Original Article

Postural changes and pain level in mothers with lap babies: a transversal study

Alterações posturais e nível de dor em mães com bebês de colo: um estudo transversal

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ABSTRACT | INTRODUCTION: The gestational period is characterized as a time of great physiological events and the puerperal period, which brings with it great physical and psychological changes. **OBJECTIVE:** To evaluate the prevalence of postural changes and pain levels in mothers with babies in arms. **MATERIAL AND METHODS:** Cross-sectional research, descriptive and quantitative approach, which was developed with mothers who participated in monitoring childcare and breastfeeding during November 2018 at a frequency of three times a week. For data collection, a sociodemographic form was used to collect some personal information; the Postural Assessment Instrument (IAP) the Visual Analog Pain Scale (VAS). Categorical data were presented using simple and absolute frequencies, followed by Pearson's chi-square test (χ^2) for the association between the level of pain and the dependent variables. **RESULTS:** The age of mothers remained between 18 and 35 years old, with a complete level of education, and most of them had no occupational activity. It was observed that, although the study did not show a significant association between postural habits and the level of pain, this symptom was present in 73.5% of women and prevailed in levels from moderate (n=26) to severe (n=24), keeping a discreet relationship with some types of deviations. The most prevalent postural change was lumbar hyperlordosis (69.1%). **CONCLUSION:** It was possible to see that pain and postural deviations are present in women with babies in arms, and it is necessary to think of interventions with this focus for this group.

KEYWORDS: Pain. Postpartum period. Posture. Pregnancy.

RESUMO | INTRODUÇÃO: O período gestacional caracteriza-se como um momento de grandes eventos fisiológicos, assim como também o período puerperal, que traz consigo grandes mudanças físicas e psicológicas. **OBJETIVO:** Avaliar a prevalência de alterações posturais e nível de dor em mães com bebês de colo. **MATERIAL E MÉTODOS:** Pesquisa transversal, de caráter descritivo e abordagem quantitativa, que foi desenvolvida com mães que participavam do acompanhamento de puericultura e aleitamento materno durante novembro de 2018 numa frequência de três vezes por semana. Para coleta dos dados, utilizou-se um formulário sociodemográfico para colher algumas informações pessoais; o Instrumento de Avaliação Postural (IAP) a Escala Analógica Visual de Dor (EVA). Os dados categóricos foram apresentados através de frequência simples e absolutas, seguidos da utilização do teste Qui-quadrado (χ^2) de Pearson para a associação entre o nível de dor com as variáveis dependentes. **RESULTADOS:** A idade das mães manteve-se entre 18 e 35 anos, com nível de escolaridade completo, e a maioria sem atividade ocupacional. Observou-se que, apesar do estudo não apresentar associação significativa entre os hábitos posturais e o nível de dor, este sintoma esteve presente em 73,5 % das mulheres e prevaleceu em níveis de moderada (n=26) à intensa (n=24), mantendo uma relação discreta com alguns tipos de desvios. A alteração postural mais prevalente foi a hiperlordose lombar (69,1%). **CONCLUSÃO:** Foi possível perceber que a dor e os desvios posturais estão presentes em mulheres com bebês de colo, sendo necessário pensar em intervenções com esse enfoque para este grupo.

PALAVRAS-CHAVE: Dor. Gravidez. Período Pós-Parto. Postura.

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Introduction

The gestational period is characterized as a time of major physiological events in a woman's life, leaving her susceptible to many physical and emotional changes. In this context, the weight gain due to increased breasts, uterus volume, and high fluid retention stand out. That causes a shift in the center of gravity and a greater variation in the center of force.[1,2]

In this sense, the spine is one of the most affected segments, resulting from the compensation generated, altering and disrespecting its physiological curvatures. In addition, muscles and ligaments are affected by the hormone relaxin, which is highly productive, as it plays a fundamental role in preparing for pregnancy, favoring ligament laxity for the time of delivery.[3]

From this process, there is, as a result, the onset of back pain, which is with higher prevalence of low back pain, this being one of the main complaints during the gestational period and that worsen over the months when this is already was a pre-pregnancy problem. Furthermore, it can remain during the puerperium, modifying the quality of life and affecting the performance of daily activities.[4]

Regarding this period, it is known that it is marked by changes in the woman's body that were caused by pregnancy, starting soon after childbirth with the excretion of the placenta and dividing into three phases: immediate puerperium from the 1st to the 10th day after delivery, late puerperium from the 11th to the 45th day and remote puerperium after 45 days.[5,6]

Postural changes are also highlighted in this period, with a higher incidence of anteversion of the pelvis, cervical protrusion, and shoulder protrusion.[7] It is noteworthy that these changes are caused by pregnancy by the compensation generated, extending into the puerperium by the intense routine of baby care, especially when breastfeeding, when the woman adopts the same posture for several hours.[8]

In addition to the vicious posture adopted during breastfeeding, there are also demands to hold the baby on the lap or carry out activities to care for him. That generates an excessive load in front of the body, promoting a hyperextension of the spine and alteration of the physiological curvatures at the moment of standing. Furthermore, there is a shift in the center of gravity when the mother is in a standing position, contributing to greater weight-bearing by the lower limbs.[9,10]

Given this new routine, women have less time for personal care, especially when they need to associate professional life with motherhood. These factors, in general, increase the probability of overweight risks, added to the gain during pregnancy, which is presented as a contributing factor in the emergence of pain in a woman's life during the postpartum period, since obesity can be a triggering factor for several locomotor changes, due to poor fat distribution that can lead to compensation of body alignment, promoting postural deviations and possibly a greater risk of pain as a consequence.[11,12]

Among the most affected regions, the lumbar region stands out, a very common complaint during the puerperium, which is not limited only to women who presented this symptom during pregnancy. Neck and chest pain are also common.[9]

Therefore, due to the various changes caused in pregnancy and aggravated in the puerperal period, this woman is vulnerable to the development of postural changes, resulting from various inadequate habits and the greater possibility of pain. For this reason, it is essential to expand studies in the area in order to generate a more precise investigation and greater understanding in order to design a more adequate and targeted treatment plan for this audience.

Given this, this study aimed to assess the correlation between the prevalence of postural changes and the level of pain in mothers with babies in arms.

Material and methods

That was a cross-sectional, descriptive study with a quantitative approach, carried out with mothers who participate in childcare and exclusive breastfeeding during November 2018 at a frequency of three times a week. Therefore, the population consisted of ten appointments per day, resulting in thirty per week, but with a final estimate of fifty appointments per week, due to living births that are directly referred for care after postpartum.

From this population, a convenience sample was selected according to the appearance of the mothers for care. Data collection was carried out in November 2018, using the saturation method, which totaled 68 participants.

The study included mothers over eighteen who had babies in their arms up to six months of age and were being followed up at the hospital. As for the exclusion criteria, mothers who presented musculoskeletal pathologies associated with a previous clinical diagnosis were considered.

Entry into the maternity ward took place through the consent letter. Soon after, the participants were approached, and all agreed to participate, thus being acquired the signature of the Free and Informed Consent Term (TCLE). Soon after signing, a sociodemographic form was applied, containing some information, such as age, number of children, occupational activity, education, among others.

At this time, the Visual Analog Pain Scale-VAS validated by Rubbo (2010) was also applied, where the evaluator questioned the participant about her degree of pain, with zero total pain absence and ten the maximum pain felt by the participant. This scale is an easy-to-apply instrument, as the participant only needs to identify what level of pain she feels through a scale with numbers and facial expressions. It assesses the degree of pain intensity that the participant presents, which can be classified as no pain/mild pain (0-3), moderate (4-7), and severe (8-10).

Then, the postural assessment was carried out using the Postural Assessment Instrument - IAP, created by Waltz, Strickland, Lenz (1991). The participant was analyzed in the anterior, lateral, and posterior view inside the breastfeeding room while her babies were undergoing childcare procedures. The results obtained by this questionnaire lead to answers such as anterior projection of the head, cervical hyperlordosis, shoulder protrusion, lumbar hyperlordosis, pelvis anteversion, among others. All instruments and assessments were applied by a single researcher trained before going into the field to carry out the research.

For statistical analysis, categorical data were presented using simple and absolute frequencies, followed by Pearson's chi-square test (χ^2) for the association between the level of pain and the dependent variables. In all analyses, a significance level of $p<0.05$ was adopted.

Results

The results below refer to a sample of sixty-eight postpartum women randomly selected as they arrived for follow-up at the hospital they were being treated. Table 1 presents the sociodemographic data; it was observed that most of the women investigated were between 18 and 35 years old (89.7%) and were mothers of 1 to 2 children (82.3%). Regarding education, it is clear that most had completed high school (92.7%). This finding is noteworthy in the context of a sample of relatively young mothers, as even after becoming pregnant or having their children, they continued their studies in search of better preparation for the labor market.

It is noteworthy that the groups were divided, taking into account the level of pain reported by the participants according to the VAS classification as mild/no pain (0-3), moderate (4-7), and severe (8-10).

Most had no occupational activity (61.8%) at the time of the survey. This fact was related to the impossibility of reconciling personal and professional life. As a result, some had to leave their jobs to dedicate themselves to their children, while others had no opportunity to work after completing their studies due to the same difficulty.

Table 1. Sociodemographic data of postpartum women

	No pain/Slight (n=18) n (%)	Moderate (n=26) n (%)	Intense (n=24) n (%)
Age			
18 a 23 years	13 (19,1)	6 (8,8)	4 (5,9)
24 a 29 years	3 (4,4)	7 (10,3)	15 (22,1)
30 a 35 years	1 (1,5)	10 (14,7)	2 (2,9)
36 a 41 years	1 (1,5)	3 (4,4)	2 (2,9)
42 a 43 years	0 (0,00)	0 (0,00)	1 (1,5)
Number of children			
1 a 2 children	17 (25,0)	23 (33,8)	16 (23,5)
3 a 5 children	1 (1,5)	3 (4,4)	8 (11,8)
Schooling			
Incomplete high school	2 (2,9)	1 (1,5)	2 (2,9)
Complete high school	16 (23,5)	25 (36,8)	22 (32,4)
BMI			
Under weight	0 (0,00)	0 (0,00)	1 (1,5)
Healthy weight	12 (17,60	11 (16,2)	7 (10,3)
Overweight	6 (8,8)	15 (22,1)	16 (23,5)
Occupational Activity			
Yes	7 (10,3)	8 (11,8)	11 (16,2)
No	11 (16,2)	18 (26,5)	13 (19,1)
Physical Activity			
Yes	4 (5,9)	2 (2,9)	4 (5,9)
No	14 (20,6)	24 (35,3)	20 (29,4)

Regarding nutritional status, it was observed that 54.4% of mothers were overweight, and only 14.7% practiced physical activities. It possibly reflects the challenges of the moment concerning the balance between taking care of themselves and the baby, resulting, in most cases, in the lack of possibility to balance their weight after pregnancy, in addition to the change in lifestyle that also ends generating more accumulation of fat.

Concerning the prevalence of painful symptoms, 73.5% of the mothers reported feeling pain (Table 2). It was not possible to find a statistically significant association between other postural habits and pain levels. However, when looking at table 2, the place where the mother breastfeeds the baby, it is observed that those who breastfed in any location had moderate (36.8%) to severe (32.4%) pain, on the other hand, puerperal women who no longer breastfed, who had a lower level of pain, concentrated in the no pain/mild pain group (7 .4%).

Table 2. Clinical characteristics and daily postural habits of postpartum women

	No pain/Slight (n=18) n (%)	Moderate (n=26) n (%)	Intense (n=24) n (%)	Value p
Feel pain				
Yes	0 (0,0)	26 (38,2)	24 (35,3)	<0,001*
No	18 (26,5)	0 (0,0)	0 (0,0)	
Where do you breastfeed				
Reserved place	0 (0,0)	0 (0,0)	1 (1,5)	
Any place	15 (22,1)	25 (36,8)	22 (32,4)	0,296
Does not breastfeed	3 (4,4)	1 (1,5)	1 (1,5)	
Way you pick up the baby				
Crouch	2 (2,9)	1 (1,5)	2 (2,9)	0,645
Tilts	16 (23,5)	25 (36,8)	22 (32,4)	
Puerperal period				
Immediate	0 (0,0)	2 (2,9)	0 (0,0)	
Late	8 (11,8)	15 (22,1)	14 (20,6)	0,311
Remote	10 (14,7)	9 (13,2)	10 (14,7)	

* Value p>0,05 (Pearson's chi-square test)

Another habit that deserves attention is the way the baby is held. The habit of bending the trunk to pick up the baby on some surface overlaps with the correct way of squatting, causing a higher level of pain (92.7%), also concentrating a greater number of women reporting moderate and severe pain.

It is also worth noting that the postpartum period in which the woman is, even though it has no significant relationship with the pain symptom, draws attention to the fact that those women in the late postpartum period (54.5%) were concentrated in the group of moderate and severe pain. This fact may be related to this period being the one of greatest adaptation, where women begin to learn to deal with all the demands on their own, as they have just left the immediate postpartum period and have greater family support.

Table 3, in turn, points to associations between postural habits and the level of pain. Moreover, although no significant associations were observed between these variables, some alterations are noteworthy for presenting a higher rate in the moderate and severe pain groups. For example, one can mention head changes, highlighting the right (48.5%) and left (33.8%) inclinations with moderate to severe pain.

Table 3. Postural changes and pain level of postpartum women

	No pain/Slight (n=18) n (%)	Moderate (n=26) n (%)	Intense (n=24) n (%)	Value p
Head				
Aligned	3 (4,4)	2 (2,9)	2 (2,9)	
Right leaning	11 (16,2)	13 (19,1)	9 (13,2)	
Left leaning	2 (2,9)	10 (14,7)	11 (16,2)	0,243
Right rotation	2 (2,9)	0 (0,0)	2 (2,9)	
Left rotation	0 (0,0)	1 (1,5)	0 (0,0)	
Shoulders				
Symmetrical	1 (1,5)	6 (8,8)	6 (8,8)	
Right elevated	9 (13,2)	12 (17,6)	9 (13,2)	0,504
Left elevated	8 (11,8)	8 (11,8)	9 (13,2)	
Thales Triangle				
Symmetrical	9 (13,2)	11 (16,2)	12 (17,6)	
Right asymmetric	3 (4,4)	4 (5,9)	2 (2,9)	0,888
Left asymmetric	6 (8,8)	11 (16,2)	10 (14,7)	
Trunk				
Aligned	16 (23,5)	21 (30,9)	18 (26,5)	
Right leaning	0 (0,0)	1 (1,5)	1 (1,5)	
Left leaning	2 (2,9)	4 (5,9)	5 (7,4)	0,811
Right rotation	0 (0,0)	0 (0,0)	0 (0,0)	
Left rotation	0 (0,0)	0 (0,0)	0 (0,0)	
Iliac Crest				
Symmetrical	10 (14,7)	19 (27,9)	17 (25,0)	
Asymmetrical right	5 (7,4)	3 (4,4)	3 (4,4)	0,627
Asymetrical left	3 (4,4)	4 (5,9)	4 (5,9)	
Hip				
Normal	13 (19,1)	20 (29,4)	19 (27,9)	
Right int rotation	0 (0,0)	1 (1,5)	2 (2,9)	
Left int rotation	4 (5,9)	5 (7,4)	3 (4,4)	0,531
Right ext rotation	1 (1,5)	0 (0,0)	0 (0,0)	
Left ext rotation	0 (0,0)	0 (0,0)	0 (0,0)	
Knees				
Normal	11 (16,2)	10 (14,7)	10 (14,7)	
Genovalgo	2 (2,9)	10 (14,7)	9 (13,2)	0,326
Genovar	5 (7,4)	6 (8,8)	5 (7,4)	

* Value p>0,05 (Pearson's chi-square test)

There is also a considerable level of moderate and intense pain in the changes present in the shoulders. It can be associated with developing a vicious posture of the arms when holding the baby in her lap or even the weight carried, which is generated by great tensions developed by the mother in this entire region. One can think of this same line of reasoning for the group of women who presented the genovalgus knee (30.8%).

Still on postural deviations, in table 4, hyperlordosis (89.5%) is highlighted, which may be associated with body adaptations during pregnancy and continued until the puerperium, causing pain in these women. Despite not having a significant association, the number of participants included in this group from the postural assessment stands out.

The alteration in head projected forward (69.1%) and changes in the pelvis with a predominance of anteversion (73.6%) also stand out among the changes and number of participants reporting mainly moderate and severe pain. In the same way as hyperlordosis, these alterations may be related to the body's compensations during pregnancy and which, as they are perpetuated in the puerperium, cause negative impacts with the appearance of pain as a symptom.

Table 4. Postural changes and pain level of postpartum women

	No pain/Slight (n=18) n (%)	Moderate (n=26) n (%)	Intense (n=24) n (%)	Value p
Head_A				
Normal	5 (7,4)	4 (5,9)	1 (1,5)	
Designed for/forward	10 (14,7)	18 (26,5)	19 (27,9)	0,313
Projected backwards/backwards	3 (4,4)	4 (5,9)	4 (5,9)	
Shoulders_A				
Normal	4 (5,9)	7 (10,3)	8 (11,8)	
Protusus	14 (20,6)	17 (25,0)	15 (22,1)	0,683
Withdrawn	0 (0,0)	2 (2,9)	1 (1,5)	
Cervical Spine				
Normal	6 (8,8)	5 (7,4)	10 (14,7)	
Hyperlordosis	10 (14,7)	17 (25,0)	12 (17,6)	0,534
Rectification	2 (2,9)	4 (5,9)	2 (2,9)	
Thoracic Spine				
Normal	12 (17,6)	16 (23,5)	17 (25,0)	
Hyperkyphosis	2 (2,9)	5 (7,4)	2 (2,9)	0,842
Rectification	4 (5,9)	5 (7,4)	5 (7,4)	
Lumbar Spine				
Normal	1 (1,5)	1 (1,5)	0 (0,0)	
Hyperlordosis	14 (20,6)	23 (33,8)	24 (35,3)	0,226
Rectification	3 (4,4)	2 (2,9)	0 (0,0)	
Pelvic Waist				
Normal	2 (2,9)	2 (2,9)	1 (1,5)	
Anteversion	14 (20,6)	15 (22,1)	21 (30,9)	0,108
Retroversion	2 (2,9)	9 (13,2)	2 (2,9)	
Knees_A				
Normal	9 (13,2)	12 (17,6)	9 (13,2)	
Genorecurverd	1 (1,5)	0 (0,0)	0 (0,0)	0,434
Genoflex	8 (11,8)	14 (20,6)	15 (22,1)	

Variable presented missing data.
* Value p>0,05 (Pearson's chi-square test)

Research and tests were also carried out for scoliosis, scapula alterations, asymmetries of gluteal folds and types of feet, and trampling. However, no significant alterations were found.

In general, it was observed that the results presented in this study did not show a significant association between postural habits and the level of pain of postpartum women, a fact that may be associated with the sample N. However, there was a high prevalence of pain in these women, concentrating on the moderate and intense levels, in addition to pointing out the appearance of some postural alterations, as previously discussed.

Discussion

The puerperium period presents itself as something quite challenging for women, as it presents new demands and demands, both physical and emotional. In this context, the immediate puerperium is the phase in which the woman needs more family support as a way of helping to cope with the new proposed reality. However, this does not exempt that this support network continues to exist in other puerperal moments, given the perpetuation of these demands and change in the routine that often restricts the social and working life of these women.[6]

This fact can be evidenced in this research, which found a predominance of women without occupational activity due to the unavailability of time due to the exclusive dedication to the child and for not having a support network to help at the time. Some authors[6] point to this profile of exclusive maternal dedication, but related to the decision to be part of the child's development, which diverges from the reason for this study.

However, disagreeing with these results, researchers show[7] that most postpartum women performed some work activity at the time. A fact that may be associated with this is that most women in this study were older than 30 years, which means that they had better maturity and family structure to adapt to the new routine. On the contrary, in this study, the women's age was concentrated below 30 years old, and most had finished high school shortly.

Therefore, given these women's struggles and difficulties, it is worth noting that the whole new routine of baby care is directly related to the appearance of back pain, where the greatest tensions are generated. In this regard, it is worth highlighting the postural vices adopted by mothers, such as trunk inclinations, a prevalent habit and associated with the presence of pain. Thus, there is a need to avoid inclinations of the trunk before caring for the baby, requiring the adaptation closer to the mother's waist, thus avoiding overload and the onset of pain while offering greater stability to hold and balance the baby's weight.[5]

In the context of pain, it is clear in this study that this symptom was quite prevalent among puerperal women and that, in addition, these pains were located at moderate and severe levels, contrary to the findings of some authors[7] who reported assessed pain levels by VAS less than or equal to five, being classified as mild to moderate. This fact may be associated with the profile of the women in this study who were between 25 and 30 years old and maintaining their active working life. The authors also relate the issue of individualities and how to cope with life, associated with the fact that pain is a subjective symptom full of meanings.[7]

Another triggering factor for pain is the moment of breastfeeding. According to research8, the act of the puerperal woman spending several hours sitting and in the same position to breastfeed the child is responsible for the appearance of neck pain, emphasizing that a good posture at this time can prevent this symptom. In agreement with the present study, which found more intense pain in those mothers who breastfed anywhere.

Because of this, it is noteworthy that although postural habits are not statistically significantly related to the level of pain in this study, some habits such as carrying the baby is a factor that generates great tensions, in addition to vicious postures and even changes in the mother, thus developing pain. A fact was already proven in the literature[9], which establishes the relationship between carrying the baby on the lap and the negative influence on the postpartum woman's posture.

Also, in this context, postural changes can be directly linked to compensations generated during pregnancy perpetuated in the puerperium. Associated with the maintenance of inappropriate postures for an extended period of the day, which was not routine before or during pregnancy. This behavior can then generate significant and uncomfortable postural changes in women.[8]

Given these results, it can be seen that the puerperal period is a phase of great challenges and changes. Caring for the baby becomes the main demand and can lead to the development of inappropriate habits that will interfere with the woman's bodily health, especially in the implementation of inappropriate postural habits and the presence of pain. Therefore, there is a need to establish studies in the area to deepen the theme and outline intervention strategies, as the literature is still scarce on the subject.

Conclusion

Although it was not possible to establish a significant relationship between the level of pain and postural deviations, it was possible to infer from this research that pain was a very prevalent aspect in the study, at moderate to severe levels and, in a way, it had a discrete relationship with some types of deviations, such as hyperlordosis, the head projected forward and alterations in the pelvis with predominance of anteversion.

It is noteworthy that of all the changes evaluated, lumbar hyperlordosis was the most prevalent change, which can be explained by the whole new routine of baby care and body adaptations during pregnancy.

Finally, the group of women who had some habits such as breastfeeding the baby anywhere and bending the trunk forward to pick up the baby; in addition to those in the late postpartum phase, they reported moderate to severe pain.

Authors' contributions

Freitas LSG participated in the conception, design, search, and statistical analysis of the research data. Rocha AAD participated in the interpretation of the results and writing of the scientific article. Silva JBF and Silva RGL participated in the survey data collection and data interpretation. Linhares WMR participated in the conception, design, statistical analysis of the research data. Costa EM, Linhares WMR, Rocha AAD, Silva JBF, and Silva RGL participated in interpreting results and writing. Silva JG participated in the orientation and approval of the final work.

Conflicts of interest

No financial, legal, or political conflicts involving third parties (government, companies, and private foundations, etc.) have been declared for any aspect of the submitted work (including, but not limited to grants and funding, advisory board participation, study design, preparation manuscript, statistical analysis, etc.).

References

1. Costa ESG, Pion MB, Costa, TS, Santos, RCA, Nóbrega AR, Sousa LB. Alterações fisiológicas na percepção de mulheres durante a gestação. Rev. Rene [Internet]. 2010;11(2):86-93. Available from: http://www.periodicos.ufc.br/rene/article/view/4531

2. Melo ACAM. Comparação do equilíbrio postural entre mulheres com e sem alteração do padrão de sono no segundo e terceiro trimestres gestacionais [dissertation] [Internet]. Natal: Universidade Federal do Rio Grande do Norte; 2017. Available from: https://repositorio.ufrn.br/jspui/handle/123456789/23577

3. Moreira LS, Andrade SRS, Soares V, Avelar IS, Amaral WN, Vieira MF. Changes of posture, equilibrium and low back pain during pregnancy. Femina [Internet]. 2011;39(5):241-4. Available from: http://files.bvs.br/upload/S/0100-7254/2011/v39n5/a2505.pdf

4. Martins RF, Silva PE, Luiz J. An exercise method for the treatment of lumbar and posterior pelvic pain in pregnancy. Rev. bras. ginecol. Obstet. 2005;27(5):275-82. https://doi.org/10.1590/S0100-72032005000500008

5. Beleza ACS, Carvalho GP. Physical-therapeutic action in the puerperium. Rev Hispeci & Lema [Internet]. 2009;1:1-6. Available from: https://www.unifafibe.com.br/revistasonline/arquivos/hispecielemaonline/sumario/12/19042010145924.pdf

6. Strapasson MR, Nedel MNB. Immediate puerperium: unveiling the meaning of maternity. Rev Gaúcha Enferm. 2010;31(3):521 https://doi.org/10.1590/S1983-14472010000300016

7. Galiotto RM, Meneghini GO. Pain assessment, musculoskeletal, postural and scarring of mothers after caesarean. Rev. Interdiscip. Ciênc. Méd [Internet]. 2017;1(2):57-65. Available from: http://revista.fcmmg.br/ojs/index.php/ricm/article/view/26/16

8. Falcão KPM, Carvalho ACF, Marques ACML, Vieira AG, Barros JD, Rolim RB. Prevalence of postural changes on puerperals before breastfeeding position. J Nurs UFPE on line [Internet]. 2015;9(11):9839-45. Available from: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/10776

9. Junqueira LD. Análise das curvaturas da coluna vertebral de mães em função do transporte de seus filhos [dissertation] [Internet]. São Paulo: Universidade de São Paulo; 2012. Available from: https://teses.usp.br/teses/disponiveis/47/47135/tde-05122012-145411/pt-br.php

10. Bim CR, Perego AL, Pires HJR. Physiotherapy in gynecology and obstetrics. Iniciação Científica Cesumar [Internet]. 2007;4(1):57-61. Available from: https://periodicos.unicesumar.edu.br/index.php/iccesumar/article/view/51/16

11. Silva LO, Alexandre MR, Cavalcante ACM, Arruda SPM, Sampaio RMM. Adequate versus inadequate weight gain and socioeconomic factors of pregnant women followed up in primary care. Rev Bras saúde mater infant. 2019;19(1):107-14. https://doi.org/10.1590/1806-93042019000100006

12. Lima SP, Santos EKA, Erdmann AL, Souza AIJ. Unveiling the lived experience meaning of being a woman breastfeeding with puerperal complications. Texto Contexto - enferm. 2018;27(1):e0880016. https://doi.org/10.1590/0104-07072018000880016