

Pelvic organ support, symptoms and quality of life during pregnancy: a prospective study

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Abstract

Introduction and hypothesis Prevalence studies show an increase in lower urinary tract and pelvic floor symptoms during pregnancy. The aim of our prospective study was to evaluate changes in pelvic organ support, pelvic floor symptoms and their effect on quality of life (QOL) during the first pregnancy using validated measures. We hypothesised that pregnancy is associated with worsening of pelvic floor function.

Methods Objective assessment of pelvic organ support using the Pelvic Organ Prolapse Quantification (POP-Q) system and subjective evaluation of symptoms of pelvic floor disorders and related QOL with the electronic Personal Assessment Questionnaire-Pelvic Floor (ePAQ-PF) were performed in the second trimester and then repeated at 36 weeks gestation.

Results A total of 182 nulliparae attended the first visit at 20 weeks and 150 (82.4 %) women returned for follow-up at 36 weeks gestation. There were no significant changes in

POP-Q points or stage between the two visits except for a significant increase in genital hiatus ($p=0.0001$) and perineal body length ($p=0.0001$). The vaginal symptoms did not show any changes. Symptoms and bother with voiding difficulties and stress urinary incontinence increased during pregnancy. Constipation ($p=0.02$) and evacuation subdomains improved significantly ($p=0.009$). In the sexual domain, the only subdomain that worsened significantly ($p=0.03$) was “sex and vaginal symptoms”. None of the pelvic floor symptoms impacted the QOL.

Conclusions In our group of nulliparae, pelvic floor-related QOL and prolapse stage did not change significantly from the second to the third trimester of pregnancy.

Keywords Pelvic floor symptoms · Pelvic organ support · Pregnancy · Quality of life

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Introduction

Childbirth is an established risk factor for pelvic organ prolapse (POP) and pelvic floor symptoms [1, 2]. Most of the previous studies have concentrated on the impact of delivery on symptoms or the prediction of postpartum pelvic floor disorders [3–8]. Although these studies show a high prevalence of pelvic floor disorders during pregnancy, the contribution of pregnancy on its own has not been sufficiently evaluated. During pregnancy the urogenital system and pelvic floor itself undergo anatomical and physiological changes [9]. These changes result in an increase of pelvic floor disorders, such as urinary and faecal incontinence (UI, FI) [1, 6–8], vaginal and sexual problems [10–12]. As pelvic floor disorders adversely affect the quality of life (QOL) [13], these changes may subsequently influence the QOL in pregnant woman with symptoms. However, there is a paucity of good quality research regarding POP, symptoms and related QOL during pregnancy.

Prospective studies using validated tools to analyse changes in POP, pelvic floor symptoms and in QOL during pregnancy are lacking. Two prospective studies from the same research group analysed only objective changes in pelvic organ support and reported a significant increment in POP stage during pregnancy using the Pelvic Organ Prolapse Quantification (POP-Q) system [14, 15]. However, these studies recruited a small number of women who had repeated POP-Q examination. Concerning pelvic floor symptoms, only two prospective studies have previously reported on pelvic floor symptoms and QOL changes in pregnancy [16, 17]. One of them was restricted to the symptoms of overactive bladder (OAB), using the Incontinence Impact Questionnaire (IIQ) [16]. Another study analysed the changes in QOL in urinary and faecal domains using the Short Form IIQ-7 and Fecal Incontinence Quality of Life (FIQOL) scale in a heterogeneous sample of 23 nulliparous and 27 multiparous women [17].

We hypothesised that pregnancy is associated with worsening in pelvic organ support, symptoms of pelvic floor function and associated QOL. The aim of our study was to prospectively evaluate these changes and their effect on QOL in nulliparous women during the antenatal period using validated measures.

Methods

This longitudinal observational cohort study was conducted in Croydon (Mayday) University Hospital. Between April 2005 and July 2006 English-speaking nulliparous women over 18 years of age with an uncomplicated singleton pregnancy were invited to participate when they attended the second trimester ultrasound scan clinic. Women with multiple pregnancies, previous prolapse surgery, medical disorders including diabetes mellitus, inflammatory bowel disease and collagen disorders were excluded. Demographic data such as age, ethnicity and body mass index (BMI) were obtained from the electronic case notes (Protos Evolution 3.5)

The objective assessment of POP was performed in the left lateral position using the validated International Continence Society staging method (POP-Q) [18–20].

For the subjective assessment, the paper version 3 of the electronic Personal Assessment Questionnaire-Pelvic Floor (ePAQ-PF) was completed at each visit. This questionnaire has been tested for reliability, validity and sensitivity to measure pelvic floor symptoms and their impact on QOL [21]. This questionnaire provides symptom assessment in four domains: urinary, bowel, vaginal and sexual and for each domain the condition-specific QOL. The urinary domain includes questions concerning voiding, bladder pain and sensation, OAB and stress urinary incontinence (SUI). The bowel domain provides information on constipation,

irritable bowel symptoms, problems with FI and bowel evacuation. The vaginal domain includes questions on sensation (such as dryness, pain) and prolapse symptoms. The sexual domain provides the differentiation into sexual problems related to urinary, vaginal and bowel problems. Scores are transformed on a scale of 0 (best possible) to 100 (worst possible): “never”=score 0, “occasionally”=1, “most of the time”=2 and “all of the time”=3. The score for the domain is derived by adding the sum of the scores for each item and multiplying by a factor to create a scale of 0–100. The impact score for each item is derived from the question “How much of a problem is this for you?” and is presented on a 4-point scale: 0=not a problem, 1=a bit of a problem, 2=quite a problem and 3=a serious problem. The impact score for any domain is equal to the maximum reported bother for any single item within that domain.

After recruitment in the second trimester (baseline or visit 1), we assessed participants at 36 weeks antenatal (visit 2). Women were given an appointment via telephone or postal letters.

The average scores for the objective and subjective measurements were paired between assessments at baseline (22 weeks antenatal) and individually with measurements at 36 weeks, and compared with the Wilcoxon matched-pairs signed-rank test. Statistical significance was declared when the *p* value was less than 0.05. All statistical analyses were carried out using Stata 8.2 (StataCorp, College Station, TX, USA). Ethical approval was obtained from the London-Surrey Borders Research Ethics Committee (REC reference number: 05/Q0806/9) and all women gave written informed consent.

Results

The mean age of the cohort was 29.7 years (SD 5.6) and BMI was 26.6 (SD 4.5). The majority (59.1 %) were Caucasians. Twelve per cent (20/168) delivered before 36 weeks. At the baseline visit all 182 women completed the ePAQ and in 175 women (96.2 %) POP-Q was performed.

A total of 150 (82.4 %) women attended the 36-week visit, 147 (80.8 %) completed the questionnaire and 148 (81.3 %) had POP-Q performed; 5 women did not attend due to miscarriage, 25 women moved away and were lost to follow-up and 2 refused to participate.

There is a discrepancy in data for POP-Q and ePAQ at each time point as some women did not wish to have POP-Q and some did not fill in the questionnaire. Data from POP-Q assessments were available for 175 women at baseline (7 POP-Q not done) and 148 women at visit 2 (POP-Q not done in 2 women). Data from ePAQ assessments were available for all 182 women at baseline and 147 women at visit 2 (3 women did not complete the questionnaire).

In Table 1 we present the results of paired analysis of average scores in POP-Q and its components. The very low average scores in POP-Q at baseline confirms that this cohort is at low risk for POP. There were no significant changes in all POP-Q points or POP-Q stage between the two visits except for a significant increase in genital hiatus ($p<0.0001$) and perineal body length ($p=0.0001$).

The results of changes in average scores of paired analyses in components of all ePAQ domains are presented in Table 2.

Urinary symptoms

The baseline averages scores of the urinary domain were in the low range of scores (0–100 for urinary symptoms and 0–3 for “bother” with the symptoms). At the second visit, three symptoms had significantly worsened in scores: voiding difficulties ($p=0.0003$), stress incontinence ($p=0.0001$) and bother from stress incontinence scores ($p=0.001$).

Bowel symptoms

There were significant improvements in some bowel symptoms. The change in constipation score ($p=0.02$) and difficulty with bowel evacuation ($p=0.009$) score were statistically significant (Table 2).

Vaginal symptoms

There were no significant changes in vaginal domain scores (Table 2).

Sexual symptoms

In this domain, the sex and vaginal symptom score was significantly worse between baseline and second visit ($p=0.03$).

Summarising these findings, two domains (urinary and sexual) demonstrated worsening in some subdomains, one domain (bowel) showed improvement and one domain (vaginal) did not show any changes. None of the domain-specific QOL changes were significant.

Discussion

In this prospective study we found no changes in POP stage in the antenatal period between the second and third trimester. These findings are similar to other small studies from the same study group [14, 15]. However, they found a significant increase in POP-Q stage between the first and the third trimester. While we are unable to provide data from the first trimester, the low number of participants in these studies from the military job-related high activity population maintaining military standards during pregnancy could explain the differences to our study. The variance in our study population is also highlighted by the fact that none of the participants had a POP-Q stage of 0 in the first trimester in their study group compared to 48 % in our study group. The significant increase of the genital hiatus and perineal body in pregnancy is similar to their findings and this probably demonstrates a physiological preparation for childbirth. Although the reason for this increment has not been previously studied, one of the possible explanations could be the increase in the pelvic floor muscle strength [22, 23], which could be due to an increase in volume of the pelvic floor muscles.

In keeping with the objective assessment, we found no change in the vaginal domain, which includes sensation and prolapse symptoms. Contrary to our study, van Brummen et al. comparing the subscales of the Urogenital Distress Inventory (UDI) questionnaire between the first and the third trimester of pregnancy found a significant increase in the

Table 1 Changes in POP-Q between two visits

POP-Q	Baseline visit 22 weeks (range 18–25), $n=175$	Visit 2 36 weeks (range 31–39), $n=143$	Change in matched pairs, $n=143$	p value
Average POP-Q stage	0.61	0.61	0.05	0.44
Average Aa score	-2.66	-2.66	0.01	0.89
Average Ba score	-2.58	-2.52	0.07	0.23
Average Ap score	-2.89	-2.88	0.02	0.49
Average Bp score	-2.89	-2.86	0.03	0.28
Average C score	-7.38	-7.51	-0.01	0.46
Average D score	-9.79	-9.93	-0.08	0.22
Average tvl score	9.79	9.95	0.11	0.09
Average gh score	2.37	2.58	0.25	<0.0001
Average pb score	4.00	4.23	0.29	0.0001

Wilcoxon signed rank test
tvl total vaginal length, gh
genital hiatus, pb perineal body

Table 2 ePAQ-PF scores and changes from visit 1 to 2

ePAQ version 3 domains (summary of individual items) (total possible range)	Visit 1, median score (range), <i>n</i> =182	Visit 2, median score (range), change from baseline <i>p</i> value [147 matched pairs]
ePAQ-PF urinary domain		
Bladder pain and sensation (burning on micturition, bladder pain, pain relieved by micturition, reduced bladder sensation) (0–100)	0 (0–41.7)	0 (0–33.3), 0.23 [146]
Bother from bladder pain (0–3)	0 (0–3)	0 (0–2), 0.12 [146]
Voiding difficulties (difficult voiding, incomplete emptying, straining, reduced stream) (0–100)	0 (0–50)	8.3 (0–41.7), 0.003 [146]
Bother from voiding difficulties (0–3)	0 (0–2)	0 (0–2), 0.01 [146]
OAB symptoms (urgency, urgency incontinence) (0–100)	8.3 (0–75)	8.3 (0–41.7), 0.11 [147]
Bother from OAB symptoms (0–3)	0 (0–3)	0 (0–3), 0.69 [147]
SUI symptoms (sneeze/cough/exercise/movement incontinence) (0–100)	0 (0–40)	6.67 (0–66.7), 0.0001 [144]
Bother from SUI (0–3)	0 (0–3)	0 (0–3), 0.001 [147]
Urinary QOL (impact on physical, social activities and on enjoyment of life) (0–100)	0 (0–100)	0 (0–88.9), 0.07 [145]
ePAQ-PF bowel domain		
Irritable bowel symptoms (stool variability, loose motions, bloating) (0–100)	22.2 (0–66.7)	22.2 (0–55.6), 0.13 [145]
Constipation symptoms (stool frequency, consistency, laxative use) (0–100) (no impact domain)	11.1 (0–100)	11.1 (0–66.7), 0.02 [145]
Difficulty with bowel evacuation (straining, incomplete emptying, painful evacuation, laxative use, duration of defecation, urge without evacuation) (0–100)	16.7 (0–72.2)	11.1 (0–55.6), 0.009 [147]
Bother with bowel evacuation difficulties (0–3)	0 (0–3)	0 (0–3), 0.07 [147]
Faecal continence (faecal urgency, flatus and stool incontinence) (0–100)	9.52 (0–28.6)	9.52 (0–33.3), 0.15 [145]
Bother with faecal incontinence (0–3)	0 (0–2)	0 (0–3), 0.69 [145]
Bowel QOL (0–100)	0 (0–66.7)	0 (0–55.6), 0.13 [146]
ePAQ-PF vaginal domain		
Vaginal sensation (dryness, soreness, reduced sensation, dragging pain) (0–100)	0 (0–58.3)	8.33 (0–66.7), 0.21 [145]
Bother from changes in vaginal sensation (0–3)	0 (0–2)	0 (0–3), 0.59 [145]
Vaginal prolapse (vaginal laxity, awareness of lump) (0–100)	0 (0–33.3)	0 (0–33.3), 0.18 [145]
Bother with vaginal prolapse (range)	0 (0–2)	0 (0–3), 0.99 [145]
Vaginal QOL (0–100)	0 (0–44.4)	0 (0–77.8), 0.99 [146]
ePAQ-PF sexual domain		
Sex and urinary symptoms (urinary incontinence during sex, avoids sex due to bladder symptoms, bladder worries & sex, overall impact on sex) (0–100)	0 (0–40)	0 (0–46.7), 0.27 [138]
Sex and bowel symptoms (flatus and stool incontinence during sex, avoids sex due to bowel symptoms, bowel worries & sex, overall impact on sex) (0–100)	0 (0–38.9)	0 (0–11.1), 0.36 [137]
Sex and vaginal symptoms (pain and sex, avoids sex due to vaginal symptoms, vaginal worries & sex, overall impact on sex) (0–100)	0 (0–60)	6.67 (0–53.3), 0.03 [137]
Bother about sex and vaginal symptoms (0–3)	0 (0–2)	0 (0–3), 0.413 [139]
General sex problems (sexual problems and QOL, overall satisfaction with sex life) (0–100)	0 (0–50)	0 (0–66.7), 0.22 [133]

OAB overactive bladder, *SUI* stress urinary incontinence

prolapse subscale score. Nevertheless, the scores were low (with mean values of 2.1 in the first trimester and 3.8 in the third trimester out of a maximum of 100) and the authors concluded that these symptoms caused little bother [24].

Although we found an increment in SUI, voiding difficulty and its associated bother, these were probably not severe enough to affect QOL. It has been shown that the first sensation to void and the maximum bladder capacity decrease during pregnancy [25]. Thus, we were surprised to find that OAB symptoms were stable during the antenatal period. It is important to consider that we did not evaluate

the symptoms in the first trimester. van Brummen et al. have shown that the prevalence of wet OAB increases significantly in the third trimester compared to the first [16]. Unfortunately, the questionnaire we used is not designed to differentiate between wet and dry OAB.

Pregnancy is known to contribute to constipation [26]. This is the first study showing the possible improvement of this symptom throughout pregnancy, as we found a significant improvement in constipation and difficulties with bowel evacuation symptoms. This is in keeping with other studies although they used non-validated questionnaires [27, 28]. We did not

find an increase in FI symptoms, although a recent study has shown an increase in incidence from 5 % at 25.4 weeks of gestation to 10 % at 34.2 weeks [7]. The difference could be explained by the use of different questionnaires and the exclusion of FI prior to pregnancy in the mentioned study. Similar to a previous study [27], we found no changes in the irritable bowel domain. Bowel and gastrointestinal symptoms and their changes in pregnancy are still not well investigated probably due to the grey zone between internal medicine and obstetrics. Interdisciplinary research would help our understanding in this area of medicine.

Although sexual conflicts during pregnancy can cause serious disruptions in relationships [11] and studies have shown a reduction of sexual activity as pregnancy progresses [11, 29–31], there is a paucity of prospective studies evaluating the cause of female sexual dysfunction in pregnancy using validated questionnaires. There is a need for evidence-based studies to further the understanding of sexual function during pregnancy [12]. We found that although subdomains evaluating sexual problems due to bladder and bowel dysfunction did not change, the subdomain concerning sex and vaginal symptoms significantly worsened from the second to the third trimester. This is not surprising as the symptoms of bladder and bowel dysfunction did not impact the condition-specific QOL. Although the questionnaire we used cannot differentiate if the problems are mostly due to psychological problems such as fear, orgasmic function, pain or other possible reasons or give an indication of the type of dysfunction, i.e. orgasm, libido or arousal, we have shown an increase in sexual problems in pregnancy. Our study is in concordance with three other prospective studies evaluating sexual functions during pregnancy using the Female Sexual Function Index (FSFI) questionnaire [10, 11, 30]. Although having a small number of participants of diverse parity [10, 30] or comparing heterogeneous groups of adults and teenagers [11], these studies also concluded that the sexual function worsens during pregnancy and especially in the third trimester. The complexity of sexual function in pregnancy needs further evaluation.

Although pelvic floor disorders are widespread in pregnancy and have been shown to impact QOL in non-pregnant women [13], data concerning QOL changes of a pregnant woman are surprisingly sparse. Three studies evaluating the impact either of OAB symptoms using theIIQ [16] or UI using the King's Health Questionnaire (KHQ) [32, 33] report on QOL in the third trimester of pregnancy compared to postpartum changes. The only existing prospective antepartum study evaluating QOL recruited a heterogeneous group of 50 women, 23 of whom were nulliparous, and evaluated only UI and FI [17]. Our study has shown that none of the changes in all subdomains of pelvic floor disorders, including vaginal, urinary, bowel and sexual, were severe enough to make an impact on changes in QOL. These findings are in concordance with the previously mentioned study [17].

The strengths of our study lie in its prospective design in which we recruited nulliparous women. A search of MEDLINE (English language 1966–2011; search terms such as “pregnancy”, “pelvic floor symptoms”, “pelvic organ support or prolapse”, “prospective”, “quality of life”) revealed that this is the only longitudinal study in pregnancy evaluating the different aspects of pelvic floor changes using validated objective and subjective tools. This is also the first study analysing the condition-specific QOL in pregnancy for all aspects of pelvic floor dysfunction.

We acknowledge several limitations of our study. We used the paper version of the ePAQ, which has been validated in the electronic format, as when this study commenced there was no single questionnaire available to evaluate pelvic floor dysfunction. While we acknowledge that this may influence our results, the impact would be minimal as the ePAQ was developed from two paper-based validated instruments [34, 35]. We used this questionnaire as it covers most of the domains of pelvic floor disorders such as urinary, bowel, vaginal and sexual.

Another possible limitation is that recruitment commenced in the second trimester of pregnancy, so we are not able to provide the information about pre-pregnancy or the first trimester.

Conclusion

Pelvic organ support and symptoms related to QOL do not deteriorate between the second and the third trimester of pregnancy. These findings cast a very different light on previous assumptions and therefore provide useful new information for pregnant women and their caregivers.

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Conflicts of interest None.

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