

Twelve-week exercise training and the quality of life in menopausal women – clinical trial

Jolanta Dąbrowska¹, Magdalena Dąbrowska-Galas², Magdalena Rutkowska¹, Bogdan Adam Michalski³

¹Department of Kinesitherapy and Special Methods, School of Health Sciences in Katowice, SUM, Katowice, Poland

²Department of Sports Medicine and Physiology of Physical Effort, School of Health Sciences in Katowice, SUM, Katowice, Poland

³Department of Gynaecology Oncological, School of Health Sciences in Katowice, SUM, Katowice, Poland

Abstract

Introduction: The menopause transition is associated with decreased health functioning. About 80-90% of women experience mild to severe physical or physiological menopause-related complaints per year when approaching menopause. Physical activity may reduce some climacteric symptoms and improve the quality of life.

Aim of the study was to investigate the influence of a 12-week training programme on the quality of life (QoL) in menopausal-aged women living in a rural area.

Material and methods: Participants were 80 women aged 40-65 years and divided into two randomly selected groups in training sessions (exercising group, $n = 40$ and control group, $n = 40$). SF36 was used to assess the quality of life in both groups before and after 12 weeks. Exercising women participated in training session 3 times a week. Each 60-minute exercise session included warming-up exercises, walking, stretching, strengthening exercises with an elastic band and cooling down exercises.

Results: A non-significant positive difference in all SF36 domains in the exercising group was observed. The results of the study showed a statistically significant higher QoL in the exercising group compared to the control group after 12-week training in two domains: vitality and mental health. The improvement in the quality of life in the study group was 0.19 points (role limits – physical domain, least change) and 4.96 (vitality domain, most change).

Conclusions: Controlled and regular exercise for 12 weeks was significantly correlated with a positive change in vitality and mental health. Sedentary women should consider modification of their lifestyle to include physical activity as it leads to improvement of their quality of life.

Key words: quality of life, physical activity, exercises, SF36.

Introduction

Between 40 and 58 years of age women experience menopause; the average age is 51 years [1]. The most frequent symptoms during menopause are hot flushes, night sweats, vaginal dryness, depression, irritability and sleep disorders [2-4]. Women living in a rural area suffer from more severe menopausal symptoms, particularly musculoskeletal, vasomotor and sexual, compared to urban women [5-7]. The menopause transition was associated in a prospective study with decreased health functioning in women who report menopausal symptoms [8, 9]. About 80-96% of women experience mild to severe physical or physiological menopause-related complaints per year when approaching menopause, which is caused by a decline in level of oestrogen [5, 10, 11]. Menopause is also related to reduction of muscle strength, increased cardiovascular diseases, stroke and osteoporosis [12]. Several studies have shown that regular exercise significantly reduced menopausal symptoms and improved

well-being [4, 13-16]. Physically active menopausal-aged women experience fewer problems with insomnia, fewer vasomotor symptoms and better mood [4, 17, 18]. Resistance exercise may reduce the decline in muscle strength in middle-aged women [19]. A positive alteration of aerobic and resistance exercises to the blood lipid profile was associated with a reduced risk of coronary heart disease in postmenopausal women, which is widely cited [13]. Although menopause is a normal aging process, the hormonal changes in this period of life may lead to many physical, physiological and social changes deteriorating the quality of life (QoL). Health-related quality of life in middle-life women is usually lower than in middle-aged men, young adults and elderly women [10, 17, 20, 21]. The overall well-being and study of quality of life in mid-aged women has become a major public health concern in the world [5].

Menopausal-aged women usually report a low physical activity level and a sedentary lifestyle which may

Corresponding author:

Magdalena Dąbrowska-Galas, PhD, Department of Sports Medicine and Physiology of Physical Effort, Medical University of Silesia, Medyków 12, 40-752 Katowice, Poland, e-mail: magdalena.j.dabrowska@gmail.com

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deteriorate their health and the quality of life. There is evidence that regular physical activity may decrease menopausal symptoms and improve the physical self-worth and QoL in middle-life women. In other words, physical activity may have direct and indirect effects on the quality of life in menopausal-aged women [11, 13, 22]. The impact of a specific exercise on the QoL in middle-aged women has not been directly tested, particularly in women from rural areas, who may experience more severe menopausal symptoms [7]. In most studies PA level was evaluated by questionnaires or a different kind of training was implemented.

The purpose of our study was to investigate the influence of 12-week training on the QoL in menopausal-aged women living in a rural area.

Material and methods

Participants

Participants were recruited by means of advertisements in a local newspaper and posters. The study was conducted in Silesia in Poland between February and March 2014. Subjects were 80 volunteer women aged 40-65 years; the average age was 51 ± 3.82 . Physically inactive women were randomized to 12 weeks of exercise ($n = 40$) or usual activity ($n = 40$). The exercising group ($n = 40$) was compared to the control group ($n = 40$). All participants provided written informed consent and they were informed by the researcher that they could withdraw from the study any time. Information about the study was provided to all the subjects by the physiotherapist.

The inclusion criteria were age between 40 and 65, a lack of regular physical exercises, a lack of contraindications to perform physical exercises, and the ability to provide written informed consent.

The exclusion criterion was contraindication to physical activity. Participants were excluded from the study if they had omitted exercise or if the questions were incomplete. The study was approved by the Ethics Committee of the Medical University in Poland.

Study design

There were a total of 80 participants. Subjects were divided into two groups: 40 were randomized to the 12-week exercise group and 40 to the non-exercise group who were asked to maintain their usual level of physical activity. Participants were randomized to either the exercising group or the non-exercising group. Random number generation between 0 and 1 was used. Forty random participants were given the number 0 and 40 the number 1. After randomization exercising women participated in training sessions 3 times a week. Each 60-minute exercise session included warming-up exer-

cises, walking, stretching, strengthening exercises with an elastic band and cooling down exercises. After 12 weeks all participants were asked to fill out a questionnaire.

Anthropometric data such as body mass and body height were measured by the researcher.

Sociodemographic information was obtained regarding age, educational level, and place of living.

Health-related quality of life (SF36)

At the time of enrolment the quality of life was evaluated using the 36-item Short Form Health Survey (SF36), which measures 8 domains of health: physical functioning, physical role limitations, bodily pain, general health, vitality, social functioning, emotional role limitations and mental health. Scoring generates a total score regarding mental health and physical health. Higher scores indicate a better quality of life.

Data analysis

The data were collected and analyzed by the computer software MS Excel and the statistical analyses were performed using Statistica software version 10. Descriptive data were reported as mean and standard deviation (SD) for quantitative variables and percentage for qualitative variables. The differences between the data before and after exercising and between the exercising and control group were tested using the *t*-test. *P* values < 0.05 were considered statistically significant.

Results

Eighty women were recruited to the study. After randomization 40 women were allocated to the exercising group and 40 to the non-exercising group. Two women from the exercising-group did not continue the exercise classes due to loss of interest (5%). They both attended 1 week of training (Fig. 1). After 12 weeks women were asked to again fill out the questionnaire.

The mean age of all participants was 51 ± 3.82 . The baseline demographic characteristics of the study participants are shown in Table I. Most rural women had primary educational level (46.25%), were overweight (52.50%), were married (88.75%), unemployed (61.25%) and were nonsmokers (58.75%). None of the participants had a history of hormone therapy (HT).

Table II presents the mean scores for each domain in SF36 in both exercising and control groups before 12-week training. The mean scores in the exercising group were 46.09 (vitality – VT) and 67.88 (role limits – physical – RP) and in the control group 46.79 (role limits – emotional – RE) and 66.51 (RP). The differences between groups were small and statistically insignificant.

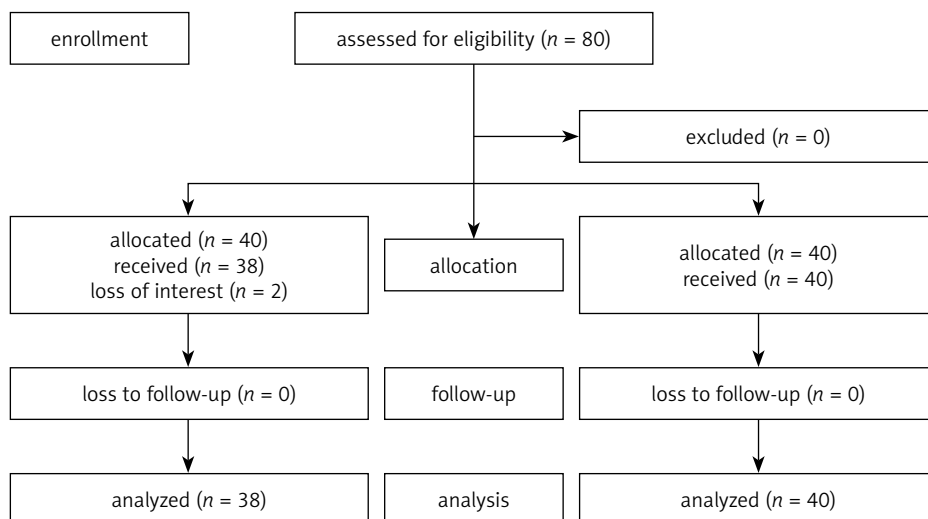


Fig. 1. Flow chart of the participants

Tab. I. Demographic characteristics of rural women

Variables	Frequency (n)	Percentage (%)
Education level		
Primary	37	46.25
Secondary	26	32.50
Tertiary	17	21.25
BMI		
Normal body mass	29	36.25
Overweight	42	52.50
Obese	9	11.25
Employment		
Employed	31	38.75
Unemployed	49	61.25
Marriage status		
Married	71	88.75
Single	9	11.25
Smoking		
Yes	33	41.25
No	47	58.75

In both groups the average scores in general health (GH), VT and RE were below the average (< 50).

Table III summarizes the mean changes in QoL (SF36) in the exercising and control group after 12 weeks of exercises in all SF36 subgroups. A positive change (non-significant) in all SF36 domains in the exercising group was observed ($p > 0.05$). In the control group the mean difference was -1.19 for RE (least change) and 0.96 for GH (most change). In the control group the average scores in four domains (PF -0.44 ,

VT -0.71 , SF -0.84 , RE -1.19) declined. However, only in two domains was the difference between the exercising and control group statistically significant: vitality ($p = 0.0046$) and mental health ($p = 0.0052$).

Discussion

The purpose of this study was to investigate the influence of the 12-week training on the QoL in menopausal-aged rural women. According to the SF36 questionnaire the average quality of life is 50. The findings of our study showed that QoL of women in both groups was lower than average in three domains: General Health, Vitality and Role limits – emotional.

The benefits of regular physical activity are routinely cited. Most studies have shown that higher PA level was associated with higher QoL scores, especially for physical aspects [22, 23].

The results of many studies have indicated that habitual physical activity had a favourable influence on menopausal symptoms particularly in the social and psychological domains and thus the quality of life is improved [14-16, 24]. Skrzypulec *et al.* examined 336 menopausal women in Poland and found that a moderate level of physical activity significantly reduces menopausal complaints, particularly vasomotor symptoms [4]. An observational study indicated that physical activity was associated with better mental health, and less anxiety and stress during menopause [15]. The longitudinal Australian Study on Women’s Health showed that increased PH level was associated with decreased menopausal somatic symptoms [25]. These studies showed the positive influence of physical activity on some menopausal symptoms, which may suggest that the quality of life was also better. However, Moilanen *et al.* reported in their study that change in global quality of life is more associated with physical activity level

Tab. II. Mean QoL scores according to SF36 in rural women (exercise and control group) before 12 weeks of exercises

QoL domains	Exercise group Mean ±SD	Control group Mean ±SD	P value (t-test)
Physical functioning (PF)	58.16 ±17.95	58.72 ±17.66	0.899
Role limits – physical (RP)	67.88 ±18.93	66.51 ±12.45	0.703
Bodily pain (BP)	51.16 ±16.64	50.4 ±16.69	0.839
General health (GH)	47.31 ±13.63	48.43 ±15.44	0.732
Vitality (VT)	46.09 ±11.78	47.28 ±11.96	0.654
Social functioning (SF)	55.19 ±19.01	56.17 ±13.99	0.792
Role limits – emotional (RE)	47.37 ±13.68	46.79 ±14.88	0.857
Mental health (MH)	58.67 ±18.9	51.41 ±15.11	0.061

Tab. III. Mean QoL scores according to SF36 in the exercise and control group after 12 weeks of exercises

QoL domains	Exercising group		Control group		p value
	Mean ±SD	Differ.**	Mean ±SD	Differ.**	
Physical functioning (PF)	60.79 ±9.73	2.63	58.28 ±7.84	-0.44	0.3296
Role limits – physical (RP)	68.07 ±13.44	0.19	66.82 ±7.72	0.31	0.6103
Bodily pain (BP)	53.63 ±10.56	2.47	51.31 ±10.58	0.91	0.3303
General health (GH)	49.92 ±6.76	2.61	49.39 ±6.56	0.96	0.7244
Vitality (VT)	51.05 ±8.64	4.96	46.57 ±4.42	-0.71	0.0046*
Social functioning (SF)	57.49 ±9.9	2.3	55.33 ±8.11	-0.84	0.289
Role limits – emotional (RE)	48.92 ±9.16	1.55	45.60 ±7.9	-1.19	0.086
Mental health (MH)	59.65 ±13.97	0.98	51.9 ±9.7	0.49	0.0052*

*Statistically significant

**The mean difference between the group before and after 12-week training.
P value – test between the mean scores of exercising and control group.

than menopausal symptoms [11]. The findings of the present study showed that rural women after 12-week training reported significantly better quality of life in two domains (vitality and mental health) and the mean scores indicated that the level of their QoL was above the average, which is 50.

Another aspect worth mentioning is that general mental health was better in both groups than general physical health in rural women. Different factors must have influenced the quality of mental health in rural areas. Thus, other factors need to be analyzed to find out the reason for the improvement in mental health in the control group. This was in concordance with the findings of Sharma *et al.* and Martin *et al.* [5, 26]. Sharma *et al.* in their study assessed the QoL in urban and rural women and found that in both groups mental health was better than physical health, but women in the rural area had worse QoL [5]. Martin *et al.* reported that moderate physical activity level mostly improved the mean score of most SF36 [26]. In our study the mean score of each domain of SF36 in rural women was much low-

er than in other studies [26]. However, after 12-week training exercising women reported improvement not only in physical aspects but also in mental health. Significant differences were observed only in vitality and mental health domains. This indicates that mental health may be improved by many different factors, but physical activity is an important factor influencing both physical and mental health. Martin *et al.* also observed significantly improved mental and physical health as a quality of life domain in women after exercises [26]. In their study exercising women participated in 3 or 4 training sessions each week for 6 months with training intensity at the heart rate associated with 50% of each woman’s peak VO₂. Reed *et al.* found that inactive women aged 40-62 who attended 12 weeks of yoga classes improved their quality of life and experienced fewer hot flushes, better sleep quality and fewer depression symptoms [27].

Our study showed that it was very important to encourage women to increase their PA level to improve their quality of life. Elavsky *et al.* observed that phys-

ically active women in menopause had improved self-worth and quality of life [13]. Moilanen *et al.* found that women whose PA level was stable or decreased during menopause had worse QoL [11]. Kim *et al.* analyzed PA level and QoL in menopausal women and found that increased PA level was associated with fewer total psychosocial symptoms and physical symptoms [28]. Our study showed similar results. The average score of mental health in the exercising group increased by 0.98, social functioning increased by 2.3 and vitality was improved by 4.96. An increased endorphin level due to exercises positively influenced mental health, and the possibility to attend exercises in groups may have a positive impact on social functioning. Consistent with other studies on exercise in midlife women, we found that exercise improved the physical domain of the QoL as compared with usual activity [22, 27, 29, 30].

Interestingly, in our study in the control group the mean scores in four SF36 domains slightly increased and in four domains decreased.

The mean score of other SF36 domains decreased in the control group. Further analysis with other factors would explain QoL changes in group of women without exercises. However, Mishra *et al.* in their longitudinal study with 2-year follow-up found that QoL measured by SF36 declines, particularly general health and well-being [31]. Ueda assessed the impact of a 12-week educational and exercise programme on the QoL and menopausal symptoms in climacteric women [32]. The QoL of all participants was improved, although statistical significance was not reached.

The results of many studies have shown that women who gained weight during menopause were more likely to report deteriorated quality of life [11, 33, 34]. Dennerstein *et al.* reported that menopausal women whose body mass index (BMI) increased showed decreased self-reported health [33]. In the Study of Women's Health Across the Nation (SWAN) the results showed that women with a higher body mass index during menopause reported more vasomotor symptoms and poorer quality of life [35]. This is consistent with the present study. Although the BMI was not considered as a factor influencing the QoL in this study, regular 12-week physical activity might have reduced body mass and could not lead to weight gain in women.

The main strength of our study is the SF36 Health Survey Questionnaire, which has 36 items assessing 8 specific QoL domains. Moreover, the influence of physical activity on QoL was assessed after 12 weeks of exercises performed with the same trainer in the same place, so there was no difference in exercises. Every woman performed the exercises in a controlled environment.

This is one of the few studies to have investigated the association between specific exercises and the quality of life in menopausal women using a validated instrument, the SF36, and a specific 12-week exercise

programme. Our study revealed that 12 weeks of exercises was a sufficient period to significantly improve the QoL in menopausal-aged women. There may be many factors influencing the improvement of the general physical and mental quality of life. Endorphin improves well-being and the QoL. After 12-week training women may experience a reduction in body mass, increase in muscle mass and other positive changes in body mass composition, which may be slower during further training. Further studies are required to find out whether 12-week training is sufficient for women to change their life style for a longer time, to assess whether women exercise continuously and to assess the QoL in a 1-2-year follow-up study.

Conclusions

A 12-week period of exercise was significantly correlated with a positive change in vitality and mental health in rural women. Our study indicates that physical activity promotion should be implemented and sedentary women should consider modification of their lifestyle to include physical activity, as it leads to improvement of their quality of life.

Disclosure

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