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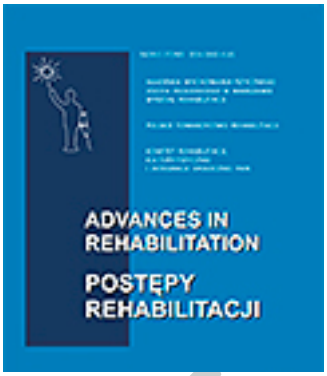

Original article

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Lumbopelvic pain problem in pregnant women

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Abstract
Abstract
Introduction: Lumbopelvic pain (LPP) is clinically diverse and difficult to treat medical problem. Changes during pregnancy and confinement conduce the appearance of pain complaints. LPP proper differential diagnosis and education constitute the basis of properly selected treatment. The aim of the study was to establish the LPP frequency in pregnant women. Additionally, the daily living activities limitations level was defined.
Materials and methods: 211 pregnant women took part in the study. The study was performed with the use of advanced online questionnaire. The research tool consisted of: original questionnaire, International Physical Activity Questionnaire – IPAQ (shortened Polish version) and Oswestry Disability Index (ODI)**.**
Results: On the basis of conducted studies, the LPP was diagnosed in majority (80.1%) of tested women. There were statistically significant correlations between the pain intensity and age ($p=0.023$, $r=-0.16$) and education ($p=0.013$, $r=-0.17$). It has been proven that there is a statistically significant correlation between the pain intensity, BMI ($p=0.002$, $r=0.22$) and physical activity level ($p=0.048$, $r=0.14$). It has been stated that 65.4% research subjects had no significant limitations in performing daily living activities.
Conclusions: The lumbopelvic pain applies to majority of pregnant women in the study. The risk of LPP increases with BMI growth. LPP occurs less frequently in women with higher education and in older ones. In majority of cases LPP does not cause limitations in daily living activities.

Keywords: lumbopelvic pain, physical activity, pregnancy

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Introduction

The lumbopelvic pain (LPP) divides into lumbar pain (LP), pelvic girdle pain (PGP) and mixed pain [1]. Each kind of the pain has got various and usually complex clinical picture. Lumbar pain is similar to the pain that is experienced by women who are not pregnant. It is usually located in the lumbar spine area, just above the sacrum. Prevertebral muscles tenderness is often associated with LP. Pelvic girdle pain, on the other hand, is described as deep, stabbing, one or both-sided, recurring or constant pain. It is usually located between posterior ridge of the iliac crest and gluteal sulcus. It may radiate towards femur, knee or crus [2]. Although differential diagnosis may cause a lot of problems, it is worth taking the challenge due to therapeutic benefits. Each kind of pain has got different cause and it requires different therapeutic practice [2-4]. Pregnancy is a huge challenge for woman's organism. Posture change, significant weight gain and changes in hormone balance occur at that time and they cause lumbopelvic pain. Center of gravity shifts few centimeters to the front and in order to balance it, the lumbar lordosis increases. Posture changes cause imbalance between pelvis and lumbar spine. Typical muscular disorders such as contracture of hip flexor and erector spinae with simultaneous weakness of abdominal muscles and hip extensors appear [5]. Pregnant women with gluteus medius weakness experience lumbopelvic pain six to eight times more often than in cases when gluteus medius is wrong enough [6]. On the other hand, overstretched piriformis muscle is usually responsible for piriformis syndrome that causes pain mainly in gluteal region [7]. Transversus abdominis muscle, which stretches and weakens during pregnancy, has got the highest influence on the stabilization of the lumbo-pelvic complex. Transversus abdominis muscle is responsible for intra-abdominal pressure elevation, fascia tension, sacroiliac joint and pubic symphysis compression [8].

Between 20th and 26th week of pregnancy, due to hormonal activity (relaxin and estrogens), relaxation of ligaments stabilizing sacroiliac joints and pubic symphysis appears. It causes much greater pelvic mobility. Pelvis positions itself in excessive anteversion. Additionally, weight gain and abdominal muscles stretching impair core stability and finally cause lumbopelvic pain [9, 10]. Contrary to popular belief, herniated nucleus pulpous with associated disc-radicular syndrome is rare during pregnancy (1 in 10000 cases)[5].

Most pregnant women believe that lumbopelvic pain is inevitable. Only 50% of women with LPP seek medical attention [11]. Education that includes information about risk factors, work ergonomics, relaxation techniques and pain relieving techniques, is an important factor in the therapy of people with LPP [12,13].

Physical activity is significant factor that alleviates the LPP and influences the course of pregnancy. Regular mild physical activity counteracts excessive weight gain, helps maintaining proper muscle tone and joint range of motion and it positively affects posture that changes during

pregnancy. Other benefits of physical activity include lower risk of swelling, varicose veins and it improves intestinal peristalsis. What is more, physically active women more often delivers by forces of nature and delivery duration is averagely shorter by 2-3 hours. Moreover, active pregnant women rarely experience premature birth, prolonged pregnancy or Caesarean section. All above benefits cause faster post-partum regeneration and relieve pain in lumbar spine area and pelvis [14, 15].

The main aim of this study was to evaluate the frequency of lumbopelvic pain in pregnant women and to identify LPP risk factors. Additional aim was to evaluate the level of functional activity impairment caused by lumbopelvic pain.

Materials and methods

The study was performed in May and June 2020. 211 women were enrolled in the study. Inclusion criteria included proper course of pregnancy and age between 18 and 45 years. Exclusion criteria included: scoliosis and Scheuermann's disease. For majority of women it was their first pregnancy (56.3%). The following table presents biometric data.

Tab. 1. Participants characteristics

Body composition	Descriptive statistics		
	n	Min.	Max.
Age [years]	211	17.00	40.00
Height [cm]	211	147.00	180.00
Body weight during pregnancy[kg]	211	44.00	134.00
Body weight before pregnancy [kg]	211	43.00	127.00
BMI during pregnancy [kg/m^2]	211	14.37	47.48
BMI before pregnancy [kg/m^2]	211	15.42	43.94
Week of pregnancy	211	4	40

N-number of observations; Min-minimum; Max-maximum

Due to epidemic situation the study was performed with the use of advanced online questionnaire. It was published on Internet groups for pregnant women and antenatal classes webpages. The questionnaire was anonymous and voluntary. The questions concerned age, education, character of work, course of pregnancy, pain. Additionally, women filled International Physical Activity Questionnaire – IPAQ (shortened Polish version) and Oswestry Disability Index (ODI).

Statistical analysis

The variables were analyzed with the use of Statistica 13.1 program produced by StatSoft company. Shapiro-Walk test verified concordance of distribution with normal distribution. Two-tailed test was used in the study. Variance homogeneity was evaluated with Levene'a test. Spearman's rank correlation coefficient was used to measure the relations between the variables. $P<0.05$ was established as the level of statistical significance.

Results

The analysis of lumbopelvic pain incidence among pregnant women showed that pain was experienced by 169 participants (80.1%) (Fig. 1).

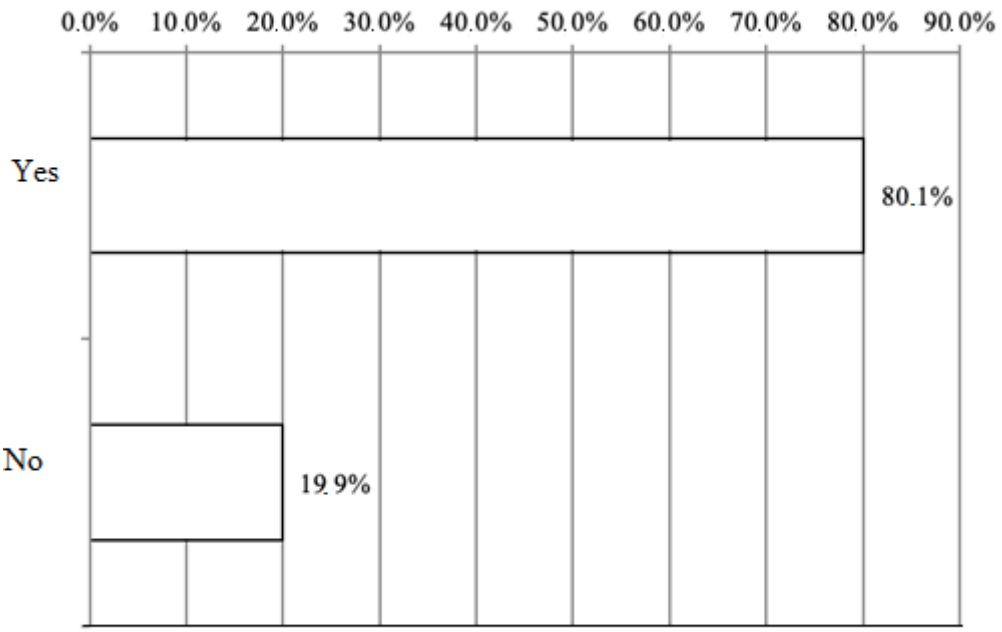

Fig. 1. Pain incidence among pregnant women

Regarding the type of pain, majority of women (141 participants - 67.8%) experienced pain in the lumbar spine area (Tab. 2).

Tab. 2. Type of pain

Type of pain experienced during pregnancy	n	%
Pain in the lumbar spine area	143	67.8%
Pain in the pelvic girdle area	117	55.5%
Lumbopelvic pain (mixed pain)	103	48.8%

n-number of observations; %-percentage

Analysis of data acquired with the use of VAS showed that moderate pain intensity was 4.11 points ±2.71 (Tab.3.).

Tab.3. Pain intensity during pregnancy

VAS pain scale	Descriptive statistics			
	n	$\bar{x}$	Min.	Max.
[0-10 pt.]	211	4.11	0.00	10.00

N-number of observations; Min-minimum; Max-maximum

Statistically significant negative correlations were demonstrated between pain intensity and participants' age (p=0.023, r=-0.16) and education (p=0.013, r=-0.17). It means that older women with better education experienced less pain. On the other hand, correlations between pain intensity and BMI (p=0.002, r=0.22) and physical activity level (p=0.048, r=0.14) were positive. It means that participants with higher BMI and who used higher energy expenditure on physical activity, experienced more pain (Tab. 4).

Tab. 4. Correlations between pain intensity and selected factors

Variables	r	*p*
Pain intensity versus pain	-0.16	0.023
Pain intensity versus age	-0.17	0.013
Pain intensity versus pregnancy duration	0.07	0.321

Pain intensity versus BMI during pregnancy	0.22	0.002
Pain intensity versus BMI before pregnancy	0.21	0.002
Pain intensity versus total IPAQ activity	0.14	0.048

r- Spearman's rank correlation coefficient *p*- probability value

Regarding data acquired from the Oswestry questionnaire, 65.4% of pregnant women had no significant limitations in daily living activities. Fig. 2 contains specific data concerning limitations in daily living activities.

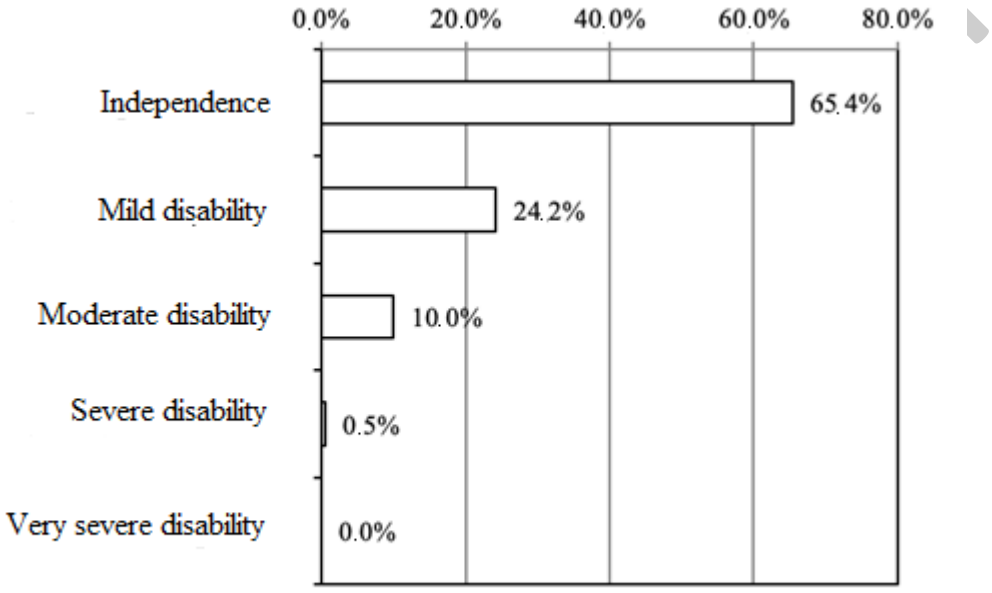

Fig. 2. Disability level of the participants

The greatest difficulties connected with spine and/or pelvic pain were experienced while standing (1.58 pt), sitting (1.53 pt) and lifting (1.07 pt) and travelling (1.03 pt). Specific data is presented in Tab. 5.

Tab. 5. Pain experience in various activities

		Descriptive statistics	
	n	Min.	Max.
Pain intensity	211	0.00	3.00
Everyday activities	211	0.00	3.00

Walking	211	0.00	2.00
Lifting	211	0.00	5.00
Sitting	211	0.00	4.00
Standing	211	0.00	4.00
Sleeping	211	0.00	5.00
Sex life	211	0.00	5.00
Social life	211	0.00	5.00
Travelling	211	0.00	6.00
Total [%]	211	0.00	70.00

N-number of observations; Min-minimum; Max-maximum

General level of physical activity among the majority of participants (69.7%) was assessed as moderate. Tab. 6 contains more information concerning general physical activity.

Tab.6. General level of physical activity

General physical activity	n	%
Low	27	12.8%
Moderate	147	69.7%
High	37	17.5%
Total	211	100.0%

n-number of observations; %-percentage

Discussion

Author's own research confirmed high frequency of lumbopelvic pain occurrence in pregnant women. 80.1% participants reported moderate intensity pain, VAS=4.11. Similar results were obtained by Östgaard and Andersson who claimed that pregnant women

experienced pain of 4.4 out of 10 [16]. Research performed by Pierre et al., showed that 71% of pregnant women experienced lumbopelvic pain intensity of VAS = 6.5. The authors observed PGP in 22%, LP in 11% and LPP in 33% of participants [13]. Starzec et al. compared 189 pregnant women with 36 women in controlled group. It was proven that LPP is significantly more frequent in pregnant women. Authors suggest that it is due to reducing daily living activities during pregnancy. Lumbopelvic pain was present in 65% of pregnant women. VAS pain intensity amounted to an average of 4.84 in case of LP and 4.87 in PGP [17].

According to many authors, high BMI is a predisposing factor for lumbopelvic pain occurrence [18-20]. This aspect was proven in the above study. Moreover, Morgen proved that higher BMI is a significant factor for lumbopelvic pain occurrence even after delivery [17].

According to European guidelines, physical exercises and relaxation show great importance in spine pain treatment [4, 19]. The above guidelines have not been proven in this study. Women who used higher energy expenditure on physical activity, experienced more pain. It can be explained by the fact that majority of active women had high BMI.

On the basis of performed test I deduce that more educated women experienced lumbopelvic pain less often. Similar findings were presented by Chang et al., who claimed that women with secondary or primary education reported higher pain intensity that women with higher education [20]. The results may have few possible explanations. Firstly, women with lower education level could have less knowledge about LPP prevention and treatment than women with higher education. Secondly, education level is bound to general socio-economic status, so women with lower level of education could have limited economic resources [22]. Thirdly, women with lower level of education had less support from third parties [23].

Negative correlation between lumbopelvic pain intensity and participants' age is an interesting problem that requires further research. It is difficult to logically explain this issue. It seems that similarly to the case of education level, younger people may have less knowledge about LPP prevention and treatment and it translates to higher pain intensity.

During the research, the participants reported problem with defining the pain. Although the questionnaire was accompanied with illustrations and descriptions, a lot of women had difficulties in qualifying their pain into one of the three groups: LP, PGP or LPP. The possible cause of these problems might have been low knowledge level of anatomy, palpation or pathomechanics. Simons claims that muscle dysfunctions are the most frequent cause of pain in lumbar spine and pelvis among pregnant women [5, 7]. During pregnancy, some muscles decrease and other increase in tone. Increased muscle tone leads to the development of oversensitive and palpable nodules, so called trigger points. They are painful under pressure

and cause pain radiating to various directions. According Simons, lumbar pain develops due to trigger points activation in the following muscles: gluteus minimus, multifidus, iliopsoas, musculus longissimus or rectus abdominis [7]. Due to the fact that the points are easy to palpate, they make proper diagnosis easier for the physiotherapist. People with no medical education may have difficulties in finding the trigger points and in diagnosis itself.

The number of clinicians who consider lumbopelvic pain as physiological and requiring no treatment is worrying [11, 24, 25]. Although, abdominal muscles and pelvic floor stretching during pregnancy and confinement is to some extent physiological, it always requires physiotherapist consultation. Neglecting the above changes impairs the stabilization of the spine and causes pain intensification. Oswerty Disability Index, which allows to measure the way spinal pain influences everyday life, showed that 24.2% participants got mild disability and 10% got moderate disability. Biernat et al. claim that filling the questionnaire individually may lead to overestimation. Moreover, the authors believe that a person conducting a survey with the use of ODI and IPAQ should be qualified in the field [26].

The research value. Conducted studies have got practical value. Obtained data shows the scale of the problem connected with lumbopelvic pain among pregnant women. It is of great importance that LPP specialists focus on risk factors. The research is also a motivation for preventive actions.

Limitations of the study. It is worth continuing the studies under physiotherapist supervision. Although the questionnaire had precise instructions, it was difficult for the participants to diversify the kinds of pain. Due to epidemic situation, it was impossible to conduct the study in direct contact conditions.

Conclusions

1. The lumbopelvic pain applies to majority of pregnant women in the study.
2. The risk of LPP increases with BMI growth.
3. LPP occurs less frequently in women with higher education and in older ones.
4. In majority of cases LPP does not cause limitations in daily living activities.

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