

## Research article

# Comparison of mood state in severe pelvic organ prolapse patients before and after surgery



Xicui Long<sup>1</sup>, Yong Hu<sup>1</sup>, Zhenghua Xiong, Chen Li, Wenjiao Jin, Huiming Guo, Juan Zhang, Xuesong Han<sup>\*</sup>

Department of Gynecology, The First Affiliated Hospital of Kunming Medical University, Kunming, Yunnan, China

## ARTICLE INFO

## Keywords:

Pelvic organ prolapse  
Anxiety  
Depression  
Mood state  
Surgery

## ABSTRACT

**Objective:** This study aimed to compare the mood state of patients with severe pelvic organ prolapse (POP) before and after surgery.

**Methods:** This prospective study enrolled 100 patients with severe POP who were surgically treated between October 2016 and February 2019. The clinical severity of POP was evaluated using the POP Quantification (POP-Q) System. Mood state evaluation, using the Hamilton anxiety (HAMA) and the Hamilton depression (HAMD) scale, was performed preoperatively and at 3 and 6 months postoperatively.

**Results:** The POP-Q stage was significantly improved postoperatively ( $P < 0.05$ ). Preoperatively, the patients had varying degrees of anxiety symptoms (mean HAMA score,  $11.94 \pm 5.59$  points) and depression symptoms (mean HAMD score,  $5.56 \pm 2.58$  points); these scores were significantly decreased at 3 months (mean HAMA score,  $4.67 \pm 2.02$  points; mean HAMD score,  $3.58 \pm 1.61$  points) and 6 months postoperatively (mean HAMA score,  $4.88 \pm 2.57$  points; mean HAMD score,  $3.38 \pm 1.60$  points) ( $P < 0.05$ ). There were no differences in the HAMD and HAMA scores in both traditional prolapse surgery patients and mesh pelvic reconstruction patients preoperatively and at 3 and 6 months postoperatively ( $P > 0.05$ ).

**Conclusions:** Patients with severe POP have different anxiety and depression symptoms preoperatively. Successful individualized surgical treatment is effective for improving the clinical severity of severe POP and might alleviate or improve POP-related anxiety or depression symptoms.

## 1. Introduction

Pelvic organ prolapse (POP) refers to the descent of one or more of the anterior vaginal wall, posterior vaginal wall, uterus (cervix), or apex of the vagina (vaginal vault or cuff scar after hysterectomy).<sup>1</sup> POP is a common disorder in parous women. The prevalence of POP is highly varied and is approximately between 3% and 50% according to different studies.<sup>2–6</sup> The number of patients suffering from symptomatic POP is predicted to increase to 46%, over 5 million individuals, by 2050 as the demographic of women over 65 years old increases in the USA.<sup>7–9</sup> Surgical treatment remains the mainstream therapeutic strategy for POP,

and more than 1/10 patients may undergo POP repair surgery during their lifetime.<sup>10</sup> Most studies have focused on the clinical efficacy of POP repair surgery, which has been confirmed to be effective for controlling POP symptoms. Although POP is generally not life-threatening, it severely impairs an individual's physical and psychological health, resulting in a significant public health burden.<sup>7</sup> Moreover, the psychosocial dysfunctions caused by POP are usually underdiagnosed and undertreated.<sup>11</sup> Mood state is a chronic or transitory psychological state experienced as a feeling or emotion that influences function and well-being.<sup>12</sup> However, several recent studies have demonstrated that mood state is closely related to pelvic floor disorders and many POP patients

\* Corresponding author. Department of Gynecology, The First Affiliated Hospital of Kunming Medical University, Kunming, Yunnan, China  
E-mail address: [h anxuesong.119@163.com](mailto:h anxuesong.119@163.com) (X. Han).



<sup>1</sup> Xicui Long and Yong Hu contributed equally to this work.

<https://doi.org/10.1016/j.gocm.2021.11.005>

Received 7 February 2021; Received in revised form 4 August 2021; Accepted 3 November 2021

Available online 25 November 2021

2667-1646/© 2021 The Authors. Publishing services by Elsevier B.V. on behalf of KeAi Communications Co. Ltd. This is an open access article under the CC BY-NC-ND

license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

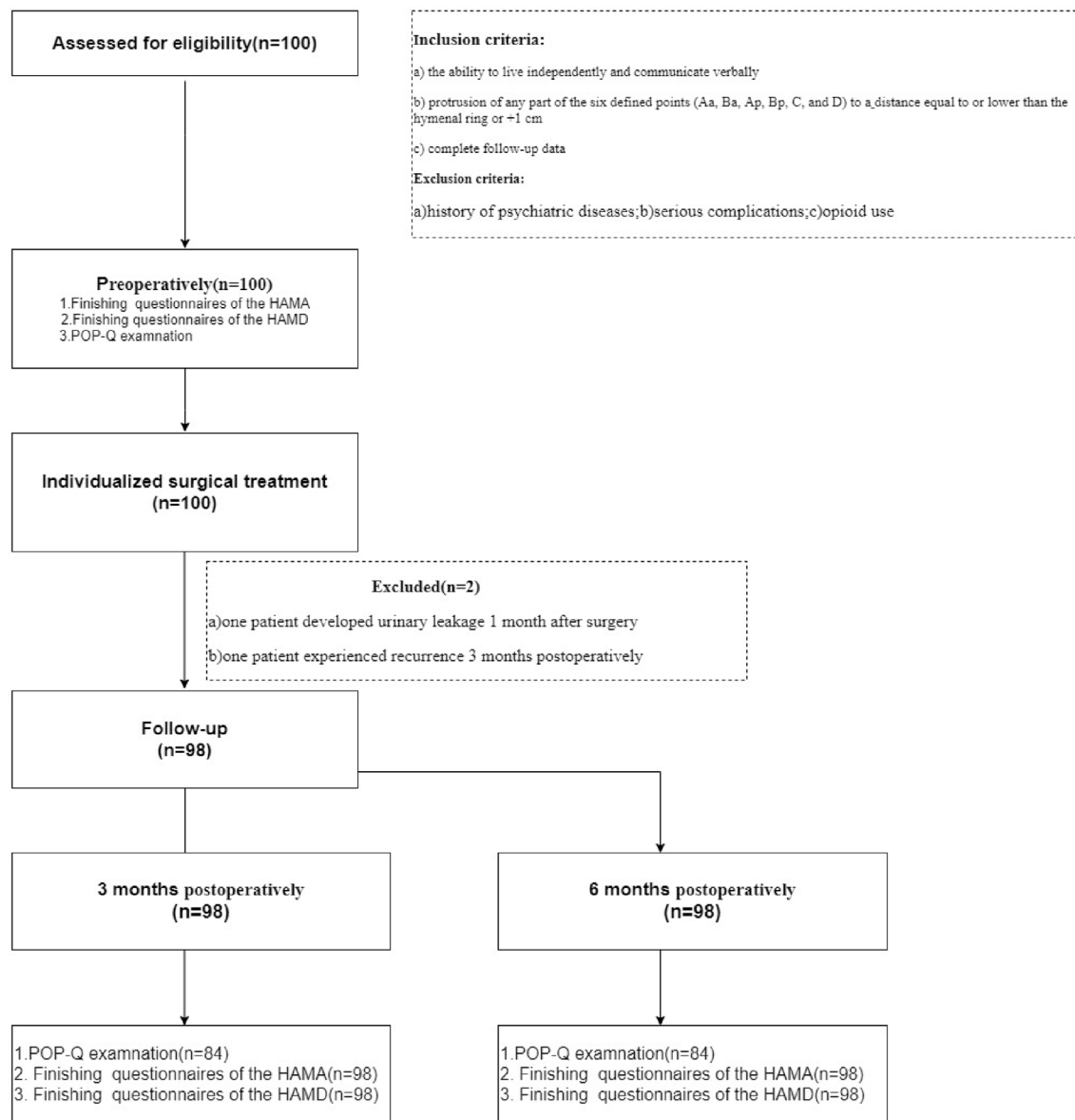


Fig. 1. Study design flowchart.

have elevated negative mood states like anxiety and depressive mood.<sup>13–16</sup> Thus, this study aimed to compare the mood state of patients with severe POP before and after surgery.

## 2. Materials and methods

This single-center prospective study included a total of 100 patients who underwent surgical treatment for severe POP in the First Affiliated Hospital of Kunming Medical University from October 2016 to February 2019. The inclusion criteria were as follows: a) the ability to live independently and communicate verbally; b) protrusion of any part of the six defined points (Aa, Ba, Ap, Bp, C, and D) to 1 cm equal to or lower than the hymenal ring<sup>17</sup>; and c) complete follow-up data. Patients with a history of psychiatric diseases, serious complications, or opioid use were excluded.<sup>18</sup> This study was approved by the Ethics Committee of Kunming Medical University (LunShen L No.13). Signed informed consent was obtained from each participant.

Anxiety and depression scores were assessed using the Hamilton Anxiety Scale (HAMA) and the Hamilton Depression Scale (HAMD),

respectively.<sup>19–23</sup> The HAMA scale consists of 14 symptom elements (including: anxious mood; tension; fears; insomnia; cognitive changes; depressed mood; somatic symptoms; sensory; cardiovascular; respiratory; gastrointestinal; genitourinary; autonomic; observed behaviour at interview), including both psychological and somatic symptoms.<sup>24</sup> Each item is scored from 1 to 5 depending on the severity of the symptoms, and the total scores are 70 points. Patients are classified into four levels according to the total points: normal (0–6), mild anxiety (7–13), moderate anxiety (14–20), and severe anxiety ( $\geq 21$ ). We used the 17 item HAMD scale to evaluate the severity of depression symptoms. The 17 items including: depressed mood (0–4); low self-esteem (0–4), feelings of guilt (0–4); suicide (0–4); insomnia early (0–2); insomnia middle (0–2); insomnia late (0–2); work and activities (0–4); retardation (0–4); agitation (0–4); anxiety, psychic (0–4); anxiety, somatic (0–4); somatic symptoms gastrointestinal (0–2); somatic symptoms general (0–2); genital symptoms (0–2); hypochondriasis (0–4); loss of weight within the last week (0–2); insight (0–4). Each item is scored from 0 to 2 or 0 to 4, depending on the severity of the symptoms and the total scores are 54 points. According to the total scores, patients are divided into four

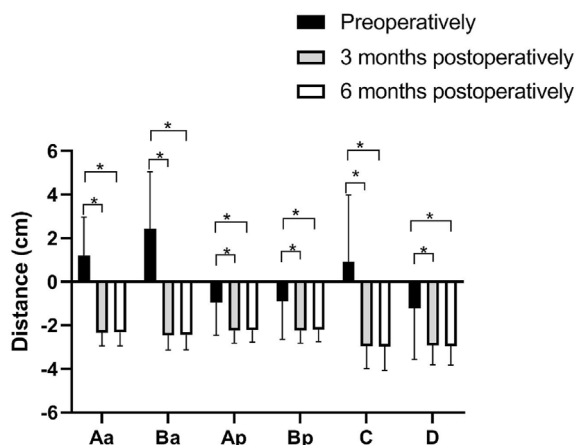


Fig. 2. Results of POP-Q examinations preoperatively and at 3 and 6 months postoperatively\*  $P < 0.05$ .

**Table 1**  
Results of psychological assessments of patient with POP.

Evaluation	HAMA score (mean $\pm$ SD)	HAMD score (mean $\pm$ SD)
Preoperatively	11.94 $\pm$ 5.59	5.56 $\pm$ 2.58
3 months postoperatively	4.67 $\pm$ 2.02 <sup>a</sup>	3.58 $\pm$ 1.61 <sup>a</sup>
6 months postoperatively	4.89 $\pm$ 2.57 <sup>a,b</sup>	3.37 $\pm$ 1.60 <sup>a,b</sup>

<sup>a</sup> Comparing to the preoperative baseline level,  $P < 0.05$ .  
<sup>b</sup> Comparing to the results 3 months postoperatively,  $P < 0.05$ .

categories: normal (0–7), mild depression (8–16), moderate depression (17–23), and severe depression ( $\geq 24$ ).

The clinical severity of POP was evaluated using with the POP Quantification (POP-Q) staging system that was introduced in 1996 as an objective and accurate scale for describing the pelvic floor anatomy in women with POP.<sup>25</sup> This scale is composed of 9 measurements regarding the vagina and perineum anatomy via a routine pelvic examination, and POP was divided into five stages (0–IV).<sup>25</sup> In this study, all examinations were performed by trained physicians, in which patients were asked to take a deep breath and then hold the breath as if they are bearing down. Recurrence was defined as a postoperative POP-Q stage of  $\geq$  II (the point of the most distal prolapse is between 1 cm above and 1 cm below the hymenal plane).<sup>26</sup>

Clinical and psychological evaluations were performed preoperatively and at 3 and 6 months postoperatively. The individual clinical profiles of the patients were collected. Afterward, individualized surgical treatment was planned according to the POP-Q stage, medical history, and subjective consideration.

SPSS 22.0 software (IBM Corp., Armonk, NY, USA) was used for statistical analyses. The enumeration data are expressed in percentage, and the measurement data are expressed as mean  $\pm$  standard deviation. Normally distributed numerical variables were compared by the  $t$ -test, and those with skewed distribution by the rank-sum test. Probability ( $P$ ) values  $\leq 0.05$  were considered significant.

### 3. Results

In this study, a total of 98 patients completed the assessments (one patient developed urinary leakage 1 month after surgery and another patient experienced recurrence 3 months postoperatively; these two patients were eventually excluded from the study due to incomplete follow-up data). Among the patients, 10 underwent vaginal total hysterectomy plus total colpectomy and four underwent Le Fort-style partial colpo-plexis; these 14 patients could not complete the POP-Q examination postoperatively. The study design flowchart is showed in Fig. 1. The other 84 patients received the POP-Q examination and the results are

showed in Fig. 2. The POP-Q stage was significantly improved 3 and 6 months postoperatively ( $P < 0.05$ ).

The mean age of the participants was  $60.59 \pm 11.68$  years (range, 34–93 years) and the mean parity was  $(2.5 \pm 1.50)$  times. The combined symptoms included mild incontinence ( $n = 12$ ; 12%); hypertension ( $n = 39$ ; 39%); diabetes ( $n = 11$ ; 11%); ovarian cyst or uterine myoma ( $n = 17$ ; 17%); and history of hysterectomy ( $n = 5$ ; 5%).

Preoperatively, all patients had varying degrees of anxiety symptoms (all  $> 7$  points; mean HAMA score,  $11.94 \pm 5.59$  points). Among these participants, 18 (18.37%) had mild anxiety symptoms, 23 (23.50%) had moderate anxiety symptoms, and 57 (58.13%) had severe anxiety symptoms. Three months postoperatively, the mean anxiety score was  $4.67 \pm 2.02$  points; 5 (5.10%) patients had mild anxiety symptoms, 3 (3.10%) had moderate anxiety symptoms, and none had severe anxiety symptoms. After 6 months, the mean anxiety score was  $4.89 \pm 2.57$  points; 2 (2.00%) patients had mild anxiety symptoms and 15 (15.30%) had moderate anxiety symptoms, and none had severe anxiety symptoms. Compared to the preoperative baseline level, the anxiety scores were significantly decreased 3 and 6 months postoperatively (both  $P < 0.05$ ). However, compared to the condition 3 months postoperatively, the anxiety scores were higher after 6 months ( $P < 0.05$ ). In this study, the preoperative mean anxiety score was  $11.94 \pm 5.59$  points, indicating that the patients had anxiety symptoms. Three months postoperatively, the mean anxiety score was  $4.67 \pm 2.02$  points, indicating that the patients' anxiety scores had decreased to normal levels. At the 6-month follow-up, the mean anxiety score was  $4.89 \pm 2.57$  points, indicating an increase in anxiety symptoms. The HAMA scores showed a slight increase from the 3-month evaluation to the 6-month evaluation; this result was statistically significant. The detailed data is presented in Table 1.

According to the surgical approaches used, we divided patients into a traditional prolapse surgery group ( $n = 46$ ) and a mesh pelvic reconstruction group ( $n = 52$ ) and compared the HAMA scores in the two groups. The respective mean anxiety scores of HAMA and HAMD had no significant difference between traditional prolapse surgery group and mesh pelvic reconstruction group before and after surgery ( $P > 0.05$ ). The detailed data is presented in Table 2.

Preoperatively, the mean HAMD score was  $5.56 \pm 2.58$  points. Among the patients, 20 (20.40%) had mild depression symptoms and none had moderate or severe depression symptoms. Three months postoperatively, the mean depression score was  $3.58 \pm 1.61$  points, which was significantly lower than the preoperative baseline level ( $P < 0.05$ ). After 6 months, the mean depression score was  $3.37 \pm 1.60$  points, which was also significantly lower than the preoperative baseline level and the 3-month data ( $P < 0.05$ ). The mean depression score was  $5.56 \pm 2.58$  points preoperatively and decreased to  $3.58 \pm 1.61$  and  $3.37 \pm 1.60$  points after 3 and 6 months, respectively. The postoperative mean depression scores were less than 7 points, meaning that our patients were within the normal range for depression symptoms. The detailed data is presented in Table 1. In the traditional prolapse surgery and mesh pelvic reconstruction groups, the respective mean depression scores were  $5.59 \pm 2.92$  and  $5.56 \pm 3.06$  points preoperatively ( $P > 0.05$ ),  $3.52 \pm 1.73$  and  $3.63 \pm 1.62$  points 3 months postoperatively ( $P > 0.05$ ), and  $3.33 \pm 1.33$  and  $3.40 \pm 1.36$  points 6 months postoperatively ( $P > 0.05$ ). The detailed data is presented in Table 2.

### 4. Discussion

POP may cause various health problems and could significantly impacts the mood health and subjective well-being of women.<sup>14</sup> Vrijens et al. conducted a cross-sectional cohort study and noted that POP was associated with anxiety and depression symptoms.<sup>15</sup> In the current study, we used the HAMA and HAMD rating scales to evaluate the severity of anxiety and depression symptoms. We also found that patients with severe POP presented varying degrees of anxiety and depression symptoms preoperatively. We speculate that the occurrence of anxiety and depression symptoms may be correlated with a poor understanding of

**Table 2**  
Results of psychological assessments for different surgical approaches of patient with POP.

Time	Evaluation	Traditional prolapse surgery	Mesh pelvic reconstruction	t value	P value
		Score (mean ± SD)	Score (mean ± SD)		
Preoperatively	HAMA	11.67 ± 5.57	12.17 ± 4.40	−0.49	0.63
	HAMD	5.59 ± 2.92	5.56 ± 3.06	0.04	0.96
3 months postoperatively	HAMA	4.46 ± 2.21	4.85 ± 2.27	−0.86	0.39
	HAMD	3.52 ± 1.73	3.63 ± 1.62	−0.33	0.74
6 months postoperatively	HAMA	4.57 ± 2.54	5.17 ± 2.08	−1.29	0.20
	HAMD	3.33 ± 1.33	3.40 ± 1.36	−0.29	0.78

POP among patients and an unwillingness to see a doctor. The patients may feel ashamed when talking about POP and may refuse to participate in daily social activities. Furthermore, Khan et al. found that pelvic floor muscle training is an effective strategy for improving POP symptoms and was most beneficial for patients without moderate-to-severe anxiety or depression. Patients with moderate-to-severe anxiety or depression may not benefit from the training.<sup>16</sup> In this study, 15 different surgery approaches were used for POP and the POP-Q stage was significantly improved 3 and 6 months postoperatively. The finding supported that individualized surgery is an effective treatment for POP. Further, the anxiety and depression scores significantly decreased postoperatively in patients with severe POP, which may provide theoretical evidence for further psychological interventions. Although we found that the depression was continuously improved with time, the anxiety seemed to be aggravated after a 6-month follow-up. The determination of the clinical relevance requires further studies. The HAMA scores and HAMD scores in the traditional prolapse surgery group and mesh pelvic reconstruction group were almost the same at the time points. In other words, the two different surgical approaches involving native tissue repair or mesh pelvic reconstruction improved the effect on anxiety and depression equally. This study provides valuable information for better understanding of psychological symptoms in patients with severe POP. Thus, clinicians should pay more attention to psychological disorders in patients at different stages of severe POP. Early diagnosis and management are important to improve the patient's health and quality of life. However, this study still has the following limitations. First, the anxiety questionnaires were administered 2 days before the surgery, which can be a very stressful time associated with higher levels of anxiety. In future studies, we will assess HAMA during the patient's initial consultation with the physician rather than before surgery. In addition, the definitive mechanisms underlying POP-related anxiety and depression symptoms remain unclear. We will enroll more POP patients and create a regression model to investigate the relationship between the variance of depression and anxiety in future studies.

In conclusion, clinicians should be aware of the presence of psychological disorders in patients with severe POP. Individualized surgical treatment might be correlated with the remission of anxiety and depression symptoms.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgments

None.

#### References

- Rogers RG, Pauls RN, Thakar R, et al. An international urogynecological association (IUGA)/international continence society (ICS) joint report on the terminology for the assessment of sexual health of women with pelvic floor dysfunction. *Neurourol Urodyn.* 2018;37(4):1220–1240. <https://doi.org/10.1002/nau.23508>.
- Chen CCG, Avondstondt AM, Khatri SK, et al. Prevalence of symptomatic urinary incontinence and pelvic organ prolapse among women in rural Nepal. *Int Urogynecol J.* 2020;31(9):1851–1858. <https://doi.org/10.1007/s00192-019-04129-y>.
- Nygaard I, Barber MD, Burgio KL, et al. Pelvic floor disorders network. prevalence of symptomatic pelvic floor disorders in US women. *J Am Med Assoc.* 2008;300(11):1311–1316. <https://doi.org/10.1001/jama.300.11.1311>.
- Åkervall S, Al-Mukhtar Othman J, Molin M, et al. Symptomatic pelvic organ prolapse in middle-aged women: a national matched cohort study on the influence of childbirth. *Am J Obstet Gynecol.* 2020;222(4). <https://doi.org/10.1016/j.ajog.2019.10.007>, 356.e1–356.e14.
- Akter F, Gartoulla P, Oldroyd J, et al. Prevalence of, and risk factors for, symptomatic pelvic organ prolapse in Rural Bangladesh: a cross-sectional survey study. *Int Urogynecol J.* 2016;27(11):1753–1759. <https://doi.org/10.1007/s00192-016-3038-0>.
- Chung SH, Kim WB. Various approaches and treatments for pelvic organ prolapse in women. *J Menopausal Med.* 2018;24(3):155–162. <https://doi.org/10.6118/jmm.2018.24.3.155>.
- Wilkins MF, Wu JM. Lifetime risk of surgery for stress urinary incontinence or pelvic organ prolapse. *Minerva Ginecol.* 2017;69(2):171–177. <https://doi.org/10.23736/S0026-4784.16.04011-9>.
- Wein AJ. Re: lifetime risk of stress urinary incontinence or pelvic organ prolapse surgery. *J Urol.* 2015;194(2):475. <https://doi.org/10.1016/j.juro.2015.05.071>.
- Jokhio AH, Rizvi RM, MacArthur C. Prevalence of pelvic organ prolapse in women, associated factors and impact on quality of life in rural Pakistan: population-based study. *BMC Womens Health.* 2020;20(1):82. <https://doi.org/10.1186/s12905-020-00934-6>.
- Olsen AL, Smith VJ, Bergstrom JO, et al. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. *Obstet Gynecol.* 1997;89(4):501–506. [https://doi.org/10.1016/S0029-7844\(97\)00058-6](https://doi.org/10.1016/S0029-7844(97)00058-6).
- Touza KK, Rand KL, Carpenter JS, et al. A scoping study of psychosocial factors in women diagnosed with and/or treated for pelvic organ prolapse. *Female Pelvic Med Reconstr Surg.* 2020;26(5):327–348. <https://doi.org/10.1097/SPV.0000000000000578>.
- Tran Y, Blumgart E, Craig A. Mood state sub-types in adults who stutter: a prospective study. *J Fluency Disord.* 2018;56:100–111. <https://doi.org/10.1016/j.jfludis.2017.10.001>.
- Larouche M, Brotto LA, Koenig NA, et al. Depression, anxiety, and pelvic floor symptoms before and after surgery for pelvic floor dysfunction. *Female Pelvic Med Reconstr Surg.* 2020;26(1):67–72. <https://doi.org/10.1097/SPV.0000000000000582>.
- Ghetti C, Skoczylas LC, Oliphant SS, et al. The emotional burden of pelvic organ prolapse in women seeking treatment: a qualitative study. *Female Pelvic Med Reconstr Surg.* 2015;21(6):332–338. <https://doi.org/10.1097/SPV.0000000000000190>.
- Vrijens D, Berghmans B, Nieman F, et al. Prevalence of anxiety and depressive symptoms and their association with pelvic floor dysfunctions—a cross sectional cohort study at a Pelvic Care Centre. *Neurourol Urodyn.* 2017;36(7):1816–1823. <https://doi.org/10.1002/nau.23186>.
- Khan ZA, Whittall C, Mansol S, et al. Effect of depression and anxiety on the success of pelvic floor muscle training for pelvic floor dysfunction. *J Obstet Gynaecol.* 2013; 33(7):710–714. <https://doi.org/10.3109/01443615.2013.813913>.
- Committee on Practice Bulletins-Gynecology, American Urogynecologic Society. Practice bulletin No. 185: pelvic organ prolapse. *Obstet Gynecol.* 2017;130(5):e234–e250. <https://doi.org/10.1097/AOG.0000000000002399>.
- Chojnacka-Szawłowska G, Kloc W, Zdun-Ryżewska A, et al. Impact of different illness perceptions and emotions associated with chronic back pain on anxiety and depression in patients qualified for surgery. *Pain Manag Nurs.* 2019;20(6):599–603. <https://doi.org/10.1016/j.pmn.2019.02.009>.
- Zimmerman M, Martin J, Clark H, et al. Measuring anxiety in depressed patients: a comparison of the Hamilton anxiety rating scale and the DSM-5 anxious distress specifier interview. *J Psychiatr Res.* 2017;93:59–63. <https://doi.org/10.1016/j.jpsychires.2017.05.014>.
- Thompson E. Hamilton rating scale for anxiety (HAM-A). *Occup Med (Lond).* 2015; 65(7):601. <https://doi.org/10.1093/occmed/kqv054>.
- Carrozzino D, Patierno C, Fava GA, et al. The Hamilton rating scales for depression: a critical review of clinimetric properties of different versions. *Psychother Psychosom.* 2020;89(3):133–150. <https://doi.org/10.1159/000506879>.
- Parker G, Hadzi-Pavlovic D. Do Hamilton depression scale items have the capacity to differentiate melancholic and non-melancholic depressive sub-types? *J Affect Disord.* 2020;274:1022–1027. <https://doi.org/10.1016/j.jad.2020.05.138>.
- Hieronimus F, Lisinski A, Eriksson E, et al. Do side effects of antidepressants impact efficacy estimates based on the Hamilton depression rating scale? a pooled patient-

- level analysis. *Transl Psychiatry*. 2021;11(1):249. <https://doi.org/10.1038/s41398-021-01364-0>.
24. Hamilton M. The assessment of anxiety states by rating. *Br J Med Psychol*. 1959; 32(1):50–55. <https://doi.org/10.1111/j.2044-8341.1959.tb00467.x>.
25. Bump RC, Mattiasson A, Bø K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol*. 1996;175(1): 10–17. [https://doi.org/10.1016/s0002-9378\(96\)70243-0](https://doi.org/10.1016/s0002-9378(96)70243-0).
26. Wagner L, Chevrot A, Llinares E, et al. Long-term anatomic and functional results of laparoscopic sacrocolpopexy: a prospective study. *Int Urol Nephrol*. 2019;51(5): 795–802. <https://doi.org/10.1007/s11255-019-02124-2>.