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# Does home birth reduce the risk of pelvic organ prolapse?

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## ABSTRACT

**Objectives:** To determine the relationship between vaginal birth and the development of POP among women who delivered in non-hospital settings (home birth).

**Material and methods:** Data were collected retrospectively from the files of patients who presented to a hospital outpatient clinic between April 1, 2011 and April 1, 2012 with complaints of urinary incontinence, uterine sagging, vaginal mass, or vaginal pain. The patients' age, height, weight, body mass index, menopause age, number of deliveries, and presence of hypertension and diabetes mellitus were noted. Patients whose urogynecologic evaluation included POP Quantification (POP-Q) scoring were included in the study. The patients were separated into a group of women who had never given birth and another group of women with one or more deliveries.

**Results:** Of the 179 patients in the study, 28 had never given birth and 151 had given birth at least once. The nulliparous patients had no cystocele, rectocele, or uterine prolapse. The prevalence rates of cystocele, rectocele, and uterine prolapse were significantly higher in the multiparous group. Cystocele, rectocele, and uterine prolapse development were significantly correlated with number of deliveries, but there was no statistical association with age, body mass index, menopausal age, diabetes mellitus, or hypertension. univariate analysis reveals that the only factor effective in the development of cytocele, rectocele and prolapse is the number of births.

**Conclusions:** Our study suggests that only number of deliveries is associated with development of cystocele, rectocele, and uterine prolapse in women who gave birth by vaginal route in residential settings.

**Key words:** POP-Q, cystocele, rectocele, uterine prolapse, vaginal delivery, home birth

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## INTRODUCTION

Pelvic organ prolapse (POP) is the herniation of pelvic organs through the vaginal opening. Its prevalence is 3–11% [1]. Patients usually present with symptoms such as sensation of pressure or heaviness in the genital area or a mass protruding from the vagina [1, 2]. Number of births, advanced age, and obesity are well established risk factors for the development of POP [1–3]. The risk of POP increases in proportion with the number of deliveries [1–3]. Delivering babies with high birth weight, prolonged second stage of labor, and giving birth before age 25 are other possible risk factors for POP development [3, 4]. However, POP may also occur in women who have never given birth [5]. Other possible risk factors include history of hysterectomy, race, chronic constipation leading to increased intra-abdominal pressure, chronic obstructive lung disease and similar conditions, collagen tissue diseases, and family history of POP [6–9]. Diagnosis is made by pelvic examination. The Pelvic Organ Prolapse Quantification (POP-Q) system is the most commonly used tool to diagnose and stage POP.

For the first time in the literature, in this retrospective cohort study we determined the incidence of POP among women who gave birth by vaginal delivery in a residential setting, with no medication or medical intervention.

### Objectives

We aimed determine the relationship between vaginal birth and the development of POP among women who

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delivered in non-hospital settings (home birth). To our knowledge this is the first study to investigate the relationship between home births and POP development.

## MATERIAL AND METHODS

The medical records of postmenopausal patients who applied to the Altınözü State Hospital Gynecology and Obstetrics outpatient clinic between April 1, 2011 and April 1, 2012 with complaints such as urinary incontinence, uterine prolapse, palpable mass in vagina, or vaginal pain were screened. The patients' age, height, weight, body mass index, menopause age, number of deliveries, and presence of hypertension and diabetes mellitus were noted. Urogynecological examination data were also obtained from the patients' files. Patients whose urogynecological evaluation included POP-Q scoring were included in the study; those without POP-Q scoring were excluded. Patients with findings of uterine fibroids in ultrasonography were excluded. In addition, patients with history of hysterectomy, sacrohysteropexy, sacrocolpopexy, sacrospinous fixation, anterior and posterior colporraphy, and transobturator tape surgery were excluded from the study.

All patients included in the study had given birth by vaginal route in residential settings (home birth). The deliveries were made at home with attendants lacking adequate medical equipment. Labor started spontaneously and no medical treatment was applied at the beginning or at later stages. The second stage of labor also occurred spontaneously and no episiotomy, forceps or other tools were used. Data regarding the gestational week at delivery, birth weight, and second stage of labor were incomplete or unreliable.

The patients were grouped according to number of deliveries, with one group comprising women with no deliveries and another including women with one or more births. We aimed to analyze the effect of vaginal birth on POP development among women who had given birth in residential settings without medical treatment or invasive interventions.

### Statistical analysis

In evaluating the study findings, statistical analyses were made using IBM SPSS Statistics 22 (IBM SPSS, Turkey) software. The Shapiro-Wilks test was used to determine whether parameters conformed to a normal distribution. In addition to descriptive statistical methods (mean, standard deviation, frequency), one-way analysis of variance (ANOVA) was used to perform between-group comparisons of normally distributed parameters, and post-hoc Tukey's honest significant difference (HSD) test was used to determine which group differed. Between-group comparisons of parameters not having normal distribution was done using Kruskal-Wallis test and Mann-Whitney U test was used to identify the group that differed. Chi square test was used to compare qualitative data. Significance was assessed at $p < 0.05$ level.

## RESULTS

A total of 179 postmenopausal women were included in the study. The study was conducted in a rural area populated by people of Arab descent. The patients included in the study were of low socioeconomic levels, and a large proportion of them were illiterate. All of the patients who participated in the study were Muslims and in this area the use of contraceptive methods was limited due to religious beliefs. Until the 1980s, most births in this area took place in residential settings unattended by a doctor or a midwife; the ratio of hospital deliveries increased in later years due to closer pregnancy follow-up. However, vaginal deliveries still occur outside the hospital environment without the supervision of a midwife or doctor. In this region, births are attended by people who are referred to as midwives in the community but who have no medical qualifications. The patients' histories did not indicate the use of alcohol, smoking, or drugs.

The demographical features of the two groups are compared in Table 1. The average ages of the nulliparous and multiparous women were 64.8 ± 6.3 years and 67.7 ± 6.2 years, respectively. The majority of patients were admitted with the complaints of urinary incontinence (n: 96, 53.6%), pelvic organ prolapse, palpable mass in vagina, or vaginal pain (n: 60, 33.5%). There was no statistically significant difference between the two groups regarding average age, body mass index, presence of diabetes mellitus and hypertension, while mean menopausal age was significantly lower in the nulliparous group. The nulliparous patients exhibited no cystocele, rectocele, or uterine prolapse. Number of deliveries was significantly higher among patients with cystocele, rectocele, and uterine prolapse compared to those without.

Table 2 demonstrates the cystocele, rectocele and prolapses uteri rates among varied parity groups. Cystocele and rectocele have begun to be seen in patients with two or more deliveries however uterine prolapse have been seen in patients with 8 or more vaginal delivery.

Table 3–5 represents the demographic and statistical comparison of patients with and without prolapse uteri, cystocele and rectocele respectively. Number of deliveries was significantly higher among patients with cystocele, rectocele, and uterine prolapse compared to those without. However, cystocele, rectocele, and uterine prolapse were not statistically association with age, body mass index, menopausal age, diabetes mellitus, or hypertension. Furthermore, univariate analysis reveals that the only factor effective in the development of cytocele, rectocele and prolapse is the number of births (Tab. 6).

**Table 1. Characteristics of 179 women included in the study**

| Characteristic | Value |
|---|---|
| Age, (years) Median (min-max) | 66 (52–85) |
| BMI, kg/m$^2$ Median (min-max) | 29.3 (17.1–64.3) |
| Parity, Median (min-max)<br>Nullipar<br>1<br>2–3<br>4–5<br>6–7<br>8–9<br>10–11<br>12–13<br>> 14 | 9 (0–16)<br>28<br>—<br>3<br>16<br>22<br>37<br>54<br>9<br>10 |
| Diabetes, n % | 31 (17.3%) |
| Hypertension, n % | 62 (34.6%) |
| Cystocele, n %<br>1st degree<br>2nd<br>3th | <br>55 (30.7%)<br>38 (21.2%)<br>4 (2.2%) |
| Rectocele, n %<br>1st degree<br>2nd<br>3st | <br>21 (11.7%)<br>2 (1.1%)<br>1 (0.6%) |
| Prolapse, n %<br>1st degree<br>2nd<br>3th | <br>6 (3.4%)<br>2 (1.1%)<br>1 (0.6%) |

## DISCUSSION

Although the exact incidence of POP cannot be determined for various reasons, an average of 200,000 patients undergo surgery with a diagnosis of symptomatic POP each year in the USA [10, 11]. Proven risk factors for POP development include the number of deliveries, advanced age, and obesity [12–14]. High birth weight, prolonged second stage of labor, and giving birth for the first time before the age of 25 years are other important birth-related risk factors [15]. In a prospective study in which 17,000 women were followed for 17 years, the number of patients presenting to hospitals for POP was 4 times higher among women after their first birth compared to nulliparous women, 8 times higher after a second birth, and continued to increase to a lesser extent after subsequent births [14]. Moalia et al. reported detecting statistically significant relationships between POP development and giving birth at early ages, high body mass index, history of prior surgery, and the use of forceps during delivery [15].

Advanced age, race, and ethnicity are also major factors in POP development. Epidemiological studies have shown that African-Americans have a lower incidence of POP and that the incidence of POP increases with age [16, 17]. A study including 1,004 women aged 18–83 demonstrated a strong

**Table 2. Cystocele rectocel and prolapse rates according to parity groups**

| Number of parity | N | Cystocel, n (%) | Rectocel, n (%) | Prolapsus, n (%) |
|---|---|---|---|---|
| Nullipar | 28 | 0 | 0 | 0 |
| 1 | — | | | |
| 2–3 | 3 | 1 (33.3%) | 0 | 0 |
| 4–5 | 16 | 6 (37.5%) | 1 (6.2%) | 0 |
| 6–7 | 22 | 14 (63.6%) | 3 (13.6%) | 0 |
| 8–9 | 37 | 16 (43.2%) | 6 (16.2%) | 2 (5.4%) |
| 10–11 | 54 | 39 (72.2%) | 10 (18.5%) | 5 (9.2%) |
| 12–13 | 9 | 6 (66.6%) | 3 (33.3%) | 0 |
| > 13 | 10 | 5 (50.0%) | 1 (10.0%) | 2 (20.0%) |

**Table 3. Demographic and statistical comparison of patients with and without prolapse**

| | Prolapse | | P value |
|---|---|---|---|
| | No (n = 170) | Yes (n = 9) | |
| Age (years), mean ± SD | 67.3 ± 6.4 | 65.8 ± 4.7 | 0.493 |
| BMI | 30.2 ± 6.3 | 29.5 ± 64.9 | 0.728 |
| Menopause age | 16.8 ± 8.2 | 16.0 ± 5.1 | 0.768 |
| Number of births | 7.4 ± 4.1 | 11.3 ± 7.5 | **0.005** |
| Diabetes | 31 (17.3%) | 0 | 0.362 |
| HT | 60 (33.5%) | 2 (22.2%) | 0.721 |

**Table 4. Demographic and statistical comparison of patients with and without cystocele**

| | Cystocele | | P value |
|---|---|---|---|
| | No (n = 82) | Yes (n = 97) | |
| Age (years), mean ± SD | 67.0 ± 6.2 | 65.5 ± 6.4 | 0.611 |
| BMI | 30.8 ± 7.2 | 29.7 ± 5.2 | 0.220 |
| Menopause age | 15.6 ± 8.8 | 17.7 ± 7.3 | 0.085 |
| Number of births | 5.5 ± 4.7 | 9.3 ± 2.5 | **0.000** |
| Diabetes | 18 (21.9%) | 13 (13.4%) | 0.166 |
| HT | 33 (40.2%) | 29 (29.9%) | 0.159 |

**Table 5. Demographic and statistical comparison of patients with and without rectocele**

| | Rectocele | | P value |
|---|---|---|---|
| | No (n = 155) | Yes (n = 24) | |
| Age (years), mean±SD | 67.0 ± 6.4 | 68.7 ± 6.0 | 0.236 |
| BMI | 29.9 ± 6.1 | 31.8 ± 7.1 | 0.169 |
| Menopause age | 16.5 ± 8.3 | 18.3 ± 6.4 | 0.303 |
| Number of births | 7.2 ± 4.2 | 9.6 ± 2.5 | **0.008** |
| Diabetes | 22 (14.2%) | 2 (8.3%) | 0.261 |
| HT | 17 (10.9%) | 7 (29.1%) | 0.648 |

**Table 6. Univariate analysis**

| | Cystocele | | | Rectocele | | | Prolapse | | |
|---|---|---|---|---|---|---|---|---|---|
| | 95% CI | OR | P | 95% CI | OR | P | 95% CI | OR | P |
| Age | 0.96–1.06 | 1.01 | 0.609 | 0.97–1.11 | 1.04 | 0.230 | 0.85–1.07 | 0.96 | 0.492 |
| BMI | 0.92–1.01 | 0.97 | 0.223 | 0.98–1.11 | 1.04 | 0.174 | 0.87–1.09 | 0.98 | 0.726 |
| Menopause age | 0.99–1.07 | 1.03 | 0.087 | 0.97–1.08 | 1.02 | 0.302 | 0.90–1.07 | 0.98 | 0.766 |
| Number of births | 1.18–1.43 | 1.30 | **0.000** | 1.04–1.35 | 1.18 | **0.011** | 1.10–1.86 | 1.43 | **0.006** |
| Diabetes | 0.83–3.98 | 1.81 | 0.135 | 0.56–11.3 | 2.53 | 0.226 | 0.00 — NS | NS | 0.998 |
| HT | 0.85–2.93 | 1.57 | 0.148 | 0.52–3.41 | 1.33 | 0.546 | 0.38–9.48 | 1.90 | 0.429 |

correlation between POP and age, Hispanic race, high body mass index, and high birth weight. The same study also showed that the risk of developing prolapse increased by 40% with every 10 years of age [18]. Previous studies indicate that overweight (BMI 25–30 kg/m$^2$) and obese (BMI over 30 kg/m$^2$) patients had significantly higher risk of POP compared to patients at normal weight. In a meta-analysis of 22 studies, it was reported that the risk of POP increased by 40% and 50% respectively for overweight and obese patients compared to those at normal weight [19].

However, POP development in patients who give birth at home has never been specifically analyzed in the literature. In our study, number of deliveries was the only factor found to be statistically significant in patients who developed POP. There were no statistically significant differences in BMI, age, or menopause age between patients with and without POP. Our study indicates that the most important factor for POP development in patients delivering by home birth is the number of deliveries, which is consistent with the literature. Although home birth does not reduce the probability of POP development our study shows that POP development occurs especially at births of 8 and over, not in lower births. This is the situation that is contrary to the knowledge base of literature and should be explained by the fact that medical and/or surgical interventions were not carried out during delivery.

One of the main limitations of our study is that it was retrospective. Another limitation is that we did not have enough information about births because they were made out of the register in an out-of-hospital setting. For this reason there were no records concerning birth weights and the second stage of labor. However, this is the first study

to investigate the relationship between home births and POP development.

In conclusion, vaginal delivery is the only risk factor in POP development. Home birth does not reduce the risk of POP development. However, prospective randomized controlled studies are needed to further elucidate the relation between home birth and POP development.

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