Research Article

Pop-Q Components Comparison among Multiparous and Nulliparous Women

Perbandingan Nilai Komponen Pop-Q pada Perempuan Multipara dan Nullipara

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Abstract

Objective: To compare the measurement of POP-Q components between multiparous and nulliparous women.

Method: This study is a cross-sectional research conducted in several hospitals in Makassar during the period of June to October 2012, with 270 women as the subjects. Subjects were divided into three groups: nulliparous, parity 1-2, and parity 3 (multiparous). We analyzed the mean POP-Q components results between 3 groups using t-test, analysis of prolapse based on POP-Q components measurement, and analysis of correlation between risk factors with prolapse was done using Chi-square test.

Result: There is a significant difference in POP-Q components measurement between multiparous and nulliparous women, consecutively for: Aa point -2.14 and -2.97 cm, Ba point -2.11 and -2.99 cm, C point -5.69 and -6.86 cm, gh 3.33 and 2.70 cm, pb 2.60 and 3.27 cm, TVL 8.65 and 9.06 cm, Ap point -2.35 and -2.93 cm, Bp point -2.61 and -2.96 cm, D point -6.61 and -7.42 cm. In multiparous women, points Aa, Ba, C, D, Ap and Bp became more prolapsed, gh became longer, while pb and TVL became shorter.

Conclusion: The proportion of prolapse is higher in multiparous women with significant associations with age, body mass index, education level, and history of heavy physical work, delivering a large baby and use of hormonal contraceptives.

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Keywords: multiparous women, nulliparous women, parity, POP-Q

Abstrak

***Tujuan**: Untuk membandingkan nilai komponen POP-Q antara perempuan multipara dan nullipara.*

***Metode**: Penelitian ini menggunakan desain potong lintang yang dilaksanakan di beberapa rumah sakit di Makassar selama periode Juni-Oktober 2012, dengan sampel sebanyak 270 perempuan yang memenuhi kriteria inklusi dan eksklusi. Sampel dibagi dalam 3 kelompok yaitu nullipara, paritas 1-2 dan paritas 3 (multipara). Analisis perbandingan rerata komponen POP-Q antara ketiga kelompok menggunakan uji t, analisis kejadian prolaps berdasarkan ukuran komponen POP-Q, dan analisis hubungan faktor-faktor risiko prolaps dengan kejadian prolaps dengan menggunakan uji Chi-square.*

***Hasil**: Terdapat perbedaan yang signifikan antara nilai komponen POP-Q pada perempuan multipara dan nullipara; yaitu untuk titik Aa -2,14 dan -2,97 cm, titik Ba -2,11 dan -2,99 cm, titik C -5,69 dan -6,86 cm, gh 3,33 dan 2,70 cm, pb 2,60 dan 3,27 cm, TVL 8,65 dan 9,06 cm, titik Ap -2,35 dan -2,93 cm, titik Bp -2,61 dan -2,96 cm, dan titik D -6,61 dan -7,42 cm, secara berturut-turut. Pada perempuan multipara, ukuran titik Aa, Ba, C, D, Ap dan Bp menjadi semakin prolaps, gh menjadi lebih panjang, sementara pb dan TVL menjadi lebih pendek.*

***Kesimpulan**: Persentase kejadian prolaps lebih tinggi pada multipara, dengan kaitan yang signifikan antara faktor usia, indeks massa tubuh, tingkat pendidikan, serta riwayat kerja berat, riwayat anak besar dan riwayat penggunaan kontrasepsi hormonal dengan prolaps organ panggul.*

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***Kata kunci**: paritas, perempuan multipara, perempuan nullipara, POP-Q*

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INTRODUCTION

In the United States, nearly 200,000 women underwent surgery for pelvic organ prolapse annually. From studies in the UK and Scotland for 20 years, from 1968 to 1974 years, Mant et al reported that the incidence of prolapse was 2.04 per 1000 women.[1]

Urogenital prolapse occurs when there is a weakness in the pelvic floor structures. Previous studies found that approximately 50% of women who had given birth had prolapse, and 10%-20% of them present with serious symptoms. Its incidence increases with age as Swift et al discovered that nearly 50% of women aged over 50 years had complaints of urogenital prolapse.[2]

During the period of 1995-2000, Dr. Cipto Mangunkusumo hospital treated 240 cases of genital prolapse with most patients requiring treatment belonging to the age group of 60-70 years and with parity of more than three.[3]

The etiology of pelvic organ prolapse is multifactorial. Based on epidemiological studies, there is

evidence that the occurrence of pelvic organ prolapse is associated with pregnancy and delivery, especially multiparity and vaginal delivery.[4]

Hormonal changes in pregnant women are physiologic. During pregnancy, collagen undergoes depolymerization by placental hormones and the ratio of glycosaminoglycans changes. The loss of placental hormones can restore tissue integrity, suggesting that these symptoms may disappear after delivery in most women. However, in some women, these symptoms can persist and cause serious predicament.[5]

Currently, pelvic organ prolapse (POP) is measured by using Pelvic Organ Prolapse Quantification (POP-Q) system. The system measures 6 points and 3 distances in and around the vagina in centimeters to provide appropriate boundaries, known as Aa, Ba, C, D, Ap, Bp, *genital hiatus* (GH), *perineal body* (pb), and total vaginal length (TVL). This system has been recognized as a standard measurement for pelvic organ prolapse.[6]

Currently, there is no accurate data of the size and reliable components of POP-Q on nulliparous and multiparous women. Therefore, we conducted this research to study the POP-Q components.

METHODS

This study was conducted at Dr. Wahidin Sudirohusodo teaching hospital and its network of hospitals in the Department of Obstetrics and Gynecology, Faculty of Medicine Hasanuddin University. Sample collection is carried out during the period of June to October 2012. The population in this study was all nulliparous and multiparous women, with a sample size of 270 women collected through non-randomized consecutive sampling. Data was processed using univariate analysis to describe the distribution, the mean value, standard deviation and the range. To analyze the independent variables with a nominal scale and the dependent variable with numerical scale, we used t-test. The association between parity group and the incidence of prolapse was assessed using Chi-Square test.

RESULTS

Sample Characteristics

Table 1. Samples Characteristics

No	Characteristics	Nullipara		Parity 1-2		Parity 3	
		N	(%)	N	(%)	N	(%)
1	Age (years)						
	35	32	(24.1)	77	(57.9)	24	(18.0)
	>35	18	(13.1)	33	(24.1)	86	(62.8)
2	BMI (kg/m^2)						
	30	33	(21.4)	69	(44.8)	52	(33.8)
	>30	17	(14.7)	41	(35.3)	58	(50.0)
3	Education (years)						
	9	28	(13.7)	79	(38.7)	97	(47.5)
	>9	22	(33.3)	31	(47.0)	13	(19.7)
4	History of heavy labor						
	Yes	1	(0.8)	40	(30.5)	90	(68.7)
	No	49	(35.3)	70	(50.4)	20	(14.4)
5	Urinary complaints						
	Yes	6	(8.5)	18	(25.4)	47	(66.2)
	No	44	(22.1)	92	(46.2)	63	(31.7)
6	Vaginal delivery						
	Yes	-	-	82	(46.6)	94	(53.4)
	No	-	-	28	(63.2)	16	(36.4)
7	History of episiotomy						
	Yes	-	-	34	(34.3)	65	(65.7)
	No	-	-	48	(62.3)	29	(37.7)
8	History of large baby						
	Yes	-	-	24	(24.5)	74	(75.5)
	No	-	-	86	(70.5)	36	(29.5)
9	Hormonal contraception						
	Yes	-	-	25	(32.5)	52	(67.5)
	No	-	-	85	(59.4)	58	(40.6)

Of the total sample evaluated, grouping was done to distinguish the age (age 35 years and >35 years), body mass index (BMI 30 kg/m^2 and >30 kg/m^2), the level of education (between 9 years and >9 years), history of complicated labor, complaints of urinary disorders, vaginal delivery, history of episiotomy, and history of hormonal contraceptives use (Table 1).

The sample of this study based on age was divided into 2 groups, age 35 and >35 years. Age and incidence of prolapse showed a significant association (Table 2), in points Aa, Ba, C, and Ap, where p-value were 0.001, 0.000, 0.031, and 0.006, respectively. However, there is no meaningful association for point D (p-value=0.123) and point Bp (p-value=0.364).

In this study, a BMI of >30 kg/m^2 have a significant association with the incidence of anterior vaginal wall prolapse (Table 2) only in the point of Aa (p-value=0.003) and Ba (p-value=0.028), whereas other points showed no significant relationship (p-value>0.05).

Level of education as one of the characteristics in this study also showed a significant association with the incidence of prolapse based on the size of point Aa (p-value=0.008), point Ba (p-value=0.001), point C (p-value=0.049) and point Bp (p-value= 0.001), whereas it was not significant for point D (p-value=0.908) and point Ap (p-value=0.073).

In this study, there is a significant association between history of heavy labor and the incidence of prolapse based on changes in the size of all components of POP Q as presented in Table 2.

Table 2. Association Between Age, BMI, Education, History of Heavy Labor, Urinary Impairment and Incidence of Prolapse.

POP-Q Components		Age (years)		BMI (kg/m^2)		Education (years)		History of heavy labor		Urinary impairment	
		35	>35	30	>30	9	>9	Yes	No	Yes	No
Aa	% prolapse	57.9	77.4	60.4	77.6	72.1	54.5	99.2	38.1	83.1	62.3
	% normal	42.1	22.6	39.6	22.4	27.9	45.5	0.8	61.9	16.9	37.7
	p-value	0.001		0.003		0.008		0.000		0.001	
Ba	% prolapse	45.9	69.3	53.2	63.8	63.7	39.4	93.9	23.7	77.5	50.8
	% normal	54.1	30.7	46.8	36.2	36.3	60.6	6.1	76.3	22.5	49.2
	p-value	0.000		0.028		0.001		0.000		0.000	
C	% prolapse	71.4	82.5	76.0	78.4	79.9	68.2	95.4	59.7	87.3	73.4
	% normal	28.6	17.5	24.0	21.6	20.1	31.8	4.6	40.3	12.7	26.6
	p-value	0.031		0.632		0.049		0.000		0.016	
D	% prolapse	35.3	44.5	39.6	40.5	40.2	39.4	48.1	32.4	49.3	36.7
	% normal	64.7	55.5	60.4	59.5	59.8	60.6	51.9	67.6	50.7	63.3
	p-value	0.123		0.880		0.908		0.008		0.063	
Ap	% prolapse	64.7	79.6	70.1	75.0	75.0	63.6	94.7	51.1	84.5	67.8
	% normal	35.3	20.4	29.9	25.0	25.0	36.4	5.3	48.9	15.5	32.2
	p-value	0.006		0.376		0.073		0.000		0.007	
Bp	% prolapse	52.6	58.1	51.9	60.3	61.8	63.6	76.3	36.0	67.6	51.3
	% normal	47.4	40.9	47.4	39.7	37.7	36.4	23.7	64.0	32.4	48.2
	p-value	0.0364		0.287		0.001		0.000		0.053	

p-value obtained from Chi-square test

Complaints in urination showed a significant correlation with the incidence of anterior vaginal wall prolapse in point Aa (p-value=0.001) and Ba (p-value=0.000).

Types of delivery showed no significant correlation with the incidence of prolapse (Table 3), except for the value of point Bp (p-value=0.001).

History of delivering a large baby shows significant correlation with the incidence of prolapse as measured by the changes in measurement of point Aa, Ba, and Ap (p-value=0.000), point C (p-value= 0.013), and point Bp (p-value=0.022). However, the relationship was not significant for the changes in point D value (p-value=0.565).

Episiotomy also showed a significant association with the incidence of anterior vaginal wall prolapse (Table 3), based on changes in the value of point Aa and Ba (p-value<0.05), but not significant to the incidence of posterior vaginal wall prolapse as seen by the changes in measurement of point Ap and Bp (p-value>0.05).

Furthermore, there is a significant association between use of hormonal contraceptives and the incidence of prolapse based on the changes of POP-Q components (Table 3) where the p-value for changes in point Aa and Ba are 0.021 and 0.016, respectively, as well as for points Ap and Bp (p-value=0.000). However, no significant association can be identified between use of hormonal contraceptives and incidence of prolapse as measured by point C (p-value=0.089) and point D (p-value =0.403).

Table 3. Association between Vaginal Delivery, History of Episiotomy, History of Delivering a Large Baby, and Hormonal Contraceptive Use and the Incidence of Pelvic Organ Prolapse

POP-Q Components		Vaginal Delivery		History of Episiotomy		History of Delivering a Large baby		Hormonal Contraceptive Use	
		Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Aa	% prolapse	80.7	84.1	86.9	72.7	100	66.4	89.6	76.9
	% normal	19.3	15.9	13.1	27.3	0	33.6	10.4	23.1
	p-value	0.603		0.018		0.000		0.021	
Ba	% prolapse	71.0	68.2	80.8	58.4	95.9	50.0	80.5	65.0
	% normal	29.0	31.8	19.2	41.6	4.1	50.0	19.5	35.0
	p-value	0.712		0.001		0.000		0.016	
C	% prolapse	90.3	97.7	89.9	90.9	96.9	87.7	96.1	89.5
	% normal	9.7	2.3	10.1	9.1	3.1	12.3	3.9	10.5
	p-value	0.110		0.822		0.013		0.089	
D	% prolapse	46.6	47.7	39.4	55.8	49.0	45.1	50.6	44.8
	% normal	53.4	52.3	60.6	44.2	51.0	54.9	49.4	55.2
	p-value	0.893		0.030		0.565		0.403	
Ap	% prolapse	86.9	77.3	90.9	81.8	96.9	75.4	98.7	77.6
	% normal	13.1	22.7	9.1	18.2	3.1	24.6	1.3	22.4
	p-value	0.109		0.076		0.000		0.000	
Bp	% prolapse	71.6	45.5	75.8	66.2	74.5	59.8	81.8	58.0
	% normal	28.4	54.5	24.2	33.8	25.5	40.2	18.2	42.0
	p-value	0.001		0.165		0.022		0.000	

p-value obtained from Chi-square test

DISCUSSION

There have been numerous studies on the value of POP-Q components recently. In this study, the measurements of POP-Q components is performed on women in reproductive age from 18 to 45 years in order to observe the effect of parity and the changes in the value of POP-Q components.

In a population-based study by the Heart and Estrogen/Progestin Replacement Study (HERS) and the Nurses' Health Study showed that the effect of parity showed very little or even no association with the incidence of prolapse in elderly women.[7]

The results shown in Table 2 indicate a change in the measurement of POP-Q components in the three parity groups. It was showen that points Aa, Ba, C, D, Ap, and Bp were more prolapsed, genital hiatus (GH) became longer, while the perineal body (pb) and total vaginal length (TVL) became shorter.

Based on Table 3, GH size were 2.70 cm and 3.33 cm, the size of the pb were 2.60 cm and 3.27 cm, while the size of TVL were 9.06 cm and 8.65 cm in nulliparous and multiparous women, respectively. This was consistent with the study by Ayiek in 2010, who obtained a mean GH size of 2.77 cm and 3.05 cm, pb size of 3.06 cm and 3.01 cm, and TVL size of 8,06 and 7.80 cm in nulliparous and multiparous women, respectively.[8]

A study by Trowbridge et al in the Southeastern Michigan area with 394 samples of caucasian and black women aged 35-64 years old, obtained a mean GH size of 3.43 cm, pb of 3.94 cm and TVL of 10.73 cm.[9]

Furthermore, Tan et al measured an average TVL of 9.4 cm using a sample of 3,247 women.[10] Another study by Seo and Kim performed on 713 Korean women aged 18-72 years with parity of 0-6 obtained an average value for point C of -5.0 cm, point D -6.6 cm, and TVL 7.0 cm with an incidence of anterior vaginal wall prolapse of 27.6%, uterine prolapse 2.0%, and posterior vaginal wall prolapse 25.4%. Overall, the incidence of prolapse stage 0 to 4 was 68.3%, 19.9%, 11.2%, 0.6% and 0%, respectively.[11]

Mant et al reported a large cumulative effect of parity on pelvic organ prolapse.[12] In a cross sectional study from the Women's Health Initiative, Hendrix et al found the risk of uterine prolapse and prolapse of the anterior vaginal wall to double with increment of labor from 10% to 21%.[13] Based on longitudinal data from the Women's Health Initiative, Handa et al found that the incidence of anterior vaginal wall prolapse increased 31% for each increment of parity. A similar relationship was also identified for uterine prolapse and posterior vaginal wall prolapse.[14]

From the results of a research in the UK and Scotland for 20 years, Mant et al concluded that parity showed the strongest relationship with prolapse. When compared with nulliparous women, women with one child had 4 times the risk of prolapse, while women with two children had 8.4 times the risk.[1] Among multiparous women, the risk for prolapse is 11 times than that of nulliparous women.[15]

Research by Duong et al discovered that Asian women with high parity had a higher risk of vaginal prolapse of the anterior compartment, as was found in European women.[16] Landon et al found that in pregnancy, connective tissue of the rectus fascia and the obturator fascia is highly stretched and elongated, but weaker. In some women, these changes can be irreversible and result in permanent dysfunction of the pelvic floor muscle. Lien and colleagues have developed a model of pelvic MRI studies to evaluate the interaction of the baby's head with the pelvic floor muscles, and found that the central part of the pubococcygeus muscle, as part of the pelvic floor muscles, can stretch up to 3.26 times the previous length.[17]

Unlike the case with longitudinal data from the Women's Health Initiative, a strong association was shown between increased BMI and posterior vaginal wall prolapse (OR=1.75), but not for uterine prolapse and prolapse of the anterior vaginal wall.[13] Fornell et al found a significant association between posterior vaginal wall prolapse with obesity (BMI>30 kg/m^2) compared to normal-weighted women (BMI<25 kg/m^2).[18]

Most studies indicate a higher risk of prolapse in overweight and obese women. Moreover, women with "apple" body shape (waist circumference larger than the pelvis) have a 17% risk of anterior and posterior vaginal walls prolapse. A study by Miedel et al on 5,489 samples aged 30-79 years in Stockholm found that the group with BMI 26-30 kg/m^2 compared to the group of BMI 19-25 kg/m^2 had an odds ratio of 1.9 (95% CI=1.2-3.1) for the incidence of pelvic organ prolapse.[19] Furthermore, Chen et al demonstrated that increasing BMI is a

risk factor for urinary and fecal incontinence with odds ratio of 4.13 and 2.06, respectively, but was not a risk factor for pelvic organ prolapse.[20]

A history of doing heavy labor can lead to increased intraabdominal pressure that plays a role in the incidence of prolapse. Hove et al discovered that heavy physical work is one of the independent risk factors for prolapse and is classified as a promotional factor with an OR of 1.48.[21]

Regarding method of delivery, there was no significant correlation between type of delivery and the incidence of prolapse. This was consistent with the results obtained by MacLennan et al in 2000 where cesarean section and vaginal delivery was both found to be associated with pelvic floor dysfunction, whereas no significant difference was identified between elective and emergency cesarean section.[22] On the contrary, Lukacz et al found that the incidence of pelvic organ prolapse was greater among women who had vaginal delivery than women who had cesarean section (OR=1.82, 95% CI=1.04-3.19).[23] A study by Larsson et al also found that cesarean section was associated with a lower risk of pelvic organ prolapse than vaginal delivery, and the protective effect is more obvious in multiparous women than in primiparous women (OR=0.063 in multiparous women vs OR=0.26 in primiparous women).[24]

Our findings were not consistent with the theory that an episiotomy can cause perineal damage, especially to the posterior vaginal wall. This was congruent with a retrospective study by Cam et al, which concluded that mediolateral episiotomy appears to prevent defects in the anterior vaginal wall.[25]

A large sample size is one of the strengths of this study. However this study was limited in our attempt to analyze the general use of hormonal contraceptives. The lack of literature on its relationship with pelvic organ prolapse caused the limited discussion on this association. Therefore, further studies need to be developed. Furthermore, history of labor in this study relied on memory of the subjects, introducing a possibility of recall bias. Therefore, a prospective study needs to be performed.

CONCLUSION

There are significant differences in the measurement of POP-Q components among multiparous and primiparous women. The changes of POP-Q components in multiparous women compared with nulliparous women showed that points Aa, Ba, C, D, Ap and Bp were more prolapsed, genital hiatus (GH) was longer, while the perineal body (pb) and total vaginal length (TVL) was shorter. The incidence of pelvic organ prolapse was higher in multiparous than nulliparous women, with significant association with age, BMI, education level, history of heavy labor, history of delivering a large baby and use of hormonal contraceptives.

Since the measurement of POP-Q components requires accuracy, especially for the measurement of point D, there is a need to perform a prospective study in order to assess the changes in the size of POP-Q components in high-risk individuals.

REFERENCES

1. Patel DA. Childbirth and pelvic floor dysfunction: an epidemiologic approach to the assessment of prevention opportunities at delivery. Am J Obstet Gynecol 2006; 195: 23-8.
2. Balmfort J, Robinson D. Pelvic Ogan Prolapse. In: Evidence-Based Physical Therapy for Pelvic Floor. Philadelphia: Elsevier; 2007: 235-6.
3. Junizaf (editor). Buku Ajar Uroginekologi I. Jakarta: Subbagian Uroginekologi Rekonstruksi, Bagian Obstetri dan Ginekologi FKUI/RSUPN-CM. 2001: 1-5.
4. Mouritsen L. Classification and evaluation of prolapse. Best Pract Res Clin Obstet Gynaecol 2005; 19(6): 895-911.
5. Petros PEP. The Anatomy and Dynamics of Pelvic Floor Function and Dysfunction. In: The Female Pelvic Floor: Function, Dysfunction and Management According to the Integral Theory. 2nd ed. Berlin: Springer; 2007: 14-5.
6. Bump RC. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol 1999; 175(1): 10-7.
7. Luber KM, Boero S, Choe JY. The demographics of pelvic floor disorders: current observations and future projections. Am J Obstet Gynecol 2001; 184: 1496-501.
8. Ayiek IA. Analisis ukuran komponen POP-Q (genital hiatus, perineal body dan total vaginal length) perempuan multipara dan nullipara di Makassar. Tesis Program Pascasarjana. Universtas Hasanuddin; 2003.
9. Trowbridge ER, Fultz NH, Patel DA, et al. Distribution of pelvic organ support in a population based sample of middle aged, community dwelling African American and white women in southeastern Michigan. Am J Obstet Gynecol. 2008; 198(548): 1-6.
10. Tan JS, Lukacz ES, Menefee SA, et al. Determinants of vaginal length. Am J Obstet Gynecol 2006; 195: 1846-50.
11. Seo JT, Kim JM. Pelvic organ support and prevalence by Pelvic Organ Prolapse-Quantification (POP-Q) in Korean women. J Urol 2006; 175(5): 1769-72.
12. Mant J, Painter R, Vessey M. Epidemiology of genital prolapse: observations from the Oxford Family Planning Association Study. Br J Obstet Gynaecol 1997; 104: 579-85.

13. Hendrix SL, Clark A, Nygaard I, et al. Pelvic organ prolapse in the Women's Health Initiative: gravity and gravidity. Am J Obstet Gynecol 2002; 186: 1160-6.
14. Handa VL, Blomquist JL, McDermott KC, et al. Pelvic floor disorders after vaginal birth. Am J Obstet Gynecol 2012; 119: 233-9.
15. Siddighi S, Hardesty JS. (eds.) Urogynecology and Female Pelvic Reconstructive Surgery: Just the Facts. 1st ed. New York: McGraw-Hill; 2006.
16. Duong TH, Korn A. Predictors of advanced pelvic organ prolapse in Asian women. J Reprod Med 2009; 54(8): 488-92.
17. Baessler K, Schuessler B. The Effect of Pregnancy and Childbirth on the Pelvic Floor; in Pelvic Floor Re-Education. Elsevier Saunders: Philadelphia. 2008: 36-45.
18. Fornell EU, Wingren G, Kjolhede P. Factors associated with pelvic floor dysfunction with emphasis on urinary and fecal incontinence and genital prolapse: an epidemiological study. Acta Obstet Gynecol Scand 2004; 83: 383-9.
19. Miedel A, Tegerstedt G, Maehle-Schmidt M, et al. Nonobstetric risk factors for symptomatic pelvic organ prolapse. Am J Obstet Gynecol 2009; 113(5): 1089-96.
20. Chen CC, Gatmaitan P, Koepp S, et al. Obesity is associated with increased prevalence and severity of pelvic floor disorders in women considering bariatric surgery. Surg Obes Relat Dis 2009; 5: 411-5.
21. Woodman PJ, Swift SE, O'Boyle Al, et al. Prevalence of severe pelvic organ prolapse in relation to job description and sosioeconomic status: a multicentre cross-sectional study. Int Urogynecol J Pelvic Floor Disfunct 2006; 17: 340-5.
22. MacLennan AH. The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. Br J Obstet Gynaecol 2000; 107(12): 1460-70
23. Lukacz ES, Lawrence JM, Contreras R, et al. Parity, mode of delivery, and pelvic floor disorders. Am J Obstet Gynecol 2006; 107: 1253-60.
24. Larsson C, Kallen K, Andolf E, et al. Cesarean section and risk of pelvic organ prolapse: a nested case-control study. Am J Obstet Gynecol 2009; 200(243): 1-4.
25. Cam C, Asoglu MR, Selcuk S, et al. Does mediolateral episiotomy decrease central defect of the anterior vaginal wall? Arch Gynecol Obstet 2012; 285: 411-5.