



ORIGINAL RESEARCH PAPER

Orthopaedics

PREVALENCE OF LOW BACK PAIN DURING PREGNANCY: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL.

KEY WORDS:

Dr Pankaj Mangotra

Postgraduate ,Department of Orthopedics GMC Jammu,Department of Orthopedics,GMC Jammu

Dr Shikha Choudhary*

Postgraduate ,Department of Obstetrics and Gynaecology GMC Jammu and Department of Orthopedics,GMC Jammu*Corresponding Author

Dr Sumitpal Singh

Lecturer,Department of Orthopedics,GMC Jammu

ABSTRACT

Objective:To assess the severity of low back pain (LBP) during pregnancy including prevalence, risk factors, impact on daily life and health management in a tertiary care hospital in Jammu. **Methods:** An anonymous, 30-question questionnaire was administered to pregnant women admitted to a tertiary care hospital and attending the OPD. A total of 500 surveys were returned between April 2022 and September 2022. **Results:** 325 (65%) respondents reported experiencing LBP during the current pregnancy. Gestational age did not affect incidence. Back pain during current pregnancy was predicted by age (younger women were more likely to experience it; LBP without pregnancy, during menstruation and during previous pregnancy. Most respondents reported that LBP during pregnancy caused sleep disturbances (52) .%) and worsened daily life (58%) Average pain was moderate Almost 32% of respondents stopped at least one daily activity because of pain and reported that the pain also prevented them from performing other routine activities. Only 40% of respondents who experienced LBP during pregnancy reported the problem to their prenatal care providers, and only 22% of prenatal care providers recommended treatment. **Conclusion:** Our study showed that LBP during menstruation predicts a high risk of LBP in the current pregnancy. The study showed that LBP during menstruation and previous LBP can be useful tests to rule out and resolve LBP during pregnancy.

Introduction

Low back pain (LBP) is a common health problem during pregnancy worldwide. The prevalence of low back pain during pregnancy varies from region to region; it varies between 2 and 90%. Moderate to severe injury associated with low back pain is often a complication of pregnancy. The negative impact of low back pain during pregnancy affects the quality of life and pregnancy-related satisfaction of mothers. A recent report shows that the duration of low back pain during pregnancy is directly correlated with absenteeism, physical dysfunction and poor performance. It is quite unfortunate that many pregnant women with lower back pain do not complain to their health care providers, while the complaints of those who do are often ignored. Therefore, it is imperative that antenatal nurses have good clinical skills to recognize and treat low back pain early in pregnancy to achieve a better outcome.

Pregnancy-related low back pain is any type of idiopathic pain that occurs during pregnancy between the lower edge of the 12th rib and the lower buttocks. The etiology is poorly understood, but it is often caused by mechanical, hormonal or multiple factors related to body changes during pregnancy. Risk factors for LBP during pregnancy vary in published reports, and there is no consensus on predisposing factors. However, chronic low back pain and LBP in previous pregnancy are the most commonly identified risk factors in published reports. The severity and incidence of LBP during pregnancy also varies between countries; in published reports, average pain intensity is 3.7 to 7 on the numerical rating scale (NRS). In addition, Gutke et al. an international study involving female populations in the United Kingdom (UK), the United States (US), Norway, and Sweden found that women in the United Kingdom reported the highest pain intensity and incidence of LBP during pregnancy, while women in the United States reported the highest prevalence of LBP despite being the least affected. Therefore, a good knowledge of LBP during pregnancy and its predisposing factors is important and can facilitate preventive strategies and tailored interventions for optimal treatment.

However, we have very little information about LBP during pregnancy. Therefore, the aim of this study was to determine the prevalence and risk factors of LBP during pregnancy in a tertiary care setting.

Methods

Study Setting and Design: This study was a cross-sectional survey study conducted on pregnant women admitted in the maternity ward or OPD of a maternity hospital in Jammu. The hospital is one of the largest teaching hospitals in the Jammu and Kashmir region.

Ethics approval: Written informed consent was obtained from the patient before administration of study materials.

Inclusion criteria: All clinically stable and consenting pregnant women admitted in labor ward or OPD.

Exclusion criteria: women who objected to informed consent.

Research instrument: a questionnaire created by the research team collected the personal data of the participants and the social habits of the participant and his wife (alcohol and tobacco consumption), history of domestic violence, presence/absence of domestic help and existing illnesses. LBP-related variables obtained included: presence/absence of pain by index pregnancy, gestational age (GA) at first pain episode during index pregnancy, pain severity (using a numerical rating scale (NRS), where 0 indicated no pain). and 10 highest pain intensities), factors exacerbating LBP, history of LBP during previous pregnancy, health-seeking behavior (complaint to doctor/nurse), and treatment of LBP. Obstetrical history data included: parity and pregnancy, history of previous spontaneous abortion (which occurred), dysmenorrhea, rate of pregnancy reserve, singleton/multiple pregnancy. Women with spinal or rheumatological diseases, previous vertebral fracture or surgery, previous significant lumbar magnetic resonance imaging (MRI), cognitive impairment and chronic pain syndrome.

Procedure: 500 consecutive and consenting pregnant women who met the inclusion criteria were included in the study from March 2022 to October 2022 in the maternity ward. They were interviewed on admission to the department or during their stay in the OPD using a questionnaire. Based on employment status, patients were classified as unemployed, employed, and students for analysis. Self-employed (farmers, artisans, traders, etc.), government and private employees are employed in this study.

Results

Low back pain: 500 consecutive and consenting women were recruited and interviewed for this study, of whom 325 (65%) reported experiencing LBP during the index pregnancy. Of the 325 women who reported LBP during the index pregnancy, the majority (27.8%) experienced LBP during their first pregnancy, while (2.13%) of them reported episodes of low back pain during a previous pregnancy. Of the 27.8% with a first episode of LBP in the index pregnancy, 19 (6%) and 254 (93%) were multiparous and primiparous, respectively. Of the 2 who had LBP in a previous pregnancy, 37 (89.5%) and 5 (10.5%) were multiparous and primiparous, respectively.

Pattern of low back pain: Out of 325 with low back pain during the index pregnancy, average pain intensity of NRS was 3 ± 1.36, and pain was mild, moderate and severe in 98 (30%), 205 (63.0%) and 21 (6.5%). Pain occurred in the first trimester (71, 2.2%), second trimester (127, 39.1%) and third trimester (189, 58.7%). Of the 325 who reported LBP during the index pregnancy, pain aggravating factors were position (120, 37%), heavy physical work (78, 23.9%), posture and strenuous work (97, 2.9%), while again missing aggravating circumstance. 117 (36.2%) of the respondents. 189 (58.7%) reported low back pain to the obstetrician, while 133 (1.3%) did not complain about it. Of the 189 patients who complained to a caregiver, 88 (6.9%) received reassuring words, 56 (32.1%) were treated with pain medication, and 5 (21%) reported that the caregiver ignored the LBP complaint.

Sociodemographic and obstetric characteristics of the population: Table 1 shows the statistical description of sociodemographic variables of the population that were considered for inclusion in the analysis. The mean age of the respondents was 29.33 ± 4.8 years. There was no significant difference in the mean age (29.23 ± 4.29 years) of the women with LBP and the mean age (29.38 ± 4.4.9 year) of the women that had no LBP (p=0.178]. The incidence of LBP was highest among the 26- 31-year-old group, unemployed women and women without formal education as also shown in Table 1. The incidence of low back pain during pregnancy was higher among the Multiparous women, in those with previous history of low back pain during pregnancy and index baby weight >4Kg as shown in Table 2. Table 3 shows domestic and lifestyle variables included in the analysis. Also, in Table 3, the incidence of LBP during pregnancy was higher in the absence of domestic help compared to the presence of domestic help during pregnancy.

Table 1 low back pain during pregnancy by sociodemographic characteristic of the participants

Demographic variables	Low back pain in pregnancy		Total (%)
	NO (%)	YES (%)	
Age (year)			
16-20	37 (66.7)	18 (33.3)	55 (11)
21-25	104 (75.0)	34 (25.0)	138 (27.6)
26-30	124 (66.9)	62 (33.1)	186 (37.2)
31-35	55 (74.7)	18 (25.3)	73 (14.6)
36-40	32 (73.2)	11 (26.8)	43 (8.6)
41-45	3 (60.0)	2 (40.0)	5 (1.0)

Religion			
Hindu	356 (71.3)	140 (28.7)	496 (99.2)
Muslims	2 (50.0)	2 (50.0)	4 (0.8)
Marital status	NO%	YES%	
Married	351 (71.3)	141 (28.7)	492 (98.5)
Single parent (Divorced/widow/unmarried)	4(57.1)	3 (42.9)	8 (1.5)
Educational status			
None	0 (0.0)	4 (100.0)	4 (0.8)
Primary	45 (77.2)	14 (22.8)	59 (11.9)
Secondary	138 (72.1)	54 (27.7)	192 (38.5)
Tertiary	170 (70.0)	74 (30.0)	244 (48.7)
Employment status			
Unemployed	48 (58.2)	35 (41.8)	83 (16.5)
Employed	248 (73.9)	92 (26.1)	340 (68.8)
Students	53 (72.9)	20 (27.1)	73 (14.6)

Table 2 low back pain in pregnancy by obstetrics characteristics

Obstetrics related variables	Low back pain in pregnancy		Total (%)
	NO (%)	YES (%)	
Parity			
Primipara	105 (62.5)	61 (34.0)	166 (33.3)
Multipara	243 (73.7)	91 (26.3)	334 (66.7)
Booking status			
Booked	259 (71.1)	106 (28.9)	365 (73.8)
Unbooked	95 (71.2)	40 (28.8)	135 (26.2)
History of spontaneous abortion			
Yes	42 (73.2)	16 (26.8)	58 (11.7)
No	309 (70.9)	133 (29.1)	442 (88.3)
History of dysmenorrhea			
Yes	13 (66.7)	6 (33.3)	19 (3.8)
No	347 (71.3)	134 (28.7)	481 (96.2)
Previous low back pain in pregnancy			
No	346 (73.9)	129 (26.1)	475 (95.4)
Yes	6 (13.6)	19 (84.4)	25 (4.6)
Multiple gestations index pregnancy			
Yes	1 (25.0)	3 (75.0)	4 (0.8)
No	352 (71.5)	144 (28.5)	496 (99.2)
Index baby birth weight(s) (Kg)			
<4	339 (73.3)	119 (26.7)	458 (91.6)
≥4	20 (47.5)	22 (52.5)	42 (8.4)

Table 3 low back pain by domestic and lifestyle characteristics

Domestic and life style variables	Low back pain in pregnancy		Total (%)
	NO (%)	YES (%)	
Domestic help			
Yes	201 (76.4)	64 (23.6)	265 (53.1)
No	152 (65.2)	83 (34.8)	235(46.9)
Alcohol consumption			
Husband	126 (72.2)	49 (22.3)	175 (34.9)
Wife	1 (100)	0 (0.0)	1 (0.2)

Both	1 (16.7)	5 (83.3)	6 (1.3)
None	216 (68.8)	102 (31.3)	318 (63.6)
Tobacco smoking/snuffing			
Husband	15 (68.2)	8 (31.8)	23 (4.6)
Wife	1 (100)	0 (0.0)	1 (0.2)
Both	--	--	--
None	337 (71.2)	139 (28.8)	476 (95.2)

	YES	NO
History of spinal or rheumatologic disorder, history of vertebral spine fracture or surgery, previous significant lumbar magnetic resonance imaging (MRI) finding, women with cognitive impairment, and chronic pain syndromes.	(15) 3%	(485) 97%

Risk factors for low back pain during pregnancy: in univariable analysis, employment status, parity, history of previous LBP in pregnancy, Index baby weight >4Kg weight, absence of domestic help and alcohol consumption were identified as factors associated with low back pain during pregnancy as shown in Table 4. The result of multivariable logistic regression analysis to determine the risk of each factor when adjusted to other factors was also summarized as shown in Table 4. In the multivariable analysis, previous history of LBP in pregnancy (aOR: 24.76, 95%CI. 6.88-89.11; p< 0.001), baby birth weight of >4kg (aOR: 4.15(2.05-8.42; p< 0.001) and absence of domestic help (aOR: 0.50 (0.31 - 0.82); p=0.006) were identified as independent risk factors for LBP during pregnancy. In Table 4, the odd of LBP in pregnancy was 28.8 times higher in a woman with a history of LBP in previous pregnancy compared to those without LBP in a previous pregnancy. Women carrying unborn macrocosmic baby were 4.2 times more likely to report LBP than those with normal fetal weight. Women that have no domestic help were more likely to report LBP than those that have domestic help.

Table 4 univariable and multivariable predictors of low back pain during pregnancy

Population characteristics	Univariable analysis	Multivariable analysis		
	OR (95% CI)	p Value	AOR (95% CI)	p Value
Age	0.962 (0.794 - 1.165)	0.692		
Religion	0.402 (0.056 - 2.885)	0.365		
Marital Status	0.536 (0.118 - 2.426)	0.418		
Educational status	0.748 (0.349 - 1.357)	0.691		
Employment status		0.103		0.115
Employed	1.632 (0.814-3.269)	0.167	1.999 (.937 - 4.227)	0.073
Student	0.938 (0.523-1.680)	0.829	1.159 (0.609 - 2.206)	0.653
Parity	0.758 (0.524 - 1.096)	0.141	0.731 (0.474 - 1.186)	0.215
Booking Status	1.005 (0.640 - 1.576)	0.984		

History of spontaneous abortion	0.889 (0.475 - 1.660)	0.714		
History of dysmenorrhea	1.242 (0.457 - 3.379)	0.671		
Previous LBP in pregnancy	17.936 (5.214 - 61.697)	0.001	24.758 (6.878 - 89.169)	<0.001
Multi gestation index pregnancy	0.886 (0.408 - 1.922)	0.759		
Index baby weight/s (Kg)	3.032 (1.574 - 5.842)	0.001	4.153 (2.049 - 8.417)	<0.001
Domestic Help	0.579 (0.388 - 0.863)	0.007	0.504 (0.309 - 0.824)	0.006
Alcohol consumption		0.028		0.062
Wife	0.648 (0.419 - 1.002)	0.051	0.635 (0.395-1.021)	0.061
Both	0.000 (0.000)	1.000	0.000 (0.000)	1.000
None	11.000 (1.268 - 095.448)	0.030	8.228 (0.840-80.607)	0.070
Tobacco smoking/snuffing	1.154 (0.460 - 2.890)	0.954		

OR: odd ratio; CI: confidence interval; AOR: adjusted odd ratio; Multi: multiple

Discussion

This study presents the global prevalence of low back pain during pregnancy [1-10]. This is close to the prevalence of 33.2% reported in Ethiopia, but quite different from the more than 50% frequency reported in Akure and Ilorin, Nigeria, Malawi, Iran, Turkey and the United States [2,,6-10]. The exact reason for the relatively low incidence of LBP during pregnancy in this study compared with most other published reports is not apparent. However, pain is subjective and sociocultural conditions influence, among other things, how a woman experiences and deals with lower back pain during pregnancy [17]. Pregnancy-related pain, such as LBP, and labor pain, as normal and expected, are common among the women in this study and are a plausible explanation for the relatively low prevalence of LBP observed [18].

The average pain intensity in this study is close to the one reported by Saxena et al. in India, but differs from Sencani et al. reported a lower mean pain intensity of 3.7. in Turkey and higher average pain intensity in 7 British women, reported by Gutke et al. [6,8]. The exact reason for the differences in mean pain intensity observed in this study compared with Turkish and British reports is not apparent. Reported pain intensity, however, reflects the subjectivity of pain and sociocultural conditions that influence treatment and perception of LBP during pregnancy. In this study, the occurrence of LBP mainly in the third trimester of pregnancy is similar to most published reports[9].

In this study, the percentage of women reporting LBP to an obstetrician compared to Gutke et al. according to an international study, this rate is 59% for American women, but differs from 66% for British women and 89% for Norwegian women [6]. Lower back pain during pregnancy is considered normal and expected in this situation; Indian women are less bothered and worried about this than British and Norwegian women. This may be a plausible explanation for the similarity and differences observed in rates of reporting LBP to

antenatal care providers. In this situation, approximately half of the patients who reported to the nurse received only reassuring words, and one in five were ignored. This suggests that some public health nurses also view LBP during pregnancy through the same sociocultural background as during normal pregnancy. If LBP-related pregnancy is not recognized and accepted as a problem, it is more likely to be neglected and untreated [6]. Therefore, it is important to look for LBP when evaluating pregnant women in the maternity clinic and to provide appropriate treatment to those affected. The etiology of LBP during pregnancy, although not yet fully understood, is usually due to changes in body load and mechanics that occur while carrying an unborn child and the effects of hormonal changes during pregnancy on the lower back musculoskeletal system and pelvis. [12,19]. Low back pain during pregnancy, like mechanical LBP in the general population, can recur or become chronic. Mogren IM showed the prevalence of recurrent or persistent LBP six months after birth in women with LBP during pregnancy, reporting a recurrence rate of 36.2% and persistent LBP in 6.9% of them [20]. This means that the risk of LBP in a subsequent pregnancy is very high if LBP occurred in a previous pregnancy, and is consistent with LBP in a previous pregnancy, which has been described as a common predisposition to LBP in pregnancy in most published reports. [8,12,1]. Thus, a history of LBP in a previous pregnancy, an independent risk factor in this study, confirms the findings of these previous reports.

In this study, the appearance of macrosomia as an independent risk factor for LBP during pregnancy is quite an interesting and unprecedented observation. Previously published reports have shown a strong correlation between macrosomia and maternal obesity and gestational weight gain [21,22]. Maternal weight gain such as high BMI during pregnancy is a risk factor for LBP during pregnancy [5,23]. Fetal weight and placenta influence maternal pregnancy weight gain. Perhaps this is the explanation why macrosomia is considered an independent risk factor for LBP during pregnancy.

In rural areas, pregnant women are often not relieved of heavy workloads and are expected to combine professional/field work with many domestic tasks [2]. Some of these household chores like sweeping, mopping, cleaning, fetching and carrying buckets of water, chopping and cooking with firewood, babysitting, etc. tend to strain the lower back, and changes in body weight and mechanics during pregnancy can easily precipitate and worsen LBP. There is no mechanism for sharing household tasks, and the cultural background of gender roles often overshadows such a need [2]. Thus, the role of the husband is shaped and limited by cultural practices, and housekeeping is seen as a degrading task for men [2]. As a result, a pregnant woman can rely on a domestic help service to fill the gap, and lacking domestic help, she has no choice but to take on the entire burden of domestic work. Thus, it is not surprising that lack of domestic help was identified as an independent risk factor for LBP during pregnancy in this study. This also confirms the correlation between LBP during pregnancy and lack of housekeeping reported by Sencan et al. in Turkey [8]. Although underrecognized, homelessness is a modifiable risk factor for LBP during pregnancy. This calls for an educational program that emphasizes on helping pregnant women with housekeeping as one of the preventive strategies for LBP-related pregnancy.

A limitation of this study is that it is a cross-sectional and single-center study Information.

REFERENCES

1. Malmqvist, S., Kjaeremann, I., Andersen, K., Økland, I., Brønnick, K., & Larsen, J. P. (2012). Prevalence of low back and pelvic pain during pregnancy in a Norwegian population. *Journal of manipulative and physiological therapeutics*, 35(4), 272–278. <https://doi.org/10.1016/j.jmpt.2012.04.004>
2. Mousavi, S. J., Parnianpour, M., & Vleeming, A. (2007). Pregnancy related

- pelvic girdle pain and low back pain in an Iranian population. *Spine*, 32(3), E100–E104. <https://doi.org/10.1097/01.brs.0000254123.26649.6e>
3. Gutke, A., Ostgaard, H. C., & Oberg, B. (2008). Predicting persistent pregnancy-related low back pain. *Spine*, 33(12), E386–E393. <https://doi.org/10.1097/BRS.0b013e31817331a4>
4. Gutke, A., Kjellby-Wendt, G., & Oberg, B. (2010). The inter-rater reliability of a standardised classification system for pregnancy-related lumbopelvic pain. *Manual therapy*, 15(1), 13–18. <https://doi.org/10.1016/j.math.2009.05.005>
5. O'Sullivan, P. B., & Beales, D. J. (2007). Diagnosis and classification of pelvic girdle pain disorders, Part 2: illustration of the utility of a classification system via case studies. *Manual therapy*, 12(2), e1–e12. <https://doi.org/10.1016/j.math.2007.03.003>
6. Bastiaansen, J. M., de Bie, R. A., Bastiaenen, C. H., Essed, G. G., & van den Brandt, P. A. (2005). A historical perspective on pregnancy-related low back and/or pelvic girdle pain. *European journal of obstetrics, gynecology, and reproductive biology*, 120(1), 3–14. <https://doi.org/10.1016/j.ejogrb.2004.11.021>
7. Noon, M. L., & Hoch, A. Z. (2012). Challenges of the pregnant athlete and low back pain. *Current sports medicine reports*, 11(1), 43–48. <https://doi.org/10.1249/JSR.0b013e31824330b6>
8. Matsuda, N., Kitagaki, K., Perrein, E., Tsuboi, Y., Ebina, A., Kondo, Y., Murata, S., Isa, T., Okumura, M., Kawaharada, R., Horibe, K., & Ono, R. (2020). Association Between Excessive Weight Gain During Pregnancy and Persistent Low Back and Pelvic Pain After Delivery. *Spine*, 45(5), 319–324. <https://doi.org/10.1097/BRS.00000000000003271>
9. Mogren I. M. (2006). BMI, pain and hyper-mobility are determinants of long-term outcome for women with low back pain and pelvic pain during pregnancy. *European spine journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, 15(7), 1093–1102. <https://doi.org/10.1007/s00586-005-0004-9>
10. Van De Pol, G., Van Brummelen, H. J., Bruinse, H. W., Heintz, A. P., & Van Der Vaart, C. H. (2007). Pregnancy-related pelvic girdle pain in the Netherlands. *Acta obstetrica et gynecologica Scandinavica*, 86(4), 416–422. <https://doi.org/10.1080/00016340601151683>
11. Bastiaenen, C. H., de Bie, R. A., & Essed, G. G. (2007). Pregnancy-related pelvic girdle pain. *Acta obstetrica et gynecologica Scandinavica*, 86(10), 1277–1279. <https://doi.org/10.1080/00016340701659163>
12. Kanakaris, N. K., Roberts, C. S., & Giannoudis, P. V. (2011). Pregnancy-related pelvic girdle pain: an update. *BMC medicine*, 9, 15. <https://doi.org/10.1186/1741-7015-9-15>
13. Hoy, D., Bain, C., Williams, G., March, L., Brooks, P., Blyth, F., Woolf, A., Vos, T., & Buchbinder, R. (2012). A systematic review of the global prevalence of low back pain. *Arthritis and rheumatism*, 64(6), 2028–2037. <https://doi.org/10.1002/art.34347>
14. Mogren, I. M., & Pohjanen, A. I. (2005). Low back pain and pelvic pain during pregnancy: prevalence and risk factors. *Spine*, 30(8), 983–991. <https://doi.org/10.1097/01.brs.0000158957.42198.8e>
15. Prasanna Chandiralingam, Sri Divya K. Low back pain in pregnancy: Prevalence among south Indian population. *Int J Orthop Sci* 2020;6(1):1027-1029. DOI: 10.22271/ortho.2020.v6.i1m.1953
16. Wu, W. H., Meijer, O. G., Uegaki, K., Mens, J. M., van Dieën, J. H., Wuisman, P. I., & Ostgaard, H. C. (2004). Pregnancy-related pelvic girdle pain (PPP), I: Terminology, clinical presentation, and prevalence. *European spine journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, 13(7), 575–589. <https://doi.org/10.1007/s00586-003-0615-y>
17. Vermani, E., Mittal, R., & Weeks, A. (2010). Pelvic girdle pain and low back pain in pregnancy: a review. *Pain practice : the official journal of World Institute of Pain*, 10(1), 60–71. <https://doi.org/10.1111/j.1533-2500.2009.00327.x>
18. Mühlemann, D., & Mühlemann, M. B. (2015). Rückenschmerzen in der Schwangerschaft: Diagnose, Behandlungsoptionen, Outcomes [Low Back Pain in Pregnancy: Diagnosis, Treatment Options and Outcomes]. *Praxis*, 104(11), 565–574. <https://doi.org/10.1024/1661-8157/a002014>
19. Weis, C. A., Pohlman, K., Draper, C., daSilva-Oolup, S., Stuber, K., & Hawk, C. (2020). Chiropractic Care for Adults With Pregnancy-Related Low Back, Pelvic Girdle Pain, or Combination Pain: A Systematic Review. *Journal of manipulative and physiological therapeutics*, 43(7), 714–731. <https://doi.org/10.1016/j.jmpt.2020.05.005>
20. Pennick, V., & Liddle, S. D. (2013). Interventions for preventing and treating pelvic and back pain in pregnancy. *The Cochrane database of systematic reviews*, (8), CD001139. <https://doi.org/10.1002/14651858.CD001139.pub3>
21. Liddle, S. D., & Pennick, V. (2015). Interventions for preventing and treating low-back and pelvic pain during pregnancy. *The Cochrane database of systematic reviews*, 2015(9), CD001139. <https://doi.org/10.1002/14651858.CD001139.pub4>
22. Mu, J., Furlan, A. D., Lam, W. Y., Hsu, M. Y., Ning, Z., & Lao, L. (2020). Acupuncture for chronic nonspecific low back pain. *The Cochrane database of systematic reviews*, 12(12), CD013814. <https://doi.org/10.1002/14651858.CD013814>
23. Bryndal, A., Glowinski, S., & Majchrzycki, M. (2022). Influence of Pregnancy on the Occurrence of Lumbar Spine Pain in Polish Women: A Retrospective Study. *Journal of personalized medicine*, 12(3), 357. <https://doi.org/10.3390/jpm12030357>