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N.B.: When citing this work, cite the original article.

Original Publication:

Louise Möller, Ann Josefsson, Marie Bladh, Caroline Lilliecreutz and Gunilla Sydsjö, Reproduction and mode of delivery in women with vaginismus or localised provoked vestibulodynia: a Swedish register-based study, 2015, British Journal of Obstetrics and Gynecology, (122), 3, 329-334.

<http://dx.doi.org/10.1111/1471-0528.12946>

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Postprint available at: Linköping University Electronic Press

<http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-115325>

Reproduction and mode of delivery in women with vaginismus or localised provoked vestibulodynia : a Swedish register-based study

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Running title: Reproduction in women with vaginismus

Word Count: 2 172

Abstract

Objective. To compare sociodemographics, parity and mode of delivery between women diagnosed with vaginismus or localised provoked vestibulodynia (LPV) to women without a diagnosis before first pregnancy.

Design. Retrospective, population-based register study.

Setting. Sweden.

Sample. All women born in Sweden 1973-1983 who gave birth for the first time or remained nulliparous during the years 2001-2009.

Methods. Nationally linked registries were used to identify the study population. Women diagnosed with vaginismus or LPV were compared to all other women. Odds ratios for parity and mode of delivery were calculated using multinominal regression analysis and logistic regression.

Main outcome measures. Parity and mode of delivery.

Results. Women with vaginismus/LPV were more likely to be unmarried ($P = 0.001$), unemployed ($P = 0.012$), have a higher educational level ($P < 0.001$), a lower body mass index ($P < 0.001$) and use nicotine during pregnancy ($P = 0.008$). They were less likely to give birth (adjusted odds ratio [OR] 0.61, 95% confidence interval [95% CI] 0.56–0.67). Women with vaginismus/LPV more often delivered by caesarean section ($P < 0.001$) especially for maternal request (adjusted OR 3.48, 95% CI 2.45–4.39). In women having vaginal delivery, those with vaginismus/LPV were more likely to suffer a perineal laceration (adjusted OR 1.87, 95% CI 1.56–2.25).

Conclusions. Women with vaginismus/LPV are less likely to give birth and those that do are more likely to deliver by caesarean section and have a caesarean section based upon maternal request. Those women delivering vaginally are more likely to suffer perineal laceration. These findings point to the importance of not only addressing sexual function in women with

vaginismus/LPV but reproductive function as well.

Keywords. Caesarean section, localised provoked vestibulodynia, reproduction, vaginismus.

Introduction

Dyspareunia, pain during vaginal intercourse, affects 8.6–13.0% of women of reproductive age (1). Localised provoked vestibulodynia (LPV) is one of the most common causes (2), often accompanied by vaginismus (3, 4). These conditions are difficult to separate, so dyspareunia and vaginismus are collapsed into one diagnostic entity in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition called genitopelvic pain/penetration disorder. Genitopelvic pain/ penetration disorder is defined as one or more of the following; persistent or recurrent difficulties with vaginal penetration, pain during vaginal intercourse, fear/anxiety about vulvovaginal pain during or in anticipation of vaginal penetration and/or marked tensing of the pelvic floor muscles during attempted vaginal penetration (5).

The aetiology is unknown and probably multifactorial. LPV has been associated with vaginal infections (6), polymorphisms in genes regulating the inflammatory response (7–9), a decreased pain-threshold (10), pain conditions such as irritable bowel syndrome and fibromyalgia (11), contradictory results regarding the use of oral contraceptives (12,13) as well as psychological and psychosexual factors (14,15). Vaginismus is currently viewed as a variable reflexive contraction of the pelvic floor muscles associated with phobic avoidance and anticipation of pain (16). Little is known about the afflicted women's reproduction, pregnancy and delivery outcome. Because of severe pain and/or vaginal spasm, these women might be unable to engage in vaginal intercourse and so suffer from infertility (17, 18). A register-based study in an Israeli hospital during the years 1988–2007 found an increased risk for delivery by caesarean section, vacuum extraction and the need to induce labour in women with vaginismus (19). A questionnaire-based case–control study in USA found a tendency towards an increased risk of delivery by caesarean section ($P = 0.07$) in women with vulvodynia (18).

The objective of this study with a large prospectively collected cohort from Swedish medical health registries was to investigate if reproductive patterns, mode of delivery and sociodemographic characteristics differ between women diagnosed with vaginismus or LPV before first completed pregnancy compared with women without a diagnosis. By access to nationwide registers, the study population comprises all women born in Sweden 1973–83 giving birth for the first time, if at all, during the years 2001–09.

Methods

From a cohort of all females born in 1973 to 1983, alive and still living in Sweden at 13 years of age ($n = 494\,692$), we extracted women giving birth for the first time or not at all during the years 2001–09 ($n = 454\,913$). The women were divided into two groups, one with women having been diagnosed with vaginismus and/or LPV between 2001 and 2009 ($n = 2554$, 0.6%), and the other with women without a diagnosis ($n = 445\,632$, 99.4%). Women diagnosed with vaginismus and/or LPV for the first time after pregnancy as well as women diagnosed with endometriosis, lichen sclerosus, lichen planus or lichen simplex chronicus ($n = 6727$, 1.5%) were excluded to avoid confounding. The final study population therefore comprised 448 186 women. Obstetric data, data on birth complications as well as sociodemographic data were collected. Body mass index (BMI) was divided into five categories (≤ 18.49 ; 18.5–24.99; 25.0–29.99; 30.0–34.99; ≥ 35 kg/m²). Employment was defined according to Statistics Sweden's definition as a yearly income $\geq 39\,700$ SEK in the year 2006. BMI and nicotine use during pregnancy was only available for women giving birth during the study period.

Data collection

In Sweden all residents have a unique personal identification number making it possible to

link data from different registers.

The Swedish Medical Birth Register (MBR) contains information on 98–99% of all pregnancies leading to parturition in Sweden since 1973 (20). Obstetric data, BMI and nicotine use during pregnancy were retrieved from this register.

The National Patient Register (NPR) has recorded public outpatient care since 2001 and public inpatient care since 1987 (21). The diagnoses are based on *The International Classification of Diseases* (ICD) (22). The ICD-10 has been used since 1997. ICD-10 codes used to identify diagnoses were: vaginismus, F52.5 and N94.2; LPV, N76.3; endometriosis, N80.0– N80.9 and N97.8D; lichen sclerosus, L90.0 and N90.4; lichen planus, L43.9; lichen simplex chronicus, L28.0; mode of delivery, O80–O84; and birth complications, O60–O75.

The Total Population Register (TPR) includes information on births, deaths, citizenship and marital status as well as migration and country of birth for Swedish residents born abroad(23).

The Causes of Death Register records information on all deceased persons registered in Sweden at the time of death since 1961 (24).

The Education Register records data on highest educational level (25). Educational level was defined as the highest level of education in 2006.

The Multi-Generation Register is part of the TPR that records kinship (26). By this we could identify the parents of our study population.

Statistics

Women with vaginismus/LPV were compared with controls (women without a diagnosis).

Univariate statistical differences were calculated using Pearson chi-square test. We estimated the risk of different modes of delivery by multinomial regression using vaginismus/LPV, sociodemographic characteristics as well as perineal lacerations as explanatory variables. The adjusted odds ratio (adj. OR) for childbirth was calculated by logistic regression using

working status, educational level and marital status as predictors. These covariates were chosen because they differed significantly between cases and controls. The risk of complications and birth injuries during labour and childbirth was calculated by logistic regression. Vaginismus/LPV, mode of delivery, macrosomia (birthweight >4000 g) and sociodemographic factors were set as predictors. These covariates were chosen because they possibly could independently impact the risk. The data were analysed using IBM SPSS version 20.0 (IBM SPSS Inc., Armonk, NY, USA). A P-value <0.05 was considered significant.

Results

In total, 2554 (0.6%) women had been diagnosed with vaginismus or LPV, of these 220 women had been diagnosed with both vaginismus and LPV. These women had lower BMI ($P < 0.001$), higher educational level ($P < 0.001$), were more often 24–29 years at first childbirth ($P = 0.040$), nicotine users ($P = 0.008$), unmarried ($P = 0.001$) and more often unemployed ($P = 0.012$; Table 1).

During the study period 225 778 (50.4%) of the women gave birth. Women with vaginismus/LPV were more often nulliparous (60.4 versus 49.6%; $P < 0.001$; Table 2). These findings remained after adjustments for educational level, working status and marital status (adj. OR 0.61, 95% CI 0.56–0.67; results not shown).

Childbirth by caesarean section as well as instrumental delivery were more common in women with vaginismus/ LPV (Table 2). Odds ratios showed a significantly increased risk for all deliveries except vaginal delivery and emergency caesarean section (Table 3). After adjusting for sociodemographic characteristics (age, marital status, BMI, educational level, working status and nicotine use) and birth injuries (perineal lacerations) the risk increased and was significant for elective caesarean section (adj. OR 1.42, 95% CI 1.10–1.84), caesarean

section on maternal request (adj. OR 3.48, 95% CI 2.45–4.94) and emergency caesarean section (adj. OR 1.38, 95% CI 1.10–1.75). The risk for instrumental delivery decreased and was non-significant (adj. OR 1.16, 95% CI 0.95–1.41; Table 3).

Women with vaginismus/LPV had an increased risk of perineal lacerations during vaginal delivery (adj. OR 1.87, 95% CI 1.56–2.25). No differences were found for other childbirth-related complications (preterm labour, failed induction of labour, abnormalities of forces of labour, long labour, obstructed labour due to maternal pelvic abnormality, other obstructed labour, intrapartum and postpartum haemorrhage, fetal distress, umbilical cord complications, other obstetric trauma, retained placenta or complications of anaesthesia). No difference was found in the use of pain-relieving methods (spinal, infiltrative and epidural anaesthesia; pethidine; paracervical and pudendal block) during labour and childbirth.

Discussion

Main findings

In this study we found that women with vaginismus/LPV are less likely to have children and those that do are at an increased risk of giving birth by caesarean section. This latter finding is in line with research by Goldsmith et al. (19) who also found vaginismus to be an independent risk factor for caesarean section. We found that women with vaginismus/LPV were more likely to undergo caesarean section based upon maternal request. In primiparous women requesting caesarean section the most common reason for requesting a caesarean section is fear of childbirth (27). Hence, the higher likelihood of nulliparity and the high rate of caesarean section for maternal request in women with vaginismus/LPV may indicate an increased fear of childbirth, possibly because of fear of pain and vulvovaginal trauma.

The risk of caesarean section was not limited to elective caesarean section. Emergency

caesarean section was also more likely for women with vaginismus/LPV despite the finding that these women had lower BMIs and were younger at first childbirth, which should decrease the risk of emergency caesarean section. The indications for emergency caesarean section did not appear to differ between groups, but available data are limited. It is possible that the observed higher rate of emergency caesarean section reflects difficulties in performing vaginal examination (19), resulting in an unplanned caesarean section.

Vaginismus/LPV was found to be a risk factor for perineal lacerations even after adjusting for mode of delivery, macrosomia (birthweight >4000 g) and sociodemographic variables. This has not been observed before. As Rosenbaum and Padoa (28) hypothesised that this may be caused by difficulties in relaxing the pelvic floor to allow for stretching during the second stage of labour. The inflammation observed in LPV might also make the tissue more fragile. This finding is important because women with vulvodynia have been shown to experience genital pain after perineal lacerations and episiotomy for longer than other women (18). Hence, one could argue that these women may benefit from a caesarean section to avoid vulvovaginal trauma in light of the higher risk of perineal laceration during vaginal delivery that we observed and the possible longer-term pain arising from such trauma (18). Furthermore, if the delivery is perceived as a fearful experience it could exacerbate the sexual dysfunction by adding more negative associations.

In line with other studies (6) women with vaginismus/LPV were less likely to give birth compared with women without a diagnosis even after adjusting for sociodemographic variables. We were unable to obtain data as to whether women with vaginismus/LPV wished to give birth or if they had conceived but miscarried or undergone abortion. It is therefore impossible to draw any conclusions regarding fertility desires in these women. Our results may merely reflect that these women wish to give birth to a lesser extent than other women. However, they appear to indicate that vaginismus and LPV independently predict the

likelihood of remaining nulliparous. Severe pain and/or vaginal spasm limit the ability to engage in vaginal intercourse, which naturally affects the possibility of becoming pregnant. A behavioural approach involving education, counselling and sensate focus techniques for affected couples as well as desensitisation of the vulva and vagina have been shown to be successful in resolving vaginismus and achieving pregnancy. Emphasis was put on the importance of including the partner in treatment because male partners can develop secondary erectile dysfunction (17). Surgical interventions (29) as well as multidisciplinary methods using desensitisation, counselling and education have been shown to be successful treatments for LPV (30).

Overall we found a lower prevalence of vaginismus/LPV than observed in earlier studies (31, 32). Since our results are based on diagnoses and earlier studies are primarily based on questionnaires this suggests there are a number of undiagnosed or misdiagnosed cases. It is possible that these women do not seek medical attention because sexual dysfunction is often perceived as embarrassing and difficult to discuss. Women with vaginismus/LPV differed from controls in sociodemographic characteristics; they had a tendency to be more educated, unmarried, unemployed, use nicotine and have a lower BMI. Other than a lower BMI, these differences have not been observed before; however, this is the first large epidemiological study in this area (6,12–14,18,33).

Strengths and limitations

This study was based on a nationwide sample enhancing the validity and generalisability of our findings. By excluding women who were diagnosed with vaginismus and LPV after first childbirth we avoided confounding by genital pain postpartum. We excluded women giving birth before 2001 because the data from outpatient care, where most women with vaginismus and LPV are treated and diagnosed, only became available from 2001 onwards. This limited our case numbers. In addition, we could not obtain any information regarding women's

fertility desires or previous fertility treatments, which would have helped interpretation of the reasons for an apparent increased likelihood of nulliparity.

Interpretation

Women with vaginismus/LPV have an increased risk of giving birth by caesarean section, to develop perineal lacerations during vaginal delivery and are more often nulliparous. To increase knowledge on fertility and fear of childbirth in women with LPV and vaginismus further prospective epidemiological studies including data on fertility treatments, abortions and fear of childbirth are needed.

Conclusion

Women with vaginismus/LPV require special attention in both gynaecological and obstetric practice. These women are more likely to remain nulliparous. Those that do give birth have an increased risk of delivery by caesarean section as well as requesting an elective caesarean section. Those delivering vaginally are more likely to suffer perineal lacerations. Whether women with vaginismus/LPV would benefit from treatment for possible fear of childbirth and be offered planned caesarean section remains to be investigated. Our findings point to the importance of not only addressing sexual function in such women but reproductive function also. In addition to treating the underlying complaint, women with vaginismus/LPV may need information on alternative methods to conceive such as self-insemination.

Disclosure of interest

The authors have no conflicts of interest to disclose.

Contribution to authorship

LM had the original idea for the study. GS, MB, AJ, CL and LM planned the study. LM and MB analysed the data and LM drafted the paper. All authors contributed to the interpretation of the data, revisions and gave input at all stages of the study. All authors have approved the

final version of the manuscript.

Details of ethics approval

This study was approved by the Human Research Ethics Committee, Faculty of Health Sciences, Linköping University #2011-246-31. 2008-08-10.

Funding

Financial support was received from Medical Research Council of Southeast Sweden.

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Table 1 Socio-demographic variables among women with vaginismus/LPV compared to controls (women without a diagnosis).

	Vaginismus/LPV n (%)	Controls n (%)	P-value
Marital status			0.001
Married	446 (17.6%)	80 745 (18.9%)	
Unmarried	2071 (81.8%)	341 575 (79.8%)	
Divorced/Widowed	16 (0.6%)	5912 (1.4%)	
Working status			0.012
Employed	2079 (82.1%)	359 348 (83.9%)	
Unemployed	454 (17.9%)	68 884 (16.1%)	
BMI kg/m²			<0.001
<18.49	30 (3.3%)	4486 (2.2%)	
18.5-24.99	678 (74.5%)	129 601 (64.8%)	
25.0-29.99	162 (17.8%)	45 473 (22.7%)	
30.0-34.99	31 (3.4%)	14 194 (7.1%)	
>35	9 (1.0%)	6386 (3.2%)	
Educational level			<0.001
Elementary	77 (3.0%)	26 613 (6.2%)	
High school	793 (31.3%)	174 611 (41.0%)	
University	1661 (65.6%)	224 649 (52.8%)	
Age at childbirth			0.040
17-23	85 (8.4%)	22 168 (9.9%)	
24-29	632 (62.5%)	131 812 (58.6%)	
30-36	295 (29.2%)	70 783 (31.5%)	
Nicotine use			0.008
Yes	418 (17.8%)	65 028 (15.8%)	
No	1935 (82.2%)	347 455 (84.2%)	
Parents country of birth			0.583
Both parents born in Scandinavia	2445 (96.2%)	424 462 (96.0%)	
One or both parents born outside of Scandinavia	97 (3.8%)	17 827 (4.0%)	

Table 2 Mode of delivery and parity among the study groups

	Vaginismus/LPV n (%)	Controls n (%)	P-value
Mode of delivery			<0.001
Vaginal	654 (64.6%)	160 252 (71.3%)	
Instrumental	138 (13.6%)	26 270 (11.7%)	
Emergency caesarean section	95 (9.4%)	19 622 (8.7%)	
Elective caesarean section	83 (8.2%)	14 802 (6.6%)	
Caesarean section on maternal request	40 (4.0%)	3387 (1.5%)	
Missing	2 (0.2%)	433 (0.2%)	
Parity			<0.001
Nulliparous	1542 (60.4%)	220 866 (49.6%)	
Parous	1012 (39.6%)	224 766 (50.4%)	

Table 3 Odds ratio (OR) and adjusted odds ratio (adj.OR*) for mode of delivery in women with vaginismus/LPV

Mode of delivery	OR	95% CI	Adj. OR*	95% CI
Instrumental delivery	1.28**	1.07-1.55	1.16	0.95-1.41
Emergency caesarean section	1.19	0.96-1.47	1.38**	1.10-1.75
Elective caesarean section	1.37**	1.09-1.72	1.42**	1.10-1.84
Caesarean section on maternal request	2.89**	1.10-3.99	3.48**	2.45-4.94

* Adjusted for age, nicotine use, BMI, marital status, working status, educational level and perineal laceration.

** p<0.05