Original Article
Knowledge, attitude and practice about reproductive health of perimenopausal and postmenopausal women in Shanghai: a cross-sectional and intervention study

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Abstract: Objective: This study aimed to investigate the knowledge, attitude and practice (KAP) in relation to reproductive health among perimenopausal and postmenopausal women in Shanghai, and to attempt to improve their KAP with interventions. Methods: A cross-sectional study was conducted in 3320 women aged 45-75 years from four districts of Shanghai with a self-administered questionnaire to assess their KAP about reproductive health, and then, randomly divided these women into intervention and control groups. Health education lectures, health counseling and health-related booklets were provided to women in intervention group while nothing to control group. A month later, the KAP of both groups were reassessed to evaluate the effectiveness of interventions. Result: Participants had better KAP in menopausal syndrome and genital tract inflammation, but a worse understanding about hysteromyoma and human papilloma virus. They also had lower scores in aspects of pelvic organ prolapse and urinary incontinence. Compared with control group, participants from the intervention group had better knowledge and attitude, but did not statistical significantly improve their practice through these interventions. Conclusion: More attention should be paid on pelvic organ prolapse and urinary incontinence, and participants with lower income and education warranted more attention.

Keywords: Perimenopause, postmenopause, reproductive health

Introduction

Menopause, seriously deteriorating women's life quality, is a universal physiological period for women with the decline in ovarian hormone secretions, causing a series of diseases and symptoms, including vasomotor symptoms, psychological symptoms, urogenital symptoms, etc. Moreover, menopause may also associate to cardiovascular disease, diabetes, osteoporosis, lipid metabolism disorders, and other diseases in postmenopausal women [1-7].

On the other hand, reports claimed that the number of the world's elderly people will increase from the 5.8 million in 1998 to 20 million in 2050, which will account for 35% of the total population. The aging society has already brought huge numbers of problems in many countries. One of the major problems is the reproductive health among the old population. At the same time, because of the human life expectancy, women could spend one-third or even half of their life after menopause. As a result, more attention to the health of perimenopausal and postmenopausal women is necessary in improving their quality of life and preventing degenerative diseases.

In China, menopausal symptoms are often misclassified as symptoms of natural aging rather than diseases in middle-aged women. Researchers found that only 20.2% women with menopausal symptoms asked for medical advice or treatment [8]. Many treatment-required women have limited knowledge about menopause, contributing to the development of much more severe health issues such as genitourinary diseases, osteoporosis and cardiovascular disease, etc., and also increasing the burden of families and society. A better social services system, including health guidance and special management for perimenopausal and postmenopausal women, is desperately needed.

Table 1. General characteristics of participants (N=3244)

Items	N	%
Age		
45-59 years	1868	57.58%
60-75 years	1376	42.42%
Educational degree		
None	59	1.85%
Primary school	257	8.04%
Junior high school	956	29.90%
Senior high school	1462	45.73%
Bachelor's degree	454	14.20%
Master's degree and above	9	0.28%
Missing	47	
Annual per capita income (RMB)		
Under 10000	387	12.47%
10000~30000	1955	63.00%
30000~50000	591	19.05%
More than 50000	170	4.83%
Missing	141	
Occupation		
Civil servant	30	0.93%
Office clerk	491	15.26%
Self-employed	31	0.96%
Worker	489	15.20%
Housewife	443	13.77%
Farmer	163	5.07%
Retired	838	26.04%
Others	733	22.78%
Missing	26	
Marital status		
Single	47	
Married	2934	1.47%
Divorced, separated, widow	210	91.95%
Missing	53	6.58%
Smoking		
Never	2879	91.66%
Others	262	8.34%
Missing	103	
History of chronic diseases		
Hypertension	914	28.18%
Diabetes	216	6.66%
Heart diseases	312	9.62%

Materials and methods

KAP questionnaire

The survey was conducted in four districts of Shanghai, from November 2013 to January 2014. A total of 3,320 women, aged 45 to 75 years old, selected by a Multi-level, group, and random method, were enrolled and volunteered to the study. Questionnaires were designed by an extensive literature reference with a pilot study that was conducted to ensure the reliability and clarity. The questionnaire included general information (age, marital status, occupation, education, economic status, etc), reproductive history (age at menarche, age at menopause, parity, contraceptive choices, etc), and their menopause's KAP. The KAP questionnaire contained 50 items in total with 20 for knowledge, 10 for attitude, 15 for practice and 5 for requirements. Items for knowledge, attitude, and practice were designed as true/false questions. Only correct answers could get points and the total score was obtained from point-summation of all items. Items for requirement were designed as multiple-choice questions to get their demands about reproductive health. The survey was conducted through face to face interviews with trained interviewers. Participants signed the informed consent after being informed that the survey was confidential.

After the survey, women's KAP improvement interventions were as follows: 1) Specialists of obstetrics and gynecology went to communities to give lectures about reproductive health and provided free health counseling. 2) Knowledge about health care was disseminated by DVD or posters in community. 3) Booklets about reproductive health and other educational materials were given to the women for self-learning. Several communities were randomly selected as control groups without given any interventions. Furthermore, none of the control communities shared any geographic borders with any intervention communities for error reduction avoidance. A month later, women from both groups filled in the questionnaire again to evaluate the efficacy of the interventions.

Data analysis

Data were analyzed by SPSS Statistics version 19.0. Questionnaires with absent of more than 20% of the critical answers were excluded from this study. Quantitative variables were expressed as mean ± standard deviation (SD) and qualitative variables as percentages. Chi-square test and ANOVA were used to compare

Table 2. Reproductive history

Items	Number	Percentage
Age at Natural Menopause		
<40 years	37	1.72%
40~44 years	118	5.48%
45~54 years	1791	83.19%
≥55 years	207	9.61%
Times of birth		
0	47	1.46%
1	2578	80.16%
2	491	15.27%
≥3	100	2.67%
Missing	28	
Delivery Way		
Vaginal Delivery	3201	82.46%
Caesarean Section	681	17.54%
Frequency of sex (per month) (45-60 years)		
0	566	33.61%
1-4	966	59.14%
>4	122	7.24%
Missing	381	
Frequency of sex (per month) (61-75 years)		
0	647	70.33%
1-4	264	28.70%
>4	9	0.98%
Missing	278	
Choice of contraception		
None	341	38.62%
Contraceptive Drugs	26	2.94%
Condom	208	23.56%
IUD	289	32.73%
Tubal Ligation	12	1.36%
Others	7	0.79%
Missing	134	

survey; and more than half of them had high school education or above. 63.00% of our participants had annual per capita income from 10 thousand to 30 thousand RMB. The prevalence rates of major chronic diseases were as follows: hypertension: 28.18%, diabetes mellitus: 6.66% and heart disease: 9.62%.

Reproductive history

The mean menarche age was 15.16±1.76 years. 2,252 participants had ceased menstruation and the mean age of menopause was 49.91±3.93 years. 95.25% participants experienced natural menopause with mean age of 50.06±3.82 years. 80.16% of the participants had been delivered only once. The proportion of caesarean section and vaginal delivery were 17.54% and 82.46%. Among participants aged 45 to 60 years, 59.14% of the participants had sex life at the frequency of 1-4 times per month while 33.61% of the participants with no sex life. The percentage of the participants with no sex life increased to 70.33% among women aged 61 to 75 years. Of all the participants who were still experiencing menstruation, 38.62% did not take any contraception, the other 61.3% participants chose the following contraception: IUD (32.73%), condoms (23.56%), contraceptives (2.94%), tubal ligation (1.36%) and others, as specified in **Table 2**.

categorical and continuous variables. P<0.05 was considered statistically significant.

Results

General characteristics

A total of 3,320 questionnaires were completed and 3,244 cases were qualified with the efficiency of 97.71%. Four cases were lost with the dropout rate of 0.12%. The lost cases had been removed.

Table 1 shows the main characteristics of participants. The mean age was 58.01±7.13 years. Approximately 92% of the participants were never smoker and married at the time of the

Average scores of KAP questionnaire

The Cronbach's alpha of KAP questionnaire was 0.82, calculated by SPSS, suggesting a high internal consistency and good reliability. Of all the participants, the average scores of knowledge, attitude and practice were: 13.58±3.64 points (out of 20 points), 7.08±1.75 points (out of 10 points) and 9.56±1.98 points (out of 15 points), respectively. The average correct rates were 67.92%±18.22%, 70.80%±17.51% and 63.73±13.17%, respectively (**Table 3**).

KAP scores of different population

T-test and ANOVA were adopted to analyze the association between the KAP scores of popula-

Table 3. The average score and correct rate of KAP questionnaire

Items	Average score (full marks)	Average correct rate
Knowledge	13.58±3.64 (20)	67.92%±18.22%
Attitude	7.08±1.75 (10)	70.80%±17.51%
Practice	9.56±1.98 (15)	63.73%±13.17%

tion and different ages, income, education and marital status. Statistics showed that marital status had no effect on the KAP score (P> 0.05). The KAP scores for different ages, education and income were statistically different (**Table 4**). The KAP scores of participants from 45 to 59 years were significantly higher than those of participants from 60 to 75 years (P<0.01). The scores of KAP increased with the increase of annual per capita income and further pair wise comparison showed that average sore of participants with income higher than 30,000 and participants with income lower than 10,000 was significantly different (P< 0.05). The scores of KAP also increased with a better education. Further pair wise comparison showed that scores between high school, college and graduate school had no significant but the left ones were significantly different with each other.

KAP scores in different aspects

Participants had better knowledge, attitude and practice about physical examination, menopausal syndrome and inflammation of reproductive system. 88.87% of the participants had regular gynecological examination every one or two years, and 94.82% of them believed those with a family history of ovarian or breast cancer should be open-eyed and take physical examination more actively. 93.22% of the participants were aware of the symptoms of menopausal syndrome and most of them would relieve it by a healthier diet, more physical exercises and mood self-regulation. About tumor, the participants were well alerted to colporrhagia after menopause, but had little knowledge on hysteromyoma or HPV. Almost half (49.54%) of the participants thought hysteromyoma should be cut as soon as diagnosed and more than half (56.26%) were afraid that hysterectomy would do harm for health for inducing abnormal hormone secretion. Only 50.43% of the participants knew the relationship between

HPV and cervical cancer with only 28.80% had ever tested it. About osteoporosis, 47.30% of the participants had examined BMD and 46.50% were taking calcium or Vitamin D in order to prevent osteoporosis. The participants had lower scores in aspects of pelvic organ prolapse and urinary incontinence. Only 59.11% and 59.79% of the participants knew the harm of anterior vaginal prolapse and posterior vaginal prolapse. 54.36% of the participants thought urinary incontinence (UI) is a natural phenomenon with aging and could not be avoided. 43.75% of the participants feel embarrassed to go public because of UI, and only 11.51% were doing pelvic floor muscle training to prevent UI and pelvic organ prolapse.

Access of knowledge and skills about reproductive health

Over half (57.75%) of the participants were extremely willing to get knowledge and skills about reproductive health, 36.60% showed a little desire and only 5.65% reported no interests. The most common ways for the participants getting knowledge were broadcast and television (63.6%), community education (60.4%), and newspapers and magazines (60.0%); however, they were more willing to get knowledge from community education (63.4%), broadcast and television (62.3%), and newspapers and magazines (57.9%). The participants were more interested in following aspects: perimenopausal routine self-care (69.2%), perimenopausal syndrome (63.4%), reproductive tract inflammation (34.8%), tumors (31.8%), UI (18.5%), pelvic organ prolapse (11.1%), sexual dysfunction (6.2%). When faced with reproductive health problems, the participants tended to seek help from: MCH center (57.6%), hospitals (42.2%), community health service station (24.0%), no treatment (2.1%) or private physicians (0.7%).

Effect of interventions on KAP

Interventions were performed on the intervention group after the survey while control group received nothing, and both groups filled the questionnaire again a month later. A statistical significant increase (P<0.05) of the KAP score was observed for both groups. The increase ranges of KAP points for different categories in the intervention group were: knowledge (1.340), attitude (0.453) and practice (0.332).

Table 4. KAP scores of different population

Variance	Number	Mean value	F	P
Age				
45-59 years	1845	30.56±5.06		
60-75 years	1360	29.75±5.62		<0.01
Marriage				
Single	46	29.70±6.51		
Married	2896	30.23±5.30	0.29	0.75
Others	210	30.10±5.14		
Education				
Never go to school	59	26.42±6.58		
Primary school	251	28.22±5.66		
Junior school	947	29.38±5.18	31.53	<0.01
Senior school	1446	30.74±5.10		
College	447	31.91±5.05		
Graduate	9	32.89±4.86		
Income				
<10000	383	29.70±5.50		
10000-30000	1929	30.17±5.27	4.22	0.02
>30000	755	30.64±5.34		

The increase ranges for the control group were: knowledge (0.872), practice (0.332) and attitude (0.155). To further detect whether the difference was caused by our intervention, independent sample t-test was adopted to compare between the groups. The increase of knowledge and attitude within the groups was statistical significantly difference between groups (P<0.05), while the increase of practice was not (P>0.05) (**Table 5**).

Discussion

In this cross-sectional study, 3,244 perimenopausal or postmenopausal women, from multiple communities in Shanghai, were included for detecting KAP status related to reproductive health. The mean age for all participants was 50.06 years old and about 95% of whom experienced natural menopause. The KAP interventions introduced in this study was statistical significantly contributed to a better understanding in reproductive health among women (P<0.05).

Previous studies showed that the mean age at natural menopause varied between places [9-12]. In this study, the age at natural menopause was 50.06±3.82 years. A survey in eight cities distributed across China in 2005 showed that the mean age at menopause was 49.64

years [9]. The age was 47.43 years in Lanzhou in 2012 [12], 50.01 years in Nanjing in 2010 [11], and 49.96 years in Shanghai in 2006 [10]. In addition, this study observed that the mean age at menopause in Shanghai was 0.1 years old later than that of Shanghai in 2006, and also of other cities. A study with 22,774 participants from USA in 2006 showed that the mean age at menopause in USA was gradually delayed during the recent 50 years, which was confirmed in our study [13]. Multiple factors influence the age of menopause. Smoking might lead to early menopause age [14], and, the history of oral contraceptive, age at menarche, number of childbirth, eating habits, education and income might also be related [11, 14]. The mechanisms were still unknown.

Previous intervention studies of perimenopausal and postmenopausal women in China had some limitations. First, only limited numbers of intervention studies were carried and with a small extent. Some conclusions had been drawn, but only limited to education and little was involved in the public health. Moreover, only limited evidences were existed, and more were needed to support the governments to make related public health policies.

Our study included over 3000 women and found that knowledge of menopausal routine self-care, menopausal syndrome and genital tract inflammation were most wanted, and women tended to have better KAP on menopausal syndrome and inflammation. However, only 6.2% of participants wanted to get knowledge about sexual dysfunction. Studies in USA found that about 32.6% of women had sexual dysfunction aged 40 to 69 years old [15]. Only little studies targeted sexual life of perimenopausal women in China. A survey in Hong Kong in 2012 showed that Chinese women had fewer intimate contacts and less coitus as menopause progressed [16]. 77.2% women, approximately twice as that of USA, had at least one type of sexual dysfunctions such as decreased libido, pain during intercourse, vaginal dryness, orgasmic disorder, etc. In our study, among women aged 45 to 60 years, 59.14% had sex life at the frequency of 1-4 times per month while 33.61% having no sex life. Among those aged 61 to 75 years, 70.33% reported having

Table 5. Comparison between intervention and control group

Type of difference value	Difference value	SD	Confidence interval	P
Knowledge	0.468	0.133	95%	<0.05
Attitude	0.298	0.700	95%	<0.05
Practice	0.000	0.071	95%	>0.05

no sex life. For perimenopausal women, the quality of sex life influenced the marital relationship and life quality. However, most people were embarrassed to go to hospitals for help and were lack of related knowledge. More effort should be put on this aspect. About contraception, 38.62% of the participants with menstruation did not adopt any contraceptive measures. Although most menstruations of perimenopausal women are anovulatory and are less likely to be pregnant, there will still be irregular ovulation and possibility of accidental pregnancy. The concept that contraception should be continued to at least one year after the last menstruation should be popularized more.

Furthermore, women tended to have a poor understanding of pelvic organ prolapse and UI. Pelvic organ prolapse and UI were easily to be detected among postmenopausal women with the decline of estrogen, relaxation of pelvic floor muscles and ligaments, and injury caused by pregnancy and delivery. It could also be aggravated by chronic cough or constipation, affecting exercise, social life and sexual life of people [17]. Other countries seemed to have more emphasis on this problem. For example, 16.3 billion dollars were spent on the treatment of UI among Americans in 2002 [18]. The consultant rate of UI in European countries was 15% to 39.7% [19] while only 6.3% in Shanghai. In this KAP survey, participants had a lower score in pelvic organ prolapse and UI. Less than 60% of the women knew the harm of the anterior vaginal prolapse and posterior vaginal prolapse. 54.36% of the participants considered UI as a natural phenomenon with aging and could not be avoided. 43.75% of the participants felt awkward to go public because of UI. Many women refused to visit physicians because that they were embarrassed or misunderstood UI as a normal phenomenon. However, for women with mild symptom, it will effectively restrain the development of diseases if they received medical guidance on pelvic floor mus-

cle training and improve their daily-life activities earlier. In this survey, only 11.51% of the participants were doing pelvic floor muscle training to prevent UI and pelvic organ prolapse. So, provide interventions in time played an important role in improving women's life quality.

When investigating their need for self-cared reproductive health, we found that most women currently went to MCH center or hospital for medical help. Most of the participants reported that they desired to learn the knowledge and skills about reproductive health, and the most preferred approaches were through community education and public media. Considering middle-aged or older women were not familiar with Internet or other emerging tools, the way of intervention should give priority to more traditional ways like TVs, newspapers or broadcasting. For example, health-related TV programs or newspaper sectors could be more helpful. Furthermore, community-based emphasizes, such as the lectures, consultations, or billborads offered by the community health service personnel, should be introduced and provided to these women who are eager to understand reproductive health.

Moreover, based on our findings, aging, lower income per year, and education lower than high school also contributed to a significantly lower KAP score. As a result, more attention should be paid on older women, and also, women with low income or education.

Conclusion

The knowledge-attitude-practice theory pointed out that knowledge and information were the basis of correct belief and attitude, and the correct belief and attitude were the impetus of changing practice. This study showed that a month later, compared with control group, the intervention group had a significant increase of knowledge and attitude but no statistical improvement of practice, which might due to the short time of intervention for people to actually change practice. The menopause-related diseases were universal and severe, however, diseases like premenopausal syndrome and UI could be better improved if interventions were provided in early stage. The cur-

rent problem of aging society is getting much more severe with the limited medical resources, which meant that more attention should be caught on the prevention and early treatment of diseases.

Due to the limitation of budget, time and personnel, this intervention only lasted one month and was too short for long-term estimation. It is unknown that whether the practice would improve or the knowledge and attitude would fall back if extended the study time. So, further prospective studies were expected.

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Disclosure of conflict of interest

None.

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References

[1] Bromberger JT, Schott LL, Kravitz HM, Sowers M, Avis NE, Gold EB, Randolph JF Jr and Matthews KA. Longitudinal change in reproductive hormones and depressive symptoms across the menopausal transition: results from the Study of Women's Health Across the Nation (SWAN). Arch Gen Psychiatry 2010; 67: 598-607.

[2] Freeman EW, Grisso JA, Berlin J, Sammel M, Garcia-Espana B and Hollander L. Symptom reports from a cohort of African American and white women in the late reproductive years. Menopause 2001; 8: 33-42.

[3] Hollander LE, Freeman EW, Sammel MD, Berlin JA, Grisso JA and Battistini M. Sleep quality, estradiol levels, and behavioral factors in late reproductive age women. Obstet Gynecol 2001; 98: 391-397.

[4] Lee CG, Carr MC, Murdoch SJ, Mitchell E, Woods NF, Wener MH, Chandler WL, Boyko EJ and Brunzell JD. Adipokines, inflammation, and visceral adiposity across the menopausal transition: a prospective study. J Clin Endocrinol Metab 2009; 94: 1104-1110.

[5] Maki PM, Freeman EW, Greendale GA, Henderson VW, Newhouse PA, Schmidt PJ, Scott NF, Shively CA and Soares CN. Summary of the National Institute on Aging-sponsored conference on depressive symptoms and cognitive complaints in the menopausal transition. Menopause 2010; 17: 815-822.

[6] Matthews KA, Crawford SL, Chae CU, Everson-Rose SA, Sowers MF, Sternfeld B and Sutton-Tyrrell K. Are changes in cardiovascular disease risk factors in midlife women due to chronological aging or to the menopausal transition? J Am Coll Cardiol 2009; 54: 2366-2373.

[7] Neer RM; SWAN Investigators. Bone loss across the menopausal transition. Ann N Y Acad Sci 2010; 1192: 66-71.

[8] Huang W, Peng W, Wu Y, Huang X, Li C, Sun Z, Zhang X, Xiong Q, Ma Q and Han Z. [The status quo of perimenopausal and postmenopausal women in Chengdu: report of a population-based cross-sectional study]. Sichuan Da Xue Xue Bao Yi Xue Ban 2003; 34: 536-538.

[9] Nie GN, Wang XY, Yang HY and Ou AH. The research on the factors affecting the timing of natural menopause in Chinese city women. Mater Child Health Care Chi 2011; 26: 1191-1193.

[10] Zhou LF, Guo LY, Yang J, Gao ES, Zhou XP, Zhou GL, Lu GH and Yu HQ. Clinacteric symptoms and health care demand in women. Mater Child Health Care Chi 2006; 21: 794-796.

[11] Li L, Wu J, Pu D, Zhao Y, Wan C, Sun L, Shen CE, Sun W, Yuan Z, Shen Q, He X, Jiang J, Luo N, He Y, Qian Q, Cai P and Zhang M. Factors associated with the age of natural menopause and menopausal symptoms in Chinese women. Maturitas 2012; 73: 354-360.

[12] Liu ML, Wang XY, Xiong D, Ma GY and Li ZL. The research on health status of perimenopausal women. Mater Child Health Care Chi 2012; 27: 4602-4605.

[13] Nichols HB, Trentham-Dietz A, Hampton JM, Titus-Ernstoff L, Egan KM, Willett WC and Newcomb PA. From menarche to menopause: trends among US Women born from 1912 to 1969. Am J Epidemiol 2006; 164: 1003-1011.

[14] Pokoradi AJ, Iversen L and Hannaford PC. Factors associated with age of onset and type of menopause in a cohort of UK women. Am J Obstet Gynecol 2011; 205: 34, e31-13.

[15] Addis IB, Van Den Eeden SK, Wassel-Fyr CL, Vittinghoff E, Brown JS, Thom DH; Reproductive Risk Factors for Incontinence Study at Kaiser Study Group. Sexual activity and function in middle-aged and older women. Obstet Gynecol 2006; 107: 755-764.

[16] Lo SS and Kok WM. Sexuality of Chinese women around menopause. Maturitas 2013; 74: 190-195.

[17] Zhu L, Lang JH, Wang H, Han SM and Liu CY. [The study on the prevalence and associated

risk factors of female urinary incontinence in Beijing women]. Zhonghua Yi Xue Za Zhi 2006; 86: 728-731.

[18] Yu HJ, Wong WY, Chen J and Chie WC. Quality of life impact and treatment seeking of Chinese women with urinary incontinence. Qual Life Res 2003; 12: 327-333.

[19] O'Donnell M, Lose G, Sykes D, Voss S and Hunskaar S. Help-seeking behaviour and associated factors among women with urinary incontinence in France, Germany, Spain and the United Kingdom. Eur Urol 2005; 47: 385-392; discussion 392.