

## Original Article

## THE STATUS OF PELVIC SUPPORTING ORGANS IN A POPULATION OF IRANIAN WOMEN 18 – 68 YEARS OF AGE AND POSSIBLE RELATED FACTORS

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**Background/Objective:** The status of pelvic supporting organs and possible related factors in a population of Iranian women, 18 – 68 years of age, were studied in primary health care centers.

**Methods:** In this cross-sectional study, 3,730 women were visited in three primary health care centers. The status of their pelvic supporting organs was measured according to the pelvic organ prolapse quantification system. Stages of prolapse were evaluated for trends in terms of various variables, using the Pearson  $\chi^2$  statistical test. Demographic and obstetric factors were tested for potential confounding variables with logistic regression analysis.

**Results:** The mean age was 36 (range: 18 – 68) years. The overall distribution of pelvic organ prolapse was as follows: stage 0, 47%; stage 1, 23.1%; stage 2, 18.3%; and stage 3, 11.6%. Based on logistic regression analysis, age  $\geq 50$  years, menopause, gravidity  $>3$ , parity  $>3$ , number of vaginal deliveries  $>3$ , history of operative delivery, history of vaginal delivery without episiotomy, and home delivery were found to be independent risk factors for development of pelvic organ prolapse.

**Conclusion:** The overall rate of prolapse was 53%, with most subjects having stage 1 or 2. Several factors influence development of pelvic organ prolapse.

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**Keywords:** Pelvic organ prolapse • quantification system • risk factors

### Introduction

Pelvic organ prolapse is common worldwide. A Swedish study showed a prevalence of 30.8% among women aged 20 – 59 years.<sup>1</sup> In Pakistan, 19.1% of young women aged 30 years reported some symptoms of prolapse.<sup>2</sup>

To date, two studies have described the degree and stage of pelvic organ prolapse in general female population.<sup>3, 4</sup> Both have used the pelvic organ prolapse quantification (pop-Q) system to

determine the distribution of pelvic organ support stages. International Continence Society proposed the pop-Q system in 1995.<sup>5</sup> The pop-Q system uses six distinct reference points on anterior, superior, and posterior vagina. These are all defined in relation to hymen—a precise anatomical landmark. This system has been found to have a high intra- and interobserver reliability, irrespective of experience in urogynecology referral practice. This descriptive technique is well-accepted by the International Continence Society, the American Urogynecology Society, and the Society of Gynecologic Surgeons.<sup>5-6</sup>

The purpose of this study was to determine the degree of pelvic supporting organs in a population considered to represent typical patients visited in primary health care clinics. This study was performed in an attempt to establish normative data on stages of pelvic supporting organs and to evaluate the possible risk factors.

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## Patients and Methods

The study population consisted of 3,730 women, aged  $\geq 18$  years, who were visited at any of the three primary health care clinics. Women were regularly invited for routine gynecologic examination every three years, unless they have had a cervical smear taken during the past year. Women were informed of contraceptive and sterilization methods, preconception counseling, prenatal and parturition care, breast cancer and breast self-examination, menopausal counseling, and hormone replacement therapy.

Women scheduled for routine health examination during 2000 – 2002 were invited to participate in our study. Of 7,250 women, 4,630 fulfilled the inclusion criteria of whom, 3,730 (80.6%) responded to the questionnaire. Pregnant women or those within six weeks postpartum were not recruited.

One physician, who was blinded to the women's parity and history of vaginal delivery, examined the entire group of 3,730 women. Subjects underwent the pop-Q system examination in dorsal lithotomy position. All points, except the total vaginal length, were recorded with the subject performing maximal Valsalva effort. The measurements were taken with a wooden spatula marked at 1-cm intervals according to the pop-Q system technique.

Subjects were then assigned a pop-Q system stage defined as follows: stage 0, showing no prolapse being demonstrated; stage 1, the most distal portion of prolapse  $> 1$  cm above the hymen; stage 2, the most distal portion of prolapse  $\leq 1$  cm proximal or distal to the plane of the hymen; stage 3, the most distal portion of prolapse  $> 1$  cm below the plane of the hymen but protrudes no further than 2 cm less than the total vaginal length; and stage 4, eversion of total lower genital tract being essentially complete.

Age, gravidity, parity, number of vaginal deliveries, history of abortions and cesarean sections, history of operative delivery, vaginal delivery with or without episiotomy, weight of the largest infant delivered vaginally, and menopausal status were also recorded by three midwives in the

three different areas.

Pearson  $\chi^2$  statistical test was used to determine the relationship between the stage and other variables. To investigate these relationships and to determine the independent risk factors of prolapse, logistic regression models were used. For the purpose of the models, prolapse was considered to be present, if any prolapse was identified, and was otherwise considered absent.

Explanatory variables, identified to be important from the descriptive analysis, were included in the regression models. Variables that did not appear to be clinically or statistically significant were later removed. Odds ratio (OR) was calculated with the use of the maximum likelihood parameter estimates obtained from the regression models. ORs were adjusted for the effect of all other explanatory variables in the model. Probability values for the ORs were derived from the Wald  $\chi^2$  significance test, based on the asymptomatic distribution of the parameter estimates. The overall significance of the categorical variables, with  $\geq 3$  levels, was assessed by the likelihood ratio test.

A *P* value of  $< 0.05$  was considered statistically significant. SPSS™ 10 software for Windows® was used for data analyses.

## Results

A total of 3,730 women were examined between October 2000 and December 2002 in three health care centers. The mean age of women was 36 (range: 18 – 68) years. Overall, the prevalence of the pop-Q system stages was as follows: stage 0, 47%; stage 1, 23.1%; stage 2, 18.3%; and stage 3, 11.6% (Table 1). There was a significant escalating trend towards the pop-Q system stage, as the age increased ( $P < 0.0001$ ).

Tables 2 and 3 show the effect of parity and the number of vaginal deliveries on the degree of prolapse. All these variables, likewise, showed a statistically significant trend towards an increased pop-Q system stage, as a result of increasing parity and the number of vaginal deliveries ( $P < 0.0001$ ).

History of vaginal delivery without episiotomy,

**Table 1.** Relative frequency of pop-Q system stage in each age group.

Age (years)	Pop-Q system stage			
	0	1	2	3
18 – 29 ( <i>n</i> = 1030)	72.8%	21.3%	5.9%	0
30 – 39 ( <i>n</i> = 1330)	46.6%	27%	15%	11.2%
40 – 49 ( <i>n</i> = 800)	33.7%	29.2%	25%	20%
$\geq 50$ ( <i>n</i> = 570)	17.6%	33.9%	26.7%	21.4%

$P < 0.0001$ .

**Table 2.** Relative frequency of pop-Q system stage according to the number of parities.

Parity (yr)	Stage 0	Stage 1	Stage 2	Stage 3
0 ( <i>n</i> = 340)	94.1%	5.9%	0	0
1-3 ( <i>n</i> = 2410)	52.6%	19.7%	15.3%	6.2%
>3 ( <i>n</i> = 980)	16.4%	22.6%	31.9%	28.8%

*P* < 0.0001.

operative delivery, and home delivery were analyzed; all of these variables showed statistically significant trends (*P* < 0.001).

Table 4 demonstrates the effect of vaginal delivery of an infant with normal weight, compared to a macrosomic infant (>4000 g), on the pop-Q system stage, which was statistically significant (*P* < 0.0001).

The effect of menopausal status on the pop-Q system stage was also statistically significant (*P* < 0.001), with postmenopausal subjects having higher pop-Q system stages.

Number of cesarean sections and abortions of the subjects were also analyzed which revealed those with higher episodes of abortions had higher pop-Q system stages (*P* < 0.002).

There was correlation between the age and

of women studied had degrees of prolapse, and that 11.6% of all women had a prolapse that reached the introitus when straining. The mild form of prolapse was a frequent finding.

To date, only two studies have described the degree of pelvic organ prolapse in general female populations. Steven and Swift used the pop-Q system to determine the distribution of pelvic organ support stages in women seen at outpatient gynecology clinics for routine gynecology health care.<sup>3</sup> In their study, the overall distribution of pop-Q system stages was: stage 0, 6.4%; stage 1, 43.3%; stage 2, 47.7%; and stage 3, 2.6%, without any cases with stage 4 disease. Bland et al reported the stage of prolapse at the time of initial examination and after one year in 241 women, aged between 45 to 55 years, who were registered

**Table 3.** Relative frequency of pop-Q system stage according to number of vaginal deliveries.

Vaginal delivery	Stage 0	Stage 1	Stage 2	Stage 3
0 ( <i>n</i> = 1030)	84.4%	13.5%	1.9%	0
1 - 3 ( <i>n</i> = 1340)	44%	22.3%	22.3%	11.1%
>3 ( <i>n</i> = 760)	16%	29.6%	36%	25.3%

*P* < 0.0001.

gravidity (*r* = 0.59, *P* < 0.001), parity (*r* = 0.60, *P* < 0.001), number of abortions (*r* = 0.20, *P* < 0.001), and menopausal status (*r* = -0.55, *P* < 0.001).

Multiple logistic regression analysis showed that the increased risk of pop-Q system stage was associated with an age ≥50 (OR = 4.46); parity >3 (OR = 3.02); gravidity >3 (OR = 2.45); number of vaginal deliveries >3 (OR = 5.90); history of vaginal delivery without episiotomy (OR = 2.91); history of operative delivery (OR = 2.41); and the menopause status (OR = 5.3) (Table 5).

## Discussion

The study population is considered to be representative of the female Iranian population aged between 18 - 68 years, typically visited in the primary health care centers. It was found that 53%

for perimenopausal gynecologic care.<sup>4</sup> Stages of prolapse among those women, at the time of the initial examination, were stage 0, 73%; stage 1, 23%; and stage 2, 4%. No patients had stage 3 or 4 disease. Support classification among our group, aged between 18 to 68 years, was stage 0, 47%; stage 1, 23.1%; stage 2, 18.3%; and stage 3, 11.6%. No patients had pop-Q system stage 4 prolapse. There appears to be a significant difference in the frequency of women with stage 0 support between the Steven and Swift's population (6.4%),<sup>3</sup> our population (47%), Bland et al's (73%)<sup>4</sup> and Samuelsson et al's (69.2%) populations.<sup>1</sup>

Seventy percent of our population had pelvic organ prolapse stage 0 or 1, which represents a good support and was noted at a much greater frequency among younger women. Also, 11.6% of

**Table 4.** Relative frequency of pop-Q system stage according to the infant's birth weight.

Birth Weight	Stage 0	Stage 1	Stage 2	Stage 3
History of vaginal delivery of infant >4000 g ( <i>n</i> = 390)	20.5%	23%	33.3%	23%
No history of vaginal delivery of infant >4000 g ( <i>n</i> = 1710)	47%	24.1%	17.7%	10.9%

*P* < 0.0001.

**Table 5.** Results of logistic regression model.

Factors	OR	95% CI	P value
Age $\geq 50$ (yr)	4.46	2.06 – 18.63	<0.0001
Parity >3	3.02	2.07 – 8.54	<0.0004
Gravidity >3	2.45	1.63 – 6.71	<0.0003
Number of abortions $\geq 2$	1.10	0.37 – 3.2	< 0.10
Number of vaginal delivery >3	5.90	2.46 – 10.87	<0.0005
History of home delivery	1.54	0.69 – 3.67	< 0.2
History of vaginal delivery without episiotomy	2.91	1.9 – 6.94	<0.002
History of operative delivery	2.41	1.5 – 3.75	<0.005
History of giving birth to macrosomic infant	1.47	0.74 – 2.63	<0.3
Menopausal status	5.13	1.90 – 17.43	<0.0001

women had stage 3 pelvic organ prolapse. This represents a poor support and was more frequently noted among women aged >40 years, with a prevalence as high as 21.4% among women  $\geq 50$  years of age. These data are consistent with the Steven and Swift's study.

In our study, with an age  $\geq 50$  years, the menopause status was found to be a potent risk factor for appearing and worsening of the prolapse. Some other studies have mentioned that advanced age and menopause correlate with the pop-Q system stage.<sup>7-9</sup> In another study, collagen tissue weakness and menopause were reported as predisposing factors for a high pop-Q system stage.<sup>10</sup> In the present study, the effect of age and menopause appears to be similar.

Another etiology for the development of pelvic organ prolapse is pregnancy and vaginal delivery of the term infant. Several studies have demonstrated damage to the nerves, fasciae, and muscles of the pelvic floor as a result of the delivery, leading to the development of pelvic organ prolapse.<sup>11-13</sup>

We found that increased gravidity, parity, and the number of vaginal deliveries are all risk factors for developing prolapse and associated with an increased pop-Q system stage, which is in agreement with other studies.<sup>1, 3, 7</sup> In a recent British cohort study of 1,700 married women, parity was the variable most strongly related to prolapse.<sup>14</sup> The risk increases with each childbirth, but the rate of increase declined once the women had delivered two children. Other studies showed only slight<sup>14</sup> or no<sup>15</sup> correlation between the number of childbirths and the development of prolapse. Samuelsson et al, in a Swedish study, found an increasing risk of prolapse with giving birth to each child when it was adjusted for confounding factors.<sup>1</sup>

In our study, number of abortions, home deliveries, and the history of macrosomic infant were found as weak risk factors, in spite of a

strong correlation between these factors and the pop-Q stage. Gurel and Gurel reported that macrosomic infants and home delivery were risk factors for developing pelvic relaxation.<sup>12</sup> Timonen et al found that one-third of his patients with prolapse had delivered babies heavier than 4000 g, as compared with the frequency of 9.5% in general population.<sup>16</sup>

Indeed, the most important issue is not the place where delivery occurs, but it is whether an episiotomy procedure has been carried out or not. In our study, vaginal delivery without episiotomy is a more potent risk factor than home delivery. Recently, some studies have reported that routine episiotomy does not play a role in prevention of pelvic floor weakness.<sup>16-18</sup> Even, it was reported that pelvic weakness is seen more frequently in patients with episiotomy.<sup>19-20</sup>

As a result, pelvic organ prolapse, specially in mild forms, seems to be a common feature among Iranian females. Age  $\geq 50$  years, menopause, parity >3, gravidity >3, number of vaginal deliveries >3, history of vaginal delivery without episiotomy, and operative delivery are possible risk factors for development of prolapse.

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