

Evaluation of Genital Hiatus and Perineal Body Measurement in Women in Turkish Society, According to Recurrent Vaginitis and Vaginal Flatus

Türk Toplumunda Kadınlarda Genital Hiatus ve Perineal Body Boyutlarının Değerlendirilmesi ve Tekrarlayan Vajinit ve Vajinal Flatus ile İlişkisi

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ABSTRACT

Objective: In our study, we aimed to determine the mean values of genital hiatus (GH) and perineal body (PB) measurements in the Turkish population to investigate the factors affecting the measurements and the effect of the values on the frequency of recurrent vaginitis and vaginal flatus.

Methods: Our study was conducted by taking GH and PB measurements in 405 women between the ages of 18 and 45 years who had never given birth and had a single birth. Body mass index (BMI), diseases, surgeries, duration of active coitus, recurrent vaginitis, and vaginal flatus symptoms were assessed.

Results: In all subjects, the mean GH value was 23.8 mm and the mean PB value was 31.1 mm. The GH values of the subjects in the vaginal delivery (NSD) group were significantly higher than those in the never delivered (nullipar) and cesarean delivery (CS) groups ($p=0.016$, $p=0.021$; $p<0.05$). Recurrent vaginitis was significantly lower in nulliparous patients ($p=0.003$; $p<0.01$). There was a statistically significant positive correlation between GH and BMI measurements, mediolateral episiotomy, and age. A statistically significant positive correlation was observed between PB and BMI measurements and active coitus duration. According to the history of recurrent vaginitis and vaginal flatus, GH and PB measurements of the subjects did not show a statistically significant difference ($p>0.05$).

Conclusion: The mean GH value was 23.8 mm and the average PB length was 31.1 mm in Turkish women. It was found that GH enlarged due to single vaginal delivery, mediolateral episiotomy, age and weight, and recurrent vaginitis was less common in nulliparous patients. According to these results, even a single delivery causes changes in the pelvic floor. Increased GH levels may disrupt the defense mechanisms of the vagina and increase the risk of infection. We believe that it is important to increase primiparous births without performing episiotomy and weight control.

Keywords: Genital hiatus, perineal body, recurrent vaginitis, vaginal flatus

ÖZ

Amaç: Çalışmamızda Türk toplumunda genital hiatus (GH) ve perineal body (PB) ölçümlerinin orta değerlerini bulmayı, ölçümlerin etkilendiği faktörleri ve değerlerin tekrarlayan vajinit, vajinal gaz sıklığına etkisini araştırmayı amaçladık.

Gereç ve Yöntem: Çalışmamız 18-45 yaş arası hiç doğum yapmamış ve tek doğum yapmış 405 kadında GH ve PB ölçümleri alınarak yapılmıştır. Bu hastalarda vücut kitle indeksi (VKİ), hastalıklar, geçirilen cerrahiler, aktif koit süresi, tekrarlayan vajinit ve vajinal gaz semptomları sorgulanmıştır.

Bulgular: Tüm olgularda GH ortalama değer 23,84 mm, PB ortalama değer 31,13 mm bulundu. Vajinal doğum yapan (NSD) grubundaki olguların GH değerleri, hiç doğum yapmamış (nullipar) ve sezeryan ile doğum yapmış (CS) grubundakilerden anlamlı yüksektir ($p=0,016$, $p=0,021$; $p<0,05$). Nullipar olgularda tekrarlayan vajinit sıklığı anlamlı olarak daha düşük tespit edildi ($p=0,003$; $p<0,01$). Olguların GH ile VKİ ölçümleri, mediolateral epizyotomi ve yaş arasında pozitif yönlü istatistiksel anlamlı ilişki saptanmıştır. Olguların PB ile VKİ ölçümleri ve aktif koit süreleri arasında pozitif yönlü istatistiksel anlamlı ilişki saptanmıştır. Tekrarlayan vajinit ve vajinal gaz yüküne göre olguların GH ve PB ölçümleri, istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$).

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Sonuç: Türk kadınlarında ortalama GH değeri 23,8 mm ve ortalama PB uzunluğu 31,1 mm idi. Tek vajinal doğum, mediolateral epizyotomi, yaş ve kiloya bağlı olarak GH genişlediği ve nullipar kadınlarda tekrarlayan vajinitin daha az olduğu saptandı. Bu sonuçlara göre tek bir doğum bile pelvik tabanda değişikliklere neden olmaktadır. Artan GH vajinanın savunma mekanizmalarını bozabilir ve enfeksiyon riskini artırabilir. Bu veriler ışığında kilo kontrolünün ve epizyotomiz primipar doğumların artırılmasının önemli olduğuna inanıyoruz.

Anhtar Kelimeler: Genital hiatus, perineal body, tekrarlayan vajinit, vajinal flatus

INTRODUCTION

Genital hiatus (GH) is the anatomical structure connecting the vagina and external genital organs. The perineal body (PB) is located at the center of the perineum and divides the perineum into urogenital and anogenital triangles. Interlocking fibers of the superficial transverse perineal muscles, posterior fibers of the bulbocavernosus muscles, and fibers of the external anal sphincter form the PB structure (1). GH is characterized as the point between the center of the external urethral meatus and the posterior edge of the hymen, and PB is identified as the distance between the posterior edge of the hymen and the midpoint of anus (2). GH and PB measurements have been defined with respect to the terminology of female pelvic organ prolapse (POP) by the joint publication of the International Urogynecological Association and International Continence Society in the Pelvic Organ Prolapse Rating system (POP-Q) (3). This standardization is ensured with an attempt to avoid variations among physicians.

Vaginitis, inflammation of the vagina, can be observed on disruption of the vaginal ecosystem, producing substances such as lactic acid and hydrogen peroxide that inhibit the growth of bacteria, not belonging in the vaginal microbiota. The most common symptoms are itching, burning sensation, abnormal odor, and discharge. However, most patients are asymptomatic and do not require treatment (4,5). Based on the causative organism, there are three main types of vaginitis: bacterial vaginosis, candidiasis, and trichomoniasis (6).

Vaginal flatulence is the state of gas emission from the vagina in women. It was established as a symptom of pelvic floor dysfunction by the International Continence Society and International Urogynecological Association in 2017, but it is also a complaint that can be encountered with changes occurring in the normal vaginal flora during menstruation (7). Experience of vaginal flatulence is common amongst women. It has not been emphasized mainly because it is not considered as a life-threatening condition and not questioned in detail (8). Its frequency in women giving birth increases up to 71% and negatively impacts the quality of life (9,10).

Vaginal infection and vaginal flatulence are non-life-threatening but annoying health problems. On review of the literature,

although the mean values of PB and GH in women without prolapse are not known precisely, no study has evaluated the average measurements in any ethnic group. In addition, the vagina may be exposed to external factors due to the enlargement of the GH and shortening of the PB. Therefore, the tendency to vaginal infections may increase and vaginal flatulence may increase secondary to the relaxation of the vaginal muscles and chronic infections. In our study, we aimed to demonstrate the mean GH and PB values in nulliparous women of Turkish ethnicity and in those who had one vaginal or abdominal delivery, as well as assess their association with descriptive characteristics such as body mass index (BMI), vaginitis, and vaginal flatulence.

METHODS

The study was designed as a prospective cross-sectional study and upon receipt of the necessary ethics committee approval, it was conducted on women aged 18-45 with Turkish ethnic origin who presented to the Department of Obstetrics and Gynecology, University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital between the dates of February 15, 2021 and February 15, 2022 (University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital Clinical Research Ethics Committee- decision no: 2021-03-19, date: 01.02.2021). Informed consent was obtained from the patients. GH and PB measurements were taken using a digital caliper. Age, height, weight, types of delivery, active coitus duration, vaginal flatulence, and vaginitis symptoms were determined. A total of 405 patients meeting the criteria were included in the study and were analyzed in three groups. The first group consisted of nulliparous participants who had never given birth, the second group had individuals with a history of one vaginal delivery, and those with a history of one cesarean section formed the third group. Information related to age, height, weight, BMI [BMI=weight(kg)/height²(m²)], types of delivery, active coitus time, vaginal flatulence, and vaginitis symptoms for the patients in all three groups were documented. Patients with a history of vaginitis more than twice a year were defined as frequent, and those with two or fewer episodes were defined as rare. Exclusion criteria of the study were as follows: pregnant women, those who underwent vaginal surgery, patients of non-Turkish ethnicity, patients under the age of 18 and aged

above 45 years, history of giving birth to an infant weighing over 4000 g, history of assisted delivery (using vacuum, forceps, etc.), and those who had 2 or more births.

GH and PB lengths of all patients included in the study were measured in the lithotomy position using a digital caliper while performing the Valsalva maneuver. The measurement unit of the digital caliper was set to millimeters. Measurements were taken by a single researcher (Dr. Halide Efendi). The lengths of GH and PB were compared in patients who had never given birth, those with a history of a single vaginal delivery, and those with a previous cesarean section, and the average of GH and PB values was calculated for all participants. GH and PB measurements were analyzed with respect to BMI, duration of coitus, frequency of vaginitis, and incidence of vaginal flatulence. Experience of vaginitis more than twice a year was noted as frequent, and occurrence of the condition twice or less was defined as rare.

Statistical Analysis

Regarding the performance of power analysis, the required number of cases for a power of 80% was found to be 400. The Number Cruncher Statistical System (NCSS) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) were used to evaluate the study data. The conformity of quantitative data to the normal distribution was tested using the Shapiro-Wilk test and graphical examinations. One-

Way analysis of variance and Bonferroni corrected binary evaluations were performed for comparisons of normally distributed quantitative variables between more than two groups. Kruskal-Wallis and Dunn-Bonferroni tests were performed to assess quantitative variables with nonnormal distribution between more than two groups. The Fisher-Freeman-Halton exact test was used to evaluate qualitative data. Spearman correlation analysis of relationships was performed with regard to quantitative variables. Statistical significance was accepted as a p-value of 0.05.

RESULTS

In the study, the ages of the patients ranged from 18 to 45 years; the mean age was 29.94±7.17. A total of n=405 women were included. On examination of the groups, 63% (n=255) were nulliparous, 15.8% (n=64) had one vaginal delivery (NSD), and 21.2% (n=86) underwent one cesarean section (CS). Although vaginitis was not identified in 75.3% of the cases, rare vaginitis was detected in 8.9% (n=36) and recurrent vaginitis was observed in 15.8% (n=64). There was also no history of vaginal flatulence in 62.5% (n=253) of women, whereas it was rare in 28.4% (n=115) and common in 9.1% (n=37). The active coitus periods of the cases varied from 0.8 to 28 years; the mean duration was 6.24±6.02 years. In addition, the average GH value of all cases was 23,843 mm, and the mean PB length was 31,134 mm.

As shown in Table 1, a statistically significant difference was demonstrated between the ages and BMI of

Table 1. Comparison of descriptive characteristics by groups

		Groups			p-value
		Nulliparous (n=255)	NSD (n=64)	CS (n=86)	
Age (year)	Mean ± SD	27.83±6.59*	33.50±7.43	33.56±6.16	*0.001**
	Median (min-max)	27 (18-45)	33.5 (20-45)	33 (19-45)	
BMI	Mean ± SD	24.63±5.09*	26.65±5.54	27.03±6.24	*0.001**
	Median (min-max)	21.1 (15.8-40.6)	25.2 (17.4-45)	26.1 (16.6-45.7)	
History of recurrent vaginitis (year)	No	206 (80.8)*	39 (60.9)	60 (69.8)	*0.003**
	Rare	19 (7.5)	11 (17.2)	6 (7.0)	
	Frequent	30 (11.8)	14 (21.9)	20 (23.3)	
Vaginal flatus	No	169 (66.3)	32 (50.0)	52 (60.5)	*0.117
	Rare	66 (25.9)	22 (34.4)	27 (31.4)	
	Frequent	20 (7.8)	10 (15.6)	7 (8.1)	
Active coit time (year)	Mean ± SD	3.73±4.14*	10.68±7.17	10.47±5.60	*0.001**
	Median (min-max)	2.5 (0.1-28)	9 (0.7-26)	9 (2-24)	

*Kruskal-Wallis test and Dunn Bonferonni test, *Fisher-Freeman-Halton test, *One-Way ANOVA test and Dunn Bonferroni test, **p<0.01 P0: Nulliparous, NSD: Vaginal delivery, CS: Cesarean delivery, BMI: Body mass index, SD: Standard deviation, min-max: Minimum-maximum

participants with respect to the groups ($p=0.001$; $p<0.01$). Based on the results of pairwise comparisons carried out to determine the source of the difference, the ages and BMI of women in the nulliparous group were notably less than those in the NSD and CS groups ($p=0.001$; $p=0.001$; $p<0.01$). A statistically meaningful variance was detected among subjects in relation to history of recurrent vaginitis according to the groups ($p=0.003$; $p<0.01$). The frequency of recurrent vaginitis in nulliparous cases was significantly lower than that in the NSD and CS cohorts. The incidence of recurrent vaginitis was found to be higher in the NSD group than in the nulliparous and CS groups. With regard to the active coitus times of participants, a statistically significant difference was identified between the groups ($p=0.001$; $p<0.01$); active coitus periods of nulliparous cases were remarkably lower than those in the NSD and CS groups ($p=0.001$; $p=0.001$; $p<0.01$).

On review of the groups, there was no statistically meaningful difference revealed regarding the experience of vaginal flatulence among the cases ($p>0.05$).

As shown in Table 2, a statistically notable difference was observed between the GH measurements of cases according to the groups ($p=0.003$; $p<0.01$). On conduction of pairwise comparisons determining the source of difference, the GH values of participants in the NSD group were remarkably higher than those in the nulliparous and CS groups ($p=0.016$, $p=0.021$; $p<0.05$). There was no statistically significant variance between PB lengths ($p>0.05$).

On evaluation of the Spearman correlation test between GH, PB lengths and BMI, mediolateral episiotomy, midline episiotomy, and active coitus times, a positive statistically weak correlation was established between GH and BMI measurements, as presented in Table 3 ($r=0.380$; $p=0.001$; $p<0.01$). There was also a positive, yet statistically very weak relationship between GH and mediolateral episiotomy measurements (with higher GH value, mediolateral episiotomy length increased) ($r=0.174$; $p=0.001$; $p<0.01$).

No statistically significant association was demonstrated between GH measurements and the ages of participants, midline episiotomy, and active coitus durations ($p>0.05$). Whilst there was a statistically very weak positive correlation between the ages of patients and PB lengths (with rising age, PB increased) ($r=0.141$; $p=0.004$; $p<0.01$), a positive relationship with a statistically low level was identified regarding BMI measurements (increasing PB associated with higher BMI values) ($r=0.346$; $p=0.001$; $p<0.01$). A positive, yet statistically very weak linear correlation existed between PB values and active coitus times (as PB increased, active coitus periods lengthened) ($r=0.183$; $p=0.001$; $p<0.01$). On the other hand, no statistically significant relationship was revealed between PB measurements and mediolateral episiotomy or midline episiotomy ($p>0.05$).

As listed in Table 4, the GH and PB measurements of cases did not show a statistically significant difference with regard to the history of recurrent vaginitis and vaginal flatus ($p>0.05$).

DISCUSSION

In our study, we identified the mean value of GH as 23.8 mm and that of PB as 31.1 mm in our measurements of women of Turkish ethnicity. On review of the literature, we could not detect a similar study conducted on Turkish women, yet as the mean PB measurement was 3.7 ± 0.9 cm in Caucasian women, it was revealed as 3.6 ± 0.9 cm in women of Asian origin. With these results, it was observed that the mean PB lengths detected in Caucasian and Asian women were longer than that of Turkish individuals (11). Additionally, PB measurements were made in the early and late stages of labor in Vietnamese pregnant women, and the average PB value was found to be 3.4 cm in the early stage and 4.3 cm in the second stage (12). With respect to a study conducted on Chinese women, PB lengths were measured in the first stage of labor, at the beginning and end of the second stage and the values were found to be 38.8 mm, 49.4 mm and 59.4 mm, and PB measurement lengthened with approaching

Table 2. Comparison of GH, PB measurements by groups

		Groups			p-value
		Nulliparous (n=255)	NSD (n=64)	CS (n=86)	
GH	Mean \pm SD	23.45 \pm 5.78	26.15 \pm 7.06*	23.28 \pm 5.45	*0.003**
	Median (min-max)	23 (10.1-49)	25.7 (11.2-47.2)	22.1 (10.8-43.7)	
PB	Mean \pm SD	31.05 \pm 6.09	31.65 \pm 7.20	31.02 \pm 5.04	*0.761
	Median (min-max)	30.9 (0-50.8)	30.7 (18-51)	30.9 (20.2-45.8)	

*One-Way ANOVA test and Dunn Bonferroni test, ** $p<0,01$, bFisher-Freeman-Halton test, NSD: Vaginal delivery, CS: Cesarean delivery, GH: Genital hiatus, PB: Perineal body, SD: Standard deviation, min-max: Minimum-maximum

labor due to the pressure related to fetal head engagement (13). However, our study was not conducted on pregnant women.

Based on our results, we determined that GH was larger in women with a history of vaginal births than in nulliparous participants or those delivering via cesarean section. Similarly, in another study conducted on 1,224 patients, GH was found to be greater in the group who delivered vaginally in contrast to those with a history of cesarean section (14). These data support the notion that vaginal birth creates permanent changes in the vaginal tissue and GH. In comparison, no difference was identified related to PB measurements of nulliparous and primiparas women or with regard to mode of delivery among primiparas patients. We attributed these results to the fact that first births were

generally at a young age, and it was easier for the perineal muscles to return to their prenatal shape. We also concluded that perineal deformity might have developed less frequently in women with a history of one single delivery. Likewise, in a study performed on 112 cases, no significant difference was noted regarding PB measurements of participants in the vaginal birth and cesarean section groups 6 months post birth (15). However, more extensive studies are required on this matter, especially including multiparous.

Although there was a weak correlation, we found that GH measurement increased because of the increase in BMI and the presence of mediolateral episiotomy. In addition, PB was measured longer in parallel with the increase in BMI, age, and coit duration. Similarly, in a study conducted on 1,043 women, obesity and POP-Q were evaluated, and a positive association was found between obesity and the sum of PB and GH (16). Contrary to our findings, in a study conducted with Korean women, no relationship was established between obesity and POP-Q. In this study, GH and PB were not assessed separately (17). In a study conducted on 549 women, patients with and without mediolateral episiotomy were examined, and GH and PB measurements were shown to be short in the group with episiotomy (18). We believe that further studies are needed with larger patient cohorts because the number of participants who underwent midline episiotomy was significantly lower in our study and the cases had only one delivery.

In a study conducted to determine the relationship between GH and PB lengths and POP, both GH and PB measurements showed a weak correlation with age. However, unlike our study, 90% of the patients in this study were multiparous women (19). In a retrospective study aiming to identify the independent risk factors of POP, evaluating 244 cases with prolapse and 314 participants without prolapse, GH

Table 3. The relationship between GH, PB lengths and BMI, mediolateral episiotomy, midline episiotomy and active coitus periods

		GH	PB
Age (year)	r	0.029	0.141
	p	0.567	0.004**
BMI	r	0.380	0.346
	p	0.001**	0.001**
Mediolateral episiotomy	r	0.174	0.023
	p	0.001**	0.643
Midline episiotomy	r	0.044	0.059
	p	0.379	0.235
Active coit time (year)	r	0.060	0.183
	p	0.231	0.001**

r: Spearman correlation test, **p<0.01, GH: Genital hiatus, PB: Perineal body, BMI: Body mass index

Table 4. Comparison of GH, PB lengths with vaginitis and vaginal flatulence symptoms

		GH			PB		
		Mean ± SD	Median (min-max)	p	Mean ± SD	Median (min-max)	p
History of recurrent vaginitis	No	23.81±5.98	23 (10.8-49)	◊ 0.647	31.42±6.22	31.1 (0-51)	◊ 0.079
	Rare	24.68±6.79	24.5 (13.7-47.2)		29.04±5.38	28.7 (19-42.5)	
	Frequent	23.54±5.70	24 (10.1-35.6)		30.93±5.51	31.2 (18.8-44.1)	
Vaginal flatus	No	23.64±6.25	22.9 (11.2-49)	◊ 0.304	31.39±6.12	31.4 (0-51)	◊ 0.420
	Rare	23.83±5.60	23.5 (10.1-43.2)		30.50±5.97	29.9 (18-47)	
	Frequent	25.27±5.42	24.4 (10.8-39.6)		31.32±6.00	30.7 (20.2-50.8)	

◊One-Way ANOVA test, GH: Genital hiatus, PB: Perineal body, SD: Standard deviation, min-max: Minimum-maximum

measurements in the group suffering from prolapse were detected to be positively correlated with age, whereas PB lengths were found to have a negative association, and GH and PB values were not compared with these variables in the group without prolapse (20).

A study including 535 patients, investigating PB and GB measurements of patients in two groups prior to prolapse surgery, did not establish a difference between sexually active women and those with no sexual activity. However, the duration of sexual activity of cases was not considered in this study. The status of sexual activity was assessed within the last 3 months (21).

We also evaluated the relationship between GH and PB measurements and vaginal symptoms such as recurrent vaginitis and vaginal flatulence. To the best of our knowledge, no other study has been identified on this matter. Although recurrent vaginitis was less common in nulliparous women, we could not detect any difference between the groups in terms of vaginal flatulence. In a study conducted, nonspecific vaginitis was not found to be associated with previous pregnancies, history of abortion, mean number of pregnancies, number of abortions, and years of sexual activity (22). In another study, no difference was found between the group with recurrent bacterial vaginosis and the control group in terms of the number of previous deliveries (23). Participants who had vaginal and cesarean deliveries were compared in a study conducted on 942 patients, and similar to our findings, no variance was shown with regard to vaginal flatulence (9). Likewise, in another study with 341 cases included, the characteristics of patients with and without vaginal flatulence were analyzed. There was no difference in these patients with regard to cesarean and vaginal deliveries (10). More and larger studies are required because vaginal flatulence is the newly identified symptom. The small number of patients and the fact that multiparous cases were not included in the study are the most important limitations of our study.

CONCLUSION

Based on the results of our study, the mean GH value was 23.8 mm and the average PH length was 31.1 mm in Turkish women. Further comprehensive studies are needed worldwide to determine whether GH and PB measurements vary between races.

When the results of our study were evaluated, GH enlargement due to single vaginal delivery, mediolateral episiotomy, age and weight, and recurrent vaginitis were less common in nulliparous patients. This finding was

accepted as supporting data of that vaginal childbirth has been a factor in leading to POP. Even if we do not find it related, increased GH may disrupt the defense mechanisms of the vagina and increase the risk of infection and vaginal flatulence, especially in multiparous cases. We believe that it is important to increase primiparous births without performing episiotomy and to control weight. Our study is the first on this subject. However, more extensive research is required to investigate the relationship between GH and PB measurements and these symptoms.

ETHICS

Ethics Committee Approval: The study was approved by the University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital Clinical Research Ethics Committee (decision no: 2021-03-19, date: 01.02.2021).

Informed Consent: Informed consent was obtained from the patients.

Authorship Contributions

Surgical and Medical Practices: H.E., K.D., Concept: H.E., K.D., Design: H.E., K.D., Data Collection or Processing: H.E., K.D., Analysis or Interpretation: H.E., K.D., Literature Search: H.E., K.D., Writing: H.E., K.D.

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REFERENCES

1. Uptodate: Surgical female urogenital anatomy. Available from: https://www.uptodate.com/contents/surgical-female-urogenital-anatomy?source=history_widget-14-August-2022
2. Haylen BT, Maher CF, Barber MD, Camargo S, Dandolu V, Digesu A, et al. An International Urogynecological Association (IUGA) / International Continence Society (ICS) joint report on the terminology for female pelvic organ prolapse (POP). *Int Urogynecol J* 2016;27:165-94.
3. Pelvic Organ Prolapse. Hoffman B, Schorge J, Bradshaw K, Halvorson L, Schaffer J, Corton M, editors. In: *Williams Gynecology*. 3rd ed. McGraw-Hill; 2016. p. 636.
4. Gynecological Infection. Hoffman B, Schorge J, Bradshaw K, Halvorson L, Schaffer J, Corton M, editors. In: *Williams Gynecology*. 3rd ed. McGraw-Hill; 2016. p. 64-5.
5. Coco AS, Vandenbosche M. Infectious vaginitis. An accurate diagnosis is essential and attainable. *Postgrad Med* 2000;107:63-6.
6. CDC, Diseases Characterized by Vulvovaginal Itching, Burning, Irritation, Odor or Discharge Available from: <https://www.cdc.gov/std/treatment-guidelines/vaginal-discharge.htm> Accessed: 14.08.2022.
7. Sultan AH, Monga A, Lee J, Emmanuel A, Norton C, Santoro G, et al. An International Urogynecological Association (IUGA)/

- International Continence Society (ICS) joint report on the terminology for female anorectal dysfunction. *Int Urogynecol J* 2017;28:5-31.
8. Krissi H, Medina C, Stanton SL. Vaginal wind - a new pelvic symptom. *Int Urogynecol J Pelvic Floor Dysfunct* 2003;14:399-402.
 9. Veisi F, Rezavand N, Zangeneh M, Malekkhosravi S, Rezaei M. Vaginal flatus and the associated risk factors in Iranian women: a main research article. *ISRN Obstet Gynecol* 2012;2012:802648.
 10. Lau HH, Su TH, Chen YY, Huang WC. The Prevalence of Vaginal Flatus in Women With Pelvic Floor Disorders and Its Impact on Sexual Function. *J Sex Med* 2021;18:487-92.
 11. Dua A, Whitworth M, Dugdale A, Hill S. Perineal length: norms in gravid women in the first stage of labour. *Int Urogynecol J Pelvic Floor Dysfunct* 2009;20:1361-4.
 12. Trinh AT, Nippita TA, Dien TN, Morris JM, Roberts CL. Perineal length among Vietnamese women. *Taiwan J Obstet Gynecol* 2017;56:613-7.
 13. Lai CY, Cheung HW, Hsi Lao TT, Lau TK, Leung TY. Is the policy of restrictive episiotomy generalisable? A prospective observational study. *J Matern Fetal Neonatal Med* 2009;22:1116-21.
 14. Handa VL, Blomquist JL, Roem J, Muñoz A. Longitudinal study of quantitative changes in pelvic organ support among parous women. *Am J Obstet Gynecol* 2018;218:320.
 15. Fairchild PS, Low LK, Kowalk KM, Kolenic GE, DeLancey JO, Fenner DE. Defining "normal recovery" of pelvic floor function and appearance in a high-risk vaginal delivery cohort. *Int Urogynecol J* 2020;31:495-504.
 16. Young N, Atan IK, Rojas RG, Dietz HP. Obesity: how much does it matter for female pelvic organ prolapse? *Int Urogynecol J* 2018;29:1129-34.
 17. Kim BH, Lee SB, Na ED, Kim HC. Correlation between obesity and pelvic organ prolapse in Korean women. *Obstet Gynecol Sci* 2020;63:719-25.
 18. Aytan H, Tok EC, Ertunc D, Yasa O. The effect of episiotomy on pelvic organ prolapse assessed by pelvic organ prolapse quantification system. *Eur J Obstet Gynecol Reprod Biol* 2014;173:34-7.
 19. Dunivan GC, Lyons KE, Jeppson PC, Ninivaggio CS, Komesu YM, Alba FM, et al. Pelvic Organ Prolapse Stage and the Relationship to Genital Hiatus and Perineal Body Measurements. *Female Pelvic Med Reconstr Surg* 2016;22:497-500.
 20. Kim CM, Jeon MJ, Chung DJ, Kim SK, Kim JW, Bai SW. Risk factors for pelvic organ prolapse. *Int J Gynaecol Obstet* 2007;98:248-51.
 21. Edenfield AL, Levin PJ, Dieter AA, Amundsen CL, Siddiqui NY. Sexual activity and vaginal topography in women with symptomatic pelvic floor disorders. *J Sex Med* 2015;12:416-23.
 22. Amsel R, Totten PA, Spiegel CA, Chen KC, Eschenbach D, Holmes KK. Nonspecific vaginitis. Diagnostic criteria and microbial and epidemiologic associations. *Am J Med* 1983;74:14-22.
 23. Hansen JG, Schmidt H. Vaginal discharge and Gardnerella vaginalis. Predisposing factors. *Scand J Prim Health Care* 1985;3:141-3.