Quality of life and its determinants in postmenopausal women: a population-based study

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A R T I C L E   I N F O

A B S T R A C T

Purpose: This study aimed to assess quality of life (QOL) and its determinants in Iranian postmenopausal women.
Methods: This population-based cross-sectional survey was conducted using cluster sampling design. The samples consisted of postmenopausal women aged 40–60 years with total household in Rasht city (north Iran) as the sample frame. Quality of life was assessed by Menopause-Specific QOL (MENQOL) Questionnaire. Mean domain scores and factors related to the higher score of each domain were determined.
Results: Findings showed that the mean scores for each domain were: vasomotor: 2.14 ± 1.49; psycho-social: 1.56 ± 0.85; physical: 1.91 ± 0.52 and sexual: 1.37 ± 1.05. Comparing the median of the studied domains, physical domain had the worst score in menopausal women. Pain in joint and muscle, one item of physical domain, had the highest score. The univariate analysis demonstrated that women aged 60–65 ($p < 0.0001$), women with postmenopausal stage 5 or more years ($p < 0.0001$), married women ($p < 0.05$), women holding higher education degree ($p < 0.05$), employed women ($p < 0.05$), women with a body mass index (BMI) <18.5 kg/m^2 ($p < 0.05$) and women who do physical activity ($p < 0.05$) showed better QOL. Based on Logistic Regression model, the predictive factors of normal QOL in menopause status were: age, husband education, score of Charlson Comorbidity Index (CCI) and BMI.
Conclusion: Our findings suggest that menopause-related symptoms had negative impact on QOL. Confirmation by further research is needed.

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1. Introduction

Menopause is regarded as a normal physiological process in every woman's life, which is defined as "the permanent cessation of menstruation due to reduction of ovarian estrogen secretion". This change affects the whole body, and creates symptoms including vasomotor symptoms such as hot flash and night sweat; somatic symptoms like bone and joint complains, and reduction of muscle mass; psychological symptoms such as sleep and mood disorders, impaired memory, lack of concentration, nervousness, depression and insomnia; as well as sexual symptoms including vaginal dryness or atrophy and dyspareunia (Abedzadeh et al, 2011; Blumel et al., 2000). The overall health and well-being of mid-aged women has become a major public health concern around the world. More than 80% of women experience physical or psychological symptoms in the year approaching menopause with various distress and distribution in their lives, leading to decrease in their quality of life (QOL) (Nisar & Sohoo, 2009).

QOL has been defined by the World Health Organization (WHO) as the "individuals' perceptions of their position in life in the context of the cultural and value systems in which they live and in relation to their goals, expectation, standards and concerns" (Orley & Kuyken, 1994).

The need to create the term health-related QOL surges, which is defined as the subjective evaluation of the patient directed toward his/her exterior and centered on the impact of his/her health over the capacity to live a satisfactory subjective life (Fallahzadeh, 2010).

Various validated tools have been applied to determine the influence of the climacteric over QOL, among them is the menopause-specific quality of life (MENQOL) questionnaire proposed by Hilditch et al. (1996), which is based upon women's own perspective. This tool has been validated upon a climacteric Chilean population, and used to determine that menopause causes QOL impairment (Blumel et al., 2000).

However, the study of QOL in the post-menopause has become an essential component in clinical practices. Most studies evaluating QOL associated with menopausal symptoms have focused on the impact of treatments such as hormone therapy (Van der Mooren & Kenemans, 2004). Only a few studies have actually addressed the contribution of

socio-demographic factors to the association between menopausal symptoms and QOL (Binfa et al., 2004; Karaçam & Seker, 2007). Furthermore, most studies were conducted in the developed countries with different socio-cultural realities, which may influence not only the perception of QOL but also the experience of menopausal symptoms, because experience of menopause differs extraordinarily among different ethnic groups (Nisar & Sohoo, 2009). Very little information exists about the QOL of menopausal women in the developing countries.

Given these various contributions, we conducted the present study to assess the menopause-related symptoms and their impact on QOL, and determine factors related to QOL impairment among the postmenopausal women living in Rasht city (north Iran).

2. Materials and methods

2.1. Study design and subjects

A population-based cross-sectional survey was conducted from Jun 2013 to Jun 2014 in Rasht city, the capital of Guilan province (north Iran). Rasht is the biggest and most populated city of the province with the estimated population of about 639,951 inhabitants in 2013. The population size for women aged between 40 and 60 years was estimated to be 74,582. This represents that about 11.65% of the total population and 22.72% of the total women population were residing in this city in 2013.

The sample consisted of the women aged 40–60 years. Inclusion criteria were complete cessation of menstruation, and lack of menstruation for at least 12 consecutive months without any drug induction or medical interventions (such as hysterectomy, oophorectomy, chemotherapy and radiotherapy); no hormones were used within the last 6 months; having the ability to communicate verbally to answer the questions, ability to speak in Persian language, and living in Rasht city at least for one year.

2.2. Sample size

According to the previous study, the percent of impaired QOL in the menopausal women was 22.7 (Abedzadeh et al., 2011). It was determined that 675 menopausal women were needed to detect medium-sized effect, with 95 percent power at a significant level of 5%, assuming a design effect of 2.5.

2.3. Sampling process

A cluster random sampling design was used to select the participants. Based on the sample size, 34 clusters in different sections of the city were picked out systematically. Since, Rasht Electrical Distribution Company covered the total households of the city, first, the statistical framework consisting of the numbers and addresses of the households was determined based on the household lists available in the company. Next, 34 households as cluster heads were selected systematically with specified sampling interval. Then nearly 20 menopausal women were randomly assigned to the study group from each cluster by moving to the right and left sides of the picked households. After selecting a woman matched to the study inclusion criteria described above, two trained interviewers gave a description of the study and requirements for participation, and administered the study protocol. This procedure was continued until the samples were completely collected. Each interview was lasted for about 30 min.

2.4. Measurements

The enrolled women signed informed consent, and filled out a questionnaire administered by the trained interviewers. The questionnaire consisted of two parts: The first part was focused on socio-demographic, lifestyle and obstetric characteristics such as age, educational level, husband's educational level, occupation status, marital status, date of the last menstrual period, menarche age, menopause age, body mass index (BMI), physical activity and Charlson's Comorbidity Index (CCI).

BMI was calculated by weight/height squared (kg/m^2) in all participants. Weight and height were measured by the researchers. The weight was measured by using an electronic scale to the nearest 100 gram, which was performed without shoes and with least clothing. The height was measured by using a tape measure to the nearest 0.5 centimeter, which was done with the participant standing on a flat surface against a wall.

Physical activity was defined as doing at least 150 minutes of moderate-intensity aerobic physical activity including walking, cycling and participating in sports throughout the week. Aerobic activity was performed in bouts of at least 10 minutes duration (WHO, 2010).

Charlson Comorbidity Index: The CCI is one of the most widely used and validated methods for predicting one-year survival based on co-morbidity data. The Charlson score consists of 19 different disease co-morbidity categories, each allocated a weight of 1, 2, 3 or 6 based on the adjusted relative risk of one-year mortality and summed to provide a total score. The relative risk of one year mortality for each increasing point of the index was 2.3 (95% confidence interval 1.9–2.8), and the overall model was a highly predictor of mortality ($p < 0.0001$) (Needham et al, 2005).

The second part of the questionnaire deals with QOL assessment. Menopause-Specific Quality of Life (MENQOL) Questionnaire, which was developed by Hilditch et al. (1996) at the University of Toronto, Canada, was used to assess the QOL in this study. The questionnaire consists of 29 items in four domains; vasomotor (3 items), psychosocial (7 items), physical (16 items) and sexual (3 items). The vasomotor domain assesses hot flashes, night sweats, and sweating. The psychosocial domain determines the psychological well-being of the individual by including items about anxiousness, memory, and feeling blue. The physical domain evaluates such items as flatulence, bloating, pain, tiredness, sleeping, energy and weight gain. The sexual domain investigates about changes in sexual desire, vaginal dryness, and intimacy. The systemic scoring for each domain is identical. Each item can be checked as present or not-present. If not-present, the participant goes to the next item; if present, the item is converted into a seven-point Likert scale according to its severity from 0 to 6. Score "0" indicates not experienced and not at all bothered; score "one" indicates that the symptom was experienced, but it was not at all bothersome; and scores "two" through "six" indicate elevating levels of bother experienced from the symptom. The average for each domain is constrained between 0 and 6.

The MENQOL, previously translated into Persian, was validated first by applying the questionnaire on a pilot sample of menopausal women. Cronbach's alpha for the scale as a whole was 0.81, indicating a good reliability. For content validity, an expert panel of ten specialists in gynecology and midwifery was asked to comment independently on necessity in order to calculate the content validity ratio (CVR), and relevancy, clarity and simplicity in order to calculate the content validity index (CVI) of the items. The CVR for the total scale was 0.90, indicating a satisfactory result. The CVI was found to be 0.91, suggesting that it had a good content validity.

2.5. Ethical approval

The Ethical Committee of Guilan University of Medical Sciences approved the study protocol. A description of the study and requirements for participation was given to all enrolled women, and written informed consent was obtained, where detailed information was offered about the research, and confidentially was assured.

2.6. Statistical analysis

Data collected from the questionnaire were coded, entered into statistics package for social sciences (SPSS, version 21.0, Chicago, IL) and

tested for normality. Non-parametric descriptive statistics were used to analyze demographic and obstetric data. Mann Whitney's *U* test (in bi-variate data) and Kruskal-Wallis test (in multivariate data) were employed to determine the impact of menopausal symptoms on QOL. Spearman's correlation (two-tailed) shows the relation between QOL domains, and quantitative variables, and forward LR Logistic Regression reveals multiple association between socio-demographic factors and QOL. The four domains assessed in the study were considered as dependent variables. To categorize QOL in each domain, the criterion of median was used; women with a score below percentile 50 were defined as normal, and those with a score above it as impaired. In all statistical analyses, the significant level was set as $p < 0.05$.

3. Results

3.1. Socio-demographic and obstetric characteristics

We conducted interviews and collected information for all of the 675 eligible post-menopausal women enrolled in the study. The mean (SD) age of the subjects was 55.24 (4.51) years (range: 40–60 years). The majority of women were in 55–60 years (56.7%). The mean (SD) age of menopause and menarche was 49.39 (4.51) years (median: 49 years) and 12.12 (1.63) years (median: 12 years), respectively. Menopausal age in 3.6% of the women was under 40 years. Fifty-five percent of the women experienced menopause more than five years. The mean (SD) of child number was 3.2 (1.52) (median: 3). The majority of participants had education under 12 years (79.6%), were married (91.9%), lived with their spouse) 81.5%), were housewives (92.5) and were overweight (BMI = 25–35) (39%). The majority of subjects' husbands had education in third level (10–12 years) (31.6%).

3.2. Menopausal QOL and domain scores

The mean scores obtained for each MENQOL domain are listed in Table 1. As shown, the mean of vasomotor domain had the highest score, and the sexual domain obtained the least score. Fifty-nine percent of the women had vasomotor scores below the median, 68% of the women in psycho-social domain, 51.2% of the women in physical domain, and 74.7% in sexual domain had scores below the median, indicating normal status in the overall QOL.

In Fig. 1, the median of each domain is compared. Among the four domains shown, physical domain illustrates the highest median, indicating that the worst affecting domain of menopause QOL is related to physical symptoms.

3.3. Factors related to menopausal symptoms

Table 2 depicts the scores of four domains of the specific QOL questionnaire for menopause at different socio-demographic characteristics. In all four MENQOL domains, women aged 45–49 years reported the worst QOL scores, but except for the vasomotor domain, which was not significant. In the vasomotor and psycho-social domains, the women who had experienced menopause five or less than five years ago had significantly higher scores from those who had reached menopause more than five years ago. There was no significant difference in duration of menopause in the physical and sexual domains ($p > 0.05$).

Table 1
The means scores per domain and total QOL in Iranian menopausal women aged 40-65.

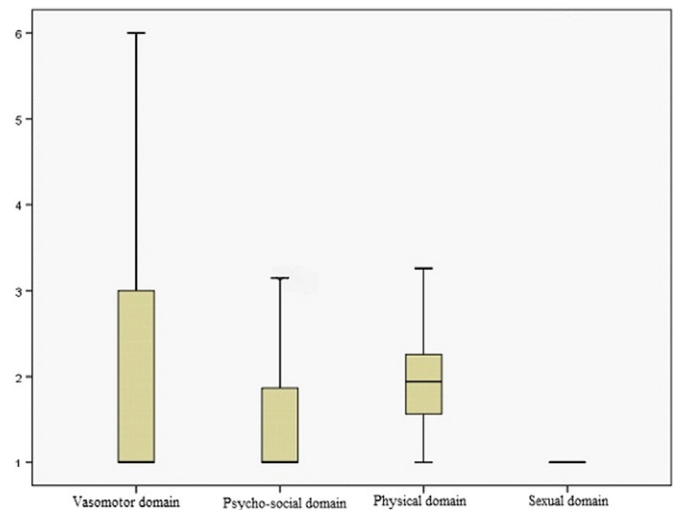|	Mean	Standard deviation	95% Confidence interval
Vasomotor	2.14	1.49	2.02-2.26
Psyco-social	1.56	0.85	1.49-1.63
Physical	1.91	0.52	1.87-1.93
Sexual	1.37	1.05	1.28-1.45
Total QOL	1.81	1.74	1.77-1.84

Fig. 1. Comparison of the medians of each QOL domain.

In the vasomotor and sexual domains, there were no significant differences between the various marital statuses. Single women had higher score in the psycho-social domain, and widowed women had higher score in physical domain. Educational level was related to the vasomotor and physical domains. In physical domain, an increase in educational level was associated with a decrease in MENQOL, indicating an improvement in QOL. In vasomotor domain, the illiterate women had lower score compared to the literate women. In psycho-social and sexual domains, no significant differences were observed. Also husband's educational level was significantly associated with vasomotor, psychosocial and physical domains. Employed women had lower score in physical domain, and there were no significant differences in other MENQOL domains. Overweight and obese women had significantly higher scores than underweight and normal weight women in the physical and psycho-social domains ($p < 0.05$). There were no significant differences between the BMI groups in vasomotor and sexual domains, and the women who were doing physical activity reported significantly better QOL score than those with no physical activity in psycho-social and physical domains.

The effect of CCI on QOL was also calculated. In physical and psychosocial domains, significantly higher impaired QOL was found in the women having higher scores of the index; this difference was not significant in the sexual and vasomotor domains.

The odd ratios (OR) and the 95% confidence interval (95% CI) of the logistic regression models were used to predict factors associated with specific QOL (Table 3). The final forward LR model showed that higher CCI increased the risk for having vasomotor, physical and psychosocial scores above the median. Vasomotor and psycho-social scores decreased with age, and psycho-social and physical scores decreased with husband's educational level. Higher BMI increased the risk of having physical scores above the median.

4. Discussion

The aim of the present study was evaluating QOL among post-menopausal women using MENQOL, and determining association between QOL and its determinants.

Based on the obtained results, the physical domain had the highest score, and pain in muscles and joints was the most common symptom, which was reported by the menopausal women. Waidyasekera et al (2009) also found similar results.

In general, being a younger post-menopausal woman, single, and housewife, having lower education, and a higher BMI, doing less physical activity, and having a higher score in CCI resulted in lower QOL on many of the MENQOL domains. After adjustment for

Table 2
Adjusted mean scores per domain in Iranian menopausal women according to socio-demographic characteristics.

Characteristics	Vasomotor[1]	Psyco-social[1]	Physical[1]	Sexual[1]
Age (years)	2.66 ± 1.80	1.63 ± 0.99	2.32 ± 1.20	1.22 ± 0.66
40–44	3.05 ± 1.79	1.65 ± 0.91	2.45 ± 1.43	1.39 ± 0.82
45–49	2.29 ± 1.44	1.65 ± 0.92	2.18 ± 1.21	1.34 ± 0.97
50–54	1.91 ± 1.28	1.62 ± 0.97	2.22 ± 0.97	1.28 ± 0.84
55–59				
60–65				
p-value[2]				
	1.76 ± 1.34	1.51 ± 0.82	2.25 ± 1.00	1.25 ± 0.93
	0.000	0.471	0.169	0.460
Duration of menopause(years)[mean ± SD]	2.37 ± 1.52	1.64 ± 0.92	1.94 ± 0.58	1.38 ± 1.08
≤5	1.82 ± 1.35	1.51 ± 0.84	1.95 ± 0.52	1.30 ± 0.90
>5	>0.001	0.028	0.760	0.636
p-value[3]				
Marital status [mean ± SD]	1.57 ± 0.98	1.90 ± 1.12	1.80 ± 0.60	1.00 ± 0.00
Single	2.13 ± 1.48	1.57 ± 0.88	1.93 ± 0.55	1.38 ± 1.06
Married and living with spouse	1.99 ± 1.39	1.82 ± 1.00	2.14 ± 0.55	1.00 ± 0.00
Widowed	5.00 ± 0.00	1.43 ± 0.00	1.38 ± 0.00	1.00 ± 0.00
Divorced	0.629	0.048	0.044	0.515
p-value[2]				
Education	1.85 ± 1.27	1.68 ± 0.96	2.07 ± 0.52	1.45 ± 1.19
Illiterate	2.34 ± 1.69	1.60 ± 0.83	1.93 ± 0.58	1.32 ± 0.85
First level (1-5years)	2.15 ± 1.47	1.48 ± 0.84	1.92 ± 0.48	1.37 ± 1.06
Second level (6–9 years)	2.43 ± 1.57	1.53 ± 0.82	1.79 ± 0.64	1.33 ± 1.01
Third level (10–12 years)	2.10 ± 1.57	1.62 ± 1.02	1.72 ± 0.53	1.08 ± 0.36
Fourth level (more than 12 years)	0.011	0.113	0.000	0.602
p-value[2]				
Husband education				
Illiterate	1.85 ± 1.00	1.75 ± 0.99	2.08 ± 0.53	1.50 ± 1.27
First level (1-5years)	2.26 ± 1.00	1.51 ± 0.73	1.97 ± 0.51	1.19 ± 0.60
Second level (6–9 years)	2.12 ± 1.00	1.55 ± 0.87	1.97 ± 0.56	1.29 ± 0.89
Third level (10–12 years)	2.19 ± 1.00	1.47 ± 0.81	1.83 ± 0.49	1.44 ± 1.15
Fourth level (more than 12 years)	2.68 ± 2.33	1.65 ± 0.92	1.83 ± 0.81	1.11 ± 0.45
p-value [2]	0.040	0.280	0.000	0.544
Employment				
Unemployed	2.11 ± 1.46	1.58 ± 0.89	1.96 ± 0.54	1.38 ± 1.07
Employed	2.17 ± 1.60	1.67 ± 0.95	1.77 ± 0.62	1.18 ± 0.67
p-value[3]	0.977	0.342	0.009	0.248
Body mass index (BMI)				
Underweight (<18.5)	1.99 ± 1.38	1.34 ± 0.57	1.60 ± 0.53	1.31 ± 0.92
Normal (18.5- < 25)	2.02 ± 1.33	1.48 ± 0.80	1.63 ± 0.48	1.45 ± 1.25
Overweight (25- < 30)	2.26 ± 1.61	1.72 ± 1.02	2.02 ± 0.50	1.38 ± 1.06
Obese (>30)	2.03 ± 1.40	1.55 ± 0.80	2.18 ± 0.53	1.30 ± 0.84
p-value[2]	0.708	0.021	0.000	0.982
Charlson comorbidity index (CCI)				
0	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
1	2.21 ± 1.59	1.37 ± 0.68	1.64 ± 0.48	1.46 ± 1.19
2	2.07 ± 1.40	1.64 ± 0.97	2.03 ± 0.53	1.29 ± 0.90
3	2.07 ± 1.42	1.80 ± 0.94	2.23 ± 0.47	1.39 ± 1.10
p-value[2]	0.724	0.000	0.000	0.672
Physical activity				
Yes	2.19 ± 1.66	1.37 ± 0.67	1.68 ± 0.51	1.37 ± 1.01
No	2.10 ± 1.44	1.62 ± 0.92	1.99 ± 0.55	1.38 ± 1.07
p-value[3]	0.917	0.017	0.000	0.840

1. mean ± SD
2. Kruskal Wallis
3. Mann Whitney *U*

potential confounders in the logistic regression, a clearer association emerged between QOL and socio-demographic factors. The observed association is in agreement with the findings of several previous studies that showed an association between lower socio-economic status, education, age and BMI, and menopausal symptoms (Fallahzadeh, 2010; Williams et al., 2009). In this study, better QOL was found in the older women who had experienced menopause more than five years ago compared to the younger women. This finding is admissible because studies have shown that the prevalence and severity symptoms of early menopause were higher than those of late menopause (Avis et al., 2001; Chedraui et al, 2007; Jacobs et al, 2000). In addition, older women may cope with menopausal symptoms over time.

Lower QOL is affected with overweight and obesity (Li et al, 2005). A significant reduction in menopausal QOL as a result of high BMI levels has been reported in several studies (Freeman et al., 2001; Gold et al., 2004; Williams et al., 2009). Also, in this study, underweight women demonstrated the least scores in vasomotor and physical domains, which is in agreement with the results of another study from Iran (Fallahzadeh, 2010). Here, 69.3% of the study population had BMI ≥25, which is similar to the findings of other researches (Fallahzadeh, 2010; Karaçam & Seker, 2007; Williams et al., 2009).

Additionally, husband's educational level was a predictive factor of menopausal QOL, especially in psycho-social and physical domains. It seems that high education level of husband results in better perception of symptoms and complications of menopausal women. Karaçam and

Table 3
Logistic regression models of factors related to menopausal QOL in Iranian menopausal women.

Factors	OR	95% CI	*p*-value
Predictive factors of vasomotor			
Age	1.233	1.16-1.30	0.000
Menopausal age	0.878	0.83-0.92	0.000
CCI	0.881	0.78-0.98	0.029
Predictive factors of psycho-social			
Age	1.07	1.02-1.11	0.001
Husband's educational level	1.19	1.03-1.38	0.013
CCI	0.73	0.64-0.82	0.000
Predictive factors of physical			
Number of children	0.84	0.74-0.95	0.008
Husband's educational level	1.2	1.04-1.37	0.009
BMI	1.22	1.06-1.41	0.004
CCI	0.65	0.58-0.74	0.000

Seker (2007) showed that menopausal women who were supported mentally from their husbands had better QOL.

In this study, having a high level of education and being employed were related to better QOL. Previous studies have found that menopausal women with high education levels experienced fewer symptoms. It is interesting that in several populations, the intensity of vasomotor, physical and sexual symptoms has been associated with lower education level (Fallahzadeh, 2010; Gold et al., 2004; Williams et al., 2009). Therefore, according to the studies mentioned above, being employed and having a high level of education might be assumed to be proxies for high income levels, and increased access to the healthcare services or increased level of awareness of available coping mechanisms for menopausal symptoms.

In the present study, an association was found between CCI and the MENQOL domains. Having high score in CCI was related to having impaired QOL, and a predictive factor of having vasomotor, physical and psycho-social scores above the median; this finding was significant in psycho-social and physical domains. To the best of our knowledge, such correlation has never been addressed in previous studies, and this is the first study that has investigated the impact of CCI, stratified by adjusted relative risk of one year mortality, on QOL. Karaçam and Seker (2007) revealed that menopause is the leading cause of obesity, cardiovascular and metabolic diseases, which had negative effect on the QOL of menopausal women. Confirmation of these results by further research is recommended.

Several limitations of our study deserve consideration. First, this study was a cross-sectional survey, which could not assess the effect of menopausal symptom predictors on change in QOL with time. Second, though the study sample was of remarkable size and it was spread out in many geographical areas of the city, this does not necessarily reflect the characteristics of the post-menopausal women in Iran as a whole. Because, there is consideration variation of symptoms reporting across race/ethnicity. Furthermore, since the MENQOL is a self-reporting questionnaire, and the women were asked to recall symptoms in the past four weeks; hence, recall bias is possible. Williams et al. believed that this is a reasonable time frame for recall of many of the MENQOL questions (Williams et al., 2009).

Our findings bolster the hypothesis that menopausal symptoms, especially in the early years of experiencing these symptoms, may reduce the QOL level. The results of this study are important in that they showed the predictors of menopausal symptoms and their relationship with the QOL. Further testable research to confirm these results is needed, and it seems mandatory to provide an educational program to prepare women for the years after menopause, in order to dominate post-menopausal complaints, which can make their QOL better. It is recommended that the Ministry of Health have set the promotion of QOL in menopausal women among its primary goals.

Authors' roles

Acknowledgements

References

Abedzadeh Kalarhoudi, M., Taebi, M., Sadat, Z., & Saberi, F. (2011). Assessment of quality of life in menopausal periods: A population study in Kashan, Iran. *Iranian Red Crescent Medical Journal*, *13*(11), 811–817.

Avis, N. E., Stellato, R., Crawford, S., Bromberger, J., Ganz, P., Cain, V., et al. (2001). Is there a menopausal syndrome? Menopausal status and symptoms across racial/ethnic groups. *Social Science & Medicine*, *52*(3), 345–356.

Binfa, L., Castelo-Branco, C., Blümel, J. E., Cancelo, M. J., Bonilla, H., Muñoz, I., et al. (2004). Influence of psycho-social factors on climacteric symptoms. *Maturitas*, *48*(4), 425–431.

Blumel, J. E., Castelo-Branco, C., Binfa, L., Gramegna, G., Tacla, X., Aracena, B., et al. (2000). Quality of life after the menopause: A population study. *Maturitas*, *34*(1), 17–23.

Chedraui, P., Aguirre, W., Hidalgo, L., & Fayad, L. (2007). Assessing menopausal symptoms among healthy middle aged women with the Menopause Rating Scale. *Maturitas*, *57*(3), 271–278.

Fallahzadeh, H. (2010). Quality of life after the menopause in Iran: A population study. *Quality of Life Research*, *19*(6), 813–819. , http://dx.doi.org/10.1007/s11136-010-9644-2.

Freeman, E. W., Sammel, M. D., Grisso, J. A., Battistini, M., Garcia-Espagna, B., & Hollander, L. (2001). Hot flashes in the late reproductive years: risk factors for Africa American and Caucasian women. *Journal of Women's Health & Gender-Based Medicine*, *10*(1), 67–76.

Gold, E. B., Block, G., Crawford, S., Lachance, L., FitzGerald, G., Miracle, H., et al. (2004). Life style and demographic factors in relation to vasomotor symptoms: baseline results from the Study of Women's Health across the Nation. *American Journal of Epidemiology*, *159*(12), 1189–1199.

Hilditch, J. R., Lewis, J., Peter, A., van Maris, B., Ross, A., Franssen, E., et al. (1996). A menopause-specific quality of life questionnaire: Development and psychometric properties. *Maturitas*, *24*(3), 161–175.

Jacobs, P. A., Hyland, M. E., & Ley, A. (2000). Self-rated menopausal status and quality of life in women aged 40–63 years. *British Journal of Health Psychology*, *5*(4), 396–411.

Karaçam, Z., & Seker, S. E. (2007). Factors associated with menopausal symptoms and their relationship with the quality of life among Turkish women. *Maturitas*, *58*(1), 75–82.

Li, C., Borgfeldt, C., Samsioe, G., Lidfeldt, J., & Nerbrand, C. (2005). Background factors influencing somatic and psychological symptoms in middle-age women with different hormonal status. A population-based study of Swedish women. *Maturitas*, *52*(3–4), 306–318.

Needham, D. M., Scales, D. C., Laupacis, A., & Pronovost, P. J. (2005). A systematic review of the Charlson comorbidity index using Canadian administrative databases: A perspective on risk adjustment in critical care research. *Journal of Critical Care, 20*(1), 12–19.

Nisar, N., & Sohoo, N. A. (2009). Frequency of menopausal symptoms and their impact on the quality of life of women: A hospital based survey, JPMA. *The Journal of the Pakistan Medical Association*, *59*(11), 752–756.

Orley, J., & Kuyken, W. (1994). *Quality of life assessment: International perspectives.* Berlin Heidelberg: Springer-Verlag.

Van der Mooren, M. J., & Kenemans, P. (2004). Postmenopausal hormone therapy: Impact on menopause-related symptoms, chronic disease and quality of life. *Drugs, 64*(8), 821–836.

Waidyasekera, H., Wijewardena, K., Lindmark, G., & Naessen, T. (2009). Menopausal symptoms and quality of life during menopausal transition in Sri Lankan women. *Menopause, 16*(1), 164–170.

Williams, R. E., Levine, K. B., Kalilani, L., Lewis, J., & Clark, R. V. (2009). Menopause-specific questionnaire assessment in US population-based study shows negative impact on health-related quality of life. *Maturitas*, *62*(2), 153–159. , http://dx.doi.org/10.1016/j.maturitas.

World Health Organization (2010). *Global recommendations on physical activity for health.* World Health Organization (http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf).