

Factors associated with the quality of life in women with perimenopausal and postmenopausal status: a cross-sectional questionnaire survey from China

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Summary

Background: Many factors may influence the quality of life (QOL) of women with perimenopausal and postmenopausal status; however, systematic research is lacking. The purpose of the current study was to determine factors associated with specific dimensions of the QOL for perimenopausal and postmenopausal Chinese women. **Materials and Methods:** A cross-sectional study was performed and initially included 403 women aged 36–76 years who visited the menopause clinic at Peking University First Hospital between September 2012 and December 2013. Participants completed the modified Kupperman index (mKMI), overactive bladder symptom score (OABSS), and SF-36 (QOL) questionnaires. Single factor logistic regression and multiple binary logistic regression were performed to evaluate the risk factors for low QOL for perimenopausal and postmenopausal women. **Results:** A total of 320 women were included in the final study sample. The average age was 52.55±5.96 years, average height was 159.99±5.70 cm, the average weight was 61.37±8.47 kg, the average BMI was 23.91±3.14kg/m², the average total score of QOL was 492.51±145.35, the average score of mKMI was 21.72±9.79, and the average score of OABSS was 2.13±2.313. Multiple logistic regression analysis showed current smoking [OR=10.132, 95%CI (1.142, 89.882), *p* = 0.038], mKMI [OR=9.151, 95%CI (1.996, 41.957), *p* = 0.004], passive attitude towards menopause [OR=3.465, 95%CI (1.878, 6.392), *p* = 0.000], and OABSS (OR=2.410, 95%CI (1.253, 4.636), *p* = 0.008] showed statistical significance towards total score of QOL. Multiple logistic regression analysis towards different dimension of QOL: factors associated with physical functioning (PF) are age, current smoking, mKMI, and OABSS. Factors associated with physical role (PR) are low frequency of sexual intercourse in the last six months, mKMI, passive attitude towards menopause, dancing, and OABSS. Factors associated with bodily pain (BP) are height, and traditional Chinese medicine (TCM) relieving menopause symptoms. Factors associated with general health (GH) are height, TCM relieving, mKMI, and passive attitude towards menopause. Factors associated with vitality (VT) are living with husband, mKMI, and passive attitude towards menopause. Factors associated with social functioning (SF) are mKMI, passive attitude towards menopause, and OABSS. Factors associated with emotional (ER) are passive smoking, low frequency of sexual intercourse in the last six months, mKMI, passive attitude towards menopause, and OABSS, Factors associated with mental health (MH) are mKMI, passive attitude, and OABSS. Linear-regression showed the different combination of relieving methods of perimenopausal symptoms, complications, relatives, and various exercises have different effects on the each dimension of QOL. **Conclusion:** Current smoking, mKMI, passive attitude towards menopause, and OABSS are risk factors towards the total QOL score for perimenopausal and postmenopausal Chinese women. Age, low frequency of sexual intercourse in the last six months, using TCM to relieve menopause symptoms, and passive smoking are risk factors towards some dimensions of the QOL for women during this period of life. Dancing, height, and living with husband are protective factors towards some dimensions of the QOL. Fully exploring the factors affecting women during this special period can help make more precise and effective treatments that may improve the QOL.

Key words: Perimenopause; Postmenopause; Quality of life; Risk effects; Questionnaire; Cross-sectional survey; China.

Introduction

According to an investigation by the World Health Organization (WHO), the population of women at least 50 years of age will reach 1.2 billion by 2030 [1]. Around this age, women will experience an important transition in their life – menopause. Most will experience perimenopausal symptoms, some of which will last for a short time, some for decades, and some will have a passive effect on their life to some extent. A recent survey showed that peri-

menopausal symptoms, hormone replacement treatment, marital status, educational status, and osteoporosis are associated with the quality of life (QOL) in perimenopausal and postmenopausal women [2]. During this period, many women will be disturbed by lower urinary tract symptoms, which may also have a negative effect on their life to some extent [3]. Another recent survey showed that overactive bladder (OAB), stress urinary incontinence (SUI), and mixed urinary incontinence (MUI) have a passive effect on the QOL in perimenopausal and postmenopausal women

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[4].

The Sixth National Census of China showed the total population of China to be 1,370,536,875 in 2015 [5]; thus, the number of women in China over 50 years of age is quite large. Past research has demonstrated that many factors affect the QOL of women during this special period; however, there has been lack of such research in Chinese women thus far. The current survey aims to explore the factors related to the QOL in Chinese perimenopausal and postmenopausal.

Materials And Methods

The study initially included 403 women aged 36–76 years who visited the menopause clinic of Peking University First Hospital between September 2012 and December 2013. The Peking University First Hospital is a famous Third Class A hospital in China, with an average of 7,000 consultations per day in all of its outpatient clinics. About half of the patients were from other provinces in China. The menopause clinic is an outpatient clinic of this hospital. The study was approved by the Clinical Ethics Committee of Peking University First Hospital (Grant No. 2013 [681]) and all of the women provided informed consent to participate.

Participants with menopausal symptoms and menopause-related irregular rhythm (menstruation less than 12 times/year) or amenorrhea for 12 consecutive months were included. A total of 320 women met the criteria and were included in the final sample of the study. Participants were classified as having either (1) natural menopause or (2) menopausal symptoms. WHO defines natural menopause as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity. Natural menopause is recognized to have occurred after 12 consecutive months of amenorrhea for which there is no other obvious pathological or physiological cause [1]. Menopausal symptoms refer to a wide variety of physical and emotional experiences that may or may not be related to hormonal or menstrual changes including: hot flashes, vaginal dryness, loss of libido, depression, anxiety, irritability, poor memory, loss of concentration, mood swings, insomnia, tiredness, aching limbs, loss of energy, and dry skin [6].

A cross-sectional questionnaire survey was administered to the women enrolled in the study. Figure 1 presents the study flow diagram. A self-administered questionnaire comprising 260 items over five pages was given to the participants who completed it in approximately 20 minutes. The questionnaire recorded general information such as age, profession, body weight, body mass index (BMI), marital status, educational level, menstrual history, child-bearing history, and previous or current diseases based on diagnoses from the patient's doctor or during annual physical examinations. The questionnaire also included the modified Kupperman index (mKMI), overactive bladder symptom score (OABSS), and the short form health survey (SF-36). The mKMI is widely used to evaluate menopausal symptoms. The OABSS is widely used to diagnose OAB, drug use, and lifestyle. The SF-36 is widely used to evaluate the QOL. Additional details for the OABSS, mKMI, and SF-36 are provided below. The patient's attitude towards the occurrence of menopause was also assessed through the questionnaire.

Most of the independent variables, such as menopausal status, marital status, profession, educational background, exercise times, monthly income, complications (according to medical records), as well as the mKMI, OABSS, and SF-36 were investigated using closed-ended questions. Other variables, including age at menarche, last menstrual period, duration of menopausal symptoms,

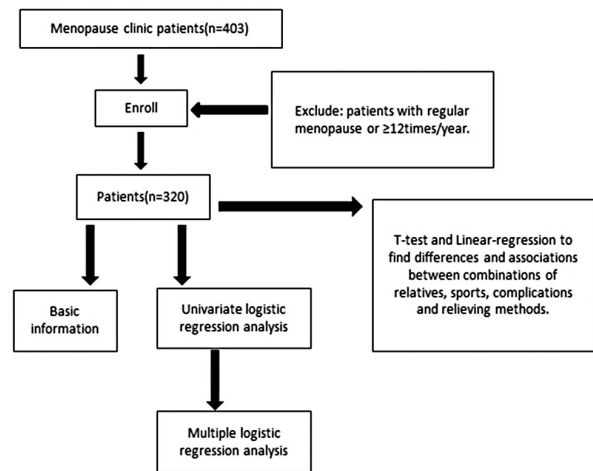


Figure 1. — Study flow chart.

height, and weight were assessed using open-ended questions. All women completed the questionnaire under the guidance of doctors who were trained and certified in the use of the questionnaire. Trained doctors completed the items in the questionnaire that needed to be calculated such as BMI and the total scores for the mKMI, OABSS, and SF-36. Trained doctors also interpreted medical terms in the questionnaire. All doctors were from the Department of Obstetrics and Gynecology. The time to fill out the questionnaire was restricted to 20 minutes.

OABSS: OAB was diagnosed using the OABSS, which is a symptom assessment tool designed to quantify OAB symptoms using a single score. It includes questions about the following four symptoms of OAB: daytime frequency, night time frequency, urgency, and urge incontinence. The Chinese version of the OABSS scale has been validated for the Chinese population [7]. The subjects were asked to rate their symptom severity using a Likert scale, with maximum (most severe) scores of 2, 3, 4, and 5 for daytime frequency, night time frequency, urgency, and urge incontinence, respectively. The total score ranged from 0 to 15, with a higher score indicating more severe OAB. According to clinical guidelines, a minimum OABSS score of 3 and a minimum urgency score of 2 are required to diagnose OAB, and the severity of OAB is classified as mild (OABSS, 3–5), moderate (OABSS, 6–11), or severe (OABSS, 12–15) [8].

mKMI: The mKMI is more sensitive than the menopause rating scale for the evaluation of menopausal symptoms in Chinese populations [9], and it considers 13 symptoms divided into the following four grades (0–3 points) according to the severity: 0=no symptoms, 1=mild symptoms, 2=moderate symptoms, and 3=severe symptoms. The weighted score for hot flashes or sweating is 4 points: paresthesia, insomnia, mood swings, sexual problems, and urinary infection are scored 2 points each, and other symptoms are scored 1 point each. The authors calculated the morbidity of menopausal symptoms using an mKMI cutoff score of ≥ 15 , which was the diagnostic criterion. Menopausal symptoms were classified according to the mKMI score as mild (mKMI, 15–24), moderate (mKMI, 25–34), or severe (mKMI, ≥ 35). All of the above criteria were based on definitions cited in the Journal of Chinese Gynecology and Obstetrics, 2007 [10].

SF-36: The SF-36 questionnaire is widely used throughout the world to evaluate the QOL. The SF-36 questionnaire includes nine dimensions: physical functioning (PF; range 10–30), physical role

(PR; range, 4-8), bodily pain (BP; range, 2-11), general health (GH; range 5-25), vitality (VT; range, 4-24), social functioning (SF; range, 2-10), emotional role (ER; range, 3-6), mental health (MH; range, 5-30), and health transition (HT). The dimensions of PF to GH represent the physical component and VT to MH represent the mental component of the QOL. The derived score for each dimension = (origin score-lowest possible score)/possible score range*100, and the total QOL is the sum of the derived score for PF to MH. The International Quality Of Life Assessment (IQOLA) determined SF-36 to be an important evaluation tool [11]. The Chinese version has been validated [12-14].

The initial sample of the current study was 403 patients and 320 patients were included in the final sample.

Statistical analyses were performed using the Statistical Analysis System (v.9.4). Data are presented as mean \pm standard deviation (SD) for continuous variables. The median, mean, maximum, and minimum, Q1, and Q3 values were calculated for the final menstrual period and duration of menopausal symptoms. Categorical variables were expressed as frequencies and percentages. The *t*-test was used to evaluate differences for continuous variables. Cronbach's α was used to test for questionnaire intramural consistency. Spearman correlation was performed prior to binary logistic regression to eliminate the possibility of collinearity among variables. Single factor logistic regression analysis was performed to determine the possible factors related to the QOL. Binary multivariate logistic regression analysis (method=ENTER) was performed to identify the factors associated with the QOL. Odds ratios (ORs) and 95% confidence intervals (CIs) were used to evaluate the risk factors. A linear-regression analysis was performed to explore the linear association between continuous variables. A *p*-value of < 0.05 was considered statistically significant.

Results

Of the 403 questionnaires received, 83 were excluded according to the exclusion criteria. Therefore, 320 patients included the final study sample. The average age was 52.55 \pm 5.960 years and the participants were diverse in educational background and profession (Table 1). The average age of menarche was 13.75 \pm 1.712 years and the average number of pregnancies was 2.44 \pm 1.469. The average mKMI, total OABSS, and total QOL scores were 21.72 \pm 9.790, 2.13 \pm 2.313, and 492.51 \pm 145.348, respectively. Additional details are provided in Table 1.

The analysis of intramural consistency for the SF-36 demonstrated that the intramural consistency was acceptable as each consistency score was less than the Cronbach's α (Table 2).

Single factor logistic regression of the total QOL score was not statistically significant for: age, profession (compared to the state organizations), monthly income, complications (including hypertension, diabetes, osteoporosis, hyperlipidemia, stroke, cervical spondylosis, uterine (myoma) fibroid, benign ovarian tumor, benign breast tumor, cervical cancer, breast cancer), family life situation (including living with husband, children, parents, father-in-law and mother-in-law, grandchildren, solitude), age of menarche, marital status, number of pregnancies, term birth number, natural delivery number, cesarean section number,

Table 1. — Basic characteristics of participated women.

Items	n	Mean \pm SD
Age	320	52.55 \pm 5.960
Menarche age	320	13.75 \pm 1.712
Pregnant times	320	2.44 \pm 1.469
Weight	320	61.37 \pm 8.472
Height	320	159.99 \pm 5.700
BMI	320	23.91 \pm 3.143
mKMI score	320	21.72 \pm 9.790
OABSS score	320	2.13 \pm 2.313
Total score of QOL	320	492.51 \pm 145.348

Tables 2. — Intramural consistency validity of women under peirmenopausal and postmenopausal status.

Items	Cronba- disAlpha	PF	RP	BP	GH	VT	SF	RE	MH
PF	0.808	1.000							
RP	0.776	.478	1.000						
BP	0.783	.319	.376	1.000					
GH	0.781	.260	.377	.277	1.000				
VT	0.743	.264	.397	.419	.460	1.000			
SF	0.777	.267	.446	.441	.331	.526	1.000		
RE	0.783	.288	.679	.421	.290	.476	.525	1.000	
MH	0.769	.204	.379	.324	.397	.715	.542	.503	1.000

height, weight, waistline, hipline, duration of perimenopausal symptoms, methods of relieving perimenopausal symptoms [including regular exercise, chatting with family, traditional Chinese medicine (TCM), developing new interests, 'letting it be', and other ways], diet guidance during the perimenopause period, medicine to relieve perimenopausal symptoms, routine exercise ways (including walking, jogging, brisk walking, swimming, sitting-up exercise, ball games, cycling, other ways), exercise frequency (>3 times/week), pelvic floor muscle function, and pelvic organ prolapse (Table 3). However, educational background [OR=0.759, 95%CI (0.617, 0.934), $p = 0.009$], current smoking [OR=9.477, 95%CI (1.186, 75.702), $p=0.034$], passive smoking [OR=1.635, 95%CI (1.044, 2.560), $p = 0.032$], coronary heart disease [OR=5.267, 95%CI (1.135, 24.433), $p = 0.034$], low frequency of sexual intercourse in the last six months [OR=2.336, 95%CI (1.065, 5.124), $p = 0.034$], BMI [OR=1.697, 95%CI (1.090, 2.640), $p = 0.019$], the duration of menopausal symptoms [OR=2.631, 95%CI (1.214, 5.704), $p = 0.014$], mKMI [OR=1.119, 95%CI (1.085, 1.153), $p < 0.001$], passive attitude towards menopause [OR=3.142, 95%CI (1.972, 5.007), $p < 0.001$], dancing [OR=0.563, 95%CI (0.334, 0.951), $p = 0.032$], OABSS [OR=1.268, 95%CI (1.125, 1.429), $p < 0.001$], and degree of urine leakage [OR=1.205, 95%CI (1.008, 1.440), $p = 0.041$] were significantly associated with total QOL. While educational background and dancing were protective factors for total QOL, the remaining were risk factors (Table

Tables 3. — Single factor logistic regression to the total score of QOL.

Items	OR (95%CI)	p value
Age	1.023 (0.985, 1.061)	0.238
Education background	0.759 (0.617, 0.934)	0.009*
Nationality	1.000 (0.404, 2.473)	1.000
Profession(compared to the state organizations)	1.007 (0.925, 1.096)	0.876
Monthly income	1.152 (0.853, 1.557)	0.357
Current smoking	9.477 (1.186, 75.702)	0.034*
Passive smoking	1.635 (1.044, 2.560)	0.032*
Hypertension	1.213 (0.703, 2.095)	0.488
Diabetes	0.398 (0.137, 1.157)	0.091
Osteoporosis	1.693 (0.940, 3.048)	0.079
Hyperlipidemia	0.775 (0.472, 1.272)	0.314
Coronary heart disease	5.267 (1.135, 24.433)	0.034*
Stroke	0.497 (0.045, 5.535)	0.570
Cervical spondylosis	0.722 (0.465, 1.121)	0.146
Uterine(myoma) fibroid	1.226 (0.787,1.910)	0.367
Benign ovarian tumor	0.816 (0.396,1.682)	0.582
Benign breast tumor	1.079 (0.503, 2.315)	0.846
Cervical cancer	2.013 (0.181, 22.421)	0.570
Breast cancer	2.013 (0.181, 22.421)	0.570
Living with husband	0.720 (0.394, 1.317)	0.286
Living with children	0.798 (0.515, 1.238)	0.315
Living with parents	1.079 (0.503, 2.315)	0.846
Living with father-in-law and mother-in-law	1.303 (0.473, 3.588)	0.609
Living with grandchildren	2.548 (0.487, 13.332)	0.268
Solitude	1.229 (0.571, 2.955)	0.533
Menarche age	0.952 (0.837, 1.083)	0.453
Marital status	0.826 (0.549, 1.244)	0.360
Pregnancies	1.132 (0.971, 1.320)	0.113
Term birth number	1.182 (0.788, 1.774)	0.418
Natural delivery number	1.061 (0.57, 1.486)	0.731
Cesarean section number	1.015 (0.650, 1.585)	0.948
Frequency of sexual intercourse in the last six months	2.336 (1.065, 5.124)	0.034*
Height	0.972 (0.935, 1.011)	0.158
Weight	1.017 (0.991, 1.044)	0.202
BMI	1.697 (1.090, 2.640)	0.019*
Waistline	1.228 (0.787, 1.914)	0.336
Hipline	1.012 (0.979, 1.047)	0.475
Duration of perimenopausal symptoms	2.631 (1.214, 5.704)	0.014*
Regular exercises relieving perimenopausal symptoms	1.092 (0.701, 1.700)	0.698
Chatting with family relieving perimenopausal symptoms	0.761 (0.466, 1.244)	0.277
TCM relieving perimenopausal symptoms	1.561 (0.976, 2.497)	0.063
Developing new interests relieving perimenopausal symptoms	1.008 (0.593, 1.713)	0.976
Relieving perimenopausal symptoms	1.154 (0.734, 1.815)	0.535
Other ways relieving perimenopausal symptoms	0.667 (0.110, 4.044)	0.659
mKMI	1.119 (1.085, 1.153)	0.000*
Passive attitude towards menopause	3.142 (1.972, 5.007)	0.000*
Diet guidance relieving perimenopausal symptoms	0.828 (0.347, 1.975)	0.670
Medicine relieving perimenopausal symptoms	0.932 (0.554, 1.568)	0.791
Routine walking	1.592 (0.861, 2.944)	0.138
Jogging	0.703 (0.400, 1.236)	0.221
Brisk walking	0.834 (0.536, 1.299)	0.423
Dancing	0.563 (0.334, 0.951)	0.032*
Swimming	0.566 (0.319, 1.006)	0.053
Setting-up exercise	0.862 (0.520, 1.428)	0.563
Ball games	0.633 (0.333, 1.203)	0.163
Cycling	0.957 (0.590, 1.555)	0.860
Other ways	0.503 (0.045, 5.606)	0.577
Exercise times per week (>3 times/week)	0.937 (0.588, 1.491)	0.782
OABSS	1.268(1.125, 1.429)	0.000*
Degree of urine leakage	1.205 (1.008, 1.440)	0.041*
Pelvic floor muscle function (type I)	0.914 (0.578, 1.448)	0.703
Pelvic floor muscle function (type II)	0.848 (0.536, 1.343)	0.482
Pelvic organ prolapse	1.168 (0.826, 1.651)	0.379

Tables 4. — Binary multivariate logistic regression analysis of QOL total score.

Items	p value	OR	95% C.I.	
			Lower limit	Upper limit
Education background	0.116	0.817	0.636	1.051
Current smoking	0.038*	10.132	1.142	89.882
Passive smoking	0.205	1.459	0.814	2.613
Coronary heart disease	0.323	3.287	0.311	34.771
Frequency of sexual intercourse in the last 6 months	0.054	2.532	0.986	6.500
Duration of perimenopausal symptoms	0.112	1.601	0.897	2.860
BMI	0.523	1.392	0.505	3.835
mKMI	0.004*	9.151	1.996	41.957
Passive attitude towards Menopause	0.000*	3.465	1.878	6.392
Dancing	0.305	0.700	0.355	1.384
OABSS	0.008*	2.410	1.253	4.636
Degree of urine leakage	0.485	1.231	0.687	2.207

3).

Multiple binary logistic regression analysis demonstrated that current smoking [OR=10.13, 95%CI (1.14, 89.88), $p = 0.038$], mKMI [OR=9.151, 95%CI (1.996, 41.96), $p = 0.004$], and a passive attitude towards menopause [OR=3.465, 95%CI (1.878, 6.392), $p < 0.001$] were related risk factors for low total QOL. However, educational background, frequency of sexual intercourse in the last six months, passive smoking, coronary heart disease, BMI, the duration of menopausal symptoms, dancing, and the degree of urine leakage were not statistically significant (Table 4).

Multiple binary logistic regression analysis was also performed for each dimension of QOL using the potential factors determined from single factor logistic regression analyses performed for each dimension (results of the individual single factor analyses are not shown). Factors significantly associated with PF were: age [OR=1.062, 95%CI (1.010, 1.117), $p = 0.019$], current smoking [OR=7.464, 95%CI (1.394, 39.983), $p = 0.019$], mKMI [OR=3.741, 95%CI (1.436, 9.743), $p = 0.007$], and OABSS [OR=1.825, 95%CI (1.035, 3.220), $p = 0.038$]. However, osteoporosis, coronary heart disease, cervical spondylosis, frequency of sexual intercourse in the last six months, the duration of menopausal symptoms, regular exercises relieving menopausal symptoms, jogging, brisk walking, dancing, swimming, and ball games were not statistically significant (Tables 5 and 6).

Factors significantly associated with PR included: frequency of sexual intercourse in the last six months [OR=2.489, 95%CI (1.056, 5.867), $p = 0.037$], mKMI [OR=4.499, 95%CI (1.432, 14.136), $p = 0.010$], passive attitude [OR=1.989, 95%CI (1.148, 3.445), $p = 0.014$], dancing [OR=0.495, 95%CI (0.270, 0.909), $p = 0.023$], and OABSS [OR=2.933, 95%CI (1.591, 5.407), $p = 0.001$]. However, age, BMI, the duration of menopausal symptoms,

and jogging were not statistically significant (Tables 5 and 9).

Factors significantly associated with BP included: height [OR=0.955, 95%CI (0.912, 0.999), $p = 0.047$] and TCM to relieve perimenopausal symptoms [OR=1.787, 95%CI (1.075, 2.971), $p = 0.025$]. However, hypertension, hyperlipidemia, coronary heart disease, BMI, waistline, mKMI, passive attitude towards menopause, jogging, and OABSS were not statistically significant (Tables 7 and 8).

Factors significantly associated with GH included: height [OR=0.932, 95%CI (0.891, 0.974), $p = 0.002$], TCM to relieve menopausal symptoms [OR=1.836, 95%CI (1.042, 3.225), $p = 0.036$], mKMI [OR=2.879, 95%CI (1.047, 7.918), $p = 0.041$], passive attitude towards menopause [OR=2.526, 95%CI (1.503, 4.245), $p < 0.001$]. However, 'let it be' was not statistically significant (Tables 7 and 8).

Factors significantly associated with VT included: living with husband [OR=0.483, 95%CI (0.238, 0.978), $p = 0.043$], mKMI [OR=3.403, 95%CI (1.213, 9.543), $p = 0.020$], and a passive attitude towards menopause [OR=3.261, 95%CI (1.969, 5.401), $p < 0.001$]. However, passive smoking, coronary heart disease, and OABSS were not statistically significant (Tables 9 and 10).

Factors significantly associated with SF included: mKMI [OR=3.779, 95%CI (1.240, 11.513), $p = 0.019$], passive attitude towards menopause [OR=3.308, 95%CI (1.949, 5.614), $p < 0.001$], and OABSS [OR=2.067, 95%CI (1.163, 3.675), $p = 0.013$]. However, pregnancies and swimming were not statistically significant (Tables 9 and 10).

Factors significantly associated with RE included: passive smoking [OR=1.765, 95%CI (1.018, 3.060), $p = 0.043$], low frequency of sexual intercourse in the last six months [OR=2.638, 95%CI (1.056, 6.593), $p = 0.038$], mKMI [OR=4.073, 95%CI (1.272, 13.045), $p = 0.018$], passive attitude towards menopause [OR=3.455, 95%CI (1.921, 6.214), $p < 0.001$], and OABSS [OR=2.502, 95%CI (1.343, 4.661), $p = 0.004$]. However, education background, coronary heart disease, and jogging were not statistically significant (Tables 11 and 12).

Factors significantly associated with MH included: mKMI [OR=8.329, 95%CI (2.144, 32.364), $p = 0.002$], passive attitude towards menopause [OR=2.224, 95%CI (1.136, 4.354), $p = 0.020$], and OABSS [OR=2.304, 95%CI (1.066, 4.981), $p = 0.034$]. However, monthly income, passive smoking, chatting with family to relieve perimenopausal symptoms, swimming, and sitting-up exercise were not statistically significant (Tables 11 and 12).

Results for t -tests and linear regression analyses regarding information about the relatives living with the participants and association with QOL dimensions were as follows: the number of relatives showed no linear regression association with any dimension of QOL, living with husband + parents was better than living with only with husband in terms of GH and MH, living with husband + parents was better than living with husband + children in

Tables 5. — Single factor logistics regression analysis of PF-RP.

Items	PF		RP	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Age	1.077 (1.035,1.122)	0.000*	1.042 (1.003,1.083)	0.035*
Education background	0.986 (0.609,1.598)	0.955	0.861 (0.703, 1.055)	0.149
Nationality	2.263 (0.802,6.388)	0.123	0.615 (0.239, 1.586)	0.315
Profession(compared to the state organizations)	1.176 (0.731,1.890)	0.504	0.884 (0.552, 1.416)	0.609
Monthly income	1.019 (0.753,1.378)	0.905	1.095 (0.813, 1.475)	0.551
Current smoking	5.841 (1.220,27.964)	0.027*	3.515 (0.735, 16.820)	0.116
Passive smoking	1.255 (0.800,1.968)	0.322	1.058 (0.677, 1.654)	0.803
Hypertension	0.688 (0.398,1.188)	0.179	1.592 (0.909, 2.788)	0.104
Diabetes	0.746 (0.269,2.069)	0.573	0.578 (0.214, 1.558)	0.278
Osteoporosis	2.316 (1.287,4.166)	0.005*	1.522 (0.841, 2.752)	0.165
Hyperlipidemia	0.772 (0.469,1.270)	0.309	1.101 (0.670, 1.811)	0.703
Coronary heart disease	4.392 (1.166,16.545)	0.029*	2.634 (0.700, 9.917)	0.152
Stroke	0.357 (0.032,3.975)	0.402	1.708 (0.53, 19.024)	0.664
Cervical spondylosis	1.612 (1.031,2.522)	0.036*	1.113 (0.717, 1.728)	0.634
Uterine(myoma) fibroid	1.042 (0.665,1.632)	0.857	1.203 (0.772, 1.876)	0.414
benign ovarian tumor	1.121 (0.537,2.342)	0.760	0.643 (0.305, 1.357)	0.247
Benign breast tumor	0.752 (0.350,1.616)	0.465	1.109 (0.516, 2.380)	0.791
Cervical cancer	1.446 (0.130,16.109)	0.764	0.586 (0.053, 6.524)	0.664
Breast cancer	1.446 (0.130,16.109)	0.764	2.372 (0.213, 26.430)	0.482
Living with family	0.709 (0.389,1.292)	0.261	0.961 (0.526, 1.753)	0.896
Living with children	1.192 (0.764,1.859)	0.439	0.953 (0.614, 1.479)	0.830
Living with parents	1.549 (0.721,3.328)	0.262	0.775 (0.361, 1.664)	0.513
Living with father-in-law and mother-in-law	1.084 (0.393,2.987)	0.876	0.842 (0.308, 2.303)	0.738
Living with grandchildren	0.548 (0.105,2.871)	0.477	0.631 (0.139, 2.865)	0.551
Solitude	0.919 (0.400,2.114)	0.843	1.089 (0.478, 2.477)	0.840
Menarche age	0.902 (0.790,1.031)	0.131	0.969 (0.852, 1.102)	0.633
Marital status	1.283 (0.529,3.114)	0.582	0.930 (0.384, 2.256)	0.873
Pregnancies	0.984 (0.846,1.146)	0.839	1.044 (0.898, 1.214)	0.577
Term birth number	1.125 (0.752,1.683)	0.566	1.303 (0.855, 1.986)	0.218
Natural delivery number	1.111 (0.790,1.561)	0.546	0.936 (0.668, 1.312)	0.700
Cesarean section number	1.022 (0.621,1.684)	0.931	1.493 (0.904, 2.466)	0.118
Frequency of sexual intercourse in the last 6 months	1.753 (1.227,2.505)	0.002*	2.431 (1.127, 5.244)	0.023*
Height	0.961 (0.924,1.000)	0.050	0.967 (0.929, 1.005)	0.090
Weight	1.024 (0.997,1.051)	0.085	1.009 (0.983, 1.036)	0.482
BMI	1.504 (0.962,2.353)	0.074	1.560 (1.002, 2.429)	0.049*
Waistline	1.473 (0.935,2.320)	0.095	1.206 (0.773, 1.883)	0.409
Hipline	1.003 (0.969,1.038)	0.877	1.000 (0.967, 1.034)	0.999
Duration of perimenopausal symptoms	3.288 (1.542,7.012)	0.002*	2.570 (1.158, 5.701)	0.020*
Regular exercises relieving perimenopausal symptoms	0.546 (0.346,0.863)	0.009*	0.720 (0.462, 1.124)	0.149
Chatting with family relieving perimenopausal symptoms	0.962 (0.586,1.577)	0.877	1.115 (0.682, 1.857)	0.664
TCM relieving perimenopausal symptoms	1.154 (0.721, 1.847)	0.552	1.541 (0.959, 2.477)	0.074
Developing new interests relieving perimenopausal symptoms	1.031 (0.602, 1.765)	0.912	0.686 (0.399, 1.179)	0.173
Relieving perimenopausal symptoms	0.938 (0.593, 1.482)	0.784	1.426 (0.905, 2.247)	0.126
Other ways in relieving perimenopausal symptoms	1.088 (0.179, 6.602)	0.927	0.291 (0.032, 2.636)	0.272
mKMI	5.614 (2.461, 12.806)	0.000*	5.958 (2.248, 15.793)	0.000*
Passive attitude towards menopause	1.906 (1.211, 3.002)	0.005*	2.008 (1.271, 3.172)	0.003*
Diet guidance relieving perimenopausal symptoms	0.707 (0.297, 1.682)	0.433	0.530 (0.210, 1.339)	0.179
Medicine relieving perimenopausal symptoms	0.803 (0.476, 1.356)	0.412	0.752 (0.444, 1.275)	0.291
Routine walking	0.760 (0.406, 1.421)	0.390	1.594 (0.867, 2.928)	0.133
Jogging	0.314 (0.162, 0.608)	0.001*	0.528 (0.300, 0.931)	0.027*
Brisk walking	0.559 (0.354, 0.883)	0.013*	0.886 (0.569, 1.381)	0.594
Dancing	0.516 (0.298, 0.894)	0.018*	0.392 (0.230, 0.666)	0.001*
Swimming	0.541 (0.296, 0.991)	0.047*	0.648 (0.368, 1.139)	0.132
Setting-up exercise	0.779 (0.463, 1.308)	0.345	0.844 (0.509, 1.398)	0.509
Ball games	0.354 (0.168, 0.743)	0.006*	0.718 (0.381, 1.350)	0.303
Cycling	0.928 (0.566, 1.519)	0.765	0.760 (0.467, 1.235)	0.268
Other ways	2.846 (0.255, 31.718)	0.395	0.426 (0.038, 4.751)	0.488
Exercise times per week(>3 times/week)	0.772 (0.479, 1.244)	0.288	0.970 (0.608, 1.546)	0.898
OABSS	2.173 (1.329, 3.553)	0.002*	3.319 (1.947, 5.657)	0.000*
Degree of urine leakage	1.473 (0.936, 2.318)	0.094	1.351 (0.865, 2.110)	0.185*
Pelvic floor muscle function (type I)	1.053 (0.662, 1.676)	0.827	1.067 (0.673, 1.692)	0.784
Pelvic floor muscle function (type II)	1.091 (0.686, 1.734)	0.713	0.989 (0.624, 1.568)	0.962
Pelvic organ prolapse	2.058 (0.948, 4.471)	0.068	1.413 (0.645, 3.099)	0.388

Tables 6. — Binary multivariate logistic regression analysis of PF-RP

Items	PF		RP	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Age	1.062 (1.010,1.117)	0.019*	1.024 (0.977, 1.073)	0.322
Current smoking	7.464 (1.394,39.983)	0.019*	—	—
Hypertension	—	—	—	—
Osteoporosis	1.435 (0.698,2.948)	0.326	—	—
Coronary heart disease	1.622 (0.330,7.980)	0.552	—	—
Cervical spondylosis	1.497 (0.867,2.583)	0.147	—	—
Frequency of sexual intercourse in the last 6 months	1.451 (0.587,3.588)	0.421	2.489 (1.056, 5.867)	0.037*
BMI	—	—	1.284 (0.769, 2.144)	0.339
Duration of perimenopausal symptoms	1.410 (0.537,3.701)	0.485	1.495 (0.553, 4.046)	0.428
Regular exercises relieving perimenopausal symptoms	0.768 (0.439,1.344)	0.355	—	—
mKMI	3.321 (1.210,9.114)	0.020*	4.499 (1.432, 14.136)	0.010*
Altitude	1.948 (1.104,3.437)	0.021*	1.989 (1.148, 3.445)	0.014*
Jogging	0.502 (0.235,1.074)	0.076	0.763 (0.401, 1.451)	0.409
Brisk walking	0.841 (0.480,1.475)	0.547	—	—
Dancing	0.832 (0.408,1.697)	0.613	0.495 (0.270, 0.909)	0.023*
Swimming	0.928 (0.432,1.994)	0.848	—	—
Ball games	0.820 (0.331,2.031)	0.668	—	—
OABSS	1.625 (0.882,2.995)	0.119	2.933(1.591, 5.407)	0.001*

terms of VT, SF, RE, MH, and total QOL. Results from similar analyses regarding complications were as follows: the number of complications was associated with PF, GH, and total QOL; gynecological disease was better than hypertension in terms of PF and BP, and better than cervical spondylosis in terms of PF. Results regarding methods to relieve perimenopausal symptoms were as follows: the number of complications was associated with PF, regular exercise to relieve perimenopausal symptoms was better than using TCM in terms of VT, culturing hobbies to relieve perimenopausal symptoms was better than regular exercise in terms of SF, and the number of routine sports showed association with PF, RP, VT, MH, and total QOL.

Discussion

The present survey creatively used the mKMI, OABSS, and SF-36 QOL questionnaires to simultaneously investigate many factors that potentially impact the QOL in perimenopausal and postmenopausal Chinese women. The results showed that current smoking, mKMI score, a passive attitude towards menopause, and high OABSS are risk factors for a low total QOL score. In addition, the results showed that each QOL dimension is associated with specific risk and protective factors. Below, the authors discuss the findings in the context of previous reports.

Factors related to total QOL.

A previous report showed that physical activity, smoking and complications were related to the Health Related Quality of life (HRQOL) according to a cross-sectional study of women in the rural areas of China [15]. Consistent with these results, the present survey also found smoking as a

risk factor for low total QOL. In addition, previous research showed that postmenopausal women tended to have a more positive attitude toward menopause than perimenopausal women, and that attitude toward menopause, self-reported health status, as well as social and lifestyle factors were associated with the QOL in Chinese midlife women [16]. Similarly, the current study also found smoking and attitude towards menopause impacts QOL. Another survey reported that women with a positive attitude towards menopause had less perimenopausal symptoms than those with a negative attitude [17]. Using the menopause rating scale (MRS) questionnaire from Macao, perimenopausal symptoms were found to have a negative effect on QOL and sexual function in a previous survey. The present research also found mKMI to be a risk factor for low total QOL. Furthermore, the OAB has previously been found to have an effect on the QOL of postmenopausal women [4], which is consistent with this research. In addition, a positive attitude towards menopause has been shown to be related to a high QOL [18], but previous research has not shown which QOL dimension is affected by attitude towards menopause. The present survey found that, except for the BP dimension, the majority of QOL dimensions are affected by the attitude towards menopause. Factors affecting specific QOL dimensions are discussed below.

Factors related to the PF dimension

A previous survey showed that age, marital status, education background and osteoporosis have a direct or indirect impact on the quality of life in perimenopausal women [3]. In contrast, our study found that age is not a risk factor for low total QOL, but is for the PF dimension of the QOL, such that physical function is reduced with increasing age.

Tables 7. — Single factor logistics regression analysis of BP-GH

Items	BP		GH	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Age	1.007 (0.970,1.045)	0.721	0.985 (0.948,1.023)	0.427
Education background	0.775 (0.479,1.256)	0.302	0.750 (0.458,1.227)	0.252
Nationality	0.634 (0.255,1.576)	0.327	0.891 (0.345,2.300)	0.812
Profession(compared to the state organizations)	0.681 (0.422,1.098)	0.115	0.799 (0.494,1.292)	0.359
Monthly income	1.047 (0.772,1.420)	0.767	1.195 (0.875,1.631)	0.263
Current smoking	1.263 (0.358,4.450)	0.717	0.897 (0.248,3.245)	0.868
Passive smoking	1.168 (0.747,1.827)	0.496	1.239 (0.780,1.966)	0.364
Hypertension	1.888 (1.088,3.274)	0.024*	1.741 (0.957,3.166)	0.069
Diabetes	1.438 (0.540,3.828)	0.467	0.850 (0.315,2.295)	0.748
Osteoporosis	1.435 (0.805,2.559)	0.221	1.805 (0.951,3.426)	0.071
Hyperlipidemia	1.653 (1.005,2.718)	0.048*	1.017 (0.610,1.696)	0.948
Coronary heart disease	3.947 (1.048,14.865)	0.042*	6.926 (0.883,54.336)	0.066
Stroke	2.529 (0.227,28.172)	0.451	∞ (0.000,∞)	0.999
Cervical spondylosis	1.379 (0.886,2.146)	0.155	1.445 (0.917,2.279)	0.113
Uterine(myoma) fibroid	0.782 (0.501,1.221)	0.280	1.329 (0.842,2.097)	0.221
benign ovarian tumor	1.093 (0.527,2.264)	0.812	0.817 (0.381,1.749)	0.602
Benign breast tumor	0.841 (0.392,1.807)	0.658	1.196 (0.550,2.600)	0.651
Cervical cancer	∞ (0.000,∞)	0.999	3.373 (0.303,37.600)	0.323
Breast cancer	1.602 (0.144,17.581)	0.702	3.373 (0.303,37.600)	0.323
Living with family	0.664 (0.364,1.210)	0.181	0.988 (0.532,1.834)	0.969
Living with children	0.924 (0.595,1.437)	0.726	0.929 (0.591,1.461)	0.751
Living with parents	1.189 (0.553,2.552)	0.658	1.642 (0.704,3.835)	0.251
Living with father-in-law and mother-in-law	1.653 (0.600,4.554)	0.331	1.339 (0.454,3.951)	0.597
Living with grandchildren	7.809 (0.929,65.629)	0.058	1.513 (0.289,7.922)	0.624
Solitude	0.823 (0.358,1.892)	0.647	0.746 (0.327,1.701)	0.486
Menarche age	0.900 (0.789,1.027)	0.117	0.919 (0.806,1.049)	0.210
Marital status	1.411 (0.581,3.423)	0.447	0.640 (0.263,1.556)	0.325
Pregnancies	0.936 (0.803,1.090)	0.395	0.949 (0.815,1.106)	0.504
Term birth number	0.889 (0.591,1.337)	0.572	0.926 (0.616,1.393)	0.713
Natural delivery number	0.838 (0.594,1.183)	0.316	0.954 (0.675,1.349)	0.790
Cesarean section number	1.095 (0.668,1.798)	0.718	1.191 (0.711,1.994)	0.507
frequency of sexual intercourse in the last 6 months	0.750 (0.360,1.563)	0.443	1.100 (0.521,2.323)	0.802
Height	0.953 (0.916,0.992)	0.017*	0.928 (0.899,0.968)	0.001*
Weight	1.011 (0.985,1.037)	0.424	0.991 (0.965,1.018)	0.514
BMI	2.138 (1.363,3.353)	0.001*	1.105 (0.703,1.738)	0.665
Waistline	1.243 (0.795,1.946)	0.340	0.893 (0.564,1.412)	0.628
Hipline	1.035 (1.000,1.072)	0.049*	1.006 (0.972,1.042)	0.719
Duration of perimenopausal symptoms	1.124 (0.551,2.292)	0.749	1.459 (0.672,3.170)	0.340
Regular exercises relieving perimenopausal symptoms	1.116 (0.715,1.742)	0.629	1.169 (0.738,1.850)	0.506
Chatting with family relieving perimenopausal symptoms	1.493 (0.913,2.441)	0.110	1.241 (0.743,2.074)	0.409
TCM relieving perimenopausal symptoms	1.752 (1.095,2.803)	0.019*	2.078 (1.248,3.460)	0.005*
Developing new interests relieving perimenopausal symptoms	0.940 (0.552,1.601)	0.819	1.348 (0.786,2.313)	0.278
Let it be relieving perimenopausal symptoms	1.535 (0.968,2.433)	0.069	0.573 (0.360,0.913)	0.019*
Other ways in relieving perimenopausal symptoms	0.530 (0.087,3.213)	0.489	1.123 (0.185,6.816)	0.900
Mkmi	3.590 (1.661,7.756)	0.001*	4.059 (1.530,10.770)	0.005*
Passive attitude towards menopause	1.677 (1.069,2.632)	0.024*	2.871 (1.752,4.705)	0.000*
Diet guidance relieving perimenopausal symptoms	0.778 (0.327,1.852)	0.571	0.760 (0.301,1.921)	0.562
Medicine relieving perimenopausal symptoms	1.204 (0.710,2.042)	0.491	0.933 (0.544,1.599)	0.800
Routine walking	1.363 (0.734,2.533)	0.327	1.654 (0.900,3.039)	0.105
Jogging	0.501 (0.276,0.907)	0.023*	0.776 (0.440,1.369)	0.382
Brisk walking	1.055 (0.676,1.646)	0.814	0.878 (0.556,1.384)	0.574
Dancing	1.137 (0.680,1.903)	0.624	0.654 (0.388,1.100)	0.110
Swimming	0.951 (0.540,1.676)	0.862	0.582 (0.330,1.027)	0.062
Setting-up exercise	1.150 (0.693,1.908)	0.589	0.844 (0.504,1.413)	0.518
Ball games	0.904 (0.478,1.712)	0.758	0.650 (0.344,1.228)	0.184
Cycling	1.078 (0.662,1.754)	0.764	0.982 (0.596,1.618)	0.942
Other ways	0.625 (0.056,6.964)	0.702	1.214 (0.109,13.537)	0.875
Exercise times per week(>3 times/week)	1.032 (0.646,1.648)	0.894	1.154 (0.712,1.871)	0.561
OABSS	1.873 (1.148,3.054)	0.012*	1.260 (0.758,2.093)	0.372
Degree of urine leakage	1.329 (0.849,2.081)	0.214	0.827 (0.523,1.309)	0.418
Pelvic floor muscle function (type I)	1.039 (0.655,1.650)	0.870	0.971 (0.605,1.560)	0.904
Pelvic floor muscle function (type II)	1.137 (0.717,1.804)	0.585	1.203 (0.746,1.942)	0.449
Pelvic organ prolapse	1.038 (0.482,2.238)	0.924	0.618 (0.287,1.331)	0.219

Tables 8. — Binary multivariate logistic regression analysis of BP-GH.

Items	BP		GH	
	OR (95%CI)	p value	OR (95%CI)	p value
Hypertension	1.428 (0.775, 2.630)	0.322	—	—
hyperlipidemia	1.436 (0.836, 2.467)	0.190	—	—
Coronary heart disease	1.846 (0.432, 7.884)	0.408	—	—
Height	0.955 (0.912, 0.999)	0.047*	0.932 (0.891, 0.974)	0.002*
BMI	0.991 (0.885, 1.110)	0.875	—	—
Hipline	1.045 (0.989, 1.104)	0.115	—	—
TCM relieving perimenopausal symptoms	1.787 (1.075, 2.971)	0.025*	1.836 (1.042, 3.225)	0.036*
Relieving perimenopausal symptoms	—	—	0.730 (0.432, 1.233)	0.239
mKMI	2.345 (0.990, 5.550)	0.053	2.879 (1.047, 7.918)	0.041*
Altitude	1.482 (0.903, 2.432)	0.119	2.526 (1.503, 4.245)	0.000*
Jogging	0.585 (0.310, 1.104)	0.098	—	—
OABSS	1.635 (0.960, 2.784)	0.070	—	—

Current smoking, mKMI, and a negative attitude towards menopause also were found to be risk factors for PF in the current study and more research is needed to explore the reasons for this relationship in the future.

Factors related to the RP dimension

A low frequency of sexual intercourse in the last six months, mKMI, a passive attitude towards menopause, and high OABSS are risk factors for the RP dimension of the QOL. Sexual dysfunction among menopausal women is common and the most affected domains have been shown to be satisfaction, desire, and arousal which are associated with older age, low education level, and the type of menopause [19]. However, this research found that a low frequency of sexual intercourse in the last six months specifically damages the RP dimension of the QOL. RP reflects the extent to which work and life are affected by physical health in the last four weeks. In contrast, dancing was found to be a protective factor for RP. The improvement of global QOL has been previously shown to be correlated with stable or increased physical activity, stable weight, and high education [20]. The present research suggests that dancing may be more useful in improving the RP dimension of QOL compared with walking, jogging, brisk walking, swimming, sitting-up exercises, ball games, cycling, and other exercises. As of yet, there is no research report regarding the use of dancing to improve the QOL for perimenopausal and postmenopausal women. Cohort or randomized trials contrasting dancing with other exercise modes in the ability to improve the QOL of perimenopausal and postmenopausal women are needed in the future.

Factors related to the BP dimension

Height and TCM to relieve perimenopausal symptoms were shown to be two factors affecting the BP dimension of the QOL. Height was found to be a protective factor for BP. The average height of the present participants was 159.99 cm while the average height of Chinese women is 155.00

cm [21]. To the best of the present authors' knowledge, there is no previous research report relating height to the QOL for perimenopausal and postmenopausal women and further research is needed. TCM to relieve perimenopausal symptoms was a risk factors for BP, which may be due to Chinese women tending to use TCM to control bodily pain on a daily basis [22, 23].

Factors related to the GH dimension

Height and TCM to relieve perimenopausal symptoms, mKMI, and a passive attitude towards menopause were found to be factors affecting the GH dimension of the QOL for perimenopausal and postmenopausal women. Height was a protective factor for GH such that improved general health was seen with increased height. There is no previous research regarding a relationship between height and the GH dimension of the QOL. TCM to relieve perimenopausal symptoms was shown to be a risk factor for GH, which may be due to trend of using TCM in China.

Factors related to the VT dimension

Living with a husband, mKMI, and a passive attitude towards menopause were found to be factors affecting VT. Living with husband was a protective factor for VT. Compared with living with parents, children, grandparent, mother-in-law and father-in-law, grandchildren, and living alone, living with a husband may improve the VT dimension of the QOL. While there is no previous report regarding whether living with specific people will affect different dimensions of the QOL, marital status has been shown to be related to the QOL for postmenopausal women [15]. This may indirectly explain why living with husband is associated with improved aspects of the QOL for perimenopausal and postmenopausal women.

Factors related to the SF dimension

A passive attitude towards menopause, mKMI, and OABSS were found to be risk factors affecting the SF di-

Tables 9. — Single factor logistics regression analysis of VT-SF.

Items	VT		SF	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Age	0.999 (0.963,1.036)	0.953	0.974 (0.938,1.012)	0.172
Education background	0.857 (0.531,1.384)	0.528	0.955 (0.777,1.175)	0.665
Nationality	1.190 (0.481,2.942)	0.707	2.081 (0.836,5.178)	0.115
Profession(compared to the state organizations)	1.052 (0.656,1.685)	0.834	0.938 (0.580,1.519)	0.796
Monthly income	1.340 (0.988,1.818)	0.060	1.080 (0.798,1.461)	0.619
Current smoking	8.012 (1.003,64.004)	0.050	1.454 (0.369,5.731)	0.593
Passive smoking	1.608 (1.024,2.525)	0.039*	1.225 (0.773,1.942)	0.387
Hypertension	0.989 (0.573,1.708)	0.969	1.066 (0.607,1.873)	0.823
Diabetes	0.444 (0.160,1.232)	0.119	1.372 (0.744,2.532)	0.311
Osteoporosis	1.522 (0.841,2.752)	0.165	1.805 (0.951,3.426)	0.071
Hyperlipidemia	0.969 (0.590,1.591)	0.901	0.807 (0.487,1.336)	0.807
Coronary heart disease	9.914 (1.264,77.727)	0.029*	1.889 (0.501,7.118)	0.347
Stroke	1.708 (0.153,19.024)	0.664	1.235 (0.111,13.763)	0.864
Cervical spondylosis	1.295 (0.833,2.012)	0.251	1.164 (0.741,1.828)	0.511
Uterine(myoma) fibroid	1.203 (0.772,1.876)	0.414	1.021 (0.648,1.610)	0.928
benign ovarian tumor	1.121 (0.545,2.305)	0.757	0.919 (0.435,1.943)	0.826
Benign breast tumor	1.291 (0.601,2.771)	0.513	1.842 (0.856,3.965)	0.118
Cervical cancer	2.372 (0.213,26.430)	0.482	0.000 (0.000,∞)	0.999
Breast cancer	2.372 (0.213,26.430)	0.482	∞ (0.000,∞)	0.999
Living with family	0.482 (0.254,0.911)	0.025*	0.957 (0.515,1.776)	0.889
Living with children	0.779 (0.501,1.210)	0.266	1.090 (0.694,1.711)	0.709
Living with parents	0.775 (0.361,1.664)	0.513	1.009 (0.460,2.216)	0.982
Living with father-in-law and mother-in-law	0.842 (0.308,2.303)	0.738	1.903 (0.600,6.040)	0.275
Living with grandchildren	1.136 (0.250,5.160)	0.869	1.554 (0.297,8.139)	0.602
Solitude	1.893 (0.793,4.523)	0.151	0.918 (0.339,2.114)	0.841
Menarche age	0.999 (0.878,1.136)	0.985	1.009 (0.884,1.151)	0.899
Marital status	0.930 (0.384,2.256)	0.873	0.537 (0.221,1.304)	0.170
Pregnancies	1.089 (0.934,1.268)	0.276	1.190 (1.007,1.405)	0.041*
Term birth number	1.140 (0.759,1.714)	0.527	1.223 (0.794,1.884)	0.361
Natural delivery number	0.936 (0.668,1.312)	0.700	1.068 (0.753,1.513)	0.714
Cesarean section number	1.229 (0.747,2.020)	0.417	1.097 (0.659,1.826)	0.722
Frequency of sexual intercourse in the last 6 months	1.541 (0.736,3.226)	0.252	1.441 (0.690,3.013)	0.331
Height	0.988 (0.950,1.027)	0.533	0.998 (0.959,1.038)	0.911
Weight	1.008 (0.982,1.035)	0.532	1.004 (0.977,1.031)	0.785
BMI	1.409 (0.906,2.191)	0.128	1.049 (0.668,1.648)	0.835
Waistline	1.146 (0.734,1.788)	0.549	0.872 (0.552,1.379)	0.559
Hipline	1.022 (0.987,1.057)	0.221	1.002 (0.968,1.037)	0.919
Duration of perimenopausal symptoms	1.603 (0.764,3.363)	0.212	1.526 (0.703,3.314)	0.285
Regular exercises relieving perimenopausal symptoms	1.032 (0.662,1.610)	0.889	1.367 (0.863,2.165)	0.183
Chatting with family relieving perimenopausal symptoms	1.047 (0.641,1.712)	0.854	1.288 (0.771,2.150)	0.334
TCM relieving perimenopausal symptoms	1.154 (0.722,1.845)	0.549	1.462 (0.895,2.389)	0.129
Developing new interests relieving perimenopausal symptoms	0.860 (0.504,1.468)	0.580	1.118 (0.650,1.924)	0.686
Relieving perimenopausal symptoms	0.880 (0.558,1.387)	0.582	1.576 (0.991,2.506)	0.055
Other ways relieving perimenopausal symptoms	0.787 (0.130,4.775)	0.795	0.404 (0.045,3.659)	0.420
Mkmi	5.958 (2.248,15.793)	0.000*	5.0476 (1.883,15.927)	0.002*
Passive attitude towards menopause	3.537 (2.194,5.704)	0.000*	3.893 (2.337,6.485)	0.000*
Diet guidance relieving perimenopausal symptoms	1.460 (0.612,3.483)	0.394	1.144 (0.474,2.762)	0.766
Medicine relieving perimenopausal symptoms	1.002 (0.594,1.688)	0.995	0.787 (0.456,1.358)	0.389
Routine walking	1.448 (0.790,2.654)	0.231	1.601 (0.872,2.941)	0.129
Jogging	0.676 (0.386,1.185)	0.172	1.129 (0.632,2.016)	0.681
Brisk walking	0.722 (0.463,1.126)	0.151	1.026 (0.651,1.617)	0.912
Dancing	0.847 (0.507,1.417)	0.528	0.724 (0.432,1.224)	0.231
Swimming	0.704 (0.401,1.236)	0.222	0.554 (0.315,0.977)	0.041*
Setting-up exercise	0.789 (0.476,1.308)	0.359	0.938 (0.559,1.572)	0.807
Ball games	0.718 (0.381,1.350)	0.303	0.671 (0.356,1.267)	0.218
Cycling	0.715 (0.439,1.162)	0.175	0.841 (0.512,1.379)	0.492
Other ways	1.728 (0.155,19.250)	0.657	0.308 (0.028,3.430)	0.338
Exercise times per week (>3 times/week)	1.027 (0.644,1.637)	0.912	1.131 (0.699,1.829)	0.617
OABSS	1.908(1.156,3.151)	0.012*	2.302(1.342,3.950)	0.002*
Degree of urine leakage	1.131 (0.725,1.764)	0.587	1.355 (0.859,2.138)	0.191
Pelvic floor muscle function (type I)	1.009 (0.637,1.600)	0.969	1.036 (0.646,1.662)	0.882
Pelvic floor muscle function (type II)	1.009 (0.637,1.600)	0.969	1.140 (0.709,1.833)	0.589
Pelvic organ prolapse	1.241 (0.572,2.692)	0.585	1.002 (0.456,2.201)	0.996

Tables 10. — Binary multivariate logistic regression analysis of VT-SF.

Items	VT		SF	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Passive smoking	1.582 (0.967, 2.588)	0.068	—	—
Coronary heart disease	7.062 (0.805, 61.922)	0.078	—	—
Pregnancies	—	—	1.181 (0.987, 1.412)	0.069
Living with husband	0.483 (0.238, 0.978)	0.043*	—	—
mKMI	3.403 (1.213, 9.543)	0.020*	3.779 (1.240, 11.513)	0.019*
Passive attitude towards menopause	3.261 (1.969, 5.401)	0.000*	3.308 (1.949, 5.614)	0.000*
Swimming	—	—	0.552 (0.297, 1.029)	0.062
OABSS	1.659(0.964, 2.856)	0.068	2.067 (1.163, 3.675)	0.013*

mension of QOL. Overactive bladder has been previously related to the QOL for postmenopausal women [4]; however, the specific QOL dimension impacted by OAB has not been previously investigated. The present results suggest the same QOL dimension is damaged by OAB, attitude and mKMI.

Factors related to the RE dimension

Passive smoking, low frequency of sexual intercourse in the last six months, mKMI, passive attitude towards menopause, and OABSS were found to be risk factors for the RE dimension of the QOL. To the best of the present authors' knowledge, there is no previous research showing associations between RE and these factors. RE reflects the extent of work impairment affected by emotional changes. Sexual intercourse dysfunction has been shown to affect women's QOL [20]; however, the previous research did not show which dimension is affected.

Factors related to the MH dimension

Marital status, financial situation, and exercise have previously been related to the QOL of perimenopause women [24]. In contrast, the present study did not find a relationship between marital status and QOL. In addition, monthly income did not show any relation with QOL except for the MH dimension. The single factor logistic regression analysis showed that there exists some relation between monthly income and MH. As the present research only investigated monthly income in the previous year, more financial indicators are needed in future research.

Symptoms related to specific QOL dimensions

Analyses between QOL dimensions and specific items on the mKMI and OABSS showed that hot flashes only impact RP and GH, suggesting that they only have a main effect on the physical component of the QOL. These results are similar to previous research in which a lower physical component score was mainly caused by hot flashes, palpitation, nervousness, while a lower mental component score was mainly caused by dizziness, nervousness, depression, insomnia, and dyspareunia [25]. The present research also

found that paresthesia, depression, muscle/joint pain, and palpitations were risk factors for both the physical and mental components of the QOL. Furthermore, all of the items from the mKMI and OABSS were found to be related to the RP dimension of QOL, while daytime urinary frequencies mainly was related to the physical not the mental component of the QOL.

The present results suggest that hot flashes maybe not be the most important risk factor to the QOL for perimenopausal and postmenopausal women. The traditional treatment protocol mainly focuses on treating hot flashes as the priority for perimenopausal women; however, the present results suggest this strategy would not improve the QOL of women bothered by perimenopausal symptoms. In addition, the treatment of women with paresthesia, depression, fatigue, muscle/joint pain, and palpitations may need to be individualized in order to improve the QOL during this special period.

Additional factors related to the physical and mental components of the QOL

Age, current smoking, perimenopausal symptoms, attitude towards menopause, OABSS, low frequencies of sexual intercourse in the last six months, and TCM to relieve perimenopausal symptoms were found to be risk factors for the physical component of the QOL, while dancing and height were protective factors. Menopausal symptoms, perimenopausal symptoms, OABSS, passive smoking, and lower frequencies of sexual intercourse in the last six months were shown to be risk factors for the mental component of the QOL, while living with a husband was a risk factor for the physical component of the QOL. Thus, perimenopausal symptoms, a passive attitude towards menopause, OABSS, and lower frequencies of sexual intercourse in the last six months are the common risk factors to both the physical and mental components of the QOL.

The results showed that living with a husband and parents is better than living only with a husband, living with a husband and children, or living with only children in terms of some of the QOL dimensions. Specifically, living with relatives appears to mainly impact the mental component of

Tables 11. — Single factor logistics regression analysis of RE-MH.

Items	RE		MH	
	OR (95%CI)	<i>p</i> value	OR (95%CI)	<i>p</i> value
Age	1.003 (0.967,1.041)	0.864	0.979 (0.944,1.017)	0.273
Education background	0.795 (0.648,0.977)	0.029*	0.833 (0.680,1.022)	0.080
Nationality	0.786 (0.317,1.952)	0.604	0.722 (0.287,1.817)	0.489
Profession(compared to the state organizations)	1.111 (0.694,1.776)	0.662	0.937 (0.585,1.499)	0.785
Monthly income	1.237 (0.913,1.676)	0.169	1.400 (1.028,1.906)	0.033*
Current smoking	4.267 (0.892,20.415)	0.069	8.547 (1.070,68.276)	0.043*
Passive smoking	1.799 (1.148,2.821)	0.010*	1.377 (0.880,2.154)	0.161
Hypertension	1.072 (0.622,1.849)	0.801	1.157 (0.669,1.999)	0.602
Diabetes	0.542 (0.195,1.503)	0.239	0.794 (0.299,2.114)	0.645
Osteoporosis	1.338 (0.749,2.388)	0.325	0.886 (0.497,1.577)	0.680
Hyperlipidemia	0.971 (0.592,1.592)	0.907	0.768 (0.468,1.260)	0.295
Coronary heart disease	5.405 (1.165,25.077)	0.031*	2.811 (0.747,10.583)	0.126
Stroke	0.510 (0.046,5.676)	0.584	0.449 (0.040,5.003)	0.515
Cervical spondylosis	1.252 (0.807,1.941)	0.316	1.392 (0.896,2.162)	0.141
Uterine(myoma) fibroid	1.115 (0.716,1.736)	0.629	1.193 (0.766,1.858)	0.436
benign ovarian tumor	0.692 (0.334,1.433)	0.322	0.600 (0.285,1.265)	0.180
Benign breast tumor	1.050 (0.489,2.253)	0.901	1.917 (0.875,4.202)	0.104
Cervical cancer	1.962 (0.176,21.862)	0.584	0.550 (0.049,6.123)	0.627
Breast cancer	1.962 (0.176,21.862)	0.584	2.227 (0.200,24.806)	0.515
Living with family	0.577 (0.313,1.063)	0.078	0.737 (0.402,1.353)	0.325
Living with children	0.882 (0.569,1.368)	0.575	0.840 (0.541,1.303)	0.437
Living with parents	0.953 (0.444,2.045)	0.901	0.966 (0.450,2.074)	0.930
Living with father-in-law and mother-in-law	1.337 (0.486,3.683)	0.574	0.900 (0.329,2.460)	0.837
Living with grandchildren	2.614 (0.500,13.678)	0.255	1.211 (0.267,5.502)	0.804
Solitude	1.915 (0.820,4.473)	0.133	1.392 (0.606,3.199)	0.436
Menarche age	0.992 (0.872,1.127)	0.896	0.911 (0.801,1.037)	0.160
Marital status	0.928 (0.382,2.249)	0.868	0.811 (0.335,1.968)	0.644
Pregnancies	1.152 (0.987,1.345)	0.072	1.076 (0.925,1.252)	0.342
Term birth number	1.189 (0.793,1.784)	0.402	1.062 (0.711,1.587)	0.768
Natural delivery number	0.851 (0.606,1.196)	0.353	0.907 (0.647,1.271)	0.571
Cesarean section number	1.315 (0.802,2.156)	0.278	1.256 (0.765,2.063)	0.367
Frequency of sexual intercourse in the last 6 months	2.302 (1.050,5.047)	0.037*	1.111 (0.534,2.314)	0.778
Height	0.987 (0.950,1.026)	0.509	1.001 (0.963,1.041)	0.948
Weight	1.011 (0.985,1.037)	0.421	0.997 (0.971,1.023)	0.811
BMI	1.535 (0.988,2.386)	0.057	0.969 (0.625,1.503)	0.889
Waistline	1.007 (0.646,1.569)	0.976	0.834 (0.535,1.301)	0.424
Hipline	1.001 (0.968,1.035)	0.952	0.987 (0.954,1.021)	0.434
Duration of perimenopausal symptoms	2.010 (0.958,4.217)	0.065	1.012 (0.496,2.063)	0.974
Regular exercises relieving perimenopausal symptoms	0.865 (0.555,1.347)	0.520	0.940 (0.604,1.465)	0.785
Chatting with family relieving perimenopausal symptoms	1.127 (0.691,1.839)	0.632	1.675 (1.016,2.761)	0.043*
TCM relieving perimenopausal symptoms	1.531 (0.957,2.447)	0.075	1.422 (0.889,2.277)	0.142
Developing new interests relieving perimenopausal symptoms	0.976 (0.574,1.659)	0.929	0.990 (0.582,1.684)	0.971
Relieving perimenopausal symptoms	1.169 (0.743,1.839)	0.499	1.220 (0.776,1.919)	0.390
Other ways relieving perimenopausal symptoms	0.241 (0.027,2.177)	0.205	0.273 (0.030,2.473)	0.248
mKMI	7.359 (2.776,19.513)	0.000*	4.143 (1.753,9.792)	0.001*
Passive attitude towards menopause	2.936 (1.848,4.666)	0.000*	4.742 (2.907,7.733)	0.000*
Diet guidance relieving perimenopausal symptoms	1.192 (0.500,2.844)	0.692	1.121 (0.472,2.667)	0.795
Medicine relieving perimenopausal symptoms	1.114 (0.662,1.876)	0.684	0.800 (0.474,1.351)	0.800
Routine walking	1.545 (0.836,2.857)	0.165	1.127 (0.616,2.062)	0.698
Jogging	0.518 (0.291,0.922)	0.025*	0.664 (0.378,1.164)	0.153
Brisk walking	0.788 (0.506,1.228)	0.293	0.715 (0.458,1.114)	0.138
Dancing	0.671 (0.399,1.127)	0.132	0.688 (0.411,1.152)	0.155
Swimming	0.636 (0.359,1.127)	0.121	0.413 (0.230,0.741)	0.003*
Setting-up exercise	0.952 (0.575,1.578)	0.850	0.566 (0.340,0.942)	0.029*
Ball games	0.725 (0.384,1.372)	0.324	0.686 (0.364,1.293)	0.244
Cycling	0.992 (0.611,1.611)	0.974	0.638 (0.392,1.039)	0.071
Other ways	0.000 (0.000,∞)	0.999	0.449 (0.040,5.000)	0.515
Exercise times per week(>3 times/week)	0.973 (0.611,1.549)	0.907	1.241 (0.777,1.980)	0.366
OABSS	2.330 (1.413,3.841)	0.001*	1.830 (1.114,3.007)	0.017*
Degree of urine leakage	1.299 (0.833,2.026)	0.249	1.085 (0.696,1.692)	0.718
Pelvic floor muscle function (type I)	0.933 (0.590,1.478)	0.768	0.787 (0.497,1.247)	0.308
Pelvic floor muscle function (type II)	0.836 (0.528,1.324)	0.446	0.667 (0.420,1.058)	0.085
Pelvic organ prolapse	0.953 (0.444,2.047)	0.902	0.829 (0.386,1.780)	0.630

Tables 12. — Binary multivariate logistic regression analysis of RE-MH.

Items	RE		MH	
	OR (95%CI)	p value	OR (95%CI)	p value
Education background	0.821 (0.648, 1.039)	0.100	—	—
Monthly income	—	—	1.109 (0.787, 1.562)	0.555
Current smoking	—	—	4.137 (0.647, 26.456)	0.134
Passive smoking	1.765 (1.018, 3.060)	0.043*	—	—
Coronary heart disease	4.467 (0.459, 43.469)	0.197	—	—
Frequency of sexual intercourse in the last 6 months	2.638 (1.056, 6.593)	0.038*	—	—
Chatting with family relieving perimenopausal symptoms	—	—	0.623 (0.291, 1.333)	0.222
mKMI	4.073 (1.272, 13.045)	0.018*	8.329 (2.144, 32.364)	0.002*
Passive attitude towards menopause	3.455 (1.921, 6.214)	0.000*	2.224 (1.136, 4.354)	0.020*
Jogging	0.591 (0.308, 1.133)	0.113	—	—
Swimming	—	—	0.534 (0.221, 1.289)	0.163
Setting-up exercises	—	—	2.236 (0.998, 5.011)	0.051
OABSS	2.502 (1.343, 4.661)	0.004*	2.304 (1.066, 4.981)	0.034*

the QOL. In addition, different complications were shown to have different effects on the QOL such that gynecological diseases appear to have less of an effect than hypertension and cervical spondylosis on at least some QOL dimensions. A number of complications impact specific QOL dimensions including PF, GH, and total QOL. These results suggest that complications have a more severe effect on the physical component than on the mental component. In addition, exercises, TCM, chatting with friends, culturing hobbies, and 'ignore it' have same effect on women in most of the QOL dimensions; however, exercises appear to be better than TCM in terms of the VT dimension, and worse than culturing hobbies in terms of SF dimension. PF was shown to increase with a number of relieving methods. Finally, PF, RP, VT, MH, and total QOL increase with the number of sports chosen. These results provide some clues as to what may be the best potential individualized therapies for women during this special period. More prospective and randomized trails are needed in the future.

Cross-sectional studies have several potential limitations. First, the sample of this survey was relatively small with relatively low power. Second, this study had limitations concerning recall bias (such as for sexual intercourse frequency) and selection bias. Patients who visited the present menopause clinic may have had more severe symptoms than other patients, possibly resulting in a selection bias. Research on a large number of menopause patients outside a hospital setting is needed. In addition, other types of studies, such as cohort studies, should be performed to further determine the factors involved in menopausal symptoms.

Conclusion

In general, women during the perimenopausal and postmenopausal periods will be affected by a variety of factors. Current smoking, perimenopausal symptoms, a passive attitude towards menopause, and high OABSS are risk fac-

tors for low QOL, while dancing, height, and living with a husband may be protective factors for some QOL dimensions. Each QOL dimension is associated with specific risk factors, and hot flashes may not be the most important factor to the QOL. Paresthesia, depression, fatigue, muscle/joint pain, and palpitations may also be risk factors to both the physical and mental components of the QOL. Individualized treatment of women during this special period may improve the QOL to a large extent. Fully exploring the factors affecting women during this special period can help make more precise and effective treatments that may improve the QOL.

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