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A cross-sectional investigation on the function of the female pelvic floor in the Sichuan Province, China

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Abstract

Background Pelvic floor dysfunction significantly impacts patients' quality of life, and its incidence is steadily increasing over time. However, there remains a lack of sufficient awareness regarding this condition. This study aims to enhance public awareness through relevant surveys.

Methods A total of 368 married women were randomly recruited from the Obstetrics and Gynecology Department of Leshan People's Hospital from May 2018 to December 2023 for pelvic floor function screening. Of these, 122 married women did not have children (group A), 122 married women had children before menopause (group B), and 124 women were postmenopausal (group C). Through questionnaire survey, Pelvic Organ Prolapse Quantification score, and myoelectric assessment, the data were collected and statistically analyzed.

Results The electrophysiological indicators of the three groups revealed statistically significant differences in the prevalence of manual muscle strength ≥ grade 3, anal lift muscle strength ≥ grade 3, Class I muscle fatigue, and maximum systolic pressure among the groups ($p < 0.05$). However, there was no statistically significant difference observed in Class II muscle fatigue. ($p \geq 0.05$). The results of pelvic organ prolapse in the three groups showed statistically significant differences ($p < 0.05$). When comparing the Aa value and C value between groups, there were statistically significant differences between group A and group B as well as between group A and group C ($p < 0.05$). However, the differences between group B and group C were not statistically significant ($p > 0.05$). In terms of the D value comparison, there was a statistically significant difference between group A and group C ($p < 0.05$), but no significance was found when comparing group A with group B or when comparing group B with group C ($p > 0.05$). Additionally, there were statistically significant variations observed in Ap values among the three groups ($p < 0.05$).

Conclusion Before the onset of symptoms associated with pelvic floor dysfunction, there are changes in the position of pelvic organs and electrophysiological indicators of the pelvic floor. Therefore, early screening, detection, and treatment are crucial for preventing the development of pelvic floor dysfunction diseases.

Keywords Healthy women, Pelvic floor function, Prevention, Pelvic organ prolapse quantification score, Electrophysiology

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Background

Degradation, trauma, and low levels of sex hormones can cause damage to the pelvic floor support system, weakening the supporting tissues and causing displacement of pelvic organs. This chain of events leads to position and functional abnormalities in other pelvic organs, ultimately resulting in pelvic floor dysfunction (PFD) [1–3], also called pelvic floor defect or relaxation of the pelvic floor support tissue. The conditions primarily encompass a range of non-fatal ailments, including urinary incontinence, fecal incontinence, pelvic organ prolapse, sexual dysfunction, and chronic pelvic pain, among others [4, 5].

In China, the prevalence of PFD among married women ranges from 40–60% [6]. In the United States, the overall prevalence of PFD among women is approximately 24%, with this figure rising to 49.7% in women aged 80 and older [7]. Projections suggest that by 2050, the incidence of uterine prolapse could approach 50% [8]. A study examining 1,600 hospitalized patients aged 20 to 81 found a PFD prevalence rate of 70.19% [9]. According to DeLancey [10], PFD affects between 300,000 and 400,000 American women, with severe cases often requiring surgical intervention for symptom relief.

The treatment predominantly depends on the impact it has on patients' quality of life [11–13]. However, presently there is insufficient public awareness regarding this condition, leading to a high prevalence rate and low consultation rate. A study involving 331 pregnant women revealed that their knowledge levels regarding PFD were categorized as high (4.83%), moderate (23.56%), and low (71.60%). The findings indicate that, although pregnant women recognize the importance of PFD, their overall awareness remains relatively limited [14]. International studies have shown that among 45 women who delivered vaginally, 93% consulted midwives postpartum, but only 56% participated in pelvic floor muscle training [15]. Among 2,400 parous women, the prevalence rates for urinary incontinence, uterine prolapse, vaginal laxity, and vaginal wall prolapse were 16.17% (388 cases), 1.33% (32 cases), 23.25% (558 cases), and 15.17% (364 cases), respectively. Educational attainment, economic status, and personal awareness are significant factors influencing PFD awareness [16, 17].

With the aging population and the implementation of China's three-child policy, the incidence of PFD is not only increasing but also exhibiting a trend toward younger age groups. Consequently, early detection, timely diagnosis, and prompt treatment are of paramount importance to mitigate the impact of PFD on affected individuals [18]. Sichuan, a relatively less economically developed province in western China, has residents with limited awareness of diseases and health issues. Leshan City, with its medium-sized population within Sichuan Province, encompasses a diverse group of women across different ages, occupations, and lifestyles, making it representative of the general characteristics of women in the region. Currently, research on pelvic floor dysfunction is predominantly focused on major cities, while medium-sized cities like Leshan receive comparatively less attention. Investigating the pelvic floor function status of women in Leshan can not only fill the research gap for medium-sized cities but also provide a more comprehensive regional perspective for disease prevention and management.

Objectives

To gain insights into the normal functioning of the female pelvic floor region, the study authors participated in a nationwide multi-center project titled "Cross-sectional study of Chinese female pelvic floor function" to investigate the fundamental pelvic floor status among married women residing in the Leshan area of the Sichuan province.

Methods

Research subjects

A total of 368 married women were recruited from the Obstetrics and Gynecology Department of Leshan People's Hospital between May 2018 and December 2023. They were divided into three groups: Group A comprised 122 married women without children, Group B included 122 married women with children before menopause, and Group C comprised 124 postmenopausal women. All participants had an active sexual life and were able to tolerate vaginal examinations, and expressed a willingness to reside locally for an extended period. The inclusion criteria for each group were as follows: Group A: no history of abortion after 16 weeks of pregnancy or giving birth before menopause. Group B: premenopausal women with a history of full-term delivery, including both vaginal delivery and cesarean section. Group C: postmenopausal women excluding those who underwent surgical menopause. The following exclusion criteria were applied: (1) Urinary incontinence within the 4 weeks preceding the examination; (2) Patients with fecal incontinence occurring within the 4 weeks before the examination; (3) Pelvic organ prolapse extending beyond the hymenal margin; (4) History of radical pelvic surgery, hysterectomy, pelvic radiotherapy, and pelvic floor surgery; (5) ≥ 16 gestational weeks of late pregnancy abortion or postpartum 1 year; (6) Pregnant or lactating women; (7) An allergy to latex or vaginal inflammation. This study was reviewed and approved by the hospital's ethics committee ([2018] No.17), and all participants provided written informed consent.

Research methods

The following data were collected from all study participants: (1) Basic information, medical history, and pregnancy and childbirth history; (2) Pelvic Organ Prolapse Quantification (POP-Q) score; (3) Improved Oxford Muscle Strength rating (MOS) and levator anal muscle test grade (LAT); and (4) pelvic floor electrophysiological function index. Two highly trained doctors were responsible for data collection.

Inspection method

The pelvic organ prolapse quantification score was utilized to quantitatively evaluate the extent of pelvic organ prolapse. Pelvic floor muscle strength was assessed using the modified MOS and LAT grades [19]. The PHENIX U4 (Unified standardized and calibrated debugging) neuromuscular stimulation therapy instrument was employed to detect electrophysiological indicators of the pelvic floor including muscle strength, fatigue, A3 reflex, and maximum dynamic pressure.

Statistical methods

The data analysis was conducted using SPSS 25.0 software (IBM Corporation, Armonk, NY, USA). Normality tests were performed on all measurement data. Data conforming to a normal distribution were expressed as mean ± standard deviation ($\bar{x} \pm s$), and inter-group differences were compared using t-tests. For data not conforming to a normal distribution, a median with an interquartile range [M(Q1, Q3)] was used, and non-parametric tests were applied. Categorical data were presented as frequencies and percentages [n(%)], and chi-square (χ^2) tests were used to compare differences between groups. Logistic stepwise regression was employed for multi-factor analysis. All statistical tests were two-sided, with $p < 0.05$ indicating statistical significance.

Results

Basic information and obstetric conditions

The baseline clinical and demographic characteristics of all patients as presented in Table 1, while the obstetric findings as presented in Table 2.

There were statistically significant differences observed among groups A, B, and C in terms of age, height, weight, education level, working position, work nature, physical labor intensity, and urinary incontinence and pelvic organ prolapse in the mother or sister of the subjects($p \leq 0.001$). There was also a statistically significant difference in toilet modes ($p = 0.04$). However, no significant difference was found in smoking prevalence between groups A, B, and C ($p = 0.23 > 0.05$).

Comparison of electrophysiological indices of pelvic floor and grading of pelvic organ prolapse among the three study groups

The electrophysiological indicators of the pelvic floor as presented in Table 3, while the grading for pelvic organ prolapse is presented in Table 4.

There were significant differences among the three groups in terms of Aa, Ap, C, and D values, hand-measured modified MOS, LAT grade, deep type I muscle fiber strength, deep type I muscle fiber fatigue, deep type II muscle fiber strength, and maximum contraction pressure (cmH_2O) ($p < 0.001$; specifically, $p = 0.01$ for maximum contraction pressure, while $p < 0.001$ for the other indicators). However, there was no significant difference in the degree of deep type II muscle fiber fatigue among the three groups ($p = 0.87 \geq 0.05$). Additionally, the differences in Ap values and Bp values among the three groups were statistically significant ($p < 0.001$). Specifically, significant differences were observed between Group A and Group B, as well as between Group A and Group C, in terms of Aa and C values, hand-measured modified MOS force grading, LAT grading, deep type I muscle fiber fatigue, and maximum contraction pressure (cmH_2O) ($p < 0.001$). However, no significant differences were found between Group B and Group C for these indicators ($p = 1.000 > 0.05$; specifically, $p = 0.089$ for the C value). The difference in D value was statistically significant between Group A and Group C ($p < 0.001$), but not between Group A and Group B or between Group B and Group C ($p > 0.05$; $p = 0.053$ for A vs. B, and $p = 0.320$ for B vs. C). Additionally, there were significant differences in the strength of deep type II muscle fibers between Group B and Group A, as well as between Group B and Group C ($p < 0.05$), but not between Group A and Group C ($p = 1.000 > 0.05$). (Tables 3 and 4).

Discussion

The incidence of PFD ranges from 15 to 52% [20], which affects the quality of life of women concerning varied aspects across their physiology, psychology, and behavior [21]. Studies have found that women who undergo surgery for urinary incontinence or pelvic organ prolapse have a lifetime surgical risk of 19–20% [22], and early screening and intervention of pelvic floor function can effectively delay and prevent surgery, and even avoid the occurrence of such diseases [23]. The prevention and rehabilitation management of pelvic floor muscle dysfunction is a highly effective medical approach, with economic benefits far outweighing the costs [24]. A multicenter randomized controlled trial by Labrie et al. found that pelvic floor muscle training (PFMT) can enable approximately half of patients with moderate to severe stress urinary incontinence to avoid surgical intervention and achieve remission [25]. Postpartum pelvic floor

Table 1 Basic characteristics of the study subjects

Comparison item	Total population	Group A	Group B	Group C	χ^2	*p*
Age	45.93 ± 0.74	31.25 ± 0.65	45.25 ± 0.63	61.06 ± 0.65	534.97	< 0.001
Height (cm)	157.51 ± 0.26	159.47 ± 0.44	157.50 ± 0.39	155.60 ± 0.44	20.78	< 0.001
Weight (kg)	55.65 ± 0.44	53.06 ± 0.77	56.40 ± 0.74	57.47 ± 0.76	9.33	< 0.001
Education level ((n%)						
High school and below	256 (69.6)	46 (37.7)	91 (74.6)	119 (96.0)	100.77	< 0.001
Above high school	112 (30.4)	76 (62.3)	31 (25.4)	5 (4.0)		
Position of work (n, %)					45.42	< 0.001
Sitting position	171 (46.5)	86 (70.5)	36 (29.5)	49 (39.5)		
Standing position	180 (48.9)	32 (26.2)	80 (65.6)	68 (54.8)		
Other	17 (4.6)	4 (3.3)	6 (4.9)	7 (5.6)		
Toilet mode (n, %)					6.61	0.04
Squatting	339 (92.1)	112 (91.8)	118 (96.7)	109 (87.9)		
Sitting	29 (7.9)	10 (8.2)	4 (3.3)	15 (12.1)		
Nature of work (n, %)					94.26	< 0.001
Mainly sedentary work	159 (53.0)	103 (84.4)	45 (36.9)	47 (37.9)		
Mainly physical work	129 (35.1)	3 (3.3)	56 (45.9)	69 (55.6)		
Sedentary as well as physical work	44 (12.0)	15 (12.3)	21 (17.2)	8 (6.5)		
Physical labor intensity (n, %)					31.03	< 0.001
Mild	308 (83.7)	118 (96.7)	93 (76.2)	97 (78.2)		
Moderate	56 (15.2)	4 (3.3)	29 (23.8)	23 (18.5)		
Severe	4 (1.1)	0 (0.0)	0 (0.0)	4 (3.2)		
Urinary incontinence in the mother or sister (n, %)					20.90	< 0.001
Present	12 (3.3)	2 (1.6)	7 (5.7)	3 (2.4)		
Absent	325 (88.3)	116 (95.1)	94 (77.0)	115 (92.7)		
No idea	31 (8.4)	4 (3.3)	21 (17.2)	6 (4.8)		
Prolapse of pelvic organs in the mother or sister (n, %)					15.11	< 0.001
Present	5 (1.4)	0 (0.0)	2 (1.6)	3 (2.4)		
Absent	316 (85.9)	115 (94.3)	95 (77.9)	106 (85.5)		
No idea	47 (12.8)	7 (5.7)	25 (20.5)	15 (12.1)		
Smoking (n, %)					2.91	0.23
Present	4 (1.1)	0 (0.0)	3 (2.5)	1 (0.8)		
Absent	364 (98.9)	122 (100.0)	119 (97.5)	123 (99.2)		
Sexual frequency (n, %)					150.32	< 0.001
No	99 (26.9)	7 (5.7)	19 (15.6)	72 (58.9)		
Occasional	119 (32.3)	26 (21.3)	51 (41.8)	42 (33.9)		
Regular, ≤ 2 times a week	103 (28.0)	56 (45.9)	39 (32.0)	8 (6.5)		
Regular, ≥ 2 times a week	47 (12.8)	33 (27.0)	13 (10.7)	1 (0.8)		

Table 2 Obstetric findings of the study subjects

Comparison item	Total population	Group A	Group B	Group C	χ2	*p*
Number of pregnancies	2.45 ± 1.78	1.10 ± 1.30	2.90 ± 1.48	3.33 ± 1.68	118.67	< 0.001
Number of miscarriages	1.47 ± 1.44	1.09 ± 1.29	1.62 ± 1.40	1.69 ± 1.56	14.78	< 0.001
Number of births	0.94 ± 0.91	0.00 ± 0.00	1.25 ± 0.52	1.56 ± 0.93		< 0.001
Maximum fetal birth weight (g)	2819.50 ± 1185.20	0.00 ± 0.00	3275.50 ± 460.40	3128.26 ± 713.87		< 0.001
Pelvic floor muscle exercise treatment(n, %)					7.43	0.01
Have	7 (1.9)	0 (37.7)	6 (4.9)	1 (0.8)		
Have not	361 (98.1)	122 (100.0)	116 (95.1)	123 (99.2)		

rehabilitation exercises not only significantly improve pelvic floor muscle function in new mothers and reduce negative emotions, but also help prevent obesity, pelvic floor disorders, and related adverse maternal outcomes such as gestational diabetes and preeclampsia [26–28]. Previous studies found that because there were no typical symptoms in the early stage of PFD, it was easily ignored by patients. In addition, the structure of the female pelvic floor is complex, which increases the difficulty of examination [29–31]. Pelvic floor muscle strength assessment

Table 3 Comparison of electrophysiological indices of pelvic floor among the three groups

Comparison item	Total population	Group A	Group B	Group C	χ2	*p*
MOS (n, %)					61.03	< 0.001
One	56 (15.2)	7 (5.7)	12 (9.8)	37 (29.8)		
Two	109 (29.6)	30 (24.6)	34 (27.9)	45 (36.3)		
Three	114 (31.0)	48 (39.3)	37 (30.3)	29 (23.4)		
Four	80 (21.7)	37 (30.3)	31 (25.4)	12 (9.7)		
Five	9 (2.4)	0 (0.0)	8 (6.6)	1 (0.8)		
LAT (n, %)					61.72	< 0.001
One	39 (10.6)	6 (4.9)	3 (2.5)	30 (24.2)		
Two	101 (27.4)	25 (20.5)	36 (29.5)	40 (32.3)		
Three	123 (33.4)	56 (45.9)	34 (27.9)	33 (26.6)		
Four	91 (24.7)	34 (27.9)	40 (32.8)	17 (13.7)		
Five	14 (3.8)	1 (0.8)	9 (7.4)	4 (3.2)		
Muscle strength of deep type I muscle fibers (n, %)					33.84	< 0.001
One	242 (65.8)	94 (77.0)	56 (45.9)	92 (74.2)		
Two	45 (12.2)	11 (9.0)	22 (18.0)	12 (9.7)		
Three	45 (12.2)	9 (7.4)	23 (18.9)	13 (10.5)		
Four	29 (7.9)	7 (5.7)	17 (13.9)	5 (4.0)		
Five	7 (1.9)	1 (0.8)	4 (3.3)	2 (1.6)		
Muscle strength of deep class II muscle fibers (n, %)					25.76	< 0.001
One	119 (32.3)	45 (36.9)	26 (21.3)	48 (38.7)		
Two	74 (20.1)	28 (23.0)	19 (15.6)	27 (21.8)		
Three	89 (20.1)	30 (24.6)	31 (25.4)	28 (22.6)		
Four	77 (24.2)	18 (14.8)	41 (33.6)	18 (14.5)		
Five	9 (2.4)	1 (0.8)	5 (4.1)	3 (2.4)		
Deep class I muscle fatigue	-1.10 ± 1.54	-0.69 ± 1.19	-1.39 ± 1.60	-1.22 ± 1.69	7.07	< 0.001
Deep class II muscle fatigue	-0.06 ± 0.44	-0.07 ± 0.28	-0.07 ± 0.54	-0.04 ± 0.45	0.14	0.87
Maximum contraction pressure(cmH_2O)	14.25 ± 13.80	11.24 ± 10.84	15.79 ± 14.87	15.69 ± 14.88	4.42	0.01

Table 4 Comparison of pelvic organ prolapse grades among the three groups

Comparison item	Total population	Group A	Group B	Group C	χ2	*p*
Aa	-1.65 ± 0.47	-0.24 ± 0.36	-1.46 ± 0.40	-1.46 ± 0.38	135.61	< 0.001
Ba	-1.65 ± 0.47	-2.04 ± 0.36	-1.46 ± 0.38	-1.46 ± 0.38	134.08	< 0.001
C	-4.61 ± 0.81	-4.92 ± 0.63	-4.35 ± 0.90	-4.57 ± 0.77	36.32	< 0.001
gh	2.59 ± 0.72	2.24 ± 0.59	2.68 ± 0.71	2.85 ± 0.71	46.59	< 0.001
pb	2.91 ± 0.59	2.84 ± 0.55	2.94 ± 0.55	2.94 ± 0.65	3.27	0.20
TVL	6.89 ± 0.56	7.04 ± 0.43	6.84 ± 0.61	6.77 ± 0.60	15.37	< 0.001
Ap	-2.24 ± 0.40	-2.47 ± 0.28	-2.23 ± 0.49	-2.04 ± 0.28	116.24	< 0.001
Bp	-2.26 ± 0.32	-2.46 ± 0.28	-2.27 ± 0.23	-2.04 ± 0.28	116.97	< 0.001
D	-5.75 ± 0.74	-5.95 ± 0.56	-5.72 ± 0.87	-5.57 ± 0.73	18.38	< 0.001

Notes

Aa: The midline of the front wall of the vagina is 3 cm from the hymen margin

Ba: The farthest distance from the hymen margin is the prolapse of the anterior wall of the vagina after Aa point

C: Farthest from the external opening of the cervix; For hysterectomies, it is the farthest end of the vaginal stump

D: Posterior vaginal fornix of an unhysterectomized person (spot D cannot be measured in hysterectomy without a cervix. Spot D is used to identify the degree of cervical elongation)

Ap: The midline of the posterior wall of the vagina is 3 cm from the margin of the hymen

Bp: The furthest distance of the prolapse of the anterior wall of the vagina after the Ap point from the hymen margin

gh: The distance from the external opening of the urethra to the midpoint of the posterior union of the labia

pb: The distance from the posterior union of the labia to the midpoint of the anal opening

tvl: Total length from the top of the vagina to the margin of the hymen when C and D are in their normal positions

can detect the contractility of type I and type II muscles, show the degree of muscle strength damage, and help to judge the degree of pelvic floor dysfunction according to the manifestation of related symptoms [32, 33].

In terms of electrophysiological indicators, the number of cases with hand-measured pelvic floor muscle strength ≥ grade 3 in groups A, B, and C were 85 (68.72%), 76 (62.30%), and 42 (33.87%), respectively. Additionally, in the assessment of levator ani muscle strength, the number of cases with muscle strength ≥ grade 3 in groups A, B, and C were 91 (74.59%), 83 (71.31%), and 54 (43.55%), respectively. The type I muscle fatigue values were − 0.69 ± 1.19 for group A, -1.39 ± 1.60 for group B, and − 1.22 ± 1.69 for group C. The maximum contraction pressure (cmH_2O) was 11.24 ± 10.84 for group A, 15.79 ± 14.87 for group B, and 15.69 ± 14.88 for group C. The differences in these indicators among the three groups were statistically significant ($p < 0.05$). These findings suggest that pelvic floor muscle strength in normal women decreases after childbirth and further declines with age and menopause, consistent with the identified independent risk factors for pelvic floor dysfunction during pregnancy and childbirth [34]. Therefore, early screening for abnormal pelvic floor muscle strength can facilitate timely intervention and delay the progression of PFD.

This study utilized the Pelvic Organ Prolapse Quantification (POP-Q) system to compare the Aa, Ap, C, and D values among the three groups. The results demonstrated statistically significant differences among the groups ($p < 0.001$). Specifically, Group A and Group C exhibited significant differences in Aa, C, and D values ($p < 0.05$), while no significant differences were observed between Group B and Group C for these parameters ($p = 1.00 > 0.05$; with C value $p = 0.089$). Additionally, significant differences were found between Group A and Group B in Aa and C values ($p < 0.001$), but not in D values ($p > 0.05$). Furthermore, the differences in Ap and Bp values among the three groups were also statistically significant ($p < 0.05$). These findings suggest that the position of pelvic organs in normal women significantly descends after delivery, but there is no further significant decline after menopause. Studies have recommended that pregnant women perform pelvic floor muscle exercises from 20 weeks of gestation until delivery [35], and another study found that the first three months postpartum are the optimal period for enhancing pelvic floor muscle strength and reducing muscle fiber fatigue [36]. Therefore, pelvic floor function screening after delivery is of great significance. Early screening and intervention can effectively reduce the incidence of PFD and decrease the need for surgical treatment.

The limitations of this study include the selection of only a portion of normal women from the Leshan area as research subjects, which may introduce sampling bias and affect the generalizability and representativeness of the findings. Current methods for evaluating pelvic floor function, such as questionnaires and pelvic floor muscle strength tests, rely to some extent on the subjective perceptions of participants and the experiential judgment of examiners, potentially leading to inaccurate or inconsistent results. Additionally, the lack of long-term follow-up and reliance on one-time assessments limit our ability to comprehensively understand the dynamic changes in pelvic floor function over time and the progression of related diseases. Consequently, potential and progressive pelvic floor dysfunctions may not be detected or accurately evaluated promptly. Furthermore, variations in medical resources, health awareness, and environmental factors across different regions of Leshan City may influence women's understanding, prevention, and treatment of pelvic floor dysfunction, thereby limiting the applicability and promotion of the study's findings in diverse settings. Future research should expand the sample size, adopt more objective assessment indicators, and conduct long-term follow-up studies.

This study adhered to international standards for cross-sectional surveys, implemented strict quality control measures, and employed dedicated personnel to minimize measurement bias. Our findings suggest that changes in the position of pelvic organs and pelvic floor electrophysiological indicators occur before the onset of symptoms associated with PFD, particularly after childbirth. This finding has not been reported in previous studies. Therefore, it is the critical responsibility of obstetricians and gynecologists to enhance public awareness of PFD through increased publicity efforts, and to promote early screening, diagnosis, and intervention, particularly conducting postpartum screening. Such measures can significantly reduce the risk of women developing PFD in the future. For populous countries like China, achieving effective early prevention of PFD is of great significance for improving women's quality of life. Future research should focus more on the prevention and treatment of PFD to establish and refine a three-tiered prevention and treatment system, thereby significantly enhancing China's capabilities in managing pelvic floor dysfunction diseases.

Abbreviations

LAT	Levator Anal Muscle Test
PFD	Pelvic Floor Dysfunction
MOS	Oxford Muscle Strength Rating
LAT	Levator anal Muscle Test Grade
POP-Q	Pelvic Organ Prolapse Quantification
PFMT	Pelvic Floor Muscle Training

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Author contributions
Ai-Ping Min designed and implemented the research; Die Zeng and Rui-Jin Zhang performed the statistical analyses; Die Zeng and Xin Feng wrote the article; Jia-Qi Luo and Ting-Ting Pan were responsible for it administration and supervising of the research. All authors read and approvedthe manuscript and report no conffict of interest.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The present study was conducted in accordance with the principles outlined in the Declaration of Helsinki and received approval from the Ethics Committee of Leshan People's Hospital (Issue 17 [2018]). All participants provided written informed consent.

Consent for publication
The inclusion of any form of information (including personal data, images, or videos) pertaining to an individual has been obtained with their explicit consent.

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Competing interests
The authors declare no competing interests.

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