Quality of Life Research **12**: 53–61, 2003.

Quality of life and menopausal transition for middle-aged women on Kinmen island

J.-L. Fuh[1], S.-J. Wang[1], S.-J. Lee[3], S.-R. Lu[1] & K.-D. Juang[2]
[1]*The Neurological Institute (E-mail: jlfuh@vghtpe.gov.tw);* [2]*Department of Psychiatry, Taipei Veterans General Hospital and National Yang-Ming University Schools of Medicine, Taipei, Taiwan;* [3]*Department of Biostatistics, Comprehensive Cancer Center, University of Michigan, Michigan, USA*

Accepted in revised form 1 May 2002

Abstract

Although it seems reasonable to suggest that most women experience significant changes in quality of life (QOL) during the menopausal period, few researchers have quantified these changes. A total of 1497 women, aged 40–54 years and living on the island of Kinmen, were recruited for this survey. However, 137 were eliminated leaving 1360 for analysis. Women who used hormonal therapy or who had undergone surgically induced menopause were excluded. The subjects with incomplete data or who exhibited mental retardation or severe psychiatric disease were also eliminated. Univariate analysis demonstrated that, in general, QOL scores were poorer for perimenopausal and postmenopausal status. Comparing pre- and postmenopausal women, significant statistical differences were demonstrated for role limitations due to physical and emotional problems, even after adjusting for age, education level, body mass index, menarche, and chronic illness. A strong association was demonstrated between menopausal symptoms and premenstrual syndrome (PMS). Women with menopausal symptoms and PMS had significantly lower scores on all SF-36 dimensions. The results of this study suggest that poorer health status is experienced by peri- and postmenopausal women compared to premenopausal women.

Key words: Health related, Menopause, Quality of life, Women

Introduction

Quality of life (QOL) is a multidimensional health concept, which represents mainly subjective symptoms that may influence the sense of well-being and day-to-day function. It includes several important domains, such as perceived well-being, role disability, and physical, psychological and social function. Women may experience significant QOL changes during menopause, and only a few researchers have quantified these changes [1–3]. Daly et al. [1] have even proposed that QOL is severely compromised by the presence of menopausal symptoms, indicating that the effects of these symptoms may have been underestimated.

The impact of menopause on QOL could be a consequence of biological changes, associated symptoms, and/or sociocultural factors. Several studies have demonstrated that hormone replacement therapy (HRT) improves QOL scores [4–7]. Nevertheless, relatively few studies have explored the effects of menopause *per se* on QOL [2, 3]. Sociocultural factors may also affect the menopausal transition experience [8]. Studies of Asian samples [9, 10] indicate that the prevalence of vasomotor symptoms is markedly lower for these populations compared Western population. As menopausal experience differs for these populations compared to Western populations, cross-cultural studies may yield more information clarifying the relationship between menopause and QOL.

Implementation of a valid and accurate QOL instrument is also very important for producing more precise information and to enable better verification of statistical relationships. Although there is no gold standard for QOL measurement, a number of self-administered QOL instruments [11, 12] have been developed over the last 20 years and broadly applied to health-services research and clinical trials. Utilization of a well-known standard questionnaire for QOL evaluation will facilitate interpretation and comparison of results obtained from different studies throughout the world.

This research was part of a larger program investigating women's health and menopause. In this cross-sectional study of middle-aged women, we examined the relationship between QOL scores, menopause, and associated symptoms, using a validated instrument – the Medical Outcomes Study Short Form-36 (SF-36) [12, 13].

Methods

Kinmen Women's-Health Investigation

Kinmen is a 176-km^2 island that is 248 km (154 miles) west of Taiwan and 41 km (25 miles) east of mainland China. It consists of four townships with a total population of 51,060 people (1998). The populace is served by two public hospitals and 31 physicians. The people of Kinmen are Han Chinese, most of whom are involved in farming activities or small business. There is no modern industry. Kinmen remained in close contact with China from the fourth century until the Japanese occupation in 1937. The government of the Republic of China reigned over the island again from 1945; however, it was under military control after the government moved to Taiwan in 1949. Kinmen became a popular tourist destination after martial law was lifted in 1993. Most of the people on Kinmen retain a traditional Chinese lifestyle, and living standards are similar to the rural areas of southern Taiwan.

There are four townships in Kinmen, with similar demographic compositions. Based on logistic convenience, Kin-Hu and Kin-Cheng were chosen for the study. From 1998 registration records, there were 2256 women aged 40–54 living in these two townships. This was the target population for the present study, and no sampling frame was used.

The Kinmen Women's-Health Investigation (KIWI) cohort was established in 1998. The study protocol was approved by the institutional review board of the Taipei Veterans General Hospital. Further details of the KIWI have been described elsewhere [13, 14].

Medical Outcomes Study Short Form-36 (SF-36) Health Survey

The SF-36 questionnaire was originally developed for the Rand Corporation's Health Insurance Experiment [11]. Its reliability and validity have been tested in Taiwan [13]. It is a self-administered, 36-item questionnaire that measures health-related function in eight domains, including physical functioning, role limitations due to physical and emotional problems, vitality, bodily pain, social functioning, mental health, and general health perceptions. After summing the Likert-scale items that make up SF-36, each scale was then standardized to range from 0 (lowest level of function) to 100 (highest level) [11]. As a general guide, Ware et al. [11] have suggested that a decrement of five points or more, for any of the SF-36 scales, is clinically relevant. Translation for a Taiwanese version of SF-36 was developed using standard methodology as detailed in the IQOLA Project [15]. The discriminative item validity was high for all subscales and Cronbach's α reliabilities were above 0.70 criterion with exception of two subscales [13].

Other questionnaires

Additional study instruments included common sociodemographic questionnaires, a menopause-related symptom checklist, the hospital anxiety and depression scale (HADS) [16, 17] and history of chronic illness. The height and weight of all the patients were measured, and the body mass index (BMI; calculated as weight (kg) divided by height (m) squared).

The menopause-related symptom checklist (symptoms experienced during the 2 weeks prior to the study) was a modification of the Kupperman index [18]. It included complaints of hot

flushes, night sweating, dizzy spells, headaches, insomnia, fatigue, arthralgia, myalgia, backaches, vaginal dryness and frequent urination.

The participants were also asked about their menstrual and reproductive history including the PMS. ('Do you or did you suffer from PMS?') A number of questions investigating premenstrual symptoms experienced were also included to screen for PMS. PMS was defined based on the Tenth Revision of the International Classification of Diseases (ICD-10) as a history of at least one physical or mood symptom occurring in a cyclic fashion, that is, present during the last week before menses and absent in the week postmenses [19, 20]. These seven symptoms included minor psychological discomfort, bloating or weight gain, breast tenderness, muscular tension, aches and pains, poor concentration, and change in appetite.

The HADS was developed and validated using non-psychiatric patients [16, 17]. Items relating to both mood disorders and physical illnesses were omitted for the current study. The modified instrument consisted of 14 questions, seven for anxiety and seven for depression. Compared to general practitioners, superior diagnostic performance was demonstrated for detection of anxiety and depression. Scores range from 0 to 42. The Cronbach's α coefficient of Chinese HADS was 0.84 [17]. The optimal cut-off points of the HADS were a depression score of 6 and an anxiety score of 3. The sensitivity was 80% and specificity was 90% [21].

The presence of chronic illness was assessed using 10 yes-or-no questions (for diabetes, hypertension, epilepsy, cancer, stroke, lung, liver, and renal disease, arthritis and other heart disease).

Definition of menopausal status

Menopausal status was classified as pre-, peri- or postmenopausal. The premenopausal period was defined by regular menstruation. A woman was considered perimenopausal if her menstrual cycles had been irregular or her last menstrual bleeding occurred more than three but less than or equal to 12 months prior to the study. Women who had not menstruated within the previous 12 months were categorized as postmenopausal. Those who used HRT or had surgically induced menopause were excluded from this study.

Data analysis

The SF-36 results were considered usable when respondents answered at least half of the items for each scale. When some (but fewer half) of the individual answers for a given scale were missing, the imputation method recommended by Ware et al. [11] was used to replace the missing items using the mean derived from other available scale items. For the present study, however, imputed scale scores were derived for only 0.7% of the respondents.

Kruskal–Wallis statistics and generalized linear models were used to compare QOL scores between menopausal status groups with and without adjustment for age, education, BMI, menarche, and presence of chronic illness.

Menopausal symptoms were analysed using two approaches. One involved the presence of individual symptoms, the other combined symptoms into four dummy categories: vasomotor (hot flushes, night sweats); psychosomatic (dizzy spells, headaches, insomnia, fatigue), physical (arthralgia, myalgia, backaches), and urovaginal (vaginal dryness, frequent urination). The χ^2 test was used to assess the association between each pair of individual menopausal symptoms as well as the association between individual menopausal symptoms and menopausal status. The relationship between each menopausal-symptom category and QOL score was assessed using the Wilcoxon rank-sum test. Further, to test the impact of menopausal symptoms on QOL score while controlling for menopausal status, the Wilcoxon rank-sum tests were performed separately for each menopausal status using the Bonferroni adjustment for the Type I-error rate.

The frequency distribution of menopausal symptoms was compared across PMS status groups using the χ^2 test. The QOL scores were compared between women who experienced and did not experience PMS discomfort using the Wilcoxon rank-sum test. Furthermore, the same analysis was performed to test the influence of menopausal-symptom categories on QOL score while controlling for PMS. Additionally, the impact of PMS on menopausal symptoms was expressed using the odds ratio with 95% confidence interval.

All statistical tests were two sided. A p-value of 0.05 or less was considered statistically significant.

The Bonferroni adjustment was used for pairwise comparison.

Results

Characteristics of the study population

Of the 2256 targeted subjects, a total of 1497 (66%) participated in the study. The remaining 759 were not included for the following reasons: (1) not at home on each of the three house calls (n = 634); (2) refused to participate (n = 88); and (3) did not receive invitation due to mail-delivery failure (n = 37). For the final analysis, 56 subjects with incomplete data were excluded, as were five who exhibited mental retardation or severe psychiatric illness, and 76 women who had undergone hysterectomy or HRT during the preceding 6 months. The final sample size was 1360.

Table 1 presents the demographic and other characteristics for enrolled patients by menopausal status. Menopausal-status distribution was 734 (54%), 363 (27%), and 263 (19%) for pre-, peri- and postmenopause, respectively. Seventy-six percent of the postmenopausal women were within the first 3 years of menopause. The mean age was 45.4 years (SD: 4.0; range: 40–54) with a highly significant difference demonstrated for all pairwise menopausal-status comparisons ($p < 0.0001$). Similarly, significant BMI differences were determined comparing pre- and perimenopause, and pre- and postmenopause. No significant differences were demonstrated between age at menarche and menopausal status, however. Of the other demographic variables studied, a significant relationship with menopausal status was only demonstrated for education.

Impact of menopause on QOL score

The SF-36 scores for different menopausal status groups are presented in Table 2. Except for social functioning, QOL scores were highest for premenopausal status and lowest for the postmenopausal women. Pairwise comparison indicated that the difference in QOL score was significant for physical functioning and role limitation due to physical problem comparing pre- and perimenopause ($p = 0.0001$ and 0.005, respectively), and between pre- and postmenopause ($p = 0.002$ and 0.0002, respectively). The biggest difference from pre- to postmenopause was demonstrated for role limitation due to physical problem (mean difference 8.8, CI [3.9, 13.6]), followed by role limitation due to emotional problem (mean difference 5.2, CI [0.5, 10.0]), and general health perception (mean difference 4.6, CI [1.7, 7.6]) in that postmenopausal women had lower scores than those who were premenopausal. Statistical significance was not demonstrated for any of these differences between premenopausal and perimenopausal status, how-

Table 1. Demographic and other characteristics of the study population according to menopausal status

	Premenopausal N = 734	Perimenopausal N = 363	Postmenopausal N = 263
Age (years)[a,b,c,d]	43.6 (2.9)	46.1 (3.7)	49.4 (3.8)
Education (years)[a,b,c,d]	6.9 (4.3)	6.0 (4.5)	4.3 (4.2)
BMI (SD) [a,b,c]	23.9 (3.4)	24.4 (3.8)	24.6 (3.6)
Age at menarche (years)[a]	15.4 (1.6)	15.6 (1.9)	15.7 (1.8)
% illiterate[e,f]	22.2%	33.9%	51.3%
% chronic illness[e]	16.4%	25.5%	28.6%
% smoking habit[e]	1.5%	1.1%	0%
% alcohol drinking habit[e]	9.1%	7.4%	7.2%

[a] Statistical analysis was performed using the Kruskal–Wallis test with Bonferroni's correction for multiple comparisons. The number for age, education, BMI, age at menarche represent the mean and standard deviation. A *p*-value of less than or equal to 0.017 was considered to be statistically significant.
[b] Significant difference between pre- and perimenopause.
[c] Significant difference between pre- and postmenopause.
[d] Significant between peri- and post-menopause.
[e] Statistical analysis using χ^2 test.
[f] A *p*-value of less than or equal to 0.05 was considered statistically significant.
BMI – body mass index.

Table 2. Mean SF-36 and HADS scores for menopausal status

	Premenopause N = 734 M (SD)	Perimenopause N = 363 M (SD)	Postmenopause N = 263 M (SD)	*p*	
				Pre- vs. peri-	Pre- vs. post-
Physical functioning	90.4 (12.8)	86.8 (15.6)	86.6 (17.4)	0.0001	0.002
Role limitation due to physical problem	81.8 (31.8)	74.9 (36.9)	73.0 (36.8)	0.005	0.0002
Bodily pain	80.0 (18.9)	77.4 (19.1)	77.3 (19.7)	0.02	0.05
Vitality	66.4 (18.1)	65.1 (18.3)	63.7 (20.4)	0.44	0.09
Social functioning	86.5 (14.3)	84.5 (16.5)	85.0 (16.1)	0.13	0.45
Role limitation due to emotional problem	82.5 (32.1)	78.8 (35.2)	77.3 (36.3)	0.11	0.05
Mental health	72.9 (15.9)	71.2 (16.7)	70.3 (18.2)	0.12	0.05
General health perceptions	66.2 (20.4)	63.2 (21.6)	61.5 (22.3)	0.04	0.007
HADS score	7.9 (5.5)	7.7 (6.0)	7.6 (5.4)	0.33	0.88

[a] Statistical analysis was performed using the Kruskal–Wallis test with Bonferroni's correction for multiple comparisons, a *p*-value of less than or equal to 0.017 was considered statistically significant.
[b] None of the scores between perimenopausal and postmenopausal status achieve statistical significance, and were not listed.
HADS – hospital anxiety and depression scale.

ever. In addition, total HADS scores did not differ significantly between any of the three groups.

After controlling for age, education level, BMI, menarche, and their interactions, it was determined that the presence of chronic illness masked the influence of menopause on QOL score, accounting for the lack of significant difference in SF-36 scores between menopausal status groups. On the other hand, significant differences were demonstrated for role limitation due to physical and emotional problems, and general health perceptions scores comparing different menopausal status groups for women without chronic illness ($p < 0.0001$, $p = 0.02$, and $p = 0.02$, respectively). Further, *ad hoc* pairwise comparisons revealed differences for general health perception pre- and perimenopause, role limitation due to emotional problem pre- and postmenopause, and, role limitation due to physical problem pre- and postmenopause and peri- and postmenopause ($p < 0.017$).

Menopausal symptoms and SF-36 score

All menopausal symptoms were strongly associated with each other (except for the association between vaginal dryness and headaches ($p = 0.04$)). Furthermore, women with vasomotor symptoms were more likely to have insomnia problems (64 vs. 47%, $p < 0.001$).

Table 3. Menopausal symptoms experienced during the 2 weeks prior to study

Symptoms	Menopausal status			*p*-Value
	Pre- (%)	Peri- (%)	Post- (%)	
Insomnia	45.3	51.8	58.1	0.002
Headaches	42.3	41.6	36.2	0.281
Dizzy spells	38.6	38.9	42.4	0.575
Backaches	37.4	38.7	42.4	0.419
Arthralgia	29.8	35.2	38.6	0.028
Fatigue	30.1	33.0	33.3	0.504
Frequent urination	23.5	32.7	25.2	0.004
Myalgia	25.1	26.0	26.2	0.928
Vaginal dryness	11.0	17.1	24.4	0.000
Hot flushes	8.4	14.3	16.7	0.000
Night sweats	3.1	7.8	11.4	0.000

p-Value derived using the χ^2 test, comparing the distribution of subjects with and without symptoms for different menopausal status.

The prevalence of menopausal symptoms by menopausal status group is presented in Table 3. Peri- and postmenopausal women had significantly higher frequencies of insomnia, arthralgia, vaginal dryness, hot flushes and night sweats compared with premenopausal women ($p < 0.05$; χ^2 test). Except for frequent urination, which was most severe for perimenopausal status ($p = 0.004$), postmenopausal women had higher frequencies for the above symptoms.

The impact of menopausal-symptom category on QOL scores was also investigated. A breakdown of mean SF-36 scores for different menopausal-symptoms categories across the eight health-related SF-36 domains is presented in Table 4. Significantly lower SF-36 scores were observed when comparing women with menopausal symptoms and those without ($p < 0.0001$). Further, this pattern was consistent across all eight of the health-related dimensions. Additional analysis revealed a similar pattern for SF-36 profiles with respect to the presence of menopausal symptoms in each category after controlling for menopausal status. Consistently lower SF-36 scores were determined for each menopausal status group where patients had all four categories of menopausal symptoms. Further, significantly lower SF-36 scores were noted for women who presented with vasomotor symptoms, despite controlling for the presence of insomnia symptoms (all $p \leqslant 0.01$, except role limitation due to emotional problem $p = 0.02$).

Premenstrual syndrome

Overall, 44.4% of the enrolled women had PMS. A significantly higher frequency of menopausal symptoms (all $p < 0.001$, except vaginal dryness $p = 0.003$) and lower SF-36 scores (all $p \leqslant 0.0001$) were observed when comparing women with PMS discomfort to those without.

The odds ratios for PMS relative to all 11 menopausal symptoms were between 1.5 and 2.4, with 95% confidence intervals excluding 1. This indicated that the likelihood of having menopausal symptoms was significantly higher for PMS sufferers.

Finally, the significantly lower SF-36 scores demonstrated for women who had symptoms in each of the four menopausal categories (compared with those who did not) were consistent with the scores for those with and without PMS (all $p < 0.01$, except for role limitation due to emotional problem vs. vasomotor symptoms without PMS, $p = 0.12$).

Discussion

This study investigated a large community-based sample. Analysis of the results revealed that scores for both the physical and psychological components of QOL were worse for postmenopausal

Table 4. Mean SF-36 score (standard deviation) comparing status for individual menopausal-symptoms category across health-related SF-36 domains

	Vasomotor		Psychosomatic		Physical		Urovaginal	
	Yes N = 193	No N = 1163	Yes N = 995	No N = 357	Yes N = 745	No N = 611	Yes N = 481	No N = 875
Physical functioning	82.7 (19.4)	89.7 (13.5)	87.3 (15.4)	92.8 (11.0)	85.3 (16.2)	92.9 (11.3)	85.3 (17.6)	90.5 (12.5)
Role limitation due to physical problem	62.4 (41.2)	80.7 (32.6)	74.4 (36.2)	89.1 (25.7)	70.8 (37.5)	87.1 (28.0)	68.3 (39.7)	83.5 (30.0)
Bodily pain	70.1 (20.1)	80.2 (18.7)	75.6 (19.1)	87.8 (16.2)	72.4 (19.0)	86.5 (16.3)	74.1 (19.8)	81.2 (18.4)
Vitality	56.8 (18.8)	66.9 (18.3)	62.6 (18.9)	73.8 (15.4)	61.3 (18.7)	70.7 (17.3)	60.0 (19.2)	68.5 (17.7)
Social functioning	79.8 (18.7)	86.7 (14.4)	84.0 (15.8)	90.6 (12.0)	82.8 (16.2)	89.2 (13.3)	81.6 (17.8)	87.9 (13.2)
Role limitation due to emotional problem	68.6 (41.1)	82.4 (32.1)	76.8 (36.1)	91.0 (23.2)	76.0 (36.3)	86.0 (29.7)	71.9 (38.1)	85.1 (30.3)
Mental health	65.5 (17.1)	73.0 (16.3)	69.6 (16.8)	78.3 (14.3)	69.0 (16.6)	75.5 (16.0)	67.8 (17.1)	74.1 (15.9)
General health perceptions	54.5 (22.6)	66.1 (20.6)	60.8 (21.1)	74.9 (17.9)	58.9 (21.0)	71.3 (19.4)	57.7 (22.4)	68.1 (19.6)

Significant differences were demonstrated for QOL for each of the menopausal-symptoms categories comparing location ($p < 0.0001$; Wilcoxon rank-sum test).

women than for premenopausal women. According to Ware et al. [11] a decrement of five points or more is clinically relevant. This criterion was fulfilled for both role limitation due to physical and emotional problems. Although a bigger impact on QOL was associated with presence of chronic illness, our results still support the proposition that QOL is lower for peri- and postmenopausal women in comparison to premenopausal women. The fact most of the postmenopausal women in our study were within 3 years of menopause, may explain why SF-36 scores did not differ significantly between peri- and postmenopausal women.

Menopausal transition was associated with several physical and psychological changes that may impact women's health outcomes. Several researchers have suggested that the menopausal transition leads to significant decreases in physical activity, energy expenditure, resting metabolic rate and fat-free mass [22, 23]. The findings of this study are consistent with those reported by Sowers et al. [24], who demonstrated that even at the relatively young age of 40–55 years, approximately one-fifth of women self-reported limited physical function. Our study also revealed that the impact of menopause on physical-role function appears to be independent of age and BMI. The poorer physical-role function scores for perimenopausal and postmenopausal women may be associated with estrogen deficiency.

Compromised psychological well-being during the menopausal transition has long been noted. Nevertheless, the relationship is still controversial [25, 26]. Our study demonstrated that menstrual status is related to SF-36 role limitation due to emotional problem score but not HADS score. This discrepancy may be due to variations in sensitivity and the dimensions of the mental scales.

Of these so-called menopausal symptoms, only the frequencies of insomnia, arthralgia, and vasomotor and urogenital symptoms were significantly higher for the peri- and postmenopausal groups compared to the premenopausal group. Further, the magnitude of the impact of these menopausal symptoms on QOL score was striking. Those women with the menopausal symptoms listed above had marked impairment in all eight domains surveyed by the SF-36. Although the methodology of the study of Daly et al. [1] has been criticized [27], our results support their finding that QOL may be compromised for women with menopausal symptoms. Our results are also in line with Ledesert et al. [2] who demonstrated that poorer reported QOL scores for postmenopausal women were explained by climacteric complaints. Nevertheless, we cannot rule out the possibility that poorer health status may predispose a woman to menopausal symptoms, rather than the contrasting notion that menopausal symptoms predispose females to poorer health status.

Disruption of sleep is a common problem, which has been associated with hot flushes [28]. It has been suggested that many of the mood changes associated with menopause may result from the sleep disruptions associated with hot flushes during the night [29, 30]. Our results confirm that women with vasomotor symptoms are more likely to have insomnia, however, the lower QOL score in this group cannot be explained by insomnia alone.

It is interesting to note that PMS had a significant impact on QOL score and menopausal symptoms for our subjects. Although retrospective diagnosis of PMS may be biased by recall error, our results are consistent with earlier findings of an association between vasomotor symptoms and previous PMS [31, 32]. The mechanisms of PMS are still controversial, however. It has been suggested that women with a history of PMS have increased sensitivity to hormonal changes [33]. There is also a socially mediated model, in which stressful life circumstances, menstrual socialization and depressed mood are associated with PMS [34]. The hypothalamic-pituitary-adrenal axis and autonomic nervous system also play important roles in PMS symptoms [35]. The association of PMS with higher frequency of menopausal symptoms and lower QOL scores may imply that women who are sensitive to hormonal changes are at increased risk for menopausal symptoms and reduced QOL during the menopausal transition. It is also possible that women prone to PMS usually have higher levels of life stress, causing the increased symptom frequency and reduced QOL.

The prevalence of vasomotor symptoms reported for Taiwanese is markedly lower than that reported in the western literature [14]. This finding is similar to other Asian studies [36]. Taiwanese women perceive menopause as a normal life process and are more positive about menopause than western women [37]. This is the first report of QOL

for Asian women in midlife. It is not possible to be sure if the results can be extrapolated to other racial and ethnic groups, however. The positive aspects of menopausal transition for Taiwanese women notwithstanding, the impact on QOL cannot be overlooked for these traditional Chinese women.

In conclusion, it was determined in this cross-sectional population-based study of rural Chinese women that QOL was poorer for naturally peri- and postmenopausal women within the first 3 years of menopause compared to premenopausal women, and that menopausal symptoms may have a significant impact on QOL. The validity of any extrapolation of our results to late-menopausal women is indeterminate, however, since most of our postmenopausal women were within 3 years of menopause and the incidence and severity of menopausal symptoms are greatest in the first 2 years of menopause after which they gradually decrease.

Acknowledgements

This study was supported by grants from the National Health Research Institute (NHRI-GT-EX908923PC and NHRI-GT-EX90-8923PC). The authors would like to thank the reviewers and the editor for their helpful comments on an earlier version of this manuscript.

References

1. Daly E, Gray A, Barlow D, McPherson K, Roche M, Vessey M. Measuring the impact of menopausal symptoms on quality of life. Br Med J 1993; 307: 836–840.
2. Ledesert B, Ringa V, Breart G. Menopause and perceived health status among the women of the French GAZEL cohort. Maturitas 1994; 20: 113–120.
3. Blumel JE, Castelo-Branco C, Binfa L, et al. Quality of life after the menopause: A population study. Maturitas 2000; 34: 17–23.
4. Derman RJ, Dawood MY, Stone S. Quality of life during sequential hormone replacement therapy-a placebo-controlled study. Int J Fertil 1995; 40: 73–78.
5. Wklund I, Karlberg J, Mattsson LA. Quality of life of postmenopausal women on a regimen of transdermal estradiol therapy: A double-blind placebo-controlled study. Am J Obstet Gynecol 1993; 168: 824–830.
6. Bech P, Munk-Jensen N, Obel EB, Ulrich LG, Eiken P, Pors Nielsen S. Combined versus sequential hormonal replacement therapy: A double-blind, placebo-controlled study on quality of life-related outcome measures. Psychother Psychosom 1998; 67: 259–265.
7. Karlberg J, Mattsson LA, Wiklund I. A quality of life perspective on who benefits from estradiol replacement therapy. Acta Obstet Gynecol Scand 1995; 74: 367–372.
8. Kaufert P, Lock M, McKinlay S, et al. Menopause research: the Kofole limitation due to physical problemsilampi workshop. Soc Sci Med 1986; 22: 1285–1289.
9. Tang GWK. The climacteric of Chinese factory workers. Maturitas 1994; 17: 177–182.
10. Boulet MJ, Oddens BJ, Lehert P, Vemer HM, Visser A. Climacteric and menopause in seven southeast Asian countries. Maturitas 1994; 19: 157–176.
11. Ware JE, Snow KK, Kosinski M, Gandek B. SF-36 Health Survey-Manual and Intefole limitation due to physical problemsretation guide. Boston, MA: The Health Institute, New England Medical Center, 1993.
12. Hunt SM, McKenna SP, McEwen J, Backett EM, Williams J, Papp E. A quantitative approach to perceived health status: A validation study. J Epidemiol Commun Health 1980; 64: 281–286.
13. Fuh JL, Wang SJ, Lu SR, Juang, Lee SJ. Psychometric evaluation of a Chinese (Taiwanese) version of the SF-36 Health Survey amongst Middle Aged Women from a Rural Community. Qual Life Res 2000; 9: 675–683.
14. Fuh JL, Wang SJ, Lu SR, Juang KD, Chiu LM. The Kinmen women-health investigation (KIWI): A menopausal study of a population aged 40–54. Maturitas 2001; 39: 117–124.
15. Ware JE, Keller SD, Gandek B, Brazier JE, Sullivan M. Evaluating translations of health status questionnaire: Methods from the IQOLA Project. Int J Technol Assess Health Care 1995; 11: 525–551.
16. Zigmond AS, Smaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983; 67: 361–370.
17. Juang KD, Wang SJ, Juang KD, Wang SJ, Lin CH, Fuh JL. Use of the hospital anxiety and depression scale as a screening tool for patients with headache. Chin Med J (Taipei) 1999; 62: 749–755.
18. Blatt MHG, Wiesbader H, Kupperman HS. Vitamin E and climacteric syndrome: Failure of effective control as measured by menopausal index. Arch Intern Med 1953; 91: 792–799.
19. World Health Organization. Mental, behavioral and developmental disorders. In: Tenth Revision of the International Classification of Disease (ICD-10). Geneva: World Health Organization, 1996.
20. Kessel B. Premenstrual syndrome: Advances in diagnosis and treatment. Obstet Gynecol Clin North Am 2000; 27: 625–639.
21. Lam CL, Pan PC, Chen AW, Chan SY, Munro C. Can the hospital anxiety and depression (HAD) scale be used on Chinese elderly in general practice? Family Pract 1995; 12: 149–154.
22. Poehlman ET, Toth MJ, Gardner AW. Changes in energy balance and body composition at menopause: A controlled longitudinal study. Ann Intern Med 1995; 123: 673–675.

23. Poehlman ET, Goran MI, Gardner AW, et al. Determinants of the decline in resting metabolic rate in aging females. Am J Physiol 1993; 264: E450–E455.
24. Sowers MF, Pope S, Welch G, Sternfeld B, Albrecht G. The association of menopause and physical functioning in women at midlife. J Am Geriatr Soc 2001; 49: 1485–1492.
25. Cooph J, Hunter M. Impact of menopausal symptoms: Effect on quality of life exaggerated. Br Med J 1993; 307: 1420–1421.
26. Ballinger CB. Psychiatric morbidity and the menopause: Screening of a general population sample. Br Med J 1975; 3: 344–346.
27. Dennerstein L, Smith AMA, Morse C. Psychological well-being, mid-life and the menopause. Maturitas 1994; 20: 1–11.
28. Erlik Y, Tataryn IV, Meldrum DR, Lomax P, Bajorek JG, Judd HL. Association of waking episodes with menopausal hot flashes. JAMA 1981; 245: 1741–1744.
29. Gonen R, Sharf M, Lavie P. The association between mid sleep waking episodes and hot flashes in post-menopausal women. J Psychosom Obstet Gynaecol 1986; 5: 113–115.
30. Shaver J, Giblin E, Lentz M, Lee K. Sleep patterns and stability in perimenopausal women. Sleep 1988; 11: 556–561.
31. Holte A. Influences of natural menopause on health complaints: A prospective study of healthy Norwegian women. Maturitas 1992; 14: 127–141.
32. Collins A, Landgren BM. Reproductive health, use of estrogen and experience of symptoms in perimenopausal women: A population-based study. Maturitas 1995; 20: 101–111.
33. Bancroft J, Backstrom T. Premenstrual syndrome. Clin Endocrinol 1985; 22: 313–336.
34. Woods NF, Mitchell ES, Lentz MJ. Social pathways to premenstrual symptoms. Res Nursing Health 1995; 18: 225–237.
35. Woods NF, Lentz MJ, Mitchell ES, Shaver J, Heitkemper M. Luteal phase ovarian steroids, stress arousal, premenses, perceived stress, and premenstrual symptoms. Res Nursing Health 1998; 21: 129–142.
36. Boulet MJ, Oddens BJ, Lehert P, Vemer HM, Visser A. Climacteric and menopause in seven south-east Asian countries. Maturitas 1994; 19: 157–176.
37. Chen YD, Voda AM, Mansfield PK. Chinese midlife women's perceptions and attitudes about menopause. Menopause 1998; 5: 28–34.

Address for correspondence: Jong-Ling Fuh, The Neurological Institute, Taipei Veterans General Hospital, No. 201, Shih Pai Road Section 2, 11217 Taipei, Taiwan, ROC
Phone: +886-2-2876-2522; Fax: +886-2-2876-5215
E-mail: jlfuh@vghtpe.gov.tw