position was also mentioned as offering the greatest comfort during puncture for spinal anesthesia.

Also regarding the moment of puncture for infiltration of spinal anesthesia, the sitting position presented evidence of lower incidence of paresthesia when the legs were placed on the surgical table.

However, when women's legs were downwards, with feet supported or not, there were more cases of severe and difficult-to-treat hypotension.

When considering the position after lumbar puncture and infiltration of spinal anesthesia, the maintenance of the lateral position for 15 minutes before placing the patient in the supine position for performing the surgical procedure presented lower incidence of hypotension. The maintenance of the head elevated for a while before putting the patient in the supine position presented more gradual onset, however, with a greater stability of blood pressure. The act of repositioning the woman, in whom lumbar puncture was performed in the sitting position, to the left lateral position before placing her in the supine position presented evidence of delaying the onset of blockade when compared to the act of repositioning immediately to the supine position.

**Table 2** presents the synthesis of the results of the studies according to the effects of the positionings in the anesthetic procedures.

**Table 2.** Synthesis of the results of the studies according to the effects of the different positions assumed in regional anesthetic procedures with lumbar puncture. Juazeiro do Norte, CE, 2016.

Position	Position change for lumbar puncture	Moment of position change	Effect
Lateral	Lateral decubitus with horizontal surgical table, followed by repositioning to the supine position after lumbar puncture	During	Faster onset of blockade (finding similar to the group of sitting position, in the same study. The two findings differed from the group of lateral position with elevation head).
		After	Greater comfort Higher incidence of paresthesia
	Lateral decubitus with elevated head	During	Lower incidence of hypotension (when maintaining lateral position for 15 minutes)
		After	Insufficient sensory blockade More gradual onset of blockade and stable blood pressure (when head elevation is maintained)
	Lateral decubitus with lowered head at 25-30°	During	Lower incidence of unintentional venous cannulation
	Lateral decubitus with volume injection and epidural extension of 5ml	During	Higher blockage level



Position	Position change for lumbar puncture	Moment of position change	Effect
Sitting	With legs downwards	During	Faster onset More severe and difficult-to-treat hypotension
	With legs on the surgical table	During	Lower incidence of paresthesia (compared to sitting position with legs downwards and without support)
	Sitting position with volume injection and epidural extension of 5ml	During	Lower blockage level
	Repositioning to the left lateral position after lumbar puncture	After	Slower onset
	Repositioning to the supine position after lumbar puncture	After	Higher incidence of hypotension and nausea

## Discussion

In relation to the year of publication, almost half of the studies were published in the last 5 years. Increase in the number of publications may be associated with scientific advances in the anesthetic area, in addition to the emphasis given in recent years to the reduction of maternal mortality, which has led to investment of scientific and technological resources in childbirth care [9].

Regarding the origin of studies, scientific evidence comes from the Asian and European continents. This evidences the need of studies to be carried out in the other continents since, according to the World Health Organization, among the worldwide epidemics of cesarean sections, Latin countries, such as Brazil, stand out for more than 50% of births occurring through cesarean sections [2]. In addition, the practice related to the positioning of the pregnant woman for spinal anesthesia should be based on scientific evidence and the various continents have particularities that need to be investigated. This highlights the relevance of conducting studies on this theme in the various realities where cesarean section is performed.

Regarding the type of study and level of evidence, all the experimental studies have level of evidence II, which contributes to the existence of information that has strength to be incorporated into practice [7]. In this context, the need for more experimental

studies that support systematic reviews and meta-analyzes is pointed out so that the highest level of evidence is reached. In addition, the importance of scientific investigations with a qualitative approach is emphasized, so that subjective issues are revealed [10] and, thus, the state of art on the theme is supported by studies of varied approaches, contributing to the holistic understanding of the phenomena and to an effective direction in the decision making of professionals and patients.

All authors of the studies evaluated in this review are medical professionals. This finding can be justified when considering that the procedure of anesthesia is attributed to a medical specialty, namely anesthesiology and, therefore, this professional category has a tendency to investigate the subject scientifically. The absence of nurses among the authors of the studies is a gap that needs to be filled in future studies, since in the practice of care, the patient's positioning for the anesthetic-surgical act is assisted by nursing practitioners and that these professionals have technical, scientific and managerial skills, as well as specific knowledge based on technical, philosophical and scientific aspects that are indispensable for the perioperative care [11, 13].

The scientific evidence analyzed in the present review indicates that there was greater comfort for the pregnant women who were in the lateral position during spinal anesthesia. Comfort shown in

lateral position among pregnant women is related to the accommodation of the gravid abdomen, obtained through body lateralization. This is relevant because the sensation of comfort with the assumed position may influence its permanence during the time necessary for the conclusion of anesthesia, which may contribute to the success of the procedure [4]. It is therefore relevant that more studies investigate the comfort of the pregnant woman for spinal anesthesia in order to contribute to the performance of professionals who assist in the anesthetic positioning and to improve the quality of care provided to this group of patients.

Positioning to perform the anesthetic procedure should be chosen by analyzing possible complications and physiological changes of the age group undergoing anesthesia [14]. In pregnant women, the primary criterion in the choice of positioning for spinal anesthesia is maternal hemodynamic stability because reduction of pregnant women's blood pressure impairs placental perfusion and is as a risk for the mother and the baby [15].

During pregnancy, increased volume and uterine weight lead to compression of the inferior vena cava when women are in supine position. This fact predisposes pregnant women to present hypotension according to their position [15]. In addition to pregnant women's body changes that lead to the risk of hypotension, reduction in blood pressure is also one of the complications of spinal anesthesia [16], which leads pregnant women exposed to this anesthetic modality to have the sum of two factors that induce the decrease in pressure values. The results of an observational study carried out in India with pregnant women submitted to spinal anesthesia for elective cesarean section corroborates with this fact. That study indicated arterial hypotension in 76% of pregnant women after spinal anesthesia and that the largest reductions, of 20% in systolic blood pressure, occurred between the sixth and seventh minutes after the anesthetic procedure [17].

The articles composing the sample of the present review pointed out that hypotension was observed in pregnant women who were sitting with their legs downwards during anesthesia and after anesthesia in the pregnant women who were in a lateral position with the non-flexed head. These findings indicate the need for further studies on the relationship between the position of the pregnant woman and hypotension. In addition, the need for professionals to be more vigilant in the pregnant woman's blood pressure during spinal anesthesia when the patient is seated, and after anesthesia, when the anesthetic procedure has been performed in the lateral decubitus position. This will contribute that interventions for pressure elevation are adopted in a timely manner, so that hemodynamic instability does not compromise the mother and the baby.

## Conclusions

The scientific evidence on the positioning of pregnant women in spinal anesthesia for cesarean delivery reveals the assumed position affects the time of onset of anesthetic blockage, is related to the comfort of the pregnant woman and to the onset of maternal hypotension. When the pregnant woman was positioned for anesthesia in the lateral horizontal decubitus position or in the sitting position with legs downwards, there was a faster onset of blockage. However, these positions were also responsible for a higher occurrence of hypotension. The lateral position was related to greater comfort.

Given the predominance of experimental studies, carrying out systematic review and meta-analysis is important to reach a higher level of evidence that contributes with recommendations with strength to be incorporated into the practice. In addition, qualitative investigations on the subject are also recommended so that subjective issues of professionals and mothers are revealed and to contribute to the best perioperative care in obstetrics.

The absence of authors of the nursing area was observed, although positioning for the anesthetic and surgical act is an important aspect of nursing care to the surgical patient, specifically in the intraoperative period. In addition, the data identified in this review may contribute to professional nursing practice with a view to the safety of the surgical and obstetric patient, especially with regard to comfort and minimization of risk when choosing a suitable position for the pregnant woman during spinal blockade.

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