

EFFECTS OF RECREATIONAL SWIMMING ON WOMEN'S PSYCHOSOMATIC STATUS

RADOMIR ZRNIĆ¹ DUŠAN MITIĆ², SAŠA JOVANOVIĆ¹ AND BOJAN BJELICA³

¹*Faculty of physical education and sport, Banja Luka, Republic of Srpska, Bosnia and Herzegovina, radomir.zrnic@ffvs.unibl.org*

²*Faculty of Sport and Physical Education, University of Belgrade, Serbia*

³*Faculty of Physical Education and Sports Pale, University of East Sarajevo, Bosnia and Herzegovina*

ABSTRACT: A sedentary lifestyle is characterized by the development of automation and lack of movement that causes various ailments and diseases and thus negatively affects the health of people. This study aimed to determine the effects of recreational swimming on the psychosomatic status of middle-aged women. The subjective assessment of psychosomatic status (SPPSS) scale was used in the study to assess ailments (disorders) of certain body parts and organic systems before and after the experimental treatment. The results of the research show that there were statistically significant changes in all tested variables, and the largest changes were in the variables: back pain ($Z = -5,169$, $p < 0.001$) and leg pain ($Z = -4,941$, $p < 0.001$), while the smallest changes were in variables indigestion ($Z = -3,983$, $p < 0.001$).

Key words: recreational swimming, subjective assessment of psychosomatic status middle-aged women.

INTRODUCTION

Swimming is an excellent natural recreational activity that has multiple beneficial effects on the female body, which is not limited only to physical characteristics but also extends to the mental ones (Lampadari et al., 2016). Swimming is a way of exercising that is very suitable for health promotion and disease prevention and is one of the most popular, most applied, and most recommended forms of physical activity (Tanaka, 2009). A sedentary lifestyle, and with-it sedentary work, are the cause of many ailments and diseases if a person in his spare time does not compensate for the causes by other/opposite activities. Many diseases due to a sedentary lifestyle (obesity, cardiovascular disease, diabetes, stress-causing neuropsychiatric disorders, Penedo, 2005) have been proven and investigated, while, on the other hand, the research of Duggal et al. (2018) confirmed the positive impact of regular physical exercise in the symptoms and diseases of a sedentary lifestyle. From a public health perspective, exercise is one of the most cost-effective means by which health goals can be achieved (Albright et al., 2000). Nowadays, everyone understands that exercise is necessary for physical and mental health. It is difficult to say which model of exercise can be singled out as better because they all have their advantages. However, aerobic exercise is the basis in most models of recreational exercise and as such has a preventive/curative effect on general health. Aerobic exercise can affect weight control and improve cardiovascular function with a low risk of sports injuries (Albright et al., 2000). Middle-aged women who do sedentary office jobs are exposed to risk factors due to insufficient movement. In addition to insufficient movement, the coming period of menopause is also problematic for many women. Hence, by the age of 40, when women's abilities are at their maximum, they have been declining since the age of 40, and this process is accelerated if one does not nurture physical and mental health on a daily basis. That is why the 40s are the turning point when it is not too late that we can help ourselves with a natural way of maintaining psychosomatic health, in which systematic exercise and a balanced diet

predominate. In order to be able to assess their current health in an easier way, subjective assessment by surveys can be used (Andrijašević and Bonacin, 1997). Self-assessment of health is an individual perception and estimation of own health (Lim, E.-J., 2021), and physical activity can influence subjective assessment of health status (Sun et al., 2016) and better quality of life (Brown et al., 2003). Authors Brown et al. (2003) have established that better quality of life, concerning health, had physically active individuals who exercised with higher intensity compare to other tested groups. Subjective health includes absence of disturbing (painful) symptoms, but it has a positive side that is manifested in energetic feeling, vitality and physical health in general (Selgman, 2008). In the present study, we are testing the effects of recreational swimming on subjective assessment of psychosomatic status where ailments/disorders represent indicators of subjective health (Kinnunen et al., 2005). Considering objective picture of sedentary middle-aged women who do office work, a recreational swimming program have been designed that can influence health status and therefore “warn” participants of the experiment about the need to change bad sedentary habits.

MATERIALS AND METHODS

SAMPLE OF PARTICIPANTS AND VARIABLES

The experimental study was conducted on a sample of 38 participants (age 35 to 45) who were randomly selected and do sedentary office work. Beforehand, the participants underwent a medical check and only healthy individuals could be included in the research and systematic exercise under the “Recreational Swimming” program. Other criteria for access to the treatment were: that they were female workers and that they were doing office work in a sitting position; that they have no somatic defects or diseases; absence from other organized forms of physical activities other than participating in the “Recreational Swimming” program; regular participation in the exercise program (three times a week) and voluntary acceptance of the exercise program.

EXPERIMENTAL TREATMENT / SWIMMING PROGRAM

The recreational swimming program lasted 12 weeks. There were three trainings per week, and each one lasted 60 minutes. The training sessions were led by a licensed swimming instructor. The warm-up and cooling exercises lasted 10 minutes each, and the main exercises lasted 40 minutes. The detailed swimming program is shown in Table 1.

Table 1. Swimming Program

Exercises		Week	Load	Frequency
Warm up (10 min)	Stretching		RPE 75	
	1. Crawl – leg stroke	1- 4 week	55-65% HRR (RPE 8-10)	
	2. Breathing while moving			
	3. Floating horizontally			
	4. Movements with swimming board			
	5. Crawl hands	5-8 week	65-75% HRR (RPE 10-12)	
	6. Free style combination			
Main exercises (40 min)	7. Leg movements in backstroke			3 / times/week
	8. Crawl swimming			
	9. Arm backstroke	9-12 week	75–85% HRR (RPE 12-14)	
	11. Backstroke swimming			
	12. Breaststroke swimming - legs			
	13. Breaststroke swimming -arms			
	14. Breaststroke swimming			
	15. Breaststroke combination			
Cool down (10 min)	Stretching		RPE 75	

INSTRUMENT

A subjective assessment of psychosomatic status was determined by questionnaire SPPSS (Blaga-jac, 1992; Vučković, 2003). The SPPSS questionnaire defines ailments/disorders where examinee evaluates existence and severity of certain ailments on a scale from 1 to 9 (1 – do not feel it to 9 – unbearable). Defined pains were divided by body parts into: shoulder and arm pain, back pain, leg pain, fatigue and sensorial discomfort, indigestion, cardiovascular disorders, neuropsychiatric disorders, symptoms of general fatigue.

STATISTICAL DATA PROCESSING

The data collected during the study were analyzed and processed by analytical and statistical program for personal computers IBM SPSS 20.0. For the analysis of data measured by continuous scale at the initial and final measurement, the basic descriptive parameters were calculated, and normality of distribution was checked by Kolmogorov-Smirnov test. The Wilcoxon Signed Rank test was used to test the difference between the initial and final state of the subjective assessment of psychosomatic status. The statistical significance was determined at the level of $p < 0.05$.

RESULTS AND DISCUSSION

The experimental procedure was conducted in order to determine the existence and nature of the effects of recreational swimming in middle-aged women's subjective assessment of psychosomatic status. The results of the experiment revealed that recreational swimming had influence on psychosomatic status of middle-aged women who do office work. Aerobic recreational swimming in deep swimming pool, that lasted three months with three trainings per week, one hour each training, had statistically significant

changes in all tested variables ($p = 0.001$). Considering the results of the Kolmogorov-Smirnov test, a non-parametric Wilcoxon Signed Rank test was applied with the presented results in further text. In this study, we hypothesized that recreational swimming would be a good way of exercise for positive influence on subjective assessment of psychosomatic health of participants.

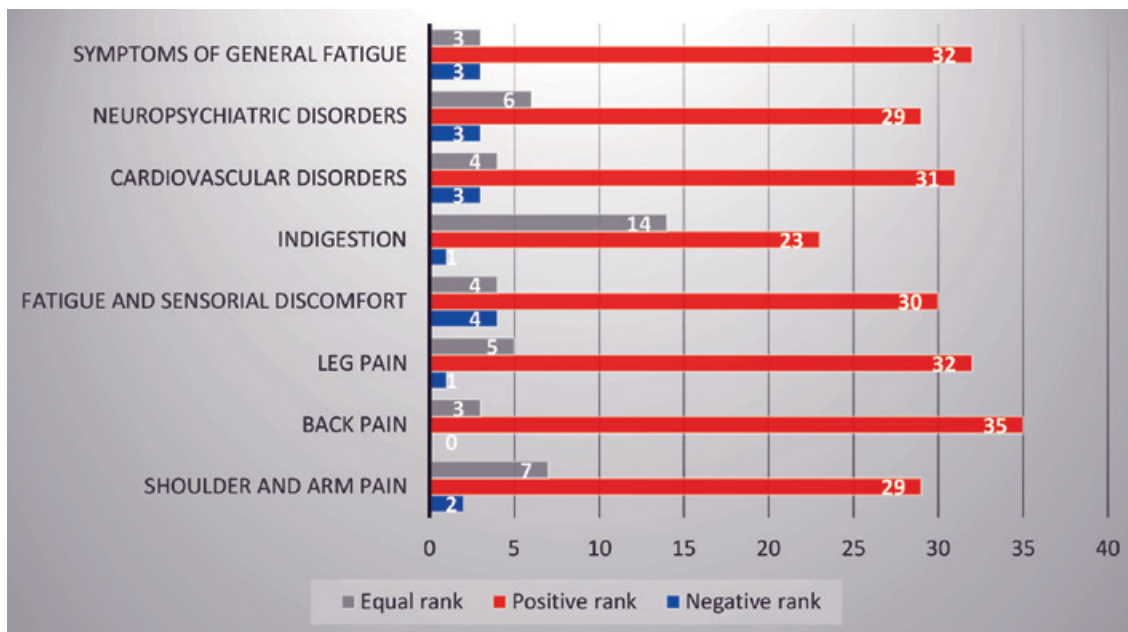


Figure 1. Analysis of differences between initial and final subjective assessment of the psychosomatic status

Observing the obtained results from Figure 1, it can be said that the participants had a visibly positive ranking orientation according to all set estimates after the application of experimental swimming treatment, which led to a statistically significant difference in all applied variables (Table 2).

Table 2. Distribution of variables and the analysis of differences of the subjective assessment of the psychosomatic status of the participants at the initial and final measurement

		Shoulder and arm pain	Back pain	Leg pain	Fatigue and sensorial discomfort	Indigestion	Cardiovascular disorders	Neuropsychiatric disorders	Symptoms of general fatigue
Initial	AS	5.84	5.39	6.44	6.26	3.71	6.65	7.97	7.78
Initial	p	.010	.041	.196	.072	.000	.304	.076	.305
Final	AS	10.84	10.68	11.57	10.50	6.00	12.47	14.76	14.10
Final	p	.529	.875	.480	.273	.142	.473	.523	.605
Z		-4.712	-5.169	-4.941	-4.453	-3.983	-4.646	-4.463	-4.659
p		.000	.000	.000	.000	.000	.000	.000	.000

The analysis of the subjective assessment of the psychosomatic status between the initial and final measurement indicates that there were statistically significant changes in all tested variables (Table 2.). The largest differences appeared in the variables: back pain ($Z = -5.169$, $p < .001$) and leg pain ($Z = -4.712$, p

<.001), and slightly smaller differences were noted in the variables shoulder and arm pain ($Z = -4.985$, $p <.001$); symptoms of general fatigue ($Z = -4.659$, $p <.001$); symptoms of neuropsychiatric disorder; ($Z = -4.463$, $p <.001$); cardiovascular disorders ($Z = -4.646$, $p <.001$); fatigue and sensorial discomfort ($Z = -4.453$, $p <.001$). The smallest differences were in the variable indigestion ($Z = -3.983$, $p <.001$). Based on the obtained results, it is notable that there is a statistically significant difference between the initial and the final measurement in all variables and that the differences between the groups of variables are small. It can be concluded that exercising according to the model of recreational swimming can eliminate the problems of psychosomatic status in middle-aged women who perform office sedentary work.

Recreational swimming is a good method for improving/alleviating the difficulties of psychosomatic status and that was confirmed by the final measurement wherein all groups of variables positively oriented ranks prevail. Why was that? Middle-aged women who perform sedentary jobs for several years are chronically burdened with the demands of work and other circumstances. The lack of compensation for chronic fatigue has produced various ailments, which, if left untreated, can progress to another extreme/illness. Water is an environment in which the body feels good, and swimming activity, especially if programmed, can have a positive effect on alleviating the problems and significantly improve functional health compared to a sedentary lifestyle. The result of a significant improvement in health status is certainly organized and systematic exercising in accordance with the recreational swimming program. Besides, the participants included in the experiment had health problems due to the sedentary jobs, therefore it could have been assumed that well-organized training would have a positive impact on improving health status. In this study, the best results were achieved in the group of variables back pain (neck, chest, and low back, $Z = -5.169$, $p <.001$). The spine in sedentary jobs is a part of the body that moves very little or almost not at all it is rather static when one is working in a sitting position. This means that the joints of the spine are heavily loaded, and the muscles that hold the spine are passive, which altogether leads to deformation/poor position of the spine that can cause pain in different segments of the spine. How swimming can help in such cases? Firstly, the body in the water is in a horizontal position where all the joints are relaxed, especially in the spine. By swimming movements in the water, we activate almost all the muscles, including the muscles of the spine whose work influences the functionality of the spine. The second-best result in the improvement/elimination of the health problems was the group of variables shoulder and arm pain (shoulders, arms, hands, and fingers, $Z = -4.985$, $p <.001$). The arms are almost under the most load in sedentary jobs with repetitive movements. Certainly, after a long time, chronic fatigue and discomfort start to appear. In this case, the water has a relaxing effect on tired muscles, and with additional/other movements in the water, the arm muscles recover, and their function and motor skills improve. It is no coincidence that the third in a line of the improvement/recovery variables are the symptoms of general fatigue (monotony, drowsiness, insomnia, feeling of weakness, and sluggishness of movement, $Z = -4.659$, $p <.001$). When the locomotor system is in a deficit of movement, it negatively affects the working abilities and the capability of creating the energy required for better health. Swimming can help statically inactive legs and statically loaded arms with various movements in the water. All in order to engage passive muscles and relax overloaded muscles of sedentary jobs, as well as to “awaken” the functions of other organ systems that have a positive effect on the symptoms of general fatigue. Next in the sequential order of recovery/prevention problems are the symptoms of neuropsychiatric disorders (headache, bad mood, indifference-apathy, general discomfort, and irritability $Z = -4.463$, $p <.001$). Prolonged sedentary jobs are in most cases stressful and negatively affect mental mood/stability. Warmer water in the pools and continuous swimming with moderate intensity will enable deeper breathing, better/accelerated circulation with a better oxygen supply needed for the functioning of all organ systems, and the use of muscles that enable all functions to improve neuropsychiatric disorders. Cardiovascular disorders (shortness of breath, quick fatigue, increased sweating,

heart disorders, $Z = -4.646$, $p < .001$) are a direct consequence of the lack of more intense movement. Aerobic training, such as swimming, can influence the improvement of cardiovascular status with swimming-technical elements and methodical procedures. Fatigue and sensorial discomfort (sensitivity to noise, sensitivity to silence and monotonous work, eye fatigue and eye pain, $Z = -4.453$, $p < .001$) are, besides the slower negative impact of a sedentary lifestyle, had statistically significant positive changes at the end of recreational swimming treatment. We believe that it is due to the influence of another/swimming working environment that has a beneficial effect on the overall psychosomatic status. Our results are congruent with some similar studies and examined variables on the impact of recreational swimming and subjective assessment of health status in sedentary women. We deliberate on these works below.

Omar et al. (2021) investigated the impact of regular swimming on the improvement of risk factors for metabolic syndrome. Their hypothesis was that swimming activity has become an important physical activity in the health system that is considered as a practical nonpharmacological approach of assessing the long-term effects of swimming on glycemic and lipidemic parameters, hemodynamic responses, body fat percentage, and index in the treatment of type 2 diabetes (T2DM), hypertension (HTN) and obesity. Forty participants of both genders with T2DM and HTN (age 52.4 ± 5.5 years) participated in the study and were divided into two groups, the swimming group, and the control group. The swimming group exercised for 2 hours, 3 times per week at a pool temperature of $29\text{--}33^\circ\text{C}$ for 16 weeks. At the same time, the control group did not participate in the exercises, and they were advised to continue with their everyday lifestyle. The results showed that there were statistically significant differences ($p < 0.05$) in the variables total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides (TG), blood glucose (BG), systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), and percentage of body fat by groups, time, and interaction for the experimental group. The authors suggest that regular swimming for 16 weeks may be a non-pharmacological approach in the treatment of T2DM and HTN.

The effect of regular swimming on body composition, strength, and blood lipids in middle-aged women was investigated by Bo-Ae Lee and Deuk-Ja Oh (2015). A sample of 24 middle-aged women, 12 women in the swimming group and 12 women in the control group were examined. The swimming group performed swimming exercises for 60 minutes three times a week, for a total of 12 weeks, and the control group was not under swimming treatment. The results of the study confirmed the changes in body composition by reduction of body fat percentage in the swimming group. Examination of the differences between the groups revealed statistical significance. The results of strength tests showed that the swimming group had a statistically significant difference in flexibility and cardiovascular endurance. The results of blood lipids showed a decrease in TC and TG and a significant increase in HDL-C, and difference tests confirmed a statistically significant difference in the TC and TG variables. Considering these findings, the authors believe that regular swimming is effective in improving body composition, physical strength, and blood lipids in middle-aged women.

Kurko (2011) investigated the influence of recreational-health swimming on the indicators of subjective and objective health of men aged 20-30. Objective health was estimated based on the pulse and subjective health was checked by questionnaire. The study lasted a year, included 31 participants with training sessions three times a week, and the duration of one training session of 1 hour. The author concluded that recreational-health swimming has a positive effect on the indicators of the objective health of the participants, which manifested in the normalization of the cardiovascular system functioning. Furthermore, swimming had a positive impact on subjective health by reducing the number of complaints of autonomic disorders and psych emotional maladaptation, while self-esteem became more adequate.

Neiva et al. (2018) examined the effects of a 12-week water aerobics program on health indicators and physical fitness in adults and the elderly. Fifteen volunteers (58.80 ± 14.32 years) were part of the experimen-

tal group, and eight volunteers (59.00 ± 12.26 years) were part of the control group. The training sessions of water aerobics lasted 45 minutes twice a week for 12 weeks; exercising was not allowed for the control group in the same period. Evaluations were conducted one week before commencing the program and upon the completion of the training program. Primary outcomes were changes in strength and cardiorespiratory capacity and secondary outcomes included body anthropometry, lipid profile and blood pressure. The adjusted analysis for age and baseline values showed no differences between the exercising group and the control group before and after training. However, there was a moderate tendency to increase the explosive power of the upper limbs ($\bar{\epsilon}p2 = 0.17$), decrease body fat ($\bar{\epsilon}p2 = 0.17$), decrease systolic blood pressure ($\bar{\epsilon}p2 = 0.14$) and triglycerides ($\bar{\epsilon}p2 = 0.19$) in exercising group. Changes within the groups indicated that the training program caused an increase in explosive power in the upper limbs (0.26 m, 95% CI, 0.03, 0.49; ES = 0.63). In addition, there was a significant reduction in adipose tissue, 95% CI, -1.74, -0.03; ES = 0.61) and systolic blood pressure (-0.83 mmHg, -1.46, -0.19; ES = 0.71). These results suggest that 12 weeks of water aerobics performed twice a week is beneficial for the explosive power, physical shape, and blood pressure of adults and the elderly, but is insufficient to alter cardiorespiratory capacity and lipid profiles.

Adnan et al. (2019) investigated the assessment of mental health in healthy adult men after a swimming intervention. They tested 28 adults aged 19–33 years that were randomly divided into two groups, a swimming group ($n = 14$) and a control group ($n = 14$). They used two sets of questionnaires, the Depression, Anxiety and Stress Scale (DASS) and Mood Profile (POMS), which examined six domains: tension, depression, anger, fatigue, confusion, and strength before and after the intervention. The swimming group underwent an exercise program three times a week for eight weeks, while the control group led an ordinary lifestyle. Initially, significant differences were identified for all parameters measured in DASS and POMS, excluding complete mood disorder and energy domain between the two groups. During the intervention, there were significant differences between the groups in anxiety and stress in DASS, as well as in the energy domain in POMS ($p < 0.05$). After eight weeks of exercise, the swimming group showed a significant reduction in all measured outcomes compared to the control group ($p < 0.05$). This study shows that eight weeks of swimming can have positive effects on the mental health of adult men during the course. Marinović Glavić et al. (2020) investigated the self-assessment of health and functional abilities of the population older than 75 years regarding gender, marital status, and level of education of the participants. The study included 189 participants, of which 118 were women and 71 were men. For the study, a survey questionnaire composed of selected particles of validated questionnaires was used. Results: Participants were asked questions about their quality of life, whether their health condition limits them in daily activities and how often they are physically active. Based on the results, the connection between gender, marital status, and level of education with the subjective assessment of the health of the elderly population and their functional abilities was confirmed. Conclusion: Functional abilities decrease with age, daily activity restrictions are lower in participants with a higher level of education and gender-wise, women subjectively assess their health worse than men and report greater difficulties in physical functioning.

CONCLUSION

On the basis of conducted study and its aim, it can be concluded that experimental treatment of recreational swimming that lasted three months, three times per week, an hour each session, had positive influence on the psychosomatic status of middle-aged women. The efficacy of the experimental treatment proved to be statistically significant for all tested variables. Among the eight groups of variables, we emphasize variable groups back pain and leg pain as groups with larger impact of recreational swimming, and somewhat weaker results were confirmed in group indigestion. Furthermore, it is noticed that “swimming

pool water" with an experienced/licensed instructor good motive for active style and an escape from the sedentary life among middle-aged women who do office work. Authors conclude that exercising in accordance to the recreational swimming model in deep water can eliminate problems of psychosomatic status of middle-aged women who do office work.

Conflict of interests

The authors declare that there is no conflict of interest.

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