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An Epidemiology of Symptomatic Pelvic Organ Prolapse among Women in Xi'an

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Abstract: Background:Theaimofthisstudywastoinvestigate the prevalence and risk factors of Pelvic organ prolapse (POP) in Xi'an of China. Methods: Thewomenseen for gynecological outpatient from July 2020 to December 2020 wereselectedastheobject of this study. Symptomatic POP was characterized as being of stage II or greater. Logistic regression analyses were carried for identifying the POP risk factors. Results: The prevalence of symptomatic POP in Xi'an women was 12.6 %, and the prevalence increased with age, ranging from 4.1 % in women aged 20-29 to 21.8 % in women over 70 years old. (P<0.0001). Multivariate analysis shows that the independent risk factors for POP were age, body mass index (BMI), age of first childbirth, maximum baby weight, constipation and chronic abdominal distension (>3 weeks). Conclusion: Symptomatic POP affects about 13% among women undergoing outpatient gynecological examinations in Xi'an, which increases significantly with age and age of first childbirth.

1. Introduction

Pelvic organ prolapse (POP) is a disease caused by the defect of pelvic floor support structure, which seriously affects the physical and mental health of women and reduces their life quality. The average prevalence of POP in developing countries was 19.7 % (range 3.4-56.4%) [1]. The prevalence of POP is different in different regions of China, ranging from 7.82% to 22.18% [2-5]. However, there is no literature report on the prevalence of POP in Xi' an of China. In this study, the prevalence and related risk factors of POP in Xi'an population were discussed.

2. Materials and methods

This is a cross-sectional study in a medical institution. The study population included women over 20 years of age, who underwent gynecological outpatient examinations at Shaanxi Provincial People's Hospital from July 2020 to December 2020. The study was aimed at local residents of Xi'an (living for 5 years or more), excluding pregnant women or women within 6 months of delivery. The study was approved by the Ethics Committee at Shaanxi Provincial People's Hospital in 2020. Written informed consent was obtained from all participants before the examinations.

All respondents need to fill out the questionnaire with the assistance of researchers, including age, eating habits, disease history, work type and birth history. Participants need to measure height,

weight and bladder emptying before gynecological examination. Based on the POP-Q evaluation system, the POP-Q staging was graded the measurement results, which were performed by experienced physicians using disposables with an increment of 0.5 cm.

3. Data analysis

The diagnostic criteria for symptomatic POP were stage II and the above defined by International Continence Society [6]. Logistic regression analysis was used to calculate the relative risks as the odds ratio (OR) with 95% confidence interval (CI). The odds ratio (OR) with 95 % confidence interval (CI) was calculated by logistic regression analysis, which was used to determine the correlation between the proposed risk factors and POP. The proposed risk factors variables are as follows: race, age, body mass index (BMI), age of first childbirth, maximum baby weight, uterine prolapse surgery, smoking, drinking, constipation, chronic cough, chronic abdominal distension, type of work, eating habits.

The enumeration data was expressed by the number of cases and the proportion (%), and the measurement data was expressed by $\bar{x} \pm s$. The prevalence between groups was compared by $\chi 2$ test. All statistical tests were bilateral, and the significance threshold was $P < 0.05$. Then, the multivariate regression analysis was carried out by the software of IBM SPSS 25.0 using the variables of being significant correlation with POP in univariate regression analysis.

4. Results

4.1 Participant characteristics

Among 1536 women surveyed during the study period, 1122 women who had given birth agreed to participate in the study (73.7% participation rate), and the number of Han people was 1087 (96.9 %). The female age included in the actual analysis was 20-80 (46±14) years with BMI being of 23.0 ± 3.0 kg/m2. The age of first childbearing was 26±6 years, and the number of cesarean section, physical workers and pasta-based women were 540 (48.1%), 776 (69.2%), 683 (60.9%), respectively.

4.2 Prevalence of symptomatic POP

The prevalence of symptomatic POP was 12.6% (141/1122), and it increased with age ($\chi 2=28.616$, $P<0.001$): 4.1% (8/196) for women aged 20-29 years, and 21.8% (20/88) for women aged ⩾70 years, as shown in Figure 1.

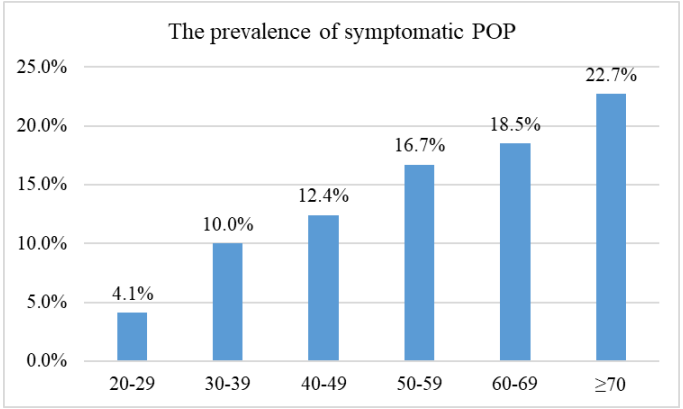

Figure 1: Distribution of symptomatic POP in each age group

4.3 Potential risk factors of symptomatic POP

As shown in Table 1, an item with P < 0.05 means that it is a risk factor of POP. Accordingly, the risk factors of POP included age, BMI, age of first childbirth, maximum baby weight, constipation and chronic abdominal distension.

Table 1: Logical regression results for symptomatic POP

Items	Unadjusted			Adjusted		
	OR	95%CI	P	OR	95%CI	P
Race						
Han (ref)	1.118	0.389-3.215	0.837	0.729	0.235-2.259	0.583
Minority						
Age						
20-29 (ref)	1	/	0.000	1	/	0.025
30-39	2.600	1.146-5.898	0.022	2.675	1.083-6.608	0.033
40-49	3.329	1.506-7.361	0.003	2.813	1.134-6.975	0.026
50-59	4.726	2.147-10.420	0.000	3.502	1.419-8.643	0.007
60-69	5.327	2.205-12.867	0.000	3.983	1.444-10.990	0.008
70-79	6.912	2.909-16.425	0.000	5.674	2.100-15.336	0.001
Body mass index (BMI)						
<18.5	0.206	0.063-0.671	0.009	0.233	0.066-0.816	0.002
18.5≤BMI<24 (ref)	1	/	0.001	1	/	0.023
24≤BMI＜28	1.503	1.032-2.190	0.034	1.552	1.012-2.381	0.044
≥28	2.142	1.041-4.405	0.038	2.601	1.145-5.911	0.022
Age of first childbirth						
≤20 (ref)	1	/	0.000	1	/	0.048
21-25	2.659	1.210-5.846	0.015	2.931	1.217-7.056	0.016
26-30	3.658	1.675-7.988	0.001	3.452	1.427-8.350	0.006
31-35	4.946	2.229-10.972	0.000	3.881	1.556-9.682	0.004
≥35	6.370	2.702-15.017	0.000	4.087	1.515-11.023	0.005
Caesarean section						
No (ref)	0.444	0.304-0.647	0.000	0.451	0.297-0.686	0.000
Yes						
Maximum baby weight						
<3500g (ref)	4.839	3.353-6.981	0.000	4.580	3.043-6.893	0.000
≥3500g						
Smoking						
No (ref)	1.606	0.874-2.951	0.127	1.624	0.801-3.293	0.179
Yes						
Drinking						
No (ref)	1.650	1.096-2.485	0.017	1.489	0.934-2.374	0.094
Yes						
Constipation						
No (ref)	2.999	1.988-4.524	0.000	1.683	1.039-2.724	0.034
Yes						
Chronic cough (>3 weeks)						
No (ref)	1.970	1.228-3.161	0.005	1.494	0.855-2.612	0.159
Yes						
Chronic abdominal distension (>3 weeks)						
No (ref)	3.270	2.189-4.885	0.000	2.769	1.732-4.427	0.000
Yes						
Job						
Mental (ref)	0.877	0.602-1.277	0.493	0.903	0.591-1.379	0.636
Physical						
Dietary habits						
Pasta-based (ref)	0.779	0.537-1.129	0.187	0.900	0.588-1.380	0.630
Rice-based						

5. Discussion

There are certain differences in China's regional economic development, and understanding the prevalence and characteristics of POP in the area can guide the prevention of POP in the area. The prevalence of symptomatic POP in this study was 12.6 %, which was higher than 7.82 % in eastern of Guangdong province [2], 9.67 % in the six cities such as Beijing [3], while lower than 17.0 % in Wenzhou [4]. In addition, compared with POP symptom questionnaire & POP-Q score study, the prevalence of POP in this study is higher, because the POPs observed in this study are mostly mild and asymptomatic, which are often considered to be normal in clinical practice.

This study found that with the increase of female age, the risk of POP increased significantly. The POP risk of overweight and obese women is higher than normal weight, and the higher the BMI value is, the higher the risk of POP is. The age of first childbearing is also significantly related to the occurrence of POP, and within a certain range, the younger the age of first childbearing, the lower the prevalence of pop. This study also found that chronic abdominal distension and constipation are closely related to the occurrence of POP. However, the effects of drinking and chronic cough on POP are significant in univariate regression analysis, but insignificant in multivariate regression analysis, which is different from previous studies. This may be related to the presence of missed diagnosis population, which affects the statistical results.

We hypothesized that pasta and coughing would hasten the development of POP. Xi'an is relatively dry in autumn and winter with prolonged haze, while it is dry heat in summer, which would easily cause coughing. And the people in Xi'an enjoy pastas such as noodles and pita bread so awked in soup, which can provide more calories and easily cause overweight or obesity. The both increased the POP risk, however, there was no significant correlation in this study, the possible reason was that the number of subjects used was too small.

We could not assess the causal relationship, but only find out the correlation in this study. Of course, there are several limitations in this study. For the hierarchical medical system, the proportion of rural population in our research population is low, and the results cannot be extended to the entire population of Xi’an. In addition, those who received pelvic floor therapy are not in our study, and the prevalence of symptomatic POP may be lower than the actual.

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