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Influence of non-pharmacological methods on duration of labor: a systematic review

A influência de métodos não farmacológicos na duração do parto: uma revisão sistemática

Thais Blaya Leite Gregolis (https://orcid.org/0000-0002-3799-4083) [1]
Sabrina da Silva Santos (https://orcid.org/0000-0001-8327-3546) [1,2]
Ilce Ferreira da Silva (https://orcid.org/0000-0002-7134-3030) [1,2]
Andréa Ramos da Silva Bessa (https://orcid.org/0000-0002-9553-9310) [1]

Abstract *The article aims to verify the influence of MNFs on the duration of the birth process. A systematic review was carried out in the MEDLINE, Web of Science and LILACS databases, through a combination of terms that cover the topic addressed, from 1996 to 2021/April. The Excel spreadsheet was used to collect data to extract information regarding each selected article, in turn, data analysis included the evaluation and classification of quality, reliability and risk of bias, thus, the following tools were used: Cochrane RoB 2, Checklist and Newcastle-Ottawa Scale. Warm bath, walking, exercises with a birthing ball, breathing techniques, supine position, acupuncture, acupressure and water birth reduced labor time. While spontaneous pushing, massage and immersion baths prolonged labor. Non-pharmacological methods capable of reducing the duration of labor were hot/warm shower, walking, birth ball exercises, breathing techniques, maternal mobility, dorsal position, acupuncture, acupressure and water birth, as well. associated applied techniques such as hot/warm bath, ball exercises and lumbosacral massage, as well as immersion bath, ball exercises, aromatherapy, vertical postures and maternal mobility with alternating vertical postures, shortened the birth time.*

Key words *Methods, Parturition, Humanizing delivery, Time*

Resumo *O objetivo do artigo é verificar a influência dos MNFs na duração do processo de parto. Realizou-se uma revisão sistemática nas bases de dados MEDLINE, Web of Science e LILACS, por meio da combinação de termos que contemple a temática abordada, no período de 1996 a 2021/abril. Utilizou-se para coleta de dados a planilha Excel para extração de informações referentes a cada artigo selecionado, por sua vez, a análise dos dados compreendeu a avaliação e classificação da qualidade, confiabilidade e risco de viés, assim, utilizou-se como ferramentas: Cochrane RoB 2, Checklist e Escala de Newcastle-Ottawa. Reduziram o tempo de trabalho de parto banho morno, caminhada, exercícios com bola de parto, técnicas respiratórias, decúbito dorsal, acupuntura, acupressão e parto na água. Enquanto empurrões espontâneos, massagem e banho de imersão prolongaram o trabalho de parto. Os métodos não farmacológicos capazes de reduzir a duração do trabalho de parto foram banho de chuveiro quente/morno, caminhada, exercícios com bola de parto, técnicas de respiração, mobilidade materna, posição dorsal, acupuntura, acupressão e parto na água, também encurtaram o tempo de parto técnicas aplicadas associadas como banho quente/morno, exercícios com bola e massagem lombossacral, assim como banho de imersão, exercícios com bola, aromaterapia, posturas verticais e mobilidade materna com posturas verticais alternadas.*

Palavras-chave *Métodos, Parto, Parto humanizado, Tempo*

[1] Programa de Pós-Graduação em Saúde Coletiva, Universidade Federal do Acre. Distrito Industrial, Rio Branco-Ac. 69920-900 Rio Branco AC Brasil. thaisgregolis@hotmail.com
[2] Departamento de Epidemiologia e Métodos Quantitativos em Saúde, Escola Nacional de Saúde Pública Segio Arouca, Fundação Oswaldo Cruz. Rio de Janeiro RJ Brasil.

Introduction

Labor involves movements of the fetus that guide it along the birth canal, promoted by contractions of the uterus[1]. In this process, the first and longest stage is dilation, lasting 10-12 hours in primiparous women and 6-8 hours in multiparas[1-3]. The second, expulsion begins at full dilation and can be divided into passive and active gain. The active phase lasts up to 3 hours in primiparous women and up to 2 hours in multiparous women[4].

As it is possible that the stages of labor are long and exhausting, it is important, in addition to the humanized assistance recommended in the guidance for labor and birth, to include non-pharmacological methods (NPMs) that can reduce the duration of labor and make the process more comfortable for fetus and mother[2,3].

Thus, NPMs have been encouraged for over 25 years. It can confer benefits through relaxation promoted by pain relief and also by promoting greater effectiveness of uterine contractions[5,6]. More active parturients, such as women who walk around during labor tend to have a shorter labor[7,8], as well as those who change position along with the movements, practice birth ball exercises and receive massages[7]. They are also more satisfied with the duration of the first and second stages of labor[8]. Acupressure, Chinese medicine stimuli, also help to reduce the duration of labor[9]. However, the effectiveness and effects of MNPs are still unclear, so it is still unclear which MNP is most effective in reducing the duration of labor and what is the best frequency and stage of labor that should be applied[10].

In this context, seeking evidence on the effects of NPM on the duration of labor is important to help improve care for parturients. The aim of the present study was to verify the influence of NPMs on the duration of the labor process.

Method

A systematic review was performed to map the effects of NPMs used in the labor process on the duration of labor and delivery. This approach was chosen to provide a broader capture of the available evidence on the topic, allowing deeper insights to be gained.

To determine the research question and search for evidence, the PICO strategy was used to facilitate the planning and execution of the study.

A bibliographic search was carried out between April 6 and 13, 2021. The selected databases for the search included MEDLINE (Medical Literature Analysis and Retrieval System Online – accessed via PubMed), Web of Science, and LILACS (*Literatura Latino-Americana e do Caribe em Ciências da Saúde* – accessed via the *Regional da Biblioteca Virtual em Saúde* - BVS portal). The search strings employed were built using terms registered in MeSH (Medical Subject Headings) – controlled vocabulary for indexing articles in the scientific literature – combined according to the search strategy chosen.

The inclusion criteria were studies of any design type, published between 1995 and April 2021, and in any language. Filters were applied to guide the search of studies for the review, according to the specific options available for each database or search site.

Thus, for PubMed, the search was carried out on April 6, with the initial retrieval of 2,089 publications, reduced to 1,431 records after applying filters by year of publication (1995-2021), human and female. For the Web of Science database, the search took place on April 13, identifying 1,205 studies, of which 1,118 were selected for the initial analysis after applying the year of publication filter (1995-2021). The search in the BVS was carried out on April 13, initially with 5,428 records, this total was reduced to 153 publications after restricting the results to studies carried out in the LILACS database, involving humans and women, and for the publication period (1995-2021). Therefore, 2,700 publications were included in the first stage of the review.

Searches retrieved studies published from 1996 to the date of the search (April 6-13, 2021). The justification for the chosen period was based on the fact that, in 1985, a meeting of specialists from all over the world was held by the World Health Organization (WHO), during which a series of practical recommendations to be used for the care in normal birth conditions were made[6]. However, despite encouragement to use evidence-based evidence, many of these practices have not been implemented. Only in 1996 did the WHO publish a guide for safe motherhood, establishing what is and what is not indicated during the care of mothers and babies in the normal delivery process[6].

The duration of labor, or its phases, is an outcome that deserves study, although it is not the main outcome. Interventions evaluated vary, as several different NFMs are used during labor that can alter the duration of this process. Regarding the study population, although parturients were the target population, studies with health profes-

sionals who apply methods that can influence the duration of labor were also included, as defined in the PICO strategy.

The stages of selection and application of the eligibility criteria were carried out by two researchers, aiming to respond to the study proposal. Reference manager was not used in the execution of this research.

Criteria for exclusion were publications studying a specific population (e.g. individuals presenting disease, such as multiple sclerosis, cancer, HIV, obesity; specific obstetric conditions such as pelvic or premature baby; women given analgesics or an amniotomy), studies not addressing NPM associated with duration of labor and/or one of its stages, that failed to specify the strategies used, or analyzed the third stage of labor only (after birth). Literature reviews were also excluded from the present work, reserving these for discussion. The low methodological quality did not motivate exclusion of publications.

Seven studies were classified as unavailable, i.e. sought by accessing the CAPES Journals Site, Research Gate and Google Scholar, and by contacting the respective authors via e-mail, to no avail.

The first step of selecting the retrieved publications included reading the title and abstracts of the identified studies, applying the eligibility criteria. In the second stage, the full text of the studies selected in a new screening was read. This step produced the final list of studies for inclusion in the analysis.

After that, the studies were all read in depth, and the data extracted in forms (Google Forms) and Excel spreadsheet (Microsoft Office).

The data extraction form included fields that collect study title, author(s), year of publication, journal, country, study location, study type, study objective, sample type, sample size, inclusion criteria, exclusion criteria, study variables, inclusion of the control group, measurement instruments, study duration, interventions, results found, statistical treatment, coherence of conclusions, authors' recommendations and classification of the quality level.

Publications were assessed and classified for quality, reliability and risk of bias using appropriate instruments for each type of study design.

The revised Cochrane risk-of-bias tool for randomized trials (RoB 2) was used for experimental studies[11], comprises 5 domains of bias (randomization, intervention, missing data, measurement, and results reporting) and expresses a result categorizing the study as Low risk of bias (good evidence quality), Some concerns, or High risk of bias (low evidence quality). The Checklist for quasi-experimental studies (non-randomized experimental studies) of the Joanna Briggs Institute[12] appraises the article in 9 domains (definition of cause and effect, inclusion of participants in comparisons similar or groups, presence of control group, pre and post measurements, follow-up, comparability, measurement of outcomes and analysis).

The Newcastle-Ottawa Scale (NOS)[13] for cohort studies comprises 3 domains (selection, comparability and results) giving a maximum score of 9 points if all requirements are met, reflecting the quality of the evidence generated. was employed to rate the quality of cross-sectional studies for. The NOS for case-control studies[14], was used to assess the quality of both cohort and case-control studies assesses 3 domains (selection, comparability and exposure), yielding 9 points if all items measuring methodological quality are met. Also, the NOS adapted for cross-sectional studies[15] comprises 3 domains, yielding a score of 0-9 points on the methodological quality assessment.

The findings of the analyses of study data and quality are given in tables and charts, grouped by NPM studied. The stages of study selection and analysis were performed as depicted in the flow diagram of the literature search and study selection for review (Figure 1).

Results

A total of 25 articles were included in the review after identification during the steps of selection and analysis of publications addressing effects of NPMs on duration of labor. The methodological characteristics of the studies selected are outlined in Chart 1[15].

The NPMs identified were hot/warm shower, water immersion, walking, breathing techniques, relaxation techniques, birth ball, massage, positions adopted by mother, acupuncture, acupressure, auriculotherapy, aromatherapy, water birth and pushing techniques during the expulsion stage. Some studies investigated a combination of these different methods.

The methods identified were grouped according to type of NPM or presented as a combination when applied in association with other methods. The influence of these NPMs on the duration of labor, or its stages, for each study reviewed is described in Chart 2.

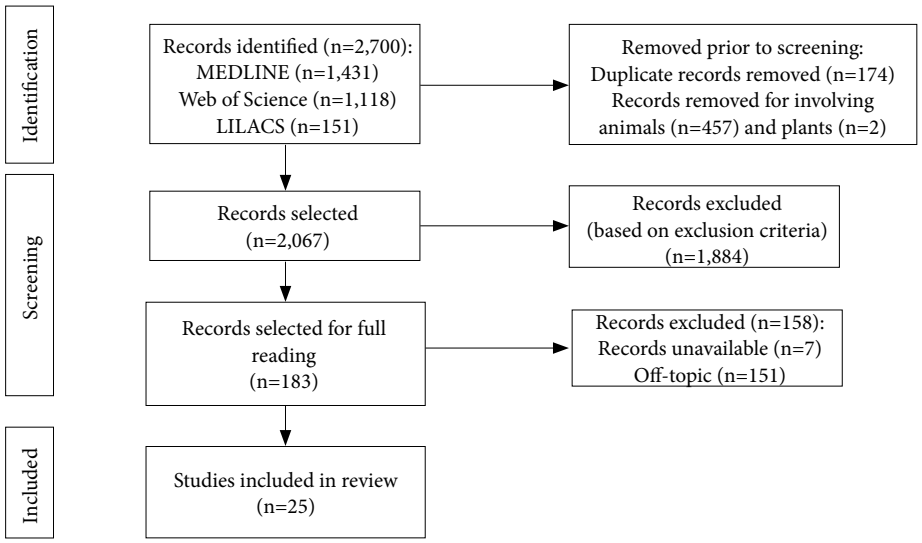

Figure 1. Flow diagram of literature search and study selection.

Source: Data from adapted study (The PRISMA 2020 statement: an updated guideline for reporting systematic reviews)[15].

Hot/warm shower

With regard to the hot/warm shower method, applied alone, the sole publication identified showed a reduction in the duration of the active stage of labor[35] and had a low risk of bias on the methodological quality analysis[11].

Immersion bath

For the immersion bath approach, mixed results were reported. Three studies found no difference in duration of labor among the women who used this method[17,20,27]. On the quality analysis, one of the publications was rated as having Low risk of bias[11], one as Some concerns[12] and the other as High risk of bias[11]. One of the studies found no effects on the active stage of labor among nulliparous and multiparous women or on the expulsion stage in multiparous women. The same study, rated as having good methodological quality[13], observed increased duration of the expulsion stage in nulliparous women who used the technique[38], however, it did not show the magnitude of the method's effect on the duration of labor.

An increase in the expulsion stage after immersion bath was documented by two studies[22,34] of high methodological quality[13], one of which also showed an increase in the duration of the active stage[22]. These studies, however, presented as a limitation the absence of a measure of the magnitude of the effect of the studied method on the duration of the labor stage.

Walking

The results of the single study investigating the effect of walking on duration of labor showed that, for every 100 meters walked in the first hour, there was a 22-minute reduction in the length of the active stage; a 10-minute reduction for the second hour, and 6-minute decrease in the third hour of labor[23], the effects were evidenced through logistic regression. This study was rated as having a low risk of bias[12].

Breathing techniques

Only one article addressed breathing techniques as a dedicated topic of investigation. The study in question applied the Lamaze method, involving breathing techniques applied at different levels. The strategy promoted a statistically significant reduction in the latent and active stages of labor, analyzed by comparison of means[32]. However, the magnitude of the effect on the duration of labor was not shown and the methodology of the study was rated as having some concerns[12].

Chart 1. Summarized characteristics of studies analyzing effects of NPMs on duration of labor.

Study	Year	Country	Study design	Method assessed
Bomfim-Hyppólito, 1998[16]	1994	Brazil (Fortaleza)	Experimental	Semi-sitting position (60º trunk inclination) during expulsion stage
Eckert *et al.*, 2001[17]	1995	Australia	Experimental	Immersion bath in first stage of labor.
Schröcksnadel *et al.*, 2003[18]	1998	Austria	Case-control	Water birth.
Almeida *et al.*, 2005[19]	2000	Brazil (Goiânia)	Experimental	Breathing techniques associated with relaxation techniques.
Bio *et al.*, 2006[7]	2003	Brazil (São Paulo)	Experimental	Keep moving and switching to vertical positions during labor and delivery.
Silva and Oliveira, 2006[20]	2002	Brazil (São Paulo)	Experimental	Immersion bath for 40-60 minutes.
Gaudernack *et al.*, 2006[21]	2003	Norway	Experimental	Acupuncture.
Zanetti-Daellenbach *et al.*, 2007[22]	1998	Switzerland	Cohort	Water birth after immersion bath for time desired by parturient.
Mamede *et al.*, 2007[23]	2004	Brazil (São Paulo)	Quasi-experimental	Walking during active stage of labor.
Gau *et al.*, 2011[24]	2008	Taiwan	Experimental	Birth ball exercise.
Cortes *et al.*, 2011[25]	2011	UK	Population-based cohort	Water birth.
Gallo *et al.*, 2013[26]	2009	Brazil (Ribeirão Preto)	Experimental	Massage during dilation period and uterine contractions for 30 mins.
Liu *et al.*, 2014[27]	2009	China	Experimental	Immersion bath in active stage of labor.
Mafetoni and Shimo, 2015[28]	2013	Brasil (Campinas)	Experimental	Acupressure at point BP6.
Desseauve *et al.*, 2016[29]	2015	France	Cross-sectional	Dorsal decubitus during labor and delivery, change in position during labor, dorsal decubitus in expulsion stage.
Vaziri *et al.*, 2016[30]	2014	Iran	Experimental	Spontaneous pushing in lateral position.
Koyucu and Demirci, 2017[31]	2013	Turkey	Experimental	Spontaneous pushing.
Cicek and Basar, 2017[32]	2016	Turkey	Experimental	Lamaze breathing technique.
Makvandi *et al.*, 2018[33]	2016	Iran	Quasi-experimental	Combination of immersion bath, birth ball exercise, aromatherapy with lavender.
Gallo *et al.*, 2018[8]	2011	Brazil (Ribeirão Preto)	Experimental	Pelvic movement exercises on Swiss ball, 40-min massage, 40-min hot/warm shower.
Ulfsdottir *et al.*, 2018[34]	2014	Sweden	Cohort	Water birth.
Maddady *et al.*, 2018[35]	2015	Iran	Experimental	Hot / warm shower.
Mafetoni *et al.*, 2018[36]	2015	Brazil (Campinas)	Experimental	Auriculotherapy.
Cavalcanti *et al.*, 2019[37]	2013	Brazil (São Paulo)	Experimental	Hot / warm shower and exercises with Swiss ball, alone and in combination.
Neiman *et al.*, 2020[38]	2016	USA	Cohort	Immersion bath and waterbirth.

Source: Authors.

Birth ball exercises

One study involved birth ball exercises, showing a reduction in duration of the active stage of the labor process by using a Swiss ball[24]. It was methodologically rated as having Some concerns[11], and it did not show the measure of the effect of the method on the duration of labor.

Chart 2. Non-pharmacological methods (NPMs) analyzed and effects on mean duration of labor or labor stage.

Study	Intervention	Sample		Effect	Duration (minutes)		Statistics	Quality
		With NPMs	Without NPMs		With NPMs	Without NPMs		
Hot/warm shower								
Maddady *et al.*, 2018[35]	Hot / warm shower	50	49	Reduction	Active stage: 221.2	Active stage: 312.6	Mean Difference -110.7; 95%CI: 169.5; -51.8	Low risk of bias[12]
Immersion bath								
Silva and Oliveira, 2006[20]	Immersion bath for 40 to 60 minutes	54	54	No effect	6-10 cm dilation: 250.9	6-10 cm dilation: 260.4	p=0.89	Low risk of bias[12]
Neiman *et al.*, 2020[38]	Immersion bath	61	111	**Nulliparous** No effect Increase **Multiparous** No effect No effect	**Nulliparous** Active stage: 764.7 Expulsion stage: 88.4 **Multiparous** Active stage: 469.3 Expulsion stage: 20.6	**Nulliparous** Active stage: 757.8 Expulsion stage: 79.7 **Multiparous** Active stage: 401.9 Expulsion stage: 16.8	**Nulliparous** p=0.13 p=0.03 **Multiparous** p=0.59 p=0.08	Good quality[14]
Liu *et al.*, 2014[27]	Immersion bath in first stage of labor	33	47	No effect No effect	Active stage: 596.55 Expulsion stage: 58.79	Active stage: 552.30 Expulsion stage: 56.04	p=0.43 p=0.72	Some concerns[13]
Eckert *et al.*, 2001[17]	Immersion bath in first stage of labor	137	137	No effect No effect	Active stage: 404.23 Expulsion stage: 64.94	Active stage: 407.21 Expulsion stage: 68.80	p=0.89 p=0.65	High risk of bias[12]
Walking								
Mamede *et al.*, 2007[23]	Walking	75	-	Reduction	Active stage: 22; 10 and 6 minutes shorter for every 100 meters walked at 1st, 2nd or 3rd hour, respectively		Linear regression	Low risk of bias[13]
Breathing techniques								
Cicek and Basar, 2017[32]	Lamaze breathing technique	35	35	Reduction Reduction No effect No effect	Latent stage: 403.71 Active stage: 174.00 Transition stage: 110.71 Expulsion stage: 19.11	Latent stage: 658.71 Active stage: 264.57 Transition stage: 101.42 Expulsion stage: 24.48	p<0.001 p=0.01 p=0.28 p=0.14	Some concerns[12]
Ball exercises								
Gau *et al.*, 2011[24]	Birth ball exercises	48	39	Reduction No effect	Active stage: 380 Expulsion stage: 38.48	Active stage: 485.4 Expulsion stage: 41.3	p=0.04 p=0.59	Some concerns[12]
Massage								
Gallo *et al.*, 2013[26]	30-min massage	23	23	Increase	Labor: 408	Labor: 342	Mean difference 1.1 hour; 95%CI: 0.2; 2.0	Low risk of bias[12]

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Chart 2. Non-pharmacological methods (NPMs) analyzed and effects on mean duration of labor or labor stage.

Study	Intervention	Sample		Effect	Duration (minutes)		Statistics	Quality
		With NPMs	Without NPMs		With NPMs	Without NPMs		
Positions adopted by mother								
Desseauve *et al.*, 2016[29]	Dorsal decubitus during labor	431	120	Reduction	Labor classified as ≥120 or <120 minutes		OR=2.2 95%CI: 1.2; 4.2	Good quality[15]
	Dorsal decubitus during expulsion	303	144	Increase	Labor classified as ≥120 or <120 minutes		OR=0.1 95%CI: 0.0; 0.4	
Bomfim-Hyppólito,1998[16]	Semi-sitting position (60º) in expulsion stage	127	121	No effect	Expulsion stage: 21.7	Expulsion stage: 25.1	p=0.06	High risk of bias[12]
Maternal mobility								
Desseauve *et al.*, 2016[29]	Switching position during labor	411	140	Increase	Labor classified as ≥120 or <120 minutes		OR=0.2 95%CI: 0.1; 0.3	Good quality[15]
Acupuncture/Acupressure/Auriculotherapy								
Gaudernack *et al.*, 2006[21]	Acupuncture	43	48	Reduction	Active stage: 264	Active stage: 366	Mean Difference 1.7 hour; 95%CI: 0.2; 3.1	Low risk of bias[12]
Mafetoni and Shimo, 2015[28]	Acupressure at point BP6	38	30	Reduction	628.10	913.10	p=0.004	Low risk of bias[12]
Mafetoni *et al.*, 2018[36]	Auriculotherapy	25	27	No effect	607.8	694.7	p=0.08	Low risk of bias[12]
Water birth								
Schröcksnadel *et al.*, 2003[18]	Water birth in District Hospital	47	265	Reduction	Expulsion stage: 15	Expulsion stage: 20	p=0.02	Good quality14
	Water birth at University Hospital	218	265	No effect	Expulsion stage: 23	Expulsion stage: 20	Non-significant	
Zanetti-Daellenbach *et al.*, 2007[22]	Water birth after immersion bath	89	146	No effect Reduction	Active stage: 330.5 Expulsion stage: 35.3	Active stage: 352.8 Expulsion stage: 49.1	Non-significant p<0.001	Good quality[14]
Cortes *et al.*, 2011[25]	Water birth	78	48	Reduction	Expulsion stage: 43	Expulsion stage: 57	p=0.01	Good quality[14]
Ulfsdottir *et al.*, 2018[34]	Water birth	306	306	Reduction	Expulsion stage: 21.6	Expulsion stage: 26.8	p=0.01	Good quality[14]
Neiman *et al.*, 2020[38]	Water birth	58	111	**Nulliparous** Reduction **Multiparous** No effect	**Nulliparous** Expulsion stage: 23.2 **Multiparous** Expulsion stage: 9.5	**Nulliparous** Expulsion stage: 79.7 **Multiparous** Expulsion stage: 16.8	**Nulliparous** p=0.03 **Multiparous** p=0.08	Good quality[14]

it continues

Chart 2. Non-pharmacological methods (NPMs) analyzed and effects on mean duration of labor or labor stage.

Study	Intervention	Sample		Effect	Duration (minutes)		Statistics	Quality
		With NPMs	Without NPMs		With NPMs	Without NPMs		
Pushing techniques in expulsion stage								
Koyucu and Demirci, 2017[31]	Spontaneous pushing	40	40	Increase	Expulsion stage: 63.2	Expulsion stage: 46.6	p<0.001	Low risk of bias[12]
Vaziri *et al.*, 2016[30]	Spontaneous pushing in lateral position	35	34	Increase	Expulsion stage: 76.32	Expulsion stage: 64.56	p<0.001	Some concerns[12]
Techniques used in association								
Almeida *et al.*, 2005[19]	Breathing plus relaxation techniques	19	17	Increase No effect No effect	Latent stage: 145.26 Active stage: 173.68 Transition stage: 126.31	Latent stage: 84.70 Active stage: 151.76 Transition stage: 103.23	p=0.01 p=0.54 p=0.16	Some concerns[12]
Cavalcanti *et al.*, 2019[37]	Hot / warm shower plus birth ball exercises	39	44	No effect	From combined intervention to birth: 216.85	Hot shower to birth: 255.05	p=0.10	Low risk of bias[12]
			45			From birth ball exercises to birth: 288.41	p=0.10	
Gallo *et al.*, 2018[8]	Ball exercises, lumbosacral massage plus warm/ hot shower	40	40	No effect Reduction	Active stage: 373 Expulsion stage: 19	Active stage: 445 Expulsion stage: 37	95%CI: 148; 5 95%CI: 30; -5	Low risk of bias[12]
Makvandi *et al.*, 2018[33]	Immersion bath, birth ball exercise, aromatherapy with lavender and vertical positions during second stage of labor	77	77	Reduction No effect	Active stage: 210.02 Expulsion stage: 36.61	Active stage: 269.54 Expulsion stage: 43.08	p<0.001 p=0.08	Low risk of bias[13]
Bio *et al.*, 2006[7]	Mobility and alternating vertical postures	50	50	Reduction	Active stage: 316	Active stage: 508	p<0.001	Some concerns[12]

Source: Authors.

Massage

Only one article addressed massage alone, whose results showed that the technique promoted an increase in duration of labor[26]. The trial in question was rated as having Low risk of bias[11].

Maternal positions adopted

In one publication, the use of dorsal decubitus in the active stage was associated with shorter labor time[29], where the study in question had Good methodological quality[14]. In another study, rated as having High risk of bias[11], the semi-sitting position had no effect on duration of labor[16], however without presenting the magnitude of the effect of the method over time.

Maternal mobility

Changes in the position of the mother during labor were associated with longer labor times[29] in a study of High methodological quality[14].

Acupuncture/Acupressure/Auriculotherapy

In a study with low risk of bias[11], acupuncture was shown to reduce the length of time elapsed

between rupture of membranes and birth[21]. Application of acupressure at specific points also reduced mean labor time in the intervention group, with the effect reaching statistical significance[28], but the magnitude of the effect on the duration of labor was not shown. The study was rated as having Low risk of bias[11]. In another study, also classified as having Low risk of bias[11], the auriculotherapy technique had no effect on average labor time[36].

Water birth

Immersion during the expulsion stage shortened length of labor in 3 studies[22,25,34]. This also held true for nulliparous women, whose labor process was shortened by use of the technique[38]. However, in a study conducted at two different hospitals, a reduction in the expulsion stage was seen at one site, while no effect was found for the other hospital[18]. These articles did not show the magnitude of effect on delivery time but were classified as having good methodological quality[13].

Pushing techniques in expulsion stage

Passive descent (delayed pushing) and spontaneous pushing were associated with longer expulsion times in 2 articles included in the review[30,31]. The 2 studies were rated as having Some concerns and Low risk of bias, respectively[11], but they did not show the measure of the effect of the method on the time of delivery.

Techniques used in association

Some of the studies reviewed explored the influence of the application of more than one NPM, used in association, on duration of labor. The application of breathing techniques in association with relaxation methods led to a longer latent stage of labor in the experimental group[19], however, it did not measure the magnitude of the effect on delivery time and was classified with some methodological concerns[11].

In another study, rated as having Low risk of bias[11], the hot/warm shower technique was combined with birth ball exercises, revealing no effect on duration of labor[37].

One study investigating the use of ball exercises, together with lumbosacral massage and hot/warm shower, showed a reduction in length of the expulsion stage, but had no effect on the active stage[9]. The study in question had Low risk of bias[11].

In one study, rated as having Low risk of bias[12], immersion bath was combined with ball exercises, aromatherapy using essential oil of lavender, and adoption of the vertical position in the expulsion stage. The association of NPMs was shown to reduce the active stage of labor but had no effect on the expulsion stage[33], however, it is important to emphasize that the study did not present the magnitude of the effect on the duration of labor.

Lastly, one of the studies reviewed, in which mothers kept moving position, switching vertical postures during labor, had shorter labor times[7]. This study was rated as having Some concerns methodologically[11], and the magnitude of the effect on the duration of labor was not shown, only the comparison of means.

Discussion

Delivery within a hospital setting is characterized by the use of a host of different technologies and procedure intended to ensure the safety of both mother and newborn. However, modern obstetrics does not treat the pregnancy period, labor or birth as natural expressions of health[39].

Under this model, mothers and newborns are exposed to major interventions which should be used in a more controlled rational manner only when necessary, yet are adopted as part of routine practice. This overuse of interventions, such as the oxytocin, episiotomy, cesarean section, nasopharyngeal aspiration, among others, disregard emotional, human and cultural aspects involved in the process of childbirth[39].

In 2004, the Ministry of Health launched the National Policy for Humanization (PNH), tackling overly interventionist practices, with guidance for professional conduct to respect the physiological aspects of labor. These guidelines acknowledge social and cultural aspects, seek to promote health, and provide the mother and family with emotional support, ensuring successful labor and childbirth[40].

Although the PNH is valued in theory, good practices in labor assistance are not always applied. According to data from the "*Nascer no Brasil*" survey, only 5.6% of normal deliveries are performed without some type of intervention, where practices considered inappropriate and even those that should be abolished, such as the Kristeller maneuver, continue to be applied[41].

It is important to emphasize that these interventions are not restricted to normal delivery, but

also to the routine use of various practices during labor that need to be reviewed in order to restore women's autonomy and well-being[42,43], because when a labor of delivery is accelerated can have consequences for the parturient.

Also, the extension of the stages of labor can lead to the indication of a cesarean section, due to the risk of complications. The delay in the expulsive phase tends to occur due to maternal exhaustion, inertia or hypoactivity of the uterus, and due to the inability to properly contract the abdominal muscles. Thus, when performing a cesarean section, there is a risk of infection, hemorrhage, pulmonary embolism and disorders during anesthesia and even the consequent maternal death[2].

In addition, complications associated with the long period of labor may include postpartum hemorrhage due to uterine atony. Therefore, the use of NFMs during this process tends to promote satisfactory results, reducing the use of medication and making parturients calmer and more relaxed, through specific techniques aimed at comfort and reduction of the duration of labor[44].

Thus, the present study investigated, through a systematic review, the effect of MNFs used alone and/or in conjunction with other methods to reduce the duration of labor and/or some stage of labor.

The bath was the method more commonly found in studies applying it in conjunction with other techniques, such as birth ball exercises[37]. A literature review concluded that the benefits of hot/warm showers on duration of labor were greater when the method was combined with the use of the birth ball[45].

For the immersion bath approach, mixed results were reported[17,20,27,38], this association of this method with others helps to delay the use of pharmacological agents, allowing a more active participation of the parturient woman and her companion[20].

These techniques are considered safe, with no adverse effects on obstetric outcomes, and are also associated with greater satisfaction with the duration of the process of labor and expulsion[8].

However, the scientific literature points out that the exercise of the birthing ball confers benefits to the woman, in the act of standing, contributing to the reduction of the time of parturition, with shortening of the active phase[24]. In this way, walking also proved to be effective in the present study for reducing the duration of both the dilation and expulsion phases[25].

Maternal mobility was also associated with a decrease in labor[46], when combined with alternating vertical postures, it was presented as a method for reducing the active phase of labor[7]. The freedom to choose the position, however, has had conflicting results, as it means that the mother can choose the position she is most comfortable in at any time during labor, be it vertical, horizontal or a combination of the two.

Also suggesting that a vertical or horizontal decubitus influences progression of labor, a literature review found most studies reported that non-horizontal positions used during expulsion reduced the duration of birth, while almost half showed that adopting the vertical position shortened the process. In the review, the best evidence suggested that positions that exploited gravity shortened the process of giving birth, directing the fetus to the birth canal[47].

In contrast to what this review found, the application of a progressive stretching method called obstetric psychoprophylaxis normally reduces the duration, ensuring to shorten the dilation and expulsion phases, thus shortening the delivery process as a whole[46]. The prescribed Lamaze method, when associated with nursing intervention, also promotes shorter labor times[48].

In addition, acupuncture and acupressure at specific points can reduce the duration of labor[21,28], shortening the active stage by an average of 1.21 hours and the second stage by 5.81 minutes[9], specifically attributed to the first method. According to Chinese medicine, there are necessary balances for the initiation and progression of the delivery process, where vital energy and blood functions are essential; thus, these methods are recommended to help balance the physical components of the body[49].

Finally, water birth is another method that reduces the expulsive time[18,22,25,34,38], however, the scientific literature states that its effects are still inconclusive[50]. Similarly, delayed expulsive efforts or spontaneous pushing were associated with a longer second step of almost an hour[51].

The diversity of analyzed methods and the heterogeneity of the studies constituted a limitation of the present study, making comparisons and clarity impossible in relation to each MNP investigated.

Conclusions

The MNFs presented in this study are strategies used for better management, with a view to good

practices in labor and birth care that enable a care model to be implemented by managers and health professionals, in the elimination of unnecessary interventions for parturients.

Among the methods presented in this study, showering, walking, exercises with the birth ball, breathing techniques, maternal mobility, acupuncture and acupressure, aromatherapy, supine position, immersion bath and water birth reduced the duration of labor and/or delivery when applied alone. Also, the association of methods, such as immersion bath, ball exercises, aromatherapy, vertical postures and maternal mobility with alternate vertical postures, shortened the time of delivery or any of its phases.

On the other hand, auriculotherapy, hot/warm bath associated with ball exercises did not affect the duration of labor, while immersion bath during labor, massage and spontaneous pushing increased the duration of labor. Combining breathing with relaxation techniques also promoted longer labor.

It is noteworthy that this diversity of analyzed methods and the heterogeneity of the selected articles in the present study verified a limitation, making it impossible to make detailed comparisons in relation to each identified NFM and the analysis of the magnitude of the effect of the strategies on the duration of labor.

However, it should be noted that this overview of the use of these methods can contribute to reflection on the practice of health professionals in relation to the assistance provided to women in labor, with the proposition of indicators that allow the use of this practice; despite the scientific literature pointing out the incipience of investigations that address the difficulties of implementation and the necessary advances for its execution as recommended.

Collaborations

TBL Gregolis performed the acquisition, analysis and interpretation of data, as well as the elaboration of the work. SS Santos, IF Silva and ARS Bessa developed the study design, also participating in the acquisition, analysis, interpretation of data and elaboration of the work, in addition to its review. All authors have read the manuscript, interpreted the results, agreed on the final version and agreed to be responsible for all aspects of the work.

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