

Epidemiological Analysis of Female Menopausal Syndrome and Exploration of Cognitive Levels Regarding Hormone Replacement Therapy

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Abstract: *Objective:* To investigate and statistically analyze the prevalence of female menopausal syndrome, while assessing their understanding of hormone replacement therapy (HRT). *Methods:* A total of 3,200 women who visited Huangpu District Maternal and Child Health Hospital in Guangzhou from October 2021 to June 2023 were selected as the subjects of this survey. Data on their basic information, disease symptoms, and understanding of HRT were collected through questionnaires. *Results:* Out of the 3,200 questionnaires distributed, the top three symptoms reported were hot flashes, insomnia, and joint pain, which occurred significantly more frequently than other symptoms ($P < 0.05$). Regarding HRT awareness, only 11.47% of the women were relatively familiar with it, primarily sourcing their knowledge from the internet, followed by information from family, friends, and colleagues, and then from health lectures and other promotional materials. Among the menopausal symptoms, 183 women had moderate Kupperman scores, and 116 had severe scores, accounting for 5.51% and 3.49% of the total surveyed, respectively. *Conclusion:* The majority of women demonstrated a significant lack of understanding regarding HRT. Enhanced education and awareness campaigns, professional medical consultations, personalized treatment plans, and the correction of past misconceptions can empower more menopausal women to make informed health choices tailored to their needs, thereby improving their quality of life. Monitoring patients' hormone levels can provide a basis for intervention and evaluating treatment effectiveness. The relatively low proportion of women with severe symptoms is a primary reason why menopausal symptoms are often overlooked by women.

Keywords: Perimenopausal syndrome; Perimenopause; Hormone therapy; Women's health

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1. Introduction

Female menopausal syndrome, now more commonly referred to as “perimenopausal syndrome,” encompasses a range of physiological and psychological symptoms that women experience during perimenopause and

postmenopause due to fluctuations or reductions in sex hormones. Common symptoms of the disease include hot flashes, night sweats, and insomnia. However, many women also encounter memory decline, difficulty concentrating, and slowed thinking during menopause, primarily due to the impact of estrogen fluctuations and declines on brain regions responsible for memory and cognitive function ^[1]. Importantly, in most cases, these symptoms do not indicate the onset of dementia but rather represent a common and usually reversible physiological phenomenon during the menopausal transition. Surveys have revealed that inadequate awareness of the disease (specifically menopausal syndrome and related health risks) among menopausal women is a key factor contributing to delayed treatment, poor treatment adherence, and ultimately, compromised quality of life and long-term health. The most direct consequence is insufficient awareness among women regarding the necessity of treatment, leading to either no medical consultation or delayed medical attention, resulting in prolonged unnecessary suffering and a diminished quality of life. In particular, inadequate awareness and misinformation about hormone replacement therapy (HRT) pose significant barriers. Due to the one-sided interpretation and dissemination of some controversial past studies, many women and some non-specialist doctors have equated HRT with “carcinogenic,” indirectly causing most women to reject the most effective treatment option and, instead, turn to alternatives with uncertain efficacy or potential harm, wasting money while posing health risks ^[2]. Therefore, understanding the symptoms of perimenopausal syndrome and enhancing awareness of HRT are crucial for improving postmenopausal quality of life and elevating the quality of medical services for women during perimenopause ^[3]. Based on this, the present study was conducted in Huangpu District, Guangzhou, from October 2021 to June 2023. Using a cluster random sampling method, 3,200 voluntarily participating women were surveyed to investigate the incidence of menopausal syndrome and awareness of hormone replacement therapy, providing a basis for interventions in female menopausal syndrome.

2. Materials and methods

2.1. Overview

From October 2021 to June 2023, in accordance with the principle of cluster random sampling, a certain number of women aged between 40 and 60 with household registration in Huangpu District, Guangzhou, or having resided in Huangpu District for over one year were selected as the research subjects from each community across the district, based on population proportion. The inclusion criteria were as follows: (1) Having household registration in Huangpu District, Guangzhou, or having resided in the district for over one year; (2) Being aged between 40 and 60; (3) Possessing a uterus and at least one ovary; (4) Being informed of the research content and voluntarily participating in the survey. The exclusion criteria included: (1) Menopause resulting from surgical removal of both ovaries; (2) Severe endocrine disorders, such as uncontrolled hyperthyroidism or hypothyroidism; (3) Recent use of hormonal medications, such as hormone replacement therapy or hormonal contraceptives; (4) Presence of severe mental illnesses, including major depression, bipolar disorder, schizophrenia, etc.

2.2. Methods

This survey was conducted using a self-designed questionnaire based on relevant literature, administered in a self-filled format. Any questions were clarified by researchers. The survey covered basic information such as occupation, education level, medical insurance, and disease symptoms, as well as participants’ awareness and use of hormone replacement therapy.

2.3. Statistical analysis

This study employed the SPSS 22.0 statistical software package for analysis. Measurement data were presented as mean $\pm$ standard deviation (SD), with inter-group comparisons conducted using the *t*-test. Count data were expressed as [n(%)], and inter-group comparisons were performed using the chi-square test (χ^2 test). A *P*-value less than 0.05 was considered statistically significant.

3. Results

3.1. Basic information of participants

All 3,200 participants completed the questionnaire. The majority of participants were workers (32.31%), with a high school or technical secondary school education being the most common, accounting for 42.09%. Most of them had medical insurance coverage through their employer (39.59%) (Table 1).

Table 1. Basic information

Category	n	Percentage (%)
Occupation		
Worker	1034	32.31
Homemaker	765	23.91
Administrative/Managerial Staff	573	17.91
Professional/Technical Staff	327	10.22
Service Industry Personnel	324	10.13
Military/Police Personnel	141	4.41
Other	36	1.13
Education Level		
High School or Technical Secondary School	1347	42.09
Junior High School	627	19.59
College	578	18.06
Bachelor's Degree or Above	372	11.63
Primary School	276	8.63
Type of Health Insurance		
Employee Health Insurance	1267	39.59
Resident Health Insurance	843	26.34
Public Health Coverage	678	21.19
Commercial Health Insurance	342	10.69
Out-of-Pocket	70	2.19

3.2. Incidence of menopausal syndrome symptoms

The most common menopausal syndrome symptoms reported by participants were hot flashes and sweating, insomnia, joint pain, and emotional lability, with prevalence rates of 66.78%, 62.41%, 59.59%, and 56.22%, respectively. These rates were significantly higher than those for other symptoms (fatigue 45.84%, vaginal dryness

43.41%, palpitations 17.59%, dizziness 16.00%, urinary tract infections 13.50%, paresthesia 7.66%), with $P < 0.05$. Other symptoms included fatigue, vaginal dryness, palpitations, and dizziness (**Table 2**).

Table 2. Incidence of menopausal syndrome symptoms

Symptom	n	Percentage (%)
Hot Flashes/Sweating	2137	66.78
Insomnia	1997	62.41
Joint Pain	1907	59.59
Mood Swings/Irritability	1799	56.22
Fatigue	1467	45.84
Vaginal Dryness	1389	43.41
Palpitations	563	17.59
Dizziness	512	16.00
Urinary Tract Infection	432	13.50
Paresthesia (Abnormal Sensations)	245	7.66

3.3. Awareness of hormone replacement therapy

Among the participants, 60.88% were unaware of HRT, 11.47% were very familiar with it, and 15.84% had heard of it. Additionally, 11.81% had used HRT (**Table 3**).

Table 3. Awareness of hormone replacement therapy

Category	Number of people	Percentage (%)
Unaware of HRT	1948	60.88
Have Heard of HRT	507	15.84
Currently Using HRT	378	11.81
Very Familiar with HRT	367	11.47

3.4. Sources of information on hormone replacement therapy

The internet (57.31%) was the primary source of information on HRT for participants, followed by family/friends/colleagues (17.88%), health lectures (15.38%), and informational brochures (13.34%) (**Table 4**).

Table 4. Sources of information on hormone replacement therapy

Information source	Number of people	Percentage (%)
Internet	1834	57.31
Family, Friends, Colleagues	572	17.88
Health Lectures	492	15.38
Pamphlets / Brochures	427	13.34
Healthcare Professionals	398	12.44
Other	390	12.19
Publicity Boards / Bulletin Boards	382	11.94
Radio / Television	128	4.00

3.5. Comparison of serum sex hormone levels between two groups

The hormone levels (follicle-stimulating hormone [FSH], luteinizing hormone [LH], and estradiol [E2]) of subjects with moderate or higher Kupperman scores were tested. There were 183 subjects with moderate scores and 116 with severe scores, accounting for 5.51% and 3.49% of the total surveyed population, respectively ($\chi^2 = 4986.60$, $P < 0.001$). The FSH and LH levels in the severe group were significantly higher than those in the moderate group ($P < 0.05$), while the E2 level in the severe group was significantly lower than that in the moderate group ($P < 0.05$) (Table 5).

Table 5. Comparison of serum sex hormone levels between the two groups (Mean $\pm$ SD)

Group	n	FSH (mIU/mL)	LH (mIU/mL)	E2 (pmol/L)
Moderate group	183	16.78 $\pm$ 3.45	19.43 $\pm$ 2.83	40.43 $\pm$ 5.22
Severe group	116	20.43 $\pm$ 3.43	22.24 $\pm$ 2.84	32.43 $\pm$ 5.24
<i>t</i> -value		9.12	8.23	12.89
<i>P</i> -value		< 0.05	< 0.05	< 0.05

4. Discussion

Menopausal syndrome is not a “disease” but a natural physiological transition stage, primarily caused by ovarian dysfunction and a decline in estrogen levels. Additionally, the dramatic hormonal changes are a core factor. Estrogen plays a crucial role in the female body, affecting not only the reproductive system but also physiological processes such as body temperature regulation, mood, and sleep. Therefore, when estrogen levels fluctuate and decline, the hypothalamus in the brain, responsible for body temperature regulation, becomes disordered, leading to sudden hot flashes, sweating (night sweats), and nocturnal sweating. In terms of cardiovascular system effects, as estrogen has a protective effect on blood vessels, maintaining their elasticity and health, its reduction increases the risk of cardiovascular disease in women. Regarding the skeletal system, estrogen helps bones store calcium, and its decline leads to rapid bone loss, increasing the risk of osteoporosis. For the urogenital system, normally, estrogen levels maintain the thickness and elasticity of the vaginal wall and urinary tract health. Once reduced, it can lead to vaginal dryness, painful intercourse, frequent urination, and urgency. Regarding the skin and hair, estrogen is responsible for promoting collagen production, so its reduction can lead to dry skin, wrinkles, and dry, brittle hair that is prone to falling out^[4].

The findings of this survey indicate that the majority of participants were engaged in manual labor (32.31%), followed by housewives (23.91%). In terms of educational attainment, a relatively high proportion of participants had completed high school or secondary vocational school (42.09%), followed by those with junior high school education (19.59%) and junior college education (18.06%). Regarding personal medical insurance, employee medical insurance was the most common (39.59%), followed by resident medical insurance (26.34%) and public medical care (21.19%). These findings suggest that the occurrence of perimenopausal syndrome may be related to occupational environments, and the relatively weak disease awareness among participants may be associated with their educational levels. Current research and observations indicate that factors such as occupational environments and educational levels indirectly influence the perceived severity, reporting rates, and effective management of perimenopausal syndrome by affecting women’s stress levels, health literacy, healthcare-seeking behaviors, and economic resources, rather than directly altering its biological incidence^[5]. Women with higher educational levels

typically possess stronger abilities to acquire, understand, and apply health information. They are more likely to proactively learn about menopause-related knowledge in advance, have reasonable psychological expectations, correctly identify physical symptoms as part of a normal physiological process, and actively seek scientific and effective medical assistance rather than enduring symptoms or seeking unproven remedies ^[6]. In contrast, women with lower educational levels may have insufficient awareness of menopause, making them more prone to misunderstandings, feelings of shame, and helplessness. They may choose to passively endure symptoms or regard menopausal and perimenopausal symptoms as natural physiological phenomena, thereby neglecting these symptoms ^[7].

The most direct and fundamental causes of emotional fluctuations and psychological disorders in perimenopausal women are the dramatic fluctuations and decline in hormones, primarily involving three types. Taking estrogen as an example, it promotes the synthesis and function of neurotransmitters in the brain that regulate emotions ^[8]. When estrogen levels suddenly fluctuate and eventually decline, the levels of these neurotransmitters also become imbalanced, directly leading to depression, irritability, anxiety, and anhedonia. Additionally, decreased estrogen levels make the hypothalamic-pituitary-adrenal (HPA) axis more susceptible to activation, resulting in a heightened and more intense bodily response to stress. This affects thermoregulation, leading to hot flashes and night sweats, particularly at night, which severely disrupt sleep patterns ^[9,10]. The survey results reveal that the most prevalent symptoms of menopausal syndrome among participants were hot flashes and sweating (66.78%), insomnia (62.41%), joint pain (59.59%), and emotional lability (56.22%), with these symptoms showing a significantly higher prevalence than others ($P < 0.05$). Hormone replacement therapy (HRT), currently an effective treatment for menopausal syndrome, works by supplementing hormones that the body no longer produces in sufficient quantities. It is primarily used to treat symptoms caused by decreased levels of estrogen, progesterone, or testosterone, effectively alleviating short- to medium-term symptoms and offering some degree of long-term health risk prevention ^[11].

However, statistical data indicate that the majority of menopausal women are unaware of or lack understanding of HRT. This may stem from inherent misconceptions about hormones; many people immediately associate hormones with obesity, moon face, or banned substances used by athletes, failing to distinguish between these hormones and the naturally secreted estrogen and progesterone in the human body, leading to strong psychological aversion ^[12,13]. This viewpoint was further validated in our study, with data showing that 60.88% of participants were unaware of HRT, 15.84% had heard of it, 11.47% were very familiar with it, and 11.81% had used it. The internet emerged as the primary source of information on hormone replacement therapy. Clearly, addressing this situation requires concerted efforts from multiple stakeholders: the media should provide more scientifically accurate popular science content, the medical community should update guidelines and enhance training for healthcare professionals, and society should encourage open discussions on menopausal health. Ultimately, this will empower every woman to make the most informed health choices based on adequate information.

The study results also indicate that the levels of FSH and LH in the severe group were significantly higher than those in the moderate group ($P < 0.05$), while the E2 level was significantly lower ($P < 0.05$). This suggests a correlation between symptoms and hormone levels, and that measuring patients' hormone levels can provide a basis for intervention and evaluating treatment effectiveness ^[14]. The incidence rates also showed statistical significance between the moderate and severe groups, indicating significant variations in the severity of menopausal syndrome, with a relatively low proportion of severe cases. This is a primary reason why women tend

to overlook menopausal symptoms.

5. Conclusion

In general, menopause is not just about short-term symptoms; it represents a pivotal turning point in women's health. A lack of awareness in any aspect can lead women to overlook these potential risks. Additionally, the overall understanding of Hormone Replacement Therapy (HRT) among menopausal women still needs improvement, with widespread issues of low awareness, low utilization rates, and low acceptance due to misconceptions and concerns. By enhancing health education, providing professional medical consultations, implementing individualized treatment plans, and correcting past misconceptions, we can assist more menopausal women in making informed health choices tailored to their needs, thereby improving their quality of life.

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The authors declare no conflict of interest.

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