



Quality of life among women with postpartum urinary incontinence: A cross-sectional study



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ARTICLE INFO

Keywords:

Postpartum period
Urinary incontinence
Quality of life
Prolapse

ABSTRACT

Objective: To provide a general description of women with postpartum urinary incontinence (PPUI), and investigate the effect of different types of PPUI with varied severity on affected women's quality of life.

Methods: We performed a cross-sectional study in China that included 130 women with reported symptoms of PPUI. At the sixth to eighth week postpartum, we analyzed sociodemographic and clinical characteristics and compared women's quality of life (measured using the I-QOL and IIQ-7) by severity of PPUI (measured using the ICI-Q-SF), types of PPUI, stages of prolapse, and age.

Results: 81 of the (62.3%) participating women were classified as mild PPUI, 43 as (33.1%) moderate, and 6 as (4.6%) severe, with 80 of these (61.5%) were grouped into stress urinary incontinence (SUI). With the symptoms of PPUI becoming more severe the total I-QOL score decreased significantly, and the total IIQ-7 score increased. Women with MUI reported lower scores for I-QOL and behavioral impacts, and higher scores of IIQ-7 than those with SUI.

Conclusions: We found that more severe symptoms of UI and prolapse more negatively affected the quality of life of postpartum women, and women with MUI experienced a lower QOL.

1. Introduction

Postpartum urinary incontinence (PPUI) is characterized as uncontrolled leakage of urine after delivery. It is primarily due to the over-expansion of the pelvic floor ligaments and muscles during pregnancy and vaginal delivery, especially the relaxation of the tissues supporting the urinary bladder floor and the upper urethra.¹ The incidence of PPUI in European and American countries is as high as 50%,² and a survey of 10,098 postpartum women in China showed that the incidence of PPUI at 6 weeks postpartum is 9.5%, and at 6 months postpartum is 6.8%.³

Previous studies have tended to focus on the prevalence, risk factors, treatments, and long-term physical impact of PPUI, while few studies have examined or measured women's quality of life (QOL) with this specific condition. PPUI doesn't directly pose a threat to health and life,⁴⁻⁶ but it affects women's mental health and interpersonal communication, resulting in feelings of low self-esteem and depression, and may

leading to sick leave and extended absences from work.⁷ The latest systematic review⁸ providing an overview of the physical, psychological, and social domains of QOL and health status in postpartum women concluded that urinary incontinence seemed to be associated with impaired QOL. However, the literature is unclear about the magnitude of this effect, and it is equivocal about whether women with more severe PPUI experience a more markedly diminished quality of life. Factors that contribute to the limited clarity in the literature include some researchers using generic, rather than incontinence-specific, quality-of-life instruments.

Therefore, the main purpose of this study was, by using QOL scales specific to patients with urinary incontinence, to provide a general description of women with PPUI, and to investigate the effect of different types of PPUI with varied severity on women's quality of life in a tertiary hospital in Beijing, China, with the aim of improving the healthcare practice of medical staff in assisting postpartum women to manage

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urinary incontinence.

2. Methods

2.1. Study design, setting, and participants

Women who went to the outpatient department of a tertiary hospital in Beijing, China, for postpartum reexamination from February to July 2019, were potentially eligible for inclusion in our cross-sectional study. The detailed inclusion criteria were: age ≥ 18 years; single pregnancy; 6–8 weeks after delivery; symptoms of postpartum urinary incontinence; informed consent and voluntary participation in the investigation. We excluded participants who had nervous system diseases, malignant tumors, mental illness, urogenital leakage, or who had symptoms combined with urinary tract inflammation or those who declined to undergo routine gynecological examination and pelvic floor function examination. Approval was obtained from the Clinical Research Ethics Committee of the Peking University People's Hospital, and written informed consent was obtained from all participants.

2.2. Questionnaires

We collected participants' demographic characteristics through a basic information questionnaire, including age, education level, monthly income, occupation, pre-pregnancy body mass index (BMI), gravidity, parity, mode of delivery, newborn weight, leakage of urine during pregnancy, pregnancy complications, chronic diseases, and postpartum complications.

To assess the incidence of postpartum urinary incontinence and its impact on patients, we adopted three validated questionnaires. First, we used the International Consultation on Incontinence Questionnaire Short Form (ICI-Q-SF). There are four items in the questionnaire, including the frequency of urine leakage, the amount of urine leakage, the impact of urine leakage on daily life, and the timing of urine leakage. According to the total score of the questionnaire, severity of urinary incontinence is divided into three grades: a total score of ≤ 6 was classified as mild; 7–12 was classified as moderate; and ≥ 13 was classified as severe. The timing of leakage further defines the type: stress urinary incontinence (SUI) is leakage during coughing or sneezing, activities, or sports; urge urinary incontinence (UUI) occurs when the toilet is not reached, or when urinating and dressing; and mixed urinary incontinence (MUI): includes both types of leakage or leakage for no apparent reason.

The second questionnaire was the Incontinence Quality of Life Instrument (I-QOL), which was originally developed by Dr. Wagner and his team at the university of Washington in the United States.⁹ The scale consists of 22 items, including 8 items for evaluating the behavioral impacts on women with UI, 9 items for the psychological impact, and 5 items for the impacts on social activities. Each item is scored on a 5-point scale, with a higher score indicating a higher quality of life. We used a standard score in this study, which is the actual score divided by the highest possible score, multiplied by 100. The Cronbach's coefficient of internal consistency of the original scale was 0.95, and the retest reliability was 0.93.

The last questionnaire we employed was Incontinence Impact Questionnaire-7 (IIQ-7). IIQ-7 was proposed by the International Consultation on Incontinence (ICI) in 2005. It is a patient-centered questionnaire to objectively evaluate the impact of incontinence on quality of life, including 7 3-point items. The higher the score, the greater the impact, with the total score varying from 0 to 21.

2.3. Data collection

This cross-sectional survey was conducted collaboratively by professional researchers together with trained clinical doctors and nurses. Researchers explained the methods and requirements of filling out the questionnaires to each included participant in detail, and then instructed

them to complete the four self-administered questionnaires. A clinical doctor performed the physical examination for all women who attended the outpatient department during their 6–8 weeks postpartum. Trained nurses collected the participants' physical characteristics through their medical records, including evaluation with the pelvic organ prolapse quantitative (POP-Q) system, genital hiatus (gh) measurements, grade of pelvic floor muscle contraction evaluated by the modified Oxford grading system, with class I and II muscle strength, and fatigue assessed by conducting pelvic floor electrophysiological examination.

2.4. Statistical analysis

A sample size calculation was not performed prior to the start of the study. The study design was to recruit as many patients as possible during the 6-month study time frame. SPSS17.0 software was used for data entry and statistical analysis. The measurement data were described as mean \pm standard deviation (SD), and compared with *t*-test or ANOVA. The counting data were described as frequency and percentage, and compared with a chi-square test. Multivariate general linear model (LSD method) was used for inter-group comparison when necessary. $P < 0.05$ was considered statistically significant.

3. Results

In this study, 770 postpartum women were initially investigated, and 138 women with self-reported symptoms of postpartum urinary incontinence (PPUI) during 6–8 weeks after delivery were enrolled in the study, with 130 (94.20%) of them included for statistical analysis (Fig. 1). The median postpartum day of the included women was 47 (42–56) days, and the age ranged from 24 to 46 years. 61 of the participants (46.9%) were first-time mothers, and 38 (32.5%) of the 117 women who underwent vaginal or forceps-assisted delivery reported a lateral episiotomy. Furthermore, 76 of the (58.5%) participants experienced symptoms of urine leakage during pregnancy. For severity of PPUI, 81 of the (62.3%) participating women were classified as mild, 43 as (33.1%) moderate, and 6 as (4.6%) severe. As for the types of PPUI, 80 of the (61.5%) participants were grouped into stress urinary incontinence (SUI), 18 of them as (13.8%) urge urinary incontinence (UUI), and 32 with (24.6%) mixed urinary incontinence (MUI). More detailed basic characteristics are shown in Table 1.

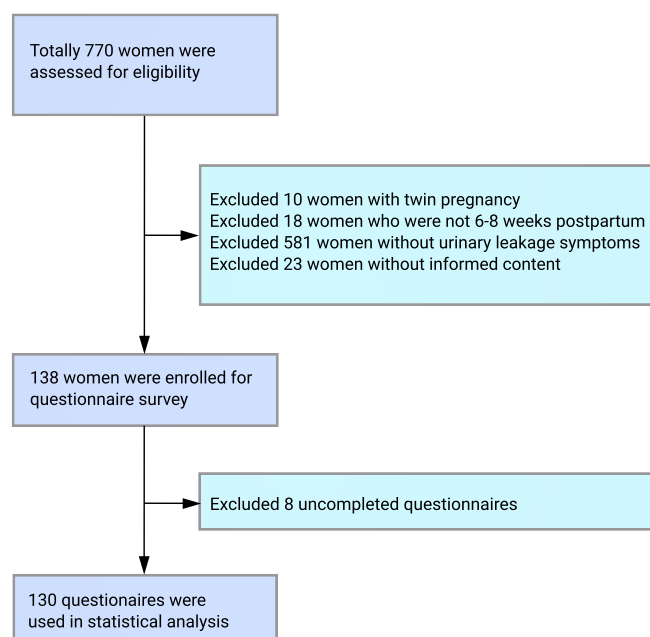


Fig. 1. Flow of participants.

Table 1
Basic information on participants (N = 130).

| Items | $\chi \pm MD/n(\%)$ |
|--|---------------------|
| Age, years | 33.37 \pm 4.50 |
| < 35 | 86 (66.2) |
| ≥ 35 | 44 (33.8) |
| BMI at pre-pregnancy (kg/m²) | 21.81 \pm 3.15 |
| Educational level | |
| Junior high school and below | 0 |
| Secondary/High school | 1 (0.8) |
| College/Undergraduate | 67 (51.5) |
| Graduate student and above | 62 (47.7) |
| Type of occupation | |
| Light manual labor | 115 (88.5) |
| Medium manual labor | 10 (7.7) |
| Heavy manual labor | 5 (3.8) |
| Monthly family income (¥) | |
| ≤ 7000 | 4 (3.1) |
| 7000–10000 | 18 (13.8) |
| ≥ 10000 | 108 (83.1) |
| Gravidity | |
| 1 | 61 (46.9) |
| 2 | 36 (27.7) |
| ≥ 3 | 33 (25.4) |
| Parity | |
| 1 | 86 (66.2) |
| 2 | 44 (33.8) |
| Number of vaginal births | |
| 0 | 11 (8.5) |
| 1 | 84 (64.6) |
| 2 | 35 (26.9) |
| Weight gain during pregnancy (kg) | 13.49 \pm 4.19 |
| Mode of delivery (most recent) | |
| Vaginal | 105 (80.8) |
| Forceps assisted | 12 (9.2) |
| Cesarean | 13 (10) |
| Lateral episiotomy | |
| yes | 38/117 (32.5) |
| no | 79/117 (67.5) |
| Neonatal birth weight | |
| < 4 kg | 100 (76.9) |
| ≥ 4 Kg | 30 (23.1) |
| Leakage of urine during pregnancy | |
| yes | 76 (58.5) |
| no | 54 (41.5) |
| Pregnancy complications | |
| yes | 30 (23.1) |
| no | 100 (76.9) |
| Postpartum complication | |
| yes | 12 (9.2) |
| no | 118 (90.8) |
| Chronic disease | |
| yes | 10 (7.7) |
| no | 120 (92.3) |
| Stage of POP-Q | |
| 0 | 11 (8.5) |
| I | 61 (46.9) |
| II | 58 (44.6) |
| Type of prolapse | |
| anterior compartment | 110/119 (92.4) |
| apical vaginal | 1/119 (0.8) |
| posterior compartment | 8/119 (6.7) |
| Oxford scale of pelvic floor muscle tone | |
| < 3 | 89 (68.5) |
| ≥ 3 | 41 (31.5) |
| Hiatus genitalis | 2.53 \pm 0.62 |
| Strength of I muscle | 5.44 \pm 3.75 |
| Strength of II muscle | 19.50 \pm 4.70 |
| Degree of fatigue | 3.75 \pm 1.67 |
| Score of ICI-Q-SF | |
| 1–6 | 81 (62.3) |
| 7–12 | 43 (33.1) |
| ≥ 13 | 6 (4.6) |
| UI types | |
| stress | 80 (61.5) |
| urge | 18 (13.8) |
| mixed | 32 (24.6) |

Table 1 (continued)

| Items | $\chi \pm MD/n(\%)$ |
|-----------------------|---------------------------------|
| Score of IIQ-7 | 1.11 \pm 2.86 (0–21) |
| 0 | 96 (73.8) |
| 1–7 | 30 (23.1) |
| 8–21 | 4 (3.1) |
| Score of I-QOL | 89.14 \pm 15.40 (32.95–100) |
| ≤ 60 | 9 (6.9) |
| 60–99 | 71 (54.6) |
| 100 | 50 (38.5) |

BMI: body mass index; ICI-Q-SF: International Consultation on Incontinence Questionnaire Short Form; POP-Q: Pelvic Organ Prolapse Quantitation; I-QOL: Incontinence Quality of Life Instrument; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

With increasing PPUI symptom severity, the total score of I-QOL and the scores of the impacts on behavior, psychology, and social activities, all significantly decreased, with the total score of IIQ-7 increasing (Table 2). Thus, the Bonferroni method was further used for multiple comparisons within the three levels of severity, and all differences were still considered significant.

Different types of PPUI had different effects on total scores for IIQ-7 and I-QOL, and on behavioral impacts, but not on psychological and social impacts (Table 3a). Women with MUI reported lower scores for I-QOL and behavioral impacts, and higher scores for IIQ-7, than women with SUI. There was no detectable difference in the three mentioned variables between women with SUI or UUI, or between women with UUI and MUI (see Table 3b).

Increases in POP-Q stage were loosely associated with increasing IIQ-7 scores, though this trend was not significant. Decreases in I-QOL score were correlated with decreases in the scores of its three subscales (Table 4a). The stage 0 and stage II groups differed significantly in I-QOL total score, and the scores of behavioral and psychological impacts. The stage I and II groups differed in their scores for social impacts (Table 4).

We also compared the outcomes between different age groups, and the results indicated that the scores of all questionnaires of participants under 35 years old were statistically similar to those were 35 or older (Table 5).

4. Discussion

In our study, we enrolled women who experienced leakage of urine during the puerperal period, and found that almost half of the women described many symptoms of UI to be moderately or severely bothersome. Further analysis demonstrated that the more severe the symptom, the stronger the impact on quality of life among women with PPUI. A longitudinal prospective study in Spain that included 546 healthy primiparas concluded that at the sixth week postpartum, regardless of the mode of birth, women with postpartum urinary incontinence reported lower health-related quality of life.¹⁰

The decline in scores of the three dimensions of QOL caused by PPUI had overlapping effects. Due to the symptoms of urine leakage, women reported having to change their lifestyle, such as wearing a pad to avoid wetness of clothes, and reducing the frequency of physical and social activities to avoid being laughed at by others. These restrictive behaviors and changes in social activities may lead to psychological discomfort, especially in patients with moderate and severe PPUI. Mental health also affects physical health and social relationships. Studies have confirmed that depression is closely related to a worse quality of life in patients with PPUI.^{11,12} Compared with non-depressed postpartum women, depressed postpartum women have lower quality of life scores, and urinary incontinence was reported as one of the main factors.¹³ Lin et al.,¹⁴ in a study on 866 women, reported that urinary incontinence during the postpartum period had a negative impact on women's health-related quality of life. These outcomes are in line with what has been identified in our study and in a systematic review¹⁵ that included 66 studies.

Table 2
Effect of PPUI severity on maternal quality of life (N = 130 , $\chi \pm MD$).

| Degree | Score of I-QOL | Behavioral impact | Psychological impact | Social activities impact | Score of IIQ-7 |
|---------------------|----------------|-------------------|----------------------|--------------------------|----------------|
| Mild (n = 81) | 96.31 ± 7.13 | 96.36 ± 6.39 | 98.38 ± 5.09 | 95.60 ± 8.59 | 0.15 ± 0.42 |
| Moderate (n = 43) | 80.50 ± 15.10 | 81.57 ± 14.93 | 89.04 ± 11.67 | 79.44 ± 20.40 | 2.35 ± 3.39 |
| Severe (n = 6) | 54.17 ± 21.12 | 66.25 ± 10.34 | 65.18 ± 23.12 | 56.00 ± 22.62 | 5.17 ± 7.96 |
| F | 58.880 | 46.871 | 46.008 | 34.135 | 18.724 |
| P | < 0.001* | < 0.001* | < 0.001* | < 0.001* | < 0.001* |

F: The statistical method used was ANOVA; *P < 0.05.

I-QOL: Incontinence Quality of Life Instrument; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

Table 3a
Effect of PPUI type on maternal quality of life (N = 130 , $\chi \pm MD$).

| Type | Score of I-QOL | Behavioral impact | Psychological impact | Social activities impact | Score of IIQ-7 |
|-------------------|----------------|-------------------|----------------------|--------------------------|----------------|
| Stress (n = 80) | 91.88 ± 13.40 | 93.53 ± 10.48 | 95.19 ± 10.57 | 89.60 ± 17.52 | 0.35 ± 1.14 |
| Urge (n = 18) | 87.12 ± 16.99 | 87.92 ± 14.51 | 91.48 ± 14.55 | 88.67 ± 16.31 | 1.11 ± 2.47 |
| Mixed (n = 32) | 83.41 ± 17.77 | 82.66 ± 15.87 | 91.45 ± 12.96 | 85.38 ± 18.61 | 3.00 ± 4.70 |
| F | 3.782 | 8.860 | 1.540 | 0.658 | 11.427 |
| P | 0.025* | 0.001* | 0.218 | 0.520 | 0.001* |

F: The statistical method used was ANOVA; *P < 0.05.

I-QOL: Incontinence Quality of Life Instrument; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

Table 3b
P values of multiple comparisons over types of PPUI.

| | Score of I-QOL | Behavioral impact | Score of IIQ-7 |
|-----------------|----------------|-------------------|----------------|
| Stress VS Urge | 0.687 | 0.268 | 0.819 |
| Stress VS Mixed | 0.025* | < 0.001* | < 0.001* |
| Urge VS Mixed | 1.000 | 0.474 | 0.051 |

The statistical method used was Bonferroni method; *P < 0.05.

I-QOL: Incontinence Quality of Life Instrument; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

In addition, we also found that women with mixed urinary incontinence reported lower scores of I-QOL than those with stress urinary incontinence, especially in terms of restrictive behavior. The coexistence of stress incontinence and urge incontinence is a bothersome condition for postpartum women in our study and may have a strong effect on postpartum quality of life. Moreover, Hermansen et al.¹⁶ conducted a cross-sectional survey among 75 PPUI women in Denmark, and the results showed that more than one third of participating women felt restricted in their ability to go to places where they were unsure about the availability of toilets, to engage in sexual intimacy, and to engage in physical recreation activities. Public policy makers need to help people who experience incontinence to feel confident to travel to new destinations. In Australia, for example, the government has launched a website that provides details of over 14,000 toilet facilities across the country. It may be useful to duplicate this strategy in other countries.

Finding that women with stage II prolapse were experiencing more poor quality of life than those with no prolapse suggested that anatomical abnormalities of the pelvic organs were correlated with patients' objective manifestation and subjective feelings. However, we also detected that 11 of the (8.5%) women with PPUI in our study had no prolapse, and the majority of prolapse occurred in the anterior compartment, which

Table 4a
Effect of POP-Q stage on maternal quality of life (N = 130 , $\chi \pm MD$).

| Stage | Score of I-QOL | Behavioral impact | Psychological impact | Social activities impact | Score of IIQ-7 |
|---------------|----------------|-------------------|----------------------|--------------------------|----------------|
| 0 (n = 11) | 96.90 ± 2.83 | 97.05 ± 3.68 | 99.19 ± 1.12 | 95.27 ± 5.88 | 0.36 ± 0.67 |
| I (n = 61) | 91.77 ± 13.29 | 91.68 ± 12.36 | 95.23 ± 10.79 | 92.66 ± 12.11 | 0.74 ± 2.32 |
| II (n = 58) | 84.89 ± 17.66 | 87.07 ± 14.72 | 91.19 ± 13.40 | 82.69 ± 21.86 | 1.64 ± 3.49 |
| F | 4.750 | 3.564 | 3.097 | 6.133 | 1.911 |
| P | 0.010* | 0.031* | 0.049* | 0.003* | 0.152 |

F: The statistical method used was ANOVA; *P < 0.05.

POP-Q: Pelvic Organ Prolapse Quantitation ; I-QOL: Incontinence Quality of Life Instrument ; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

may be related to the fact that the majority of participants' delivery modes were vaginal and forceps-assisted delivery. The relationship between modes of delivery and postpartum UI has been clearly illustrated in many previous studies.^{5,17,18}

Our study found that PPUI women above 35 years old reported similar patterns of incontinence on QOL to those below 35 years old, which contradicts the result of one previous survey.¹¹ In a prospective study estimating the prevalence of post-partum depressive symptomatology and assessing its relationship to quality of life in a sample of Tunisian women, the prevalence of depressive symptomatology in the total sample (150 women) was 14.7% and was more common above 35 years of age. The reason for this discrepancy may be that QOL questionnaires related to urinary incontinence were used in our study, while a general quality of life scale was adopted in that study, which assessed more dimensions of QOL apart from urinary incontinence. Therefore, more specific study may be needed to shed more light on the correlation between age and the impact of urinary incontinence on QOL.

Table 4b
P values of multiple comparisons over stages of POP-Q.

| | Score of I-QOL | Behavioral impact | Psychological impact | Social activities impact |
|---------------------|----------------|-------------------|----------------------|--------------------------|
| Stage 0 VS Stage I | 0.297 | 0.212 | 0.301 | 0.638 |
| Stage 0 VS Stage II | 0.016* | 0.022* | 0.039* | 0.026 |
| Stage I VS Stage II | 0.014* | 0.056 | 0.061 | 0.002* |

The statistical method used was LSD method; *P < 0.05.

I-QOL: Incontinence Quality of Life Instrument ; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

Table 5Effect of age on maternal quality of life (N = 130 , $\chi \pm MD$).

| Age | Score of I-QOL | Behavioral impact | Psychological impact | Social activities impact | Score of IIQ-7 |
|------------------|----------------|-------------------|----------------------|--------------------------|----------------|
| < 35y (n = 86) | 89.38 ± 14.67 | 90.58 ± 12.11 | 93.93 ± 11.59 | 87.58 ± 18.69 | 0.70 ± 1.71 |
| ≥35y (n = 84) | 88.66 ± 16.89 | 89.09 ± 15.51 | 93.43 ± 12.41 | 90.09 ± 15.27 | 1.91 ± 4.21 |
| T | 0.248 | 0.602 | 0.224 | -0.769 | -1.834 |
| P | 0.804 | 0.548 | 0.823 | 0.444 | 0.073 |

T: The statistical method used was t-test;

I-QOL: Incontinence Quality of Life Instrument ; IIQ-7: Incontinence Impact Questionnaire-7; UI: urinary incontinence.

A primary strength of our study was our use of three validated instruments to evaluate the impacts of urinary incontinence on quality of life for postpartum women. However, our study also had limitations. First, the women were selected from only one hospital, which could limit generalization of our results, though our comprehensive analysis was rigorous and provides valuable insights for clinical nursing practice on postpartum women. Second, we included no control group of continent postpartum women, so some of the impaired quality of life found could be due to the stressors of a new baby or other physical or social issues besides incontinence, and the questionnaires were not developed to be specific to postpartum women. A yet more suitable instrument should be developed and applied among postpartum women in the future. Third, we have increased the reliability of the collected data through medical records and confirmations of relevant information with participants, though some of the information, such as the frequency of urine leakage and its impact on life, were retrospective and may be inaccurate due to memory bias.

Our study carefully evaluated the impact of PPUi on women's quality of life, and found that women with severe PPUi, diagnosed with stage II prolapse, or experiencing mixed urinary incontinence, are more affected, which was not clarified in previous studies. The results of our study also suggest that more targeted nursing measures should be focused on postpartum women with moderate or severe symptoms of UI, prolapse, or MUI.

5. Conclusions

In our study, we found that the more severe the symptoms of urinary incontinence and prolapse, the quality of life of postpartum women was more affected, and women with mixed urinary incontinence experienced a lower QOL. This suggests that the symptoms of urinary incontinence and its specific impacts on women's lives should be identified in the early postpartum period, thus providing targeted nursing measures.

Author contribution

Y, L: data collection; data analyses ; a preliminary draft, Q Y, CW: data analyses data collection, X, L : review and revise the preliminary draft; providing support and guidance for this study, X, Y: data collection.

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.

Acknowledgements

This research was funded by National Key R&D Program of China (ID: 2018YFC2002204).

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