ORIGINAL RESEARCH

The Effect of Sleep Coaching on Quality of Sleep and Life in Postmenopausal Women with Sleep Problems

Özlem Şahan, PhD; Ümran Oskay, PhD

ABSTRACT

Objective • The study aims to assess the effect of Information, Motivation, Behavior Skills (IMB) model-based sleep counseling program on the quality of life and sleep quality in postmenopausal women with sleep problems.

Methods • The study design includes a randomized controlled experiment with pre-test and post-test control groups. The study was conducted with 175 postmenopausal women (IMB Group:85, control group:90) who visited Konyaalti Municipality Social Services Center between March 2018 and May 2019 and met the inclusion criteria for the research. Individual sleep counseling training based on the IMB model was conducted in 3 weekly sessions with women in the IMB group, with sessions continuing for at least 45 minutes. All participants were administered the sociodemographic Information Form, Women's Health Initiative Insomnia Rating Scale (WHIIRS), General Health Questionnaire (GHQ-12), Sleep-Related Questions Form Based on the IMB Model, and Menopause-Specific Quality of Life Scale (MENQOL). Data were analyzed using descriptive statistics, Pearson's chi-square, *t* test, and variance analysis in SAS software.

Results • After the training, the difference between WHIIRS and MENQOL subscale mean scores between the groups was statistically significant. IMB model-based individual sleep counseling training increased the information, motivation, and healthy behavior patterns of women who experience sleep problems in the postmenopausal period.

Conclusion • IMB model-based individual sleep counseling is a model that can be used to create appropriate health behavior changes to improve sleep quality and the quality of life in postmenopausal women. (*Altern Ther Health Med.* 2025;31(4):48-53).

Özlem Şahan, **PhD**, Assistant Proffesor, Antalya Bilim University Faculty of Health Sciences Midwifery Department.
Ümran Oskay, **PhD**, Prof. Dr, Istanbul University Cerrahpaşa Florence Nightingale Faculty of Nursing, Women's Health and Disease Nursing, Istanbul, Turkey.

Corresponding author: Özlem Şahan, PHD
E-mail: ozlemsahanbilen@gmail.com

INTRODUCTION

Insomnia, one of the most important complaints seen in the postmenopausal period, is a condition that adversely affects the quality of life and well-being of women.[1] Inadequate or disrupted sleep causes women to experience intense postmenopausal complaints due to fatigue.[2] Health professionals can play a significant role in alleviating postmenopausal complaints.[1] This study was carried out by providing information, motivation, and behavioral skills (IMB) model-based sleep coaching. The predictive effectiveness of the IMB model has not yet been investigated concerning sleep, quality of life, and behaviors preventing menopause-related insomnia in women who have sleep problems in the postmenopausal period. To the best of our knowledge, this is the first study that evaluates the effect of IMB model-based sleep coaching on sleep and quality of life in postmenopausal women with sleep problems.

The study was carried out by performing IMB model-based sleep coaching.[3] The IMB model is based on three components: information that enables people to get better informed; motivation that motivates people to use the information learned to change their risky negative behaviors and to maintain consistent and healthy behaviors; and, behavioral skills that help individuals to reduce the negative outcomes and enhance health-improving behaviors.[4,5,6] Knowledge and motivation activate behavioral changes related to certain behaviors and this helps to initiate and maintain preventive health behaviors.[7] This study evaluates the effects of the Information, Motivation, and Behavioral Skills (IMB) model-based sleep counseling program on quality of life and sleep in postmenopausal women with sleep problems.

METHODS

Study Design

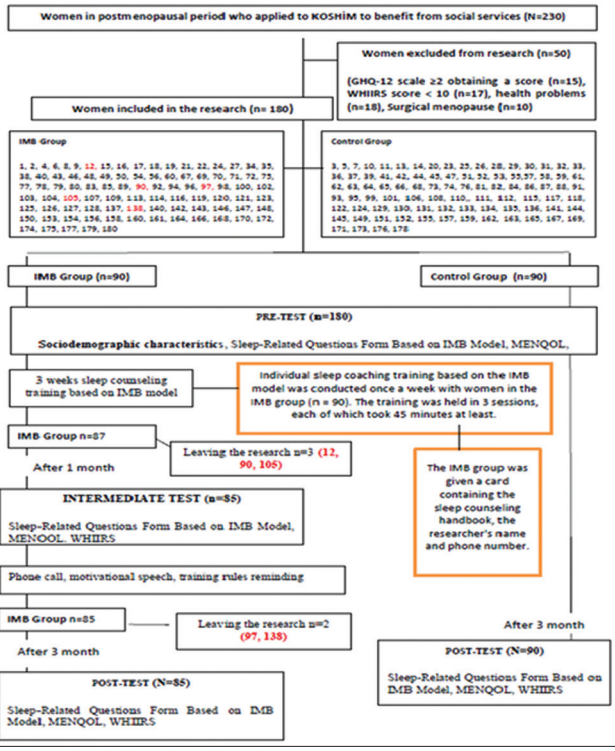
In this study, appropriate training programs were carried out by determining the information and motivation levels of individuals through the IMB model, and then the development of behavioral changes was assessed.

This study used a randomized controlled trial design with a pre-test-post-test control group.

As a pre-test application, both groups were administered "a Personal Information Form, an IMB Model-Based Sleep-Related Questions Form, the Menopause-Specific Quality of Life (MENQOL) Questionnaire, and the Women's Health Initiative Insomnia Rating Scale (WHIIRS)" (IMB group = 90, Control group = 90). Individual sleep coaching training based on the IMB model was conducted once a week with women in the IMB group by the researcher. The training was held in 3 sessions, each lasting at least 45 minutes. Each woman was required to attend all 3 sessions. Only 5 women were excluded from the study because they did not attend all sessions. On the day of the training, the IMB group was given a sleep coaching handbook and a card with the name and phone number of the researcher. During the training, the participants were given brief information about menopause and the changes seen in the menopausal period, the definition of sleep insomnia, the effects of insomnia, nonpharmacological sleep methods applied to cope with insomnia and sleep hygiene principles. The women in the IMB group were asked to follow the rules described in non-pharmacological methods (sleep hygiene, light therapy, sleep shortening therapy, and relaxation exercises). According to these rules, women should take a brisk walk for 45-60 minutes daily to increase their sleep quality and pay attention to sleep hygiene principles. To benefit from the natural light source, they should receive sunlight for 15-20 minutes on the balcony, and practice relaxation techniques in a dim light before bedtime. After completion of training sessions, the IMB group was administered "the IMB Model-Based Sleep-Related Questions Form, the MENQOL, and the WHIIRS" as an intermediate test (IMB group = 85). No interim test was administered to the control group (Control group = 90).

In the post-training period, the women in the IMB group were called by phone once a week for three months, and women were asked to state the rules given in the training. Data about women's sleep routines and the practices recommended by the researcher were collected. At the end of three months, the IMB Model-Based Sleep-Related Questions Form, the MENQOL, and the WHIIRS were re-administered as a post-test for re-evaluation (IMB group = 85, Control group = 90). At the end of three months, the IMB Model-Based Sleep Questionnaire, MENQOL, and WHIIRS post-test were completed face to face by the researcher for re-evaluation of the women (IMB group = 85, Control group = 90). Figure 1 shows the study flow diagram.

Figure 1. Flowchart of the Research



Patients

The study data were collected between March 2018 and May 2019 at Konyaalti Municipality Social Services Center (KOSHIM). KOSHIM is an institution affiliated with the Konyaaltı Municipality in Antalya province of Turkey. The study was carried out at KOSHIM due to the ease of access by the women who would be provided sleep coaching and the availability of a room that can be used for training.

The inclusion criteria of the study included women going through the postmenopausal period without Hormone Therapy (HT) treatment, obtaining a score of less than 2 on the General Health Questionnaire (GHQ)-12 scale, and obtaining an overall score of greater than 10 from the WHIIRS. Exclusion criteria included receiving HT, surgical menopause, chronic systemic disease, and/or psychiatric health problems.

The population of the study consisted of women who came to KOSHIM to benefit from social services, were in the postmenopausal period, had a score of 10 or more on the Women's Health Initiative Insomnia Scale (WHIS), and a score of less than 2 points on the GHQ-12 scale. The sample size was determined as 170 using a G-Power analysis. Considering that there may be missing data during the research phase, the number of participants for each group was determined to be 90 women. A total of 180 women constituted the sample of our study. Five women in the experimental group willingly quit the study. The study sample consisted of 175 women. The IMB and control groups were determined based on a random numbers table generated on the https://www.random.org/ website to eliminate bias during the creation of the groups (IMB group = 85, Control group = 90).

The data obtained in the study were analyzed using the SAS 9.4 software (SAS Institute, Cary, North Carolina) package. The descriptive statistics for the quantitative variables determined by measurements were presented as mean and standard deviation values, and for the qualitative variables, they were shown as numbers and percentages. The *t* test was conducted for two-category variables, like groups and inter-group comparisons, while variance analysis was done to determine the differences between the multiple-category

variables, like follow-up tests (pre/intermediate/post-test) and repeated measurements obtained from the same individuals at different times. Also, the paired-sample *t* test was conducted for features found significant because of variance analysis in repeated measurements. Significance was determined at $P < .05$. Cronbach's alpha reliability coefficients were calculated to test the internal consistency reliability of the scales. The GHQ-12 Cronbach alpha value was found to be 0.84. The WHIS Cronbach alpha value was found to be 0.94. The MENQOL Scale Cronbach alpha coefficient was found to be 0.90 for the vasomotor domain; 0.92 for the psychosocial domain; 0.95 for the physical domain; and, 0.91 for the sexual domain.

Ethical Aspects of the Research

Approval of the ethics committee for the study was obtained from the Health Sciences University Antalya Training and Research Hospital Clinical Research Ethics Committee (Decision No: 17/11). Institutional permission was obtained from Konyaaltı Municipality the Directorate of Culture and Social Affairs. Permission was obtained from the authors for the use of the scales. Informed consent was obtained from the participants in our study, which was conducted following the rules of the Declaration of Helsinki.

RESULTS

The IMB and control groups had statistically similar sociodemographic characteristics mean scores ($P > .05$) (Table 1).

The level of sleep-related knowledge in nearly all women in the IMB group was found to increase ($P < .001$). In the control group, on the other hand, the responses given in the first and last interviews were similar ($P > .05$) (Table 2). The difference between the attitudes and motivation levels of women in the IMB group in the sleep counseling training (pre-test/intermediate/post-test) was found to be statistically significant ($P < .001$). On the other hand, no difference was found between the attitude and motivation levels of the control group obtained in the first and last interviews ($P > .05$).

The answers given by women in the IMB group to the statements about their behavioral skills were like the content provided during sleep coaching. Development of healthy behavioral skills was observed in all women in the IMB group ($P < .001$), whereas these behaviors did not develop in the control group ($P > .05$).

The mean pre-test WHIIRS scores of the participants in the IMB and control groups were similar, which showed a homogeneous distribution ($P > .05$). On the other hand, when the mean post-test WHIIRS scores of the participants in the IMB and control groups were compared, the sleep problems of the IMB group were found to decrease ($P < .001$) (Table 4).

The examination of the mean scores obtained by the women in the IMB and control groups from the pre-test administration of the MENQOL subscales indicated that the groups showed a homogeneous distribution and had similar quality of life ($P > .05$); however, the sexual domain sub-dimension was found to be significantly different in terms of their mean scores ($P < .001$) . It was observed that the WHIS scores of women from each test (pre-test/mid-test/post-test) decreased significantly. The difference between the IMB group WHIS score averages was found to be statistically significant ($F = 452.82$; $P < .001$). In the study, it was determined that the difference between the WHIS score averages of the women in the control group in the first and last interviews was not statistically significant ($P > .05$). The difference between the post-test WHIS score averages of the participants in the IMB and control groups was found to be statistically highly significant ($P < .001$). When the MENQOL subscale scores of women in the IMB and control groups

Table 1. Sociodemographic Characteristics and Analysis Results of Participants in IMB and Control Group

Sociodemographic characteristics		IMB Group n = 85 $\bar{x} \pm SD$		Control Group n = 90 $\bar{x} \pm SD$		Total N = 175		Statistical Result
The mean age		54.62 ± 4.98		53.32 ± 4.52		53.95 ± 4.78		$t = 1.81$ $P = .072$
The mean duration of menopause		5.19 ± 3.11		4.79 ± 2.84		4.98 ± 2.84		$t = 0.93$ $P = .353$
		n	%	n	%	n	%	*P* value
Age	≤50 age	23	27.06	29	32.22	52	29.71	.558
	>50 age	62	72.94	61	67.78	123	70.29	.455
Education	≤ 12 year	34	40.00	34	37.78	68	38.86	.09
	>12 year	51	60.00	56	62.22	107	61.14	.763
Working status	Working	10	11.76	28	31.11	38	21.71	9.624
	Non-working	75	88.24	62	68.89	137	78.29	.001

Table 2. Comparison of Questions About Motivation Based on the IMB Model in IMB and Control Groups

Questions and answers about motivation		IMB Group						Control Group			
		Pre-Test		Mid-Test		Post-Test		Pre-Test		Post-Test	
		n	%	n	%	n	%	n	%	n	%
Women may experience sleep problems after menstruation stops	Yes	79	92.94	82	96.47	75	88.24	80	88.89	80	88.89
	No	6	7.06	3	3.53	10	11.76	10	11.11	10	11.11
	χ^2 / *P*	4.208		.121		.000		1.000			
The thing that scares women the most during menopause is not knowing when their sleep problems will end.	Yes	62	72.94	72	84.71	69	81.18	63	70.00	63	70.00
	No	23	27.06	13	15.29	16	18.82	27	30.00	27	30.00
	χ^2 / *P*	3.816		.148		.000		1.000			
Many women worry that they are disturbing their partners in bed due to lack of sleep.	Yes	67	78.82	77	90.59	77	90.59	60	66.67	60	66.67
	No	18	21.18	8	9.41	8	9.41	30	33.33	30	33.33
	χ^2 / *P*	6.787		**.033**		.000		1.000			
Many women feel tired/weak during the menstrual period due to lack of sleep.	Yes	74	87.06	81	90.59	77	95.29	69	76.67	69	76.67
	No	11	12.94	4	9.41	8	4.71	21	23.33	21	23.33
	χ^2 / *P*	3.536		**.000**		.000		1.000			
Women often become irritable, nervous, and restless due to lack of sleep during the menstrual period.	Yes	72	84.71	70	82.35	76	89.41	71	78.89	71	78.89
	No	13	15.29	15	17.65	9	10.59	19	21.11	19	21.11
	χ^2 / *P*	1.770		.412		.000		1.000			
The end of menstruation turns many women's lives upside down.	Yes	53	62.35	34	40.00	33	38.82	55	61.11	55	61.11
	No	32	37.65	51	60.00	52	61.18	35	38.89	35	38.89
	χ^2 / *P*	11.994		**.002**		.000		1.000			
The end of menstruation is a period in a woman's life when many problems occur.	Yes	56	65.88	43	50.59	28	32.94	60	66.67	60	66.67
	No	29	34.12	42	49.41	57	67.06	30	33.33	30	33.33
	χ^2 / *P*	18.478		**.000**		.000		1.000			
Having insomnia after menstruation has stopped does not significantly affect a woman's life.	Yes	48	56.47	36	42.35	57	67.06	50	55.56	51	56.67
	No	37	43.53	49	57.65	28	32.94	40	44.44	39	43.33
	χ^2 / *P*	10.565		**.005**		.022		0.880			
For many women, the insomnia they experience after menstruation has stopped is a very difficult situation to endure.	Yes	66	77.65	71	83.53	54	63.53	65	72.22	61	67.78
	No	19	22.35	14	16.47	31	36.47	25	27.78	29	32.22
	χ^2 / *P*	9.554		**.008**		.423		0.515			
In fact, almost every woman suffers from this insomnia that occurs in her life.	Yes	75	88.24	79	92.94	55	64.71	76	84.44	71	78.89
	No	10	11.76	6	7.06	30	35.29	14	15.56	19	21.11
	χ^2 / *P*	26.311		**.000**		.927		.335			
Even if I take precautions to eliminate the insomnia problem, I don't think there will be a change.	Yes	48	56.47	15	17.65	10	11.76	45	50.00	45	50.00
	No	37	43.53	70	82.35	75	88.24	45	50.00	45	50.00
	χ^2 / *P*	49.096		**.000**		.000		1.000			
Insomnia weakens mental functions such as perception, thinking, decision-making, and remembering in many women.	Yes	71	83.53	74	87.06	71	83.53	69	76.67	63	70.00
	No	14	16.47	11	12.94	14	16.47	21	23.33	27	30.00
	χ^2 / *P*	.544		.761		1.022		.311			

Table 3. Comparison of Responses to Questions About IMB Model-Based Behavioral Skills Applied During Pre- and Post-Training Interviews in IMB and Control Groups

Questions and responses about behavioral skills		IMB Group						Control Group			
		Pre-Test		Mid-Test		Post-Test		Pre-Test		Post-Test	
		n	%	n	%	n	%	n	%	n	%
You should go to bed at the same hour every day.	Yes	46	54.12	70	82.35	75	88.24	46	51.11	46	51.11
	No	39	45.88	15	17.65	10	11.76	44	48.89	44	48.89
	χ^2 / *P*	30.081		.000				.000		1.000	
Noise, if any, should be reduced.	Yes	77	90.59	84	98.82	84	98.82	71	78.89	68	75.56
	No	8	9.41	1	1.18	1	1.18	19	21.11	22	24.44
	χ^2 / *P*	10.200		.006				.284		.593	
Caffeine (tea/coffee) intake should be restricted 6 hours before sleep.	Yes	48	56.47	60	70.59	68	80.00	36	40.00	36	40.00
	No	37	43.53	25	29.41	17	20.00	54	60.00	54	60.00
	χ^2 / *P*	11.150		.003				.000		1.000	
You should stop consuming herbal tea 2 hours before going to bed.	Yes	43	50.59	51	60.00	69	81.18	40	44.44	38	42.22
	No	42	49.41	34	40.00	16	18.82	50	55.56	52	57.78
	χ^2 / *P*	18.092		.000				.090		.763	
You should take a warm shower before going to bed.	Yes	34	40.00	63	74.12	56	65.88	48	53.33	48	53.33
	No	51	60.00	22	25.88	29	34.12	42	46.67	42	46.67
	χ^2 / *P*	22.451		.000				.000		1.000	
You should take a daytime nap, even if it is short.	Yes	52	61.18	65	76.47	72	84.71	51	56.67	51	56.67
	No	33	38.82	20	23.53	13	15.29	39	43.33	39	43.33
	χ^2 / *P*	12.633		.001				.000		1.000	
You should go walking and do exercise regularly.	Yes	47	55.29	64	75.29	71	83.53	48	53.33	51	56.67
	No	38	44.71	21	24.71	14	16.47	42	46.67	39	43.33
	χ^2 / *P*	17.542		.000				.202		.653	
You should take sleeping pills.	Yes	23	27.06	9	10.59	6	7.06	26	28.89	26	28.89
	No	62	72.94	76	89.41	79	92.94	64	71.11	64	71.11
	χ^2 / *P*	15.276		.000				.000		1.000	
You should push yourself to sleep.	Yes	59	69.41	27	31.76	21	24.71	65	72.22	59	65.56
	No	26	30.59	58	68.24	64	75.29	25	27.78	31	34.44
	χ^2 / *P*	40.320		.000				.933		.334	
You should create a suitable and comfortable sleep environment for yourself.	Yes	76	89.41	79	92.94	83	97.65	78	86.67	77	85.56
	No	9	10.59	6	7.06	2	2.35	12	13.33	13	14.44
	χ^2 / *P*	4.663		.027				.046		.829	

Table 4. Comparison of the Mean Scores of the Women in the IMB and the Control Group by Follow-Up

			IMB Group	Control Group	Statistical Result	
			Mean ± SD (n = 85)	Mean ± SD (n = 90)	*t*	*P* value
Women's Health Initiative Insomnia Scale		Pre-Test	16.14 ± 2.24	16.39 ± 1.79	-0.81	.418
		Mid Test	8.38 ± 1.45			
		Post-Test	5.12 ± 3.31	16.43 ± 1.82	-28.23	.000
		F/*P* value	452.82 .000	.03 .868		
Menopause-Specific Quality of Life (MENQOL) Questionnaire	Vasomotor	Pre-Test	4.15 ± 1.99	4.01 ± 1.89	0.50	.619
		Mid Test	3.30 ± 1.30			
		Post-Test	3.34 ± 1.45	3.99 ± 1.89	-2.56	.011
		F/*P* value	7.62 .000	0.00 .952		
	Psychosocial	Pre-Test	3.85 ± 1.63	3.48 ± 1.46	1.59	.112
		Mid Test	2.66 ± 1.50			
		Post-Test	2.21 ± 1.28	3.44 ± 1.38	-6.14	.000
		F/*P* value	28.07 .000	0.03 .863		
	Physical	Pre-Test	4.46 ±1.52	4.07 ± 1.34	1.81	.072
		Mid Test	2.85 ± 1.43			
		Post-Test	2.36 ± 1.14	4.05 ± 1.28	-9.21	.000
		F/*P* value	54.46 .000	0.01 .938		
	Sexual	Pre-Test	5.00 ± 2.11	4.06 ± 2.14	2.93	.003
		Mid Test	3.58 ± 2.04			
		Post-Test	3.29 ± 1.54	4.11 ± 2.03	-3.01	.003
		F/*P* value	19.45 .000	0.03 .870		

were evaluated, they were found as follows: vasomotor domain (t = -2.56, P < .05); psychosocial domain (t = -6.14, P < .001); physical domain (t = -9.21, P < .001); and, sexual domain (t = -3.01, P < .001) (Table 4). In the postmenopausal period, sleep counseling training based on the IMB model increased the quality of life of women in the IMB group.

DISCUSSION

The education level of women participating in our study (61.14% with high school and above education) was quite high compared to that of the women in the country and region. This is because women with a high level of education visit KOSHİM (the study center), where programs are conducted for sports, social, cultural, tourism, art, and educational activities. It can also be associated with the fact that as the level of education increases, health-seeking behaviors increase. Although 78.29% of the women participating in our study seemed to be unemployed, most of them were retired considering their age (Table 1).

The evaluation of the knowledge level of the women in the IMB group according to the follow-ups (pre-, intermediate-, and post-test) indicated that the knowledge level of the women in the IMB group about sleep after the individual sleep coaching training was higher than before the training and the control group (P < .001).

In their study evaluating the effects of IMB model-based malaria-related health training, Balami et al. (2019), found a significant relationship between the knowledge scores of the experimental and control groups.[8] In their interventional study on IMB model-based breast self-examination (BSE), Esfahanı et al. (2018) stated that there was a significant difference between the mean pre- and post-interventional knowledge scores.[9] Consistent with the results of these studies, our findings also indicate that the IMB model-based individual sleep coaching training effectively increases the level of knowledge about sleep. Increasing the level of women's knowledge about the menopausal period facilitates compliance with menopause interventions and enables them to better cope with the sleep problems seen with menopausal symptoms. Therefore, it is important that individualized coaching, whose effectiveness is shown in our study, should be included in healthcare services.

Menopause is a biopsychosocial condition affected by women's attitudes and the attitudes of their spouses, families, friends, and social norms. When the motivation level of women in the IMB group was evaluated according to the follow-ups (pre-/intermediate-/post-test), the attitudes of women in 4 out of 12 questions (Table 2) did not change. This is likely due to the problems experienced by women in the postmenopausal period and those experienced due to familial changes (experience remarriage and loss of the spouse or parents). A significant difference was found between pre-and post-interventional diabetes self-care behaviors in the study by Jeon and Park,[10] in the malaria-related health study of Balami et al. (2019),[8] and the motivation scores of experimental and control groups in the BSE-related training intervention in the study of Esfahanı et al. (2018).[9] In their study on women's attitudes towards menopause, Gönenç and Koç (2019), found that planned health training about menopause positively improved women's attitudes.[11]

As a result, the women in our study generally have a positive attitude toward sleep problems in the postmenopausal period. The attitude change was achieved easily since individuals regard health personnel as credible sources. Tümer and Kartal (2018), reported that women with positive menopausal attitudes experienced fewer menopausal

symptoms.[12] In our study, with the increase in the positive attitude towards menopause, the subjective experience of quality of sleep increased. In societies where the prestige, freedom, value, role, and acceptability of women increase, problems related to menopause are stated to decrease and quality of life to increase. The motivational status of the women making up our sample may have increased because they were socially active individuals with a high level of education and social prestige.

When the behavioral skills of women in the IMB group were evaluated based on the follow-ups (pre-/mid-/post-test), healthy behavioral changes were achieved in each interview held with the participants ($P < .001$) (Table 3). A significant correlation was found between the pre- and post-interventional diabetes self-care behaviors in the study of Jeon and Park,[10] malaria-related health training study of Balami et al. (2019),[13] and the experimental and control groups in the BSE-related training intervention study of Esfahani, et al. [9] On the other hand, no effective behavioral development was reported in the study of Kudo (2013), on IMB model-based condom use training.[14] Although some of the studies reviewed indicated no effective behavioral changes were developed, most studies supported the effectiveness of the IMB model.

The IMB model has a strong theoretical structure for creating behavioral change.[5] Questions and responses regarding behavior patterns showed that the participants developed behavioral skills complying with sleep hygiene training rules, which were parallel with the training content. A significant increase was found in each interview concerning the rules of sleep hygiene training (pre-/mid-/post-test). The IMB model proposes that behavioral skills primarily mediate behavioral outcomes. This model is designed to be easily transformed into interventions in health promotion programs. According to the model, individuals need to be well-informed and well-motivated as well as have the necessary objectives and perception skills for behavioral skills to develop.[5] In light of the literature, our study group was well-informed and well-motivated with the IMB model-based individual sleep coaching training, and the information and motivation received were easily transformed into behavioral skills as they had a high level of education.

Scores obtained from the WHIIRS range from 0 to 20, and scores greater than 9 show a high risk for insomnia.[15] The rate of insomnia in women in the IMB and control groups was found to be quite high (IMB group, 16.14 ± 2.24; control group, 16.39 ± 1.79) (Table 4). In the study conducted by Timur and Şahin (2009), the mean WHIIRS score of women in the postmenopausal period was 9.78 ± 5.48,[2] whereas, in the study of Duman and Taşhan (2018), the mean pre-test WHIIRS score of the experimental group was 14.03 ± 3.4 while the pre-test WHIIRS score of the control group was 14.35 ± 3.2.[16] Hachul et al. (2009), compared sleep quality in early (under 5 points) and late (over 5 points) postmenopausal periods. They reported that there were more complaints about sleep in the late-term group. The mean WHIIRS scores in our study differ from the findings of other researchers. This was thought to have come from the fact that our study sample consisted of postmenopausal women with only insomnia problems, while other studies included women in all menopausal periods. Furthermore, the mean menopausal duration of our participants was about 5 years, which implies a late menopausal period.[17] Our study findings are consistent with the findings of Hachul et al. (2009).

In our study, the evaluation of the mean WHIIRS scores of women in the IMB group before and after sleep coaching training indicated that the sleep problem in the IMB group decreased ($P < .001$) (Table 4). Duman and Taşhan (2018), stated that sleep hygiene training and progressive relaxation exercise provided to women in the postmenopausal period improved sleep quality.[16] Drake et al. (2019), investigated whether cognitive-behavioral therapy, sleep hygiene training, and sleep restraint therapy were equally effective treatments for menopausal chronic insomnia. They reported that cognitive-behavioral therapy and sleep restraint treatment were more effective than sleep hygiene training in menopausal sleep disorders. They also stated that although sleep hygiene was a commonly used treatment method to improve sleep quality, it can improve some aspects of sleep only slightly, but alone, it has little benefit.[18]

Melatonin is thought to possibly play a role in the increase of insomnia complaints in the postmenopausal period.[19] Trihandayani (2024), stated that relaxation techniques effectively improve sleep routine.[20] In the IMB model-based individual sleep coaching training in our study, each of the non-pharmacological methods (sleep hygiene, light therapy, sleep reduction treatment, and relaxation exercises) mentioned in the study results were explained to the participants and were asked to go for a 45-60 minute brisk walk daily, to pay attention to sleep hygiene principles, to get sunlight on the balcony for 15-20 minutes, and to use relaxation techniques in a dim-lit room before going to bed. The results of this study comply with the results of the studies conducted so far. In general, exercise has an impact on acute or chronic sleep disorders. Sleep is a behavior that changes during life and shows differences from night to night, and can be altered through sleep coaching training.

Sleep complaints are a common and disturbing menopausal symptom in the menopausal transition and postmenopausal periods.[21] Therefore, it can affect individuals' quality of life in the vasomotor, psychosocial, physical, and sexual domains and create conditions that increase economic burdens. Webster et al. (2018), stated that vasomotor symptoms were especially critical for women in the menopausal period.[22] Consistent with the literature in our study, while the pre-test WHIIRS insomnia scores were high, the women's vasomotor, psychosocial, physical and sexual domain mean scores were also high, and while the post-test WHIIRS score was low, their quality of life was also high.

Women can also be affected by psychological and sociocultural factors in the menopausal period.[23] Kuck and Hogervorst (2024), found a significant relationship between

anxiety levels and quality of life in the vasomotor, physical, sexual, and psychosocial domains by stating that the general mood and the presence of anxiety in humans could affect life in every sense.[24] Park and Kim (2018), stated that there was a strong relationship between depression and quality of life in postmenopausal women.[25] Zagalaz-Anula et al. (2019), stated that there is a positive relationship between sleep disorders, anxiety levels, and the severity of menopausal symptoms.[26] Ertem (2010), reported in a study investigating the quality of life in women in the postmenopausal period that 85% of menopausal women experienced problems related to menopause and that 60% of these problems made up the physical symptoms.[27] In other studies conducted on women in the menopausal period, the highest mean score was obtained from the physical domain, among the subscales of the MENQOL.[28,29] Similarly, in our study, the mean score of the physical domain is higher than those of vasomotor and psychosocial domains.

Sexual health is an important issue among middle-aged women in the menopausal transition period due to the prevalence of sexual health problems and the thought that sexual attraction may disappear in women and that sexual functions will end.[30] Kling et al. (2017), associated shorter sleep times and higher insomnia scores with decreased sexual functionality in the postmenopausal period.[31] Our findings were in line with previous literature showing that there was a relationship between less sleep and poor sexual function. It is expected that the quality of life is low in women with insomnia, and this is consistent with the literature. To increase the quality of life of individuals, healthcare professionals should first determine the factors affecting the quality of life and carry out practices to alleviate the problem. In this study, a decrease in the mean scores of the women in the IMB group was obtained between the pre- and post-training administration of the subscales of the MENQOL ($P < .001$) (Table 4). The IMB model-based individual sleep coaching training effectively improved the quality of life. This study showed that the IMB model-based sleep coaching could increase the quality of life in vasomotor, psychosocial, physical, and sexual domains and sleep quality during the postmenopausal period.

CONCLUSION

In this study, the IMB model-based sleep coaching effectively increased sleep quality and quality of life. Individual sleep coaching also increased the knowledge, motivation, and healthy behavior skills of women who experienced sleep problems in the postmenopausal period. The IMB model-based individual sleep coaching training was found to provide comprehensive support for creating appropriate health behavior changes and to be a useful model. The IMB model-based individual sleep coaching may be a suitable intervention for sleep problems experienced by postmenopausal women, who are otherwise reluctant to use medicines due to their side effects or cannot use other pharmacological methods because of their drawbacks, to improve sleep quality and quality of life.

FUNDING

The study did not receive any financial support.

AUTHOR DISCLOSURE STATEMENT

The authors declare no conflict of interest. The study received no financial support or relationships that may create a potential conflict of interest. This study has been accepted as a doctoral thesis by Istanbul University Health Sciences Institute.

ACKNOWLEDGEMENT

I would like to thank the authors and volunteer participants who contributed to the study.

REFERENCES

1. Terauchi M, Obayashi S, Akiyoshi M, Kato K, Matsushima E, Kubota T. Insomnia in Japanese peri- and postmenopausal women. *Climacteric*. 2010;13(5):479-486. doi:10.3109/13697130903353478
2. Timur S, Şahin NH. Effects of sleep disturbance on the quality of life of Turkish menopausal women: a population-based study. *Maturitas*. 2009;64(3):177-181. doi:10.1016/j.maturitas.2009.08.016
3. Zarani F, Besharat MA, Sarami G, Sadeghian S. An information-motivation-behavioral skills (IMB) model-based intervention for CABG patients. *Int J Behav Med*. 2012;19(4):543-549. doi:10.1007/s12529-011-9193-2
4. Vural BK, Zencir G. Sexual Health Education Model: IMB Model. *Eur J Ther*. 2010;16(3):1-5. doi:10.58600/eurjther.2010-16-3-1205-arch
5. Fisher CM. Adapting the information-motivation-behavioral skills model: predicting HIV-related sexual risk among sexual minority youth. *Health Educ Behav*. 2012;39(3):290-302. doi:10.1177/1090198111406537
6. Smith LR, Fisher JD, Cunningham CO, Amico KR. Understanding the behavioral determinants of retention in HIV care: a qualitative evaluation of a situated information, motivation, behavioral skills model of care initiation and maintenance. *AIDS Patient Care STDs*. 2012;26(6):344-355. doi:10.1089/apc.2011.0388
7. Nahar VK, Allison Ford M, Brodell RT, et al. Skin cancer prevention practices among malignant melanoma survivors: a systematic review. *J Cancer Res Clin Oncol*. 2016;142(6):1273-1283. doi:10.1007/s00432-015-2086-z
8. Balami AD, Said SM, Zulkefli NAM, Bachok N, Audu B. Effects of a health educational intervention on malaria knowledge, motivation, and behavioural skills: a randomized controlled trial. *Malar J*. 2019;18(1):41. doi:10.1186/s12936-019-2676-3
9. Esfahani MS, Taleghani F, Noroozi M, Tabatabaeian M. An educational intervention on based information, motivation and behavior skills model and predicting breast self-examination. *J Prev Med Hyg*. 2018;59(4):E277-E281. doi:10.15167/2421-4248/jpmh2018.59.4.796
10. Jeon E, Park HA. Experiences of Patients With a Diabetes Self-Care App Developed Based on the Information-Motivation-Behavioral Skills Model: Before-and-After Study. *JMIR Diabetes* 2019;18;4(2):e11590. doi:10.2196/11590
11. Gönenç İM, Koç G. The Effect of the Education Program Applied to the Menopause Period on the Attitudes of Women Towards Menopause. *SDU Journal of Health Sciences*. 2019;10(1).
12. Tümer A, Kartal A. The relationship between women's attitudes towards menopause and their menopausal complaints. *Pa Med J*. 2018;11(3):337-346.
13. Ybarra ML, Korchmaros JD, Prescott TL, Birungi R. A Randomized Controlled Trial to Increase HIV Preventive Information, Motivation, and Behavioral Skills in Ugandan Adolescents. *Ann Behav Med*. 2015;49(3):473-485. doi:10.1007/s12160-014-9673-0
14. Kudo Y. Effectiveness of a condom use educational program developed on the basis of the Information-Motivation-Behavioral Skills model. *Jpn J Nurs Sci*. 2013;10(1):24-40. doi:10.1111/j.1742-7924.2012.00207.x
15. Levine DW, Kripke DF, Kaplan RM, et al. Reliability and validity of the Women's Health Initiative Insomnia Rating Scale. *Psychol Assess*. 2003;15(2):137-148. doi:10.1037/1040-3590.15.2.137
16. Duman M, Timur Taşhan S. The effect of sleep hygiene education and relaxation exercises on insomnia among postmenopausal women: A randomized clinical trial. *Int J Nurs Pract*. 2018;24(4):e12650. doi:10.1111/ijn.12650
17. Hachul H, Brandão LC, Bittencourt LRA, et al. Clinical profile of menopausal insomniac women referred to sleep laboratory. *Acta Obstet Gynecol Scand*. 2009;88(4):422-427. doi:10.1080/00016340902777509
18. Drake CL, Kalmbach DA, Arnedt JT, et al. Treating chronic insomnia in postmenopausal women: a randomized clinical trial comparing cognitive-behavioral therapy for insomnia, sleep restriction therapy, and sleep hygiene education. *Sleep*. 2019;42(2):zsy217. doi:10.1093/sleep/zsy217
19. Jehan S, Jean-Louis G, Zizi F, et al. Sleep, melatonin, and the menopausal transition: what are the links? *Sleep Sci*. 2017;10(1):11-18. doi:10.5935/1984-0063.20170003
20. Trihandayani Y. Analysis of the Effect of Relaxation Techniques on Sleep Quality in Patients with Sleep Disorders. *Iran J Nurs Midwifery Res*. 2024;2(3):88-95.
21. McCurry SM, Guthrie KA, Morin CM, et al. Telephone-Based Cognitive Behavioral Therapy for Insomnia in Perimenopausal and Postmenopausal Women With Vasomotor Symptoms: A MsFLASH Randomized Clinical Trial. *JAMA Intern Med*. 2016;176(7):913-920. doi:10.1001/jamainternmed.2016.1795
22. Webster AD, Finstad DA, Kurzer MS, Torkelson CJ. Quality of life among postmenopausal women enrolled in the Minnesota Green Tea Trial. *Maturitas*. 2018;108:1-6. doi:10.1016/j.maturitas.2017.10.013
23. Namazi M, Sadeghi R, Behboodi Moghadam Z. Social Determinants of Health in Menopause: An Integrative Review. *Int J Womens Health*. 2019;11:637-647. doi:10.2147/IJWH.S228594
24. Kuck MJ, Hogervorst E. Stress, depression, and anxiety: psychological complaints across menopausal stages. *Front Psychiatry*. 2024;15:1323743. doi:10.3389/fpsyt.2024.1323743
25. Park H, Kim K. Depression and its association with health-related quality of life in postmenopausal women in Korea. *Int J Environ Res Public Health*. 2018;15(11):2327. doi:10.3390/ijerph15112327
26. Zagalaz-Anula N, Hita-Contreras F, Martínez-Amat A, et al. The associations between menopausal symptoms and sleep quality in Spanish postmenopausal women. *Climacteric*. 2019;22(5):511-517. doi:10.1080/13697137.2019.1609439
27. Ertem G. Investigation of the quality of life of women after menopause. *Int J Hum Sci*. 2010;7:1.
28. Devi B, Karki P, Chhetry R, et al. Quality of life of post-menopausal women residing in rural and urban areas of Sikkim, India. *Int J Reprod Contracept Obstet Gynecol*. 2018;7(12):5125-5133. doi:10.18203/2320-1770.ijrcog20184979
29. Ganapathy T, Furaikh SA. Health-related quality of life among menopausal women. *Arch Med Health Sci*. 2018;6(1):16-23. doi:10.4103/amhs.amhs_122_17
30. Cagnacci A, Venier M, Xholli A, Paglietti C, Caruso S; ANGEL Study. Female sexuality and vaginal health across the menopausal age. *Menopause*. 2020;27(1):14-19. doi:10.1097/GME.0000000000001427
31. Kling JM, Manson JE, Naughton MJ, et al. Association of sleep disturbance and sexual function in postmenopausal women. *Menopause*. 2017;24(6):604-612. doi:10.1097/GME.0000000000000824