

RESEARCH

Open Access



Prevalence of menopausal symptoms and attitudes towards menopausal hormone therapy in women aged 40–60 years: a cross-sectional study

Jie Lu¹, Kangfen Li¹, Xinlie Zheng¹, Ran Liu¹, Min Chen², Jingyun Xian², Suhua Tu³ and Lingling Xie^{2*}

Abstract

Background Menopause is a specific physical and psychological transition period for women, during which they experience a series of menopausal symptoms. Menopausal hormone therapy is an important treatment for improving menopausal symptoms. Helping women correctly understand menopausal hormone therapy is a prerequisite for increasing the acceptance and utilization of menopausal hormone therapy by women. Physical examinations are an important method for women to master their own health status and detect potential health problems, and in recent years, an increasing number of women have actively participated in physical examinations. Therefore, this study aims to comprehend the prevalence of menopausal symptoms and attitudes towards menopausal hormone therapy among women aged 40–60 who underwent physical examinations, which would provide a useful reference to reduce the prevalence of menopausal symptoms and improve acceptance of menopausal hormone therapy.

Methods This cross-sectional study was conducted at the Health Management Centre of the Affiliated Hospital of Southwest Medical University in Luzhou City, Sichuan Province. The data were collected from 295 women aged between 40 and 60 using convenience sampling. Information on all participants was collected through face-to-face interviews. Participants completed a demographic questionnaire and an attitude towards menopausal hormone therapy questionnaire, and the modified Kupperman index was used to assess the prevalence and severity of participants' menopausal symptoms. The collected data were processed using SPSS and Excel software and analysed using descriptive statistics and logistic regression.

Results The top 5 menopausal symptoms were insomnia, fatigue, bone and joint pain, sexual dysfunction and emotional instability. Multiple linear regression analysis showed that residence, sexual intercourse frequency, mentality, and physical exercise were the influencing factors of menopausal symptoms. The study showed that 77% of women said they were still reluctant to receive menopausal hormone therapy after experiencing menopause-related symptoms. The main source of menopausal hormone therapy-related knowledge among women was from surrounding menopausal women (62%), and 54% wanted to gain menopausal hormone therapy-related knowledge through a web-based approach.

*Correspondence:

Lingling Xie

736866031@qq.com

Full list of author information is available at the end of the article



© The Author(s) 2023. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Conclusion The incidence of menopausal symptoms is higher in women aged 40–60 years, which is related to women's mentality, exercise, and sexual intercourse frequency. In addition, the results of this study indicate that women's knowledge of menopausal hormone therapy is insufficient, which suggests that we need to strengthen health education to improve the acceptance rate of menopausal hormone therapy.

Keywords Menopause, Menopausal hormone therapy, Physical examination

Introduction

Menopause is the reproductive to nonreproductive transition period in women and is a necessary period in the life of a woman [1]. Because of the decline in ovarian function, hormone levels can fluctuate dramatically, which can cause women to experience hot flashes, insomnia, depression, and other related symptoms [2–4], and these physical and mental symptoms can lead to a reduction in a woman's health level and quality of life [5, 6]. In addition, postmenopausal women have an increased risk of osteoporosis [7] and genitourinary syndrome [8].

Menopausal hormone therapy (MHT) is a common treatment to improve menopausal symptoms and can effectively reduce the adverse effects caused by hormone level fluctuations [9]. A randomized controlled trial that included 150 women showed that MHT improved hot flashes and enhanced women's quality of life [10]. In addition, several studies have confirmed the benefits of MHT for menopausal women; for example, MHT can improve hot flashes in menopausal women [11] and reduce the incidence of osteoporosis [12] and cardiovascular disease [13]. In 2016, the International Menopause Society suggested that MHT is an important step in improving the health of menopausal women [14]. This shows that the benefits of MHT as an important treatment are widely recognized. Women in China have fewer opportunities to receive menopausal health education, have a single form of health education, and know less about menopause and MHT, so they do not choose to receive MHT after menopausal symptoms appear and let nature take its course. The results of a research study showed that fewer menopausal women in China actively seek medical treatment and have a lower willingness to undergo MHT [15]. It is clearly stated in the Endocrine Society Clinical Practice Guidelines [16] that MHT needs to be individualized according to a standardized diagnosis and treatment process, and women receiving MHT should receive corresponding health guidance to develop better management strategies. Therefore, how to increase the acceptance rate of MHT among women is an urgent issue that needs to be addressed.

In recent years, with the economic development of China and the support of national policies, women's awareness of self-care has been increasing, and an increasing number of women are actively participating in

physical examinations. Currently, research on menopause has been conducted in various populations. For example, in community groups of women, the prevalence of menopausal symptoms is as high as 73.8% [15]. Additionally, a study focused on rural women in India indicated that perimenopausal women are more prone to experiencing menopausal symptoms compared to pre-menopausal and post-menopausal women [17]. However, there is a dearth of menopausal studies on women undergoing physical examinations.

Therefore, through this cross-sectional study, we aim to comprehend the prevalence of menopausal symptoms among women undergoing physical examinations, along with their attitudes towards menopausal hormone therapy, so as to inform the reduction of the prevalence of menopausal symptoms and improve acceptance of menopausal hormone therapy.

Methods

Study design

This is a cross-sectional study. We selected respondents using the convenience sampling method and chose women who had undergone physical examinations at the Health Management Centre of the Affiliated Hospital of Southwest Medical University from March 2022 to August 2022.

Inclusion and exclusion criteria

The inclusion criteria were as follows: 1. Women aged 40–60 years old; 2. Women who were able to understand and cooperate with the study; and 3. Women who provided informed consent. The exclusion criteria were as follows: 1. Patients with heart, liver, lung, kidney, brain and other major organ diseases; 2. Patients with malignant tumours; and 3. Patients with mental health conditions that could affect their cooperation. The study was approved by the Clinical Trial Ethics Committee of the Affiliated Hospital of Southwest Medical University (Approval No.: KY2022083), and the study subjects gave informed consent and volunteered to participate in this study.

Sample size determination and calculation

The sample size for this study is based on the single population proportion formula. The specific formula is as

follows: $n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2}$. In this sample size formula, we set the confidence interval to 95%, the value of $z\alpha/2$ to 1.96, the expected prevalence of menopausal symptoms among Chinese women aged 40–60 years to 80% [18], the P value to 0.8, and the marginal sampling error tolerated to 0.05, and substituting into the formula, we obtained: $n = \frac{(1.96)^2 0.8 (1-0.8)}{(0.05)^2}$. In addition, considering the 10% non-response rate, we finally confirmed the sample size of 271.

Sampling procedures

The flow chart of participant selection is shown in Fig. 1. A total of 310 participants who met the inclusion and exclusion criteria were recruited for this study, of whom five refused to sign the informed consent form, four dropped out of the survey midway, and six missed important data. Finally, the number of valid questionnaires in this study was 295.

Measurement

We administered face-to-face interviews to all participants. The investigation content was as follows: 1. A demographic questionnaire: This questionnaire collected data on age, residence, education background, marital status, career, monthly income, menstrual condition, taking hormonal medication, mentality, sexual intercourse frequency, number of children and physical exercise level; 2. The modified Kupperman index: The modified Kupperman Scale index was used to assess the severity of menopausal symptoms, which has been shown to be suitable for Chinese women [19]. The scale included the assessment of 13 common menopausal symptoms: hot flashes and sweating, insomnia, mood swings, urinary tract infections, sensory disturbances, skin tingling, depression, headache, palpitations, dizziness, sex life status, bone and joint pain, and fatigue. The basic score

for each symptom varied, with hot flashes and sweating being 4 points, insomnia, mood swings, and sensory disturbances being 2 points, and the remaining symptoms being 1 point. According to the severity of symptoms, there were four-degree scores: normal (0 points), mild (1 point), moderate (2 points), and severe (3 points). The total score for each symptom was calculated by multiplying the basic score by the degree score, and the sum of all the symptom scores was the total score of the scale, with scores ranging from 0 to 63 points; scores ≤ 6 points indicated normal symptoms, 7 to 15 points indicated mild symptoms, scores of 16 to 30 points indicated moderate symptoms, and scores > 30 points indicated severe symptoms; 3. An attitude towards menopausal hormone therapy questionnaire: This questionnaire includes understanding of menopause, understanding of MHT, sources of knowledge related to MHT, desired health education methods, willingness to use MHT after symptoms, reason for receiving MHT, and reason for refusing MHT.

Data quality control

First, in the research design stage, we chose a validated scale that is more applicable to Chinese women as the survey instrument [19]. Second, before the survey began, we provided uniform and standardised training to the investigators to ensure the reliability and validity of the questionnaire. Finally, before data entry, the researchers scrutinised the collected data. During the data entry process, it was carried out independently by two researchers, and data verification was performed using Excel software to ensure the accuracy of the data.

Statistical analysis

We used Excel software for data entry and charting, and we performed descriptive and logistic regression analyses

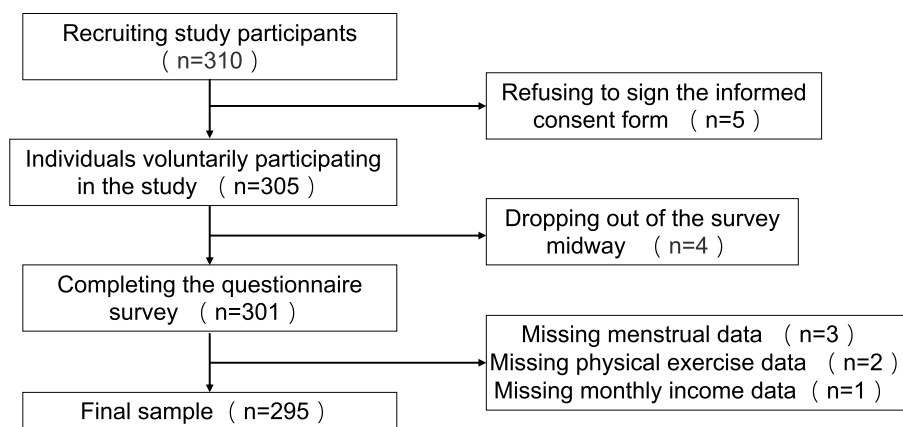


Fig. 1 Flow chart of participant selection

with the help of SPSS software. In analysing the descriptive statistics, we used the mean and standard deviation, and the distribution was expressed using frequency and percentage. While exploring the influencing factors, we performed a logistic regression analysis considering several variables such as residence, mentality, number of children, sexual intercourse frequency, taking hormonal medication, and physical exercise. The test level was set at $\alpha=0.05$.

Results

General demographic characteristics

The age range of the respondents was predominantly from 45–54 years old (69.15%), most women had a college level education or above (58.31%), were employed (71.50%), and had a monthly income ranging from ¥2000 to 5000 (43.10%) Yuan. The investigated women had an average menarche age of 13.25 years (SD ± 1.24) and an average menopause age of 48.98 years (SD ± 3.29) (Fig. 2).

Occurrence of menopausal symptoms

Eighty-seven respondents had no symptoms, and 208 had menopausal symptoms. The top five menopausal symptoms were insomnia, fatigue, bone and joint pain, sexual dysfunction and emotional instability. The severity of menopausal symptoms is shown in Table 1, the incidence of menopausal symptoms is shown in Fig. 3, and the distribution of menopausal symptoms is shown in Fig. 4.

Table 1 Severity of symptoms during menopause

Degree of symptoms during menopause	Number (n = 295)	Percentage	Modified kupperman Score
Normal	87	29.49	3.64 ± 1.91
Mild	137	46.44	10.59 ± 2.43
Moderate and Severe	71	24.07	19.72 ± 3.47

Multivariate analysis of the modified Kupperman score for menopausal symptoms

Multivariate logistic regression analysis was performed with the modified Kupperman score for menopausal symptoms as the dependent variable and residence, mentality, the number of children, sexual intercourse frequency, the use of hormonal medications, and physical exercise as the independent variables, and the results showed that residence in a rural area, emotional instability, a low sexual intercourse frequency, the use of hormonal medications, and a lack of physical exercise were risk factors for menopausal symptoms (Fig. 5).

Analysis of cognitive status related to menopausal hormone therapy

The survey results showed that 22% of women had a complete understanding of MHT, MHT-related knowledge was mainly obtained from surrounding

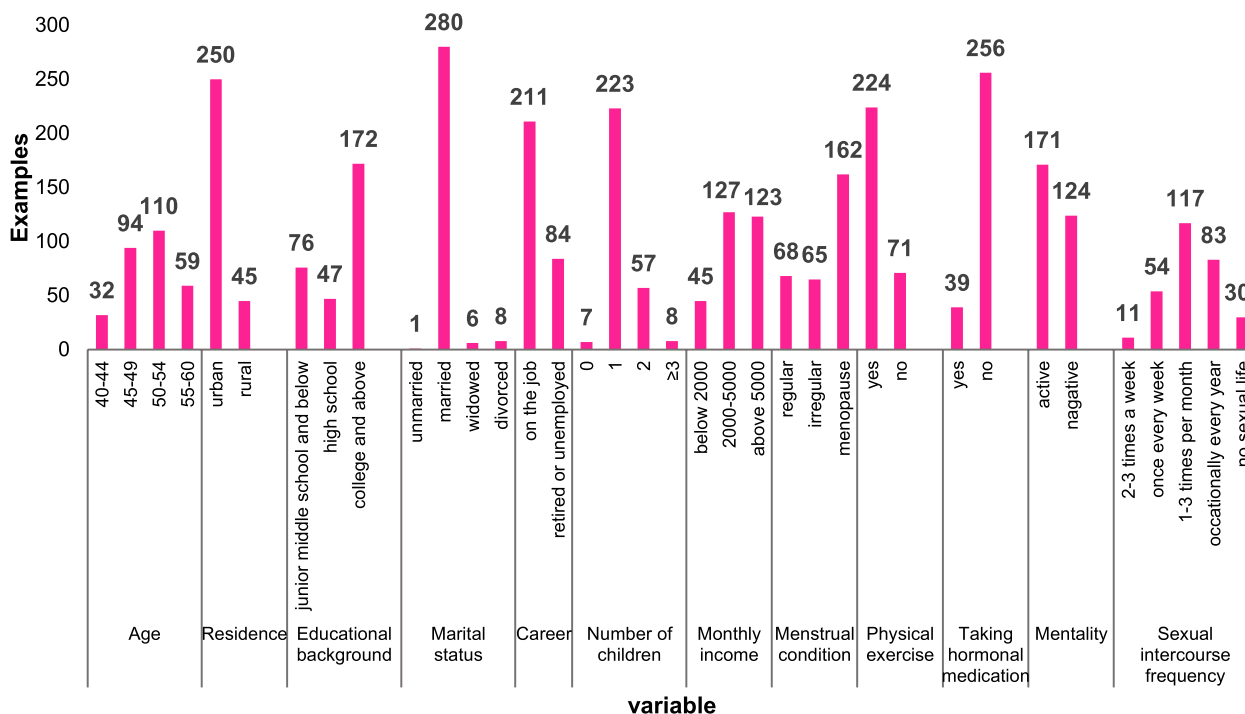


Fig. 2 General demographic characteristics

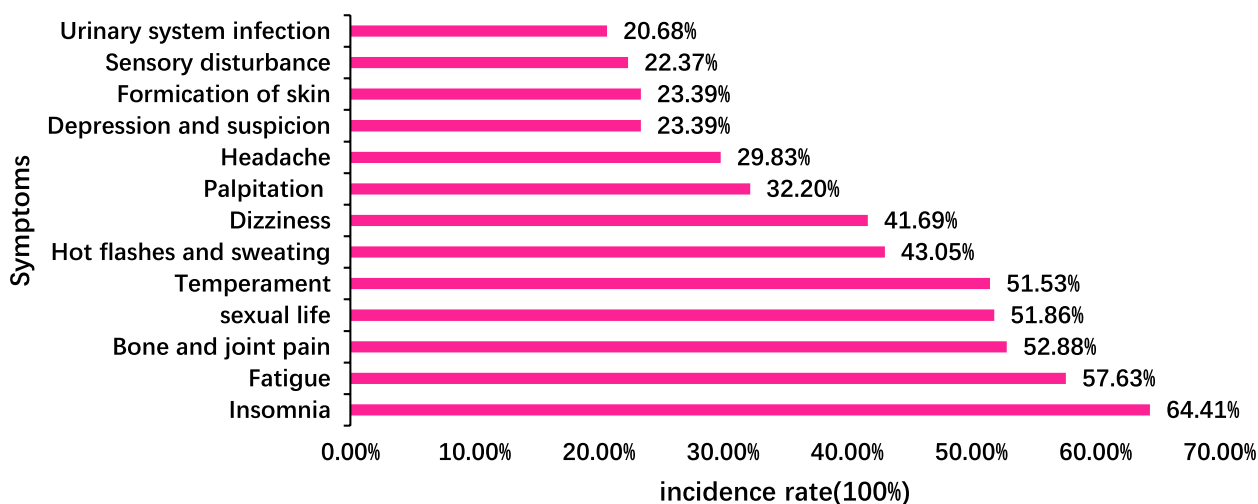
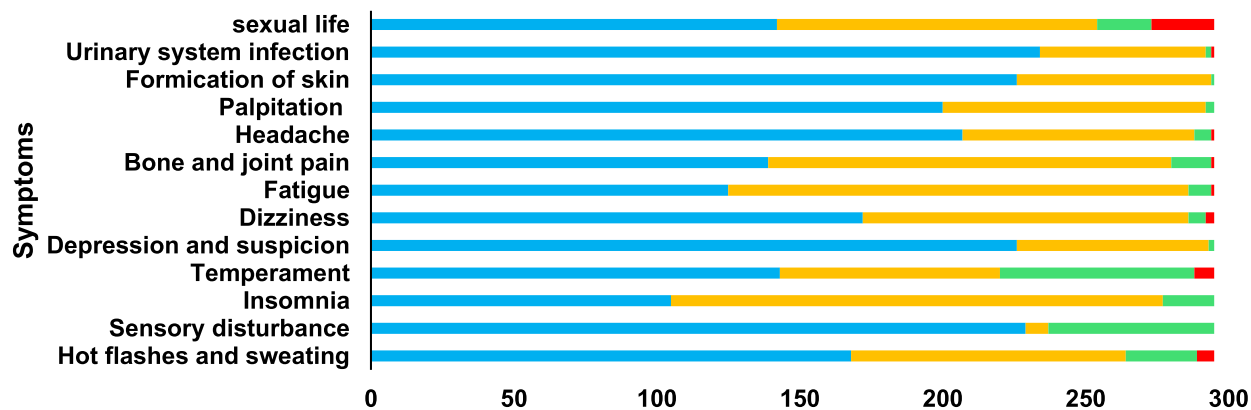


Fig. 3 Incidence of menopausal symptoms (n = 295)



	Hot flashes and sweating	Sensory disturbance	Insomnia	Temperament	Depression and suspicion	Dizziness	Fatigue	Bone and joint pain	Headache	Palpitation	Formication of skin	Urinary system infection	sexual life
Normal	168	229	105	143	226	172	125	139	207	200	226	234	142
Mild	96	8	172	77	67	114	161	141	81	92	68	58	112
Moderate	25	58	18	68	2	6	8	14	6	3	1	2	19
Severe	6	0	0	7	0	3	1	1	1	0	0	1	22

Examples

Normal Mild Moderate Severe

Fig. 4 Distribution of menopausal symptoms (n = 295)

menopausal women, and more than half of the women wanted to obtain MHT-related knowledge through an internet-based approach. A total of 23.05% were willing to undergo MHT after experiencing menopausal symptoms, and improving menopausal symptoms was the primary reason why women were willing to accept MHT. The primary reason why women refused MHT was that they considered menopause to be natural (Table 2).

Discussion

Menopausal symptoms are unique abnormal symptoms in women and important factors affecting women's physical and mental health and living standards. We found that the incidence of menopausal-related symptoms in women who underwent physical examinations was high, but to a lesser extent; this was basically consistent with the results of Ding et al. [20] study carried out in nurses but slightly lower than the results of Huang et al. [18]

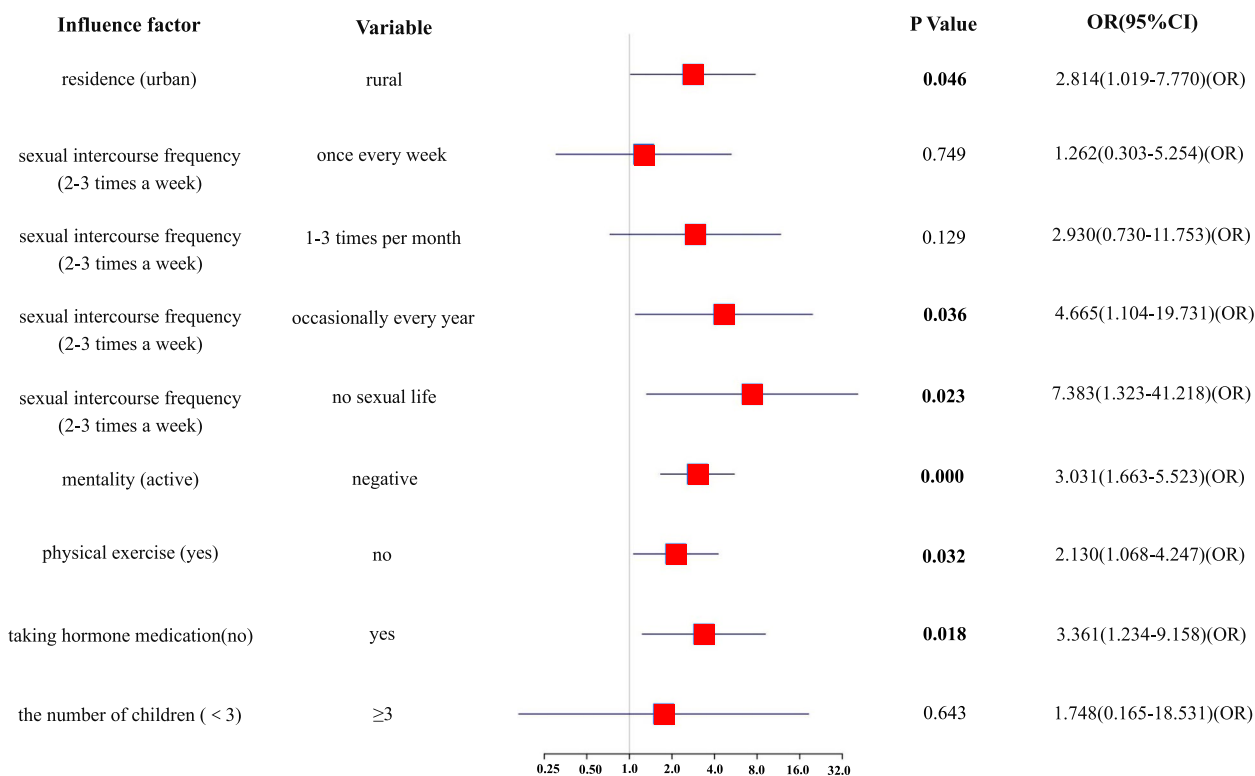


Fig. 5 Multivariate logistic regression analysis of menopausal symptoms

survey carried out in menopausal clinics in Shanghai, which may be related to different cultural backgrounds, economic levels, and populations selected for the survey. The occurrence of menopausal symptoms differs in women in different regions: surveys in Cambodia have found that the most prevalent menopausal symptom is fatigue [21]. A study carried out in Zhejiang found that bone and joint pain is the most common symptom in menopausal women [22]. Hot flashes, insomnia, bone and joint pain, mood swings, and palpitations are the reasons why Chinese women seek medical treatment [23], while in Western countries, vasomotor symptoms (e.g., hot flashes and sweating) are the most common symptoms in menopausal women and one of the most important reasons women seek medical treatment [24]. In addition, a study in the United States noted that hot flashes lasted for an average of 7.4 years in women [3]. In this survey, the top five menopausal symptoms were insomnia, fatigue, bone and joint pain, sexual dysfunction, and emotional instability. It is suggested that medical staff should pay attention to symptoms with higher incidence and implement targeted coping strategies in combination with the characteristics of each region.

We analysed the influencing factors of menopausal symptoms and found that women living in urban areas, with a positive mentality, a high sexual intercourse

frequency, and regular physical exercise had a lower incidence of menopausal-related symptoms, which was consistent with the findings of Wang [25] and AN [26]. Women living in rural areas have fewer opportunities to receive menopause-related health education, have less understanding of the menopausal period, and cannot seek medical attention in a timely manner when menopausal symptoms occur, which in turn increases the possibility of menopausal symptoms [27]. In addition, maintaining a good mentality during the menopausal period is an important factor in reducing the occurrence of menopausal syndrome. The more positive the attitudes of women towards the menopausal period, the more likely they are to actively seek help from others to obtain more mental and material support after the onset of menopausal symptoms, and the more able they are to cope with the physical and mental changes brought about by the menopausal period. Physical exercise is a promoting factor for women to maintain their physical health and plays an important role in preventing and improving menopausal symptoms [28]. Regular physical exercise can improve sleep quality, help to maintain a good mood, and prevent obesity and has a positive effect on reducing the occurrence of menopausal symptoms in women. Studies have shown that there is a positive and significant relationship between menopausal symptoms

Table 2 Cognitive status of menopausal hormone therapy ($n = 295$)

Category	Frequency	Ratio
Understanding of menopause		
Understand	64	0.22
Partial understand	218	0.74
Not understand	13	0.04
Understanding of MHT		
Understand	13	0.04
Partial understand	67	0.23
Not understand	215	0.73
Sources of knowledge related to MHT		
Surrounding Menopausal women	182	0.62
Hospitals, community health service centers, clinic	123	0.42
WeChat public platform, Internet hospital, Search engine, Mobile phone SMS	115	0.39
Television, radio, broadcast	29	0.10
Related books, newspapers, magazines, promotional brochures, Journals	20	0.07
Desired health education methods		
WeChat public platform, Internet hospital, Search engine, Mobile phone SMS	159	0.54
Professional lectures provided by medical units or residential/village committees	85	0.29
Television, radio, broadcast	68	0.23
Related books, newspapers, magazines, promotional brochures, journals	64	0.22
Willingness to use MHT after symptoms		
Willing to	68	0.23
Not willing	227	0.77
Reason for receiving MHT ($n = 68$)		
Improve menopausal symptoms	68	1.00
Prevention of cardiovascular and cerebrovascular diseases	27	0.40
Preventing osteoporosis and fractures	10	0.15
Maintain body shape and skin elasticity	7	0.10
Delaying Alzheimer's disease and maintaining ovarian function	4	0.06
Reduce the risk of diabetes and Alzheimer's disease	1	0.01
Reason for refusing MHT ($n = 227$)		
Menopause should be natural	186	0.82
Worried about increasing cancer risk	37	0.16
Worried about increasing the incidence of cardiovascular and cerebrovascular diseases	31	0.14
Worried about increasing the risk of obesity	23	0.10
Worried about causing abnormal vaginal bleeding	16	0.07

and social support, and menopausal symptoms decrease with increasing social support [29]. Spousal support is an important source of social support, and sexual intercourse frequency can to a certain extent reflect whether the relationship between husband and wife is harmonious. A good relationship between a husband and wife can improve spousal support for women and can effectively alleviate the adverse psychological emotions caused by the menopausal period, thereby improving women's well-being and relieving their menopausal symptoms. In summary, maintaining a good positive mentality, engaging in reasonable physical exercise, and promoting a good

marital relationship during the menopausal period are beneficial in reducing the incidence of menopausal symptoms. The present study found no significant correlation between age, marital status, career, the number of children, and menstruation regulation and the occurrence of menopausal symptoms through univariate analyses, which differed from the results of studies in other countries. A Turkish study noted that women with a menopausal age of 44–50 years had a higher risk of developing menopausal symptoms [30]; a survey among women in the community showed that marital status was one of the factors affecting menopausal symptoms [31]; the

results of a Greek study showed that women who were employed had less severe menopausal symptoms [32]; an Iranian study noted that women with a high number of children had more severe menopausal somatic symptoms [33]; and a Sri Lankan study noted that postmenopausal women had more severe menopausal symptoms than premenopausal women [34]. The differences between the results of the foreign studies and the results of the present survey may be due to differences in national policies and the demographic characteristics of the respondents; for example, the one-child policy was implemented in 1979 in China [35], so 76% of the women in the present survey had only one child; in addition, 95% of the respondents in the present study were married, which lacked comparability.

Menopause is a completely new stage in women's lives, and women's understanding of menopause directly affects their attitudes towards menopause. Women who lack knowledge of menopause are more likely to have negative attitudes towards it. Research suggests that the severity of menopausal symptoms affects women's attitudes towards menopause, with fewer symptoms being associated with more positive attitudes towards menopause [36]. A survey of perimenopausal women conducted in the UK showed that more than 60% of women had no understanding of menopause at all [37], whereas Italian studies indicated that more than half of women had never received menopause-related health education [38]. Unlike the results of international surveys, most women in this study had some knowledge of menopause. This result may be due to the high educational level of the respondents in this study, and the respondents were people who came to the hospital for physical examinations, had a high awareness of self-care and received more menopause health education.

MHT is a common treatment to improve menopausal symptoms and can effectively reduce adverse effects caused by fluctuations in hormone levels [39]. The results of this survey showed that the awareness and acceptance rates of MHT were low among the women, which may be related to a low educational level, a lack of knowledge about MHT and relatively higher treatment costs. Studies have shown that negative attitudes toward MHT among healthcare professionals are a significant contributor to lower rates of MHT utilization [40]. An Israeli study found that the majority of women presenting with menopausal symptoms had not received treatment and only 12.6% had received MHT [41], in general agreement with the findings of this study. The results of a Swedish survey showed that most women refused MHT because they considered menopause to be a normal physiological process, and received MHT because they experienced significant menopausal symptoms [42], which is consistent with

the present findings. In addition, the results of this survey showed that the main sources of MHT-related knowledge among women were menopausal women around them, medical units, and internet-based pathways; 42% of the respondents' knowledge originated from medical units, and most of the respondents' menopause-related knowledge came from nonmedical units. The results of a cross-sectional survey conducted in Brazil showed that the main sources of women's knowledge about menopause were close friends, family members, and relatives, which is consistent with the results of this study [43]. In recent years, internet information technology has developed rapidly, and the internet has the advantages of convenience, privacy, promotion, etc., so that women can receive menopause-related knowledge anytime and anywhere [44]. This study showed that more than half of the women wanted to gain knowledge about MHT through a web-based approach. At present, the internet has become one of the important ways for women to obtain MHT related knowledge in China, but the quality of information sourced from the internet varies and some of it has a commercial purpose [44, 45], resulting in women not being able to access scientific information. According to a Canadian study, 17% of website information resources were rated as having very poor information quality, incomplete information and inaccurate information in the search results for "MHT" [46]. In addition, the readability of information on websites is important to the reader, and studies have found that information on websites about menopause is poorly readable and, in parts, difficult to understand [47]. Therefore, it is particularly important to improve the scientific content of internet resources. Relevant departments should strengthen the supervision of internet information and build an internet information platform that is managed by medical and health professionals to ensure the scientific accuracy of information.

In addition, professional guidance by health care professionals is one of the important factors affecting whether women are willing to accept MHT [48], the study found that women who had a discussion with a healthcare professional were more willing to undergo MHT [49]. A study of Jamaican primary care physicians and gynecologists found that 66% were knowledgeable about treatment options for menopause and that the more knowledgeable a physician was, the more likely he or she was to direct patients to MHT treatment [50]. But the current status of healthcare professionals' attitudes towards MHT and mastery of related knowledge is not good. The results of a questionnaire survey carried out in China showed that among 3216 clinical staff members, 23.3% believed that MHT was not necessary [51]. In a survey of 3426 healthcare professionals, 44.7% had

not participated in professional menopausal management training in the past year, and nearly half of them could not correctly identify contraindications to MHT [52]. Therefore, to improve the awareness, acceptance and usage rates of MHT, it is necessary to strengthen the training of medical and health professionals and improve their knowledge levels.

Strengths and limitations

Our study has several key strengths. First, the data collection method of face-to-face interviews enabled us to collect a reliable dataset that reflected the population of the study. Second, the use of a validated questionnaire ensured the reliability of the data collected. Finally, we converted the survey data into bar charts and forest plots to improve the visibility of the data. Our study has some limitations: First, this is a cross-sectional study that can only obtain data on women's health over a specific time period and cannot track future changes. Cross-sectional studies also cannot indicate causality. Second, we obtained the study data from a single hospital, and the findings may not be generalizable to all women. Third, this study did not collect data on the hormone levels of the survey respondents and cannot analyse and discuss the hormone levels of menopausal women.

Practice implications

Although our study has some limitations, it has important practical implications in terms of reducing the incidence of menopausal symptoms and improving acceptance of menopausal hormone therapy. Firstly, this study analysed the factors affecting menopausal symptoms, which can inform healthcare providers to adopt targeted interventions to reduce the occurrence of menopausal symptoms. Secondly, based on the results of the study, healthcare providers can make use of the Internet to develop more targeted health education programmes to help women learn about MHT, thereby changing women's attitudes towards MHT and increasing the acceptance rate of MHT.

Conclusions

In summary, the higher incidence of menopausal symptoms in women aged 40–60 is related to women's mentality, exercise, and sexual frequency. Therefore, healthcare professionals should help women maintain a positive mindset and moderate physical activity so as to reduce the incidence of menopausal symptoms. In addition, we found that women's knowledge of MHT was insufficient, which suggests that it is necessary for healthcare professionals to improve the health education of MHT in order to increase the rate of knowledge and acceptance of MHT. In order to reduce the incidence of menopausal

symptoms, future studies can explore effective interventions by conducting randomised controlled trials. In addition, in order to gain a more in-depth understanding of women's attitudes towards menopausal MHT, future studies may consider conducting qualitative studies.

Abbreviation

MHT Menopausal hormone therapy

Acknowledgements

The authors would like to thank all women who volunteered to participate in this study. We thank the Luzhou Science and Technology and Talent Bureau for supporting this study. We thank SNAS for language editing service of this manuscript.

Authors' contributions

JL, SHT, and LLX collected the data, completed all statistical analyses, and drafted the manuscript; KFL, XLZ, and RL participated in the development of the study, data interpretation, and helped draft the manuscript; MC and JYX collected the data and helped revise the manuscript. All authors have read and approved the final manuscript.

Funding

This study was supported by a grant from the Luzhou Science and Technology Program Project (2021-SYF-31).

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Clinical Trial Ethics Committee of the Affiliated Hospital of Southwest Medical University (Project No.: KY2022083) and conformed to the ethical guidelines of the Declaration of Helsinki. All research methods were carried out in accordance with relevant guidelines and regulations. All participants signed an informed consent form and volunteered to participate in this study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹School of Nursing, Southwest Medical University, Sichuan, China. ²Department of Gynecology, Affiliated Hospital of Southwest Medical University, Sichuan, China. ³Nursing Department, Affiliated Hospital of Southwest Medical University, Sichuan, China.

Received: 4 June 2023 Accepted: 25 August 2023

Published online: 04 September 2023

References

- Harlow SD, Gass M, Hall JE, Lobo R, Maki P, Rebar RW, Sherman S, Sluss PM, de Villiers TJ, STRAW CG. Executive summary of the Stages of Reproductive Aging Workshop+10: addressing the unfinished agenda of staging reproductive aging. *Climacteric*. 2012;15(2):105–14.
- Dennerstein L, Dudley EC, Hopper JL, Guthrie JR, Burger HG. A prospective population-based study of menopausal symptoms. *Obstet Gynecol*. 2000;96(3):351–8.

3. Avis NE, Crawford SL, Greendale G, Bromberger JT, Everson-Rose SA, Gold EB, Hess R, Joffe H, Kravitz HM, Tepper PG, et al. Duration of menopausal vasomotor symptoms over the menopause transition. *Jama Intern Med.* 2015;175(4):531–9.
4. Bromberger JT, Schott LL, Kravitz HM, Sowers M, Avis NE, Gold EB, Randolph JF Jr, Matthews KA. Longitudinal change in reproductive hormones and depressive symptoms across the menopausal transition. *Arch Gen Psychiatry.* 2010;67(6):598–607.
5. Daly E, Gray A, Barlow D, McPherson K, Roche M, Vessey M. Measuring the impact of menopausal symptoms on quality of life. *BMJ (Clinical research ed).* 1993;307(6908):836–40.
6. Wang X, Ran S, Yu Q. Optimizing quality of life in perimenopause: lessons from the East. *Climacteric.* 2019;22(1):34–7.
7. Blake J, Cosman FA, Lewiecki EM, McClung MR, Pinkerton JV, Shapiro M, North AMSN. Management of osteoporosis in postmenopausal women: the 2021 position statement of The North American Menopause Society. *Menopause.* 2021;28(9):973–97.
8. Ward K, Deneris A. Genitourinary syndrome of menopause: A new name for an old condition. *Nurse Pract.* 2016;41(7):28–33.
9. Hamoda H, Panay N, Pedder H, Arya R, Savvas M. The British Menopause Society & Women's Health Concern 2020 recommendations on hormone replacement therapy in menopausal women. *Post Reprod Health.* 2020;26(4):181–209.
10. Savolainen-Peltonen H, Hautamaki H, Tuomikoski P, Ylikorkala O, Mikkola TS. Health-related quality of life in women with or without hot flashes: a randomized placebo-controlled trial with hormone therapy. *Menopause.* 2014;21(7):732–9.
11. Daley A, Stokes-Lampard H, Thomas A, MacArthur C. Exercise for vasomotor menopausal symptoms. *Cochrane Database Syst Rev.* 2014;2014(11):CD006108.
12. Jou H, Yeh PS, Wu S, Lu Y. Ultradistal and distal forearm bone mineral density in postmenopausal women. *Int J Gynaecol Obstet.* 2003;82(2):199–205.
13. Schierbeck LL, Rejnmark L, Tofteng CL, Stilgren L, Eiken P, Mosekilde L, Kober L, Jensen J. Effect of hormone replacement therapy on cardiovascular events in recently postmenopausal women: randomised trial. *BMJ.* 2012;345:e6409.
14. Baber RJ, Panay N, Fenton A, IMS WG. 2016 IMS Recommendations on women's midlife health and menopause hormone therapy. *Climacteric.* 2016;19(2):109–50.
15. Du L, Xu B, Huang C, Zhu L, He N. Menopausal symptoms and perimenopausal healthcare-seeking behavior in women aged 40–60 years: a community-based cross-sectional survey in Shanghai, China. *Int J Environ Res Public Health.* 2020;17(8):2640.
16. Stuenkel CA, Davis SR, Gompel A, Lumsden MA, Murad MH, Pinkerton JV, Santen RJ. Treatment of symptoms of the menopause: an endocrine society clinical practice guideline. *J CLIN ENDOCR METAB.* 2015;100(11):3975–4011.
17. Thakur M, Kaur M, Sinha AK. Assessment of menopausal symptoms in different transition phases using the Greene Climacteric Scale among rural women of North India. *Ann Hum Biol.* 2019;46(1):46–55.
18. Huang C, Zheng Y, Zhu L, Li Y, Du L, Tao M, Xu B. Demands for perimenopausal health care in women aged 40 to 60 years—a hospital-based cross-sectional study in Shanghai, China. *Menopause.* 2019;26(2):189–96.
19. Tao M, Shao H, Li C, Teng Y. Correlation between the modified Kupperman Index and the Menopause Rating Scale in Chinese women. *Patient Prefer Adher.* 2013;7:223–9.
20. Ding L, Xie L, Zhang H, Ding J, Li J, Wang S, Mao J, Zhou Q. Present situation and analysis of factors affecting perimenopausal syndrome among clinical nurses - a cross-sectional survey. *ANN PALLIAT MED.* 2022;11(7):2432.
21. Thapa R, Yang Y. Menopausal symptoms and related factors among Cambodian women. *Women Health.* 2020;60(4):396–411.
22. Lan Y, Huang Y, Song Y, Ma L, Chen P, Ying Q, Li W, Cai Y, Zhou J. Prevalence, severity, and associated factors of menopausal symptoms in middle-aged Chinese women: a community-based cross-sectional study in southeast China. *Menopause.* 2017;24(10):1200–7.
23. Sun D, Shao H, Li C, Tao M. An analysis of the main reasons that perimenopausal and postmenopausal women in China have for seeking outpatient treatment and factors influencing their symptoms: a single-center survey. *Clin Exp Obstet Gyn.* 2015;42(2):146–51.
24. Thurston RC. Vasomotor symptoms: natural history, physiology, and links with cardiovascular health. *Climacteric.* 2018;21(2):96–100.
25. Wang L, Zhang R, Yang Y, Sun X, Zhang B, Zhu H, Luo X, Ma X, Zhang X. Severity and factors of menopausal symptoms in middle-aged women in Gansu Province of China: a cross-sectional study. *BMC Womens Health.* 2021;21(1):405.
26. An J, Li L. Urban-rural differences in epidemiology and risk factors of menopause syndrome in middle-aged Chinese women. *Menopause.* 2023;30(3):306–16.
27. Koyuncu T, Unsal A, Arslantas D. Evaluation of the effectiveness of health education on menopause symptoms and knowledge and attitude in terms of menopause. *J Epidemiol Glob Health.* 2018;8(1–2):8–12.
28. Tan MN, Kartal M, Guldal D. The effect of physical activity and body mass index on menopausal symptoms in Turkish women: a cross-sectional study in primary care. *BMC Womens Health.* 2014;14:38.
29. Polat F, Orhan I, Kucukkelepce DS. Does social support affect menopausal symptoms in menopausal women? *Perspect Psychiatr Care.* 2022;58(3):1062–70.
30. Kotak DY, Beji NK. Modeling the risk factors of women with very severe menopausal symptoms. *J Obstet Gynaecol Res.* 2023;49(4):1264–72.
31. Xiong AQ, Luo BR, Li M, Chong MC, Wang J, Liao SJ. Longitudinal associations between sleep quality and menopausal symptoms among community-dwelling climacteric women: a multi-centered study. *Sleep Med.* 2022;100:198–205.
32. Augoulea A, Moros M, Kokras N, Karageorgiou V, Paschou S, Lymberi R, Konstantinos P, Kaparos G, Lykeridou A, Lambrinoudaki I. Association of menopausal symptoms with sociodemographic factors and personality traits. *Menopause Rev.* 2019;18(4):191–7.
33. Sharami SH, Darkhaneh RF, Gashti NG, Mansour-Ghanaei M, Eghbal SB. The association between reproductive history and menopausal symptoms: an evidence from the cross-sectional survey. *BMC Womens Health.* 2022;22(1):136.
34. Rathnayake N, Lenora J, Alwis G, Lekamwasam S. Prevalence and severity of menopausal symptoms and the quality of life in middle-aged women: a study from Sri Lanka. *Nurs Res Pract.* 2019;2019:2081507.
35. Ding QJ, Hesketh T. Family size, fertility preferences, and sex ratio in China in the era of the one child family policy: results from national family planning and reproductive health survey. *BMJ (Clinical research ed).* 2006;333(7564):371–3.
36. Woods NF, Alexander JL, Dennerstein L, Richardson G. Impact of clinician and patient attitudes on clinical decision making for the symptomatic menopausal woman with or without comorbidity. *Expert Rev Neurother.* 2007;7(11 Suppl):S27–34.
37. Harper JC, Phillips S, Biswakarma R, Yasmin E, Saridogan E, Radhakrishnan S, C Davies M, Talaulikar V. An online survey of perimenopausal women to determine their attitudes and knowledge of the menopause. *Womens Health (London, England).* 2022;18:892517578.
38. Donati S, Cotichini R, Mosconi P, Satolli R, Colombo C, Liberati A, Mele A. Menopause: knowledge, attitude and practice among Italian women. *Maturitas.* 2009;63(3):246–52.
39. Yuksel N, Evaniuk D, Huang L, Malhotra U, Blake J, Wolfman W, Fortier M. Guideline No. 422a: menopause: vasomotor symptoms, prescription therapeutic agents, complementary and alternative medicine, nutrition, and lifestyle. *J Obstet Gynaecol Can.* 2021;43(10):1188–204.
40. Yu Q, Lin L. The promotion of menopausal hormone therapy might be determined by the attitude of health-care professionals. *Climacteric.* 2022;25(3):213–4.
41. Frankenthal D, Karni-Efrati Z, Zatlawi M, Keinan-Boker L, Bromberg M. Menopausal symptoms and attitudes toward hormone replacement therapy among Israeli women. *J Women Aging.* 2023. <https://doi.org/10.1080/08952841.2023.2222048>.
42. Lindh-Astrand L, Brynhildsen J, Hoffmann M, Liffner S, Hammar M. Attitudes towards the menopause and hormone therapy over the turn of the century. *Maturitas.* 2007;56(1):12–20.
43. Amaral I, Baccaro LF, Lui JF, Osis M, Pedro AO, Costa-Paiva L. Opinions and main sources of information about menopause among middle-aged Brazilian women. *Menopause.* 2019;26(10):1154–9.
44. Sowler J, Astin F, Dye L, Marshall P, Knapp P. Assessment of the quality and content of website health information about herbal remedies for menopausal symptoms. *Maturitas.* 2016;88:16–22.

45. Perez-Lopez FR. An evaluation of the contents and quality of menopause information on the World Wide Web. *Maturitas*. 2004;49(4):276–82.
46. Murtaza F, Shirreff L, Huang LN, Jacobson M, Jarcevic R, Christakis MK. Quality and readability of online health information on menopausal hormone therapy in Canada: what are our patients reading? *Menopause*. 2022;29(1):54–62.
47. Charbonneau DH. Readability of menopause web sites: a cross-sectional study. *J Women Aging*. 2012;24(4):280–91.
48. Castelo-Branco C, Peralta S, Ferrer J, Palacios S, Cornago S, Quereda F. The dilemma of menopause and hormone replacement—a challenge for women and health-care providers: knowledge of menopause and hormone therapy in Spanish menopausal women. *Climacteric*. 2006;9(5):380–7.
49. Appling SE, Allen JK, Van Zandt S, Olsen S, Brager R, Hallerdin J. Knowledge of menopause and hormone replacement therapy use in low-income urban women. *J Womens Health Gend Based Med*. 2000;9(1):57–64.
50. Harrison GM, Medley NN, Carroll KN, Simms-Stewart DA, Wynter SH, Fletcher HM, Rattray CA. Mind the gap: primary care physicians and gynecologists' knowledge about menopause and their attitudes to hormone therapy use in Jamaica. *Menopause*. 2021;28(12):1385–90.
51. Zhu Y, Yang X, Wang Y, Zhu X. Assessment of knowledge, understanding and awareness of Chinese women clinical staff towards menopause hormone therapy: a survey study. *J Obstet Gynaecol*. 2023;43(1):2171779.
52. Lin L, Feng P, Yu Q. Attitude and knowledge for menopause management among health professionals in mainland China. *Climacteric*. 2020;23(6):614–21.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

