



RESEARCH TO IMPROVE HEALTH CARE FOR WOMEN WITH NORMAL PREGNANCY APPLYING RECREATIONAL WELLNESS ACTIVITY

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ABSTRACT

PURPOSE: The aim of this study was to achieve a control model of cardiac and respiratory function through key indicators established in a comparative analysis between the results of the initial and final pulse tests for women with normal pregnancies.

METHODS: The research was done among 111 women, all Bulgarians. We used: functional tests for assessing the effects of our own original Recreational Wellness program with a specific focus on pregnant women. We measured the intensity of the tool branded under the name of the co-author Nesheva.

RESULTS: During our own original Recreational Wellness program was established data by specific tests and the analysis has shown that the average values (Mean \pm SD) of the measured indicators, in the six lessons are statistically different ($p < 0.05$). These indicators are interpreted as optimal prenatal improvement of health care, but probably our Recreational Wellness program also favours the maintenance of Wellness lifestyle during all period of pregnancy.

CONCLUSIONS: The results in our study are in support of establishing a system for assessing information to improve health care during the period of a normal pregnancy. This specific instrument is a reliable basis for validating standards for regulated inclusion in Recreational Wellness activity programs.

Key words: Basic model, Recreational influences, Wellness programs, motor activity, heart rate, vital capacity, normal pregnancy, women health specificity.

INTRODUCTION

Pregnancy requires changes in the everyday diary to which the woman is accustomed and requires to applying Wellness lifestyle (1, 2). During the 9 months of pregnancy, women can safely continue her daily activities, go to work and perform her duties (3-6). During the last five years to apply a everyday Wellness lifestyle which enhance the National Wellbeing and Happiness indexes (7-10). Moderate recreational motor work is useful. It strengthens the body and keeps the spirit fresh. Conversely, inactivity, lack of movement, prolonged lying down for fear of pregnancy, depress the mood, predispose to weight gain, laziness of the intestines and

muscle weakness (11-13). It is important to observe what is necessary with respect for the baby to give him a Wellness environment (14-16). From conception to birth and beyond, the development of the human individual is a very complex, dynamic and continuous process that confirms the vital importance of foetal development. For women who have led an active lifestyle, it is no problem to maintain a large amount of physical activity, only adapting it to changes in the body during pregnancy (17). To obtain a culture of quality is necessary to have a well-trained specialized staff in educational programs for Wellness culture in all scholar levels—from secondary schools to Doctoral degree and expert to apply adapted recreation programs (18-21).

METHODOLOGY

The aim of this study was to achieve a control model of basic functional indicators established by comparative analysis between

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the results of the initial and final study of anthropometric and functional tests in women with normal pregnancy.

The research was done among 111 women, all Bulgarians (only 101 full test-retests). Between May 2018 and February 2020, with age average 26,5 (20 to 33) years old. To achieve the purpose we selected only pregnant women. We express our gratitude for the partnership of the specialized hospitals "Mother House (Maichin Dom)" and "Sheinovo" – both in the Bulgarian capital Sofia. The studied target group was divided into age groups (20 to 26 years and the first 6 months; 26 years and the second 6 months to 33 years). During the Wellness motor activity our registered pregnant clients are in the second trimester (from IV to VI months), confirming their conscious awareness and claim to be the most suitable period for physical activity. Every participant gives us a medical permission to attend our Recreational Wellness motor activity. The research was done in the biggest Sport University in Bulgaria (National sports academy “V. Levski”, Sofia). Each participant signs an agreement giving us permission for public dissemination of their results. We used: functional tests for assessing the effects of our own original Recreational Wellness program with a specific focus to pregnant women. We measured the intensity of the tool branded under the name of the co-author Nesheva.

A. Functional Characteristics: HR (HR_I, HR_F), initial and final IT - FT (HR_I, HR_F), before and after a separate Wellness exercise (HR_{pre}, HR_{post}), during exercise (HR_{max}, HR_{min}, HR_{avg}); Experimental methods for the determination of morph-functional indicators, vital capacity (VC) at indirectly determined

respiratory indicators (oxygen consumption - VO_{2peak}, respiratory rate - R-Ravg, minute ventilation – VE peak) during the Wellness exercise in each of the 6 specific parts inside the class.

The Statistical analysis was done with Microsoft Office Excel 97-2003 program and the data were processed with SPSS Statistics. We apply: Descriptive Statistics, NPar Tests (Wilcoxon RT), Nonparametric Correlations (Spearman's rho) and ANOVA with repeated measures. The critical rejection level of the zero hypotheses was set to 0.05. Graphics are made with Microsoft Excel and Graph Pad.

RESULTS

The stimulating effect of Recreation Wellness exercises on respiratory function is extremely important for pregnant women. The applied model for women with normal pregnancy appropriately activates the cardiorespiratory functions, which are quickly restored to the initial level. Diastolic pressure and heart rate are within normal limits. Vital capacity does not differ significantly from that of untrained women. The three BMI values are within the normal range for women, despite pregnancy. An interesting result is the increased vital capacity after gymnastics.

The obtained results give grounds to assume that the recreational motor activity load from the innovative model has a beneficial effect on cardiorespiratory function and maintains the physical fitness of women with normal pregnancies. In 80 cases out of a total of 101 women with normal pregnancy who participated in the recreational motor program, the influence of the Wellness activity on hearth rate indicators was studied.

Table 1. Variation analysis (Mean ± SD) of HR and RR indicators (RRs, RRd) before and after gymnastics.

Indicators	N	Before the activity		Indicators	After the activity	
		Mean	SD		Mean	SD
HRpre	80	87.39	11.733	HRpost	89.14	14.548
RRspre	80	108.71	11.126 ^a	RRspost	106.20	11.322 ^b
RRdpre	80	68.15	8.019	RRdpost	67.11	9.547

Table 1 presents the values (Mean ± SD) of heart rate and blood pressure before and after the Wellness motor activity. Comparison (Wilcoxon Signed Ranks Test) between circulatory indicators before and after

exercises showed that heart rate and diastolic pressure recovered rapidly after exercise with insignificant differences (p>0.05). Systolic pressure decreased significantly (statistically: p <0.05). The obtained results give grounds to

interpret as a good adaptation of pregnant women to the activities with Recreational complexes with rapid recovery without risk for the participants.

The oxygen consumption, respiratory rate and pulmonary ventilation) the results of heart rate monitoring with the *Pulse Testers System Temeo* device for the 6 phases of the

recreational motor activity occupation (1. operative preparatory, 2. preparatory, 3. dance, 4. main part, 5. final, 6. restorative) are presented graphically below. The dynamics of the three indicators of heart rate (HRmax, HRmin, HRavg) during the 6 phases of all controlled gymnastic activities is shown in **Figures 1 to 7.**

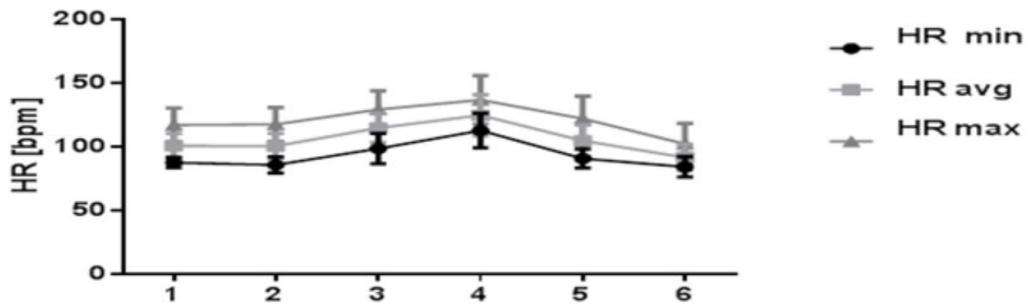


Figure 1. Dynamics of heart rate at exercise 1 (Mean ± SD).

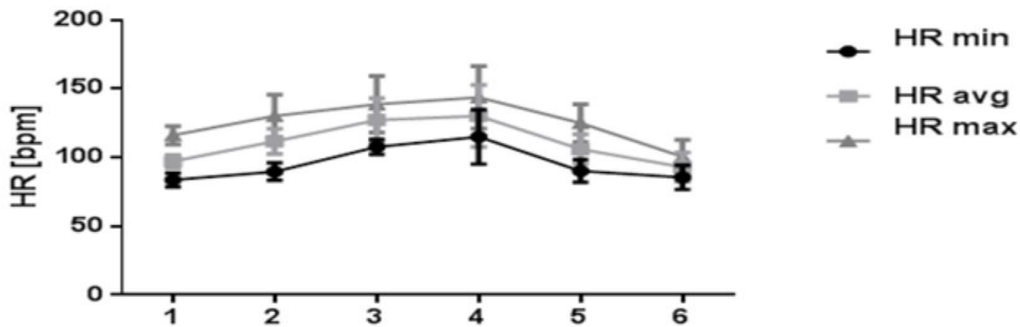


Figure 2. Dynamics of heart rate during exercise 2 (Mean ± SD).

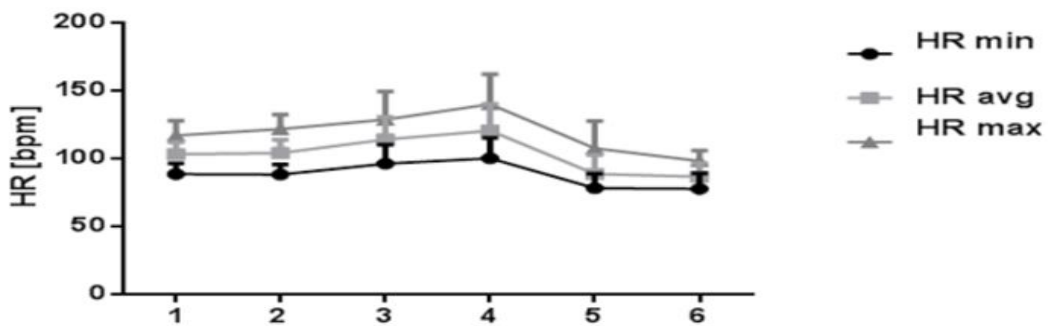


Figure 3. Dynamics of heart rate at exercise 3 (Mean ± SD).

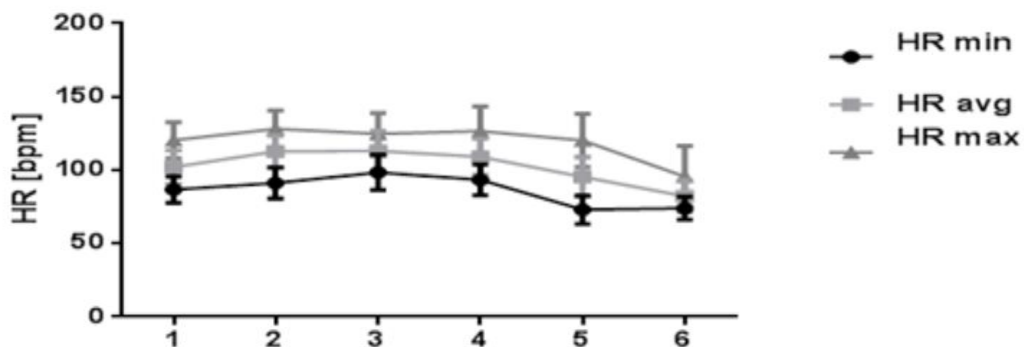


Figure 4. Dynamics of heart rate at exercise 4 (Mean ± SD).

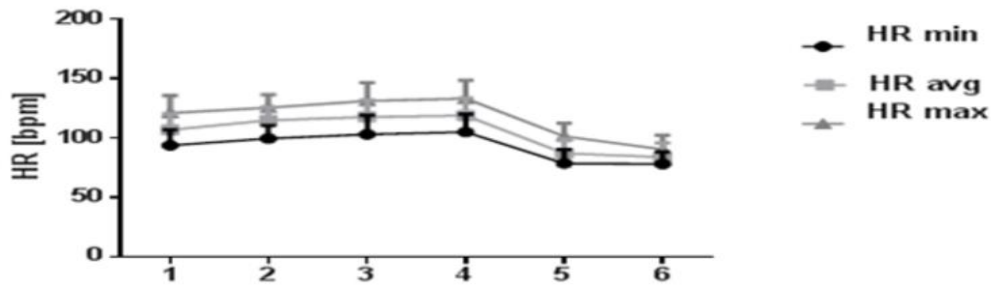


Figure 5. Dynamics of heart rate at exercise 5 (Mean \pm SD).

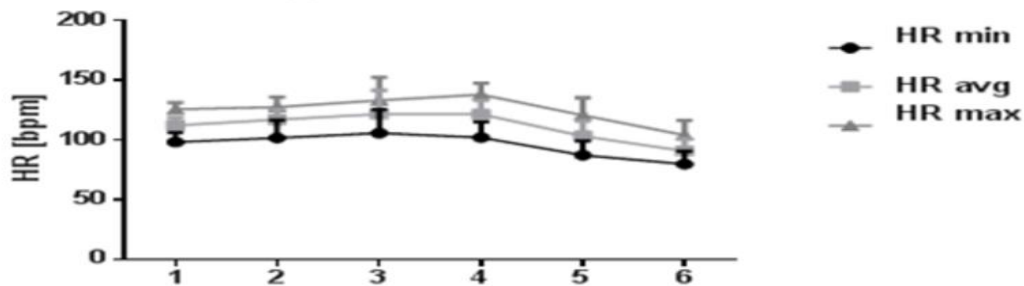


Figure 6. Dynamics of heart rate at exercise 6 (Mean \pm SD).

The three HR indicators follow almost the same trend in the 6 gymnastics sessions with a smooth peak in the fourth phase (main). In activity 4, the elevated level starts from the 2nd phase and is maintained almost plateau-like until the 4th phase. In the last two phases the trend is analogous to reaching lower values in the 6th phase compared to the operational one before the working one. This is a natural course of the recovery process, given that the

last 5 minutes pregnant women relax on the barbarians with appropriate musical impact.

The processed data from the Suunto Memory Belt monitor illustrate the dynamics of HRmax, HRmin, HRavg in 7 phases (rest, preparatory, dance, phase with exercises for the upper part of the body, phase with exercises for the lower part of the body, stretching and relaxation phase) of one gymnastic activity (experiment-control) in 8 pregnant women (Figure 7)

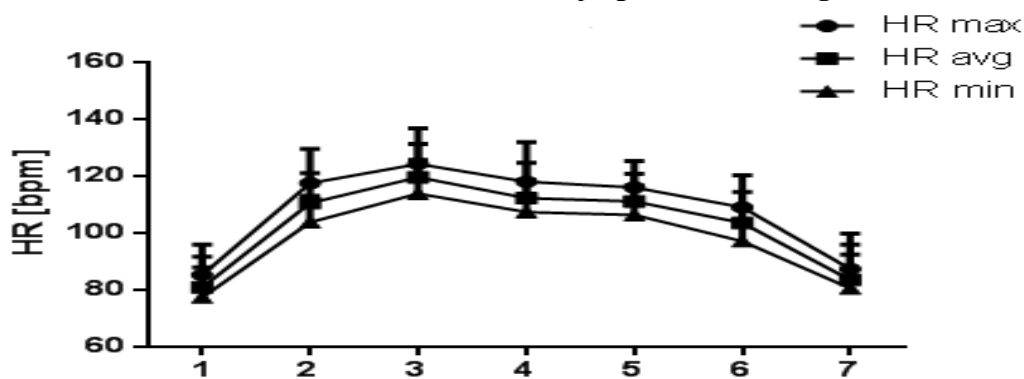


Figure 7. Dynamics of heart rate during 7 phases of one gymnastic activity.

Despite the known differences in the two HR monitors used and the processing of the R-R intervals, the tendency of smooth change of the inclination of the heart rate curves during the recreational motor activity is maintained. In this experiment, the heart rate values were lower in the initial phase due to the 5-minute relative rest on the barbarians. The indirect respiratory parameters VO_{2peak} , R-Ravg, VE peak were calculated. Their dynamics is presented in Figures 8-10.

Peak values of the three respiratory parameters, similar to those of the heart rate, are also observed in the dance phase of the activity. The use of the *Suunto Memory Belt monitor* has possibilities for a more complex individual and group characteristic of the adaptation to the recreational motor activity of pregnant women through the analysis of the cardiorespiratory dynamics. The results of the variation analysis of the heart rate, presented graphically for all phases of 7 activities show that even in the most active phases are within

the limits comparable to the indicated target pulse zones (Table 2). The age range of

pregnant women included in the Program corresponds to the marked areas in Table 2.

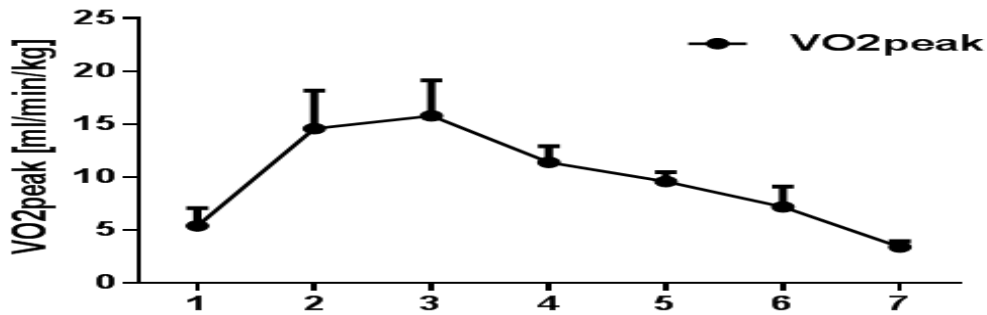


Figure 8. Dynamics of oxygen consumption (Mean ± SD).

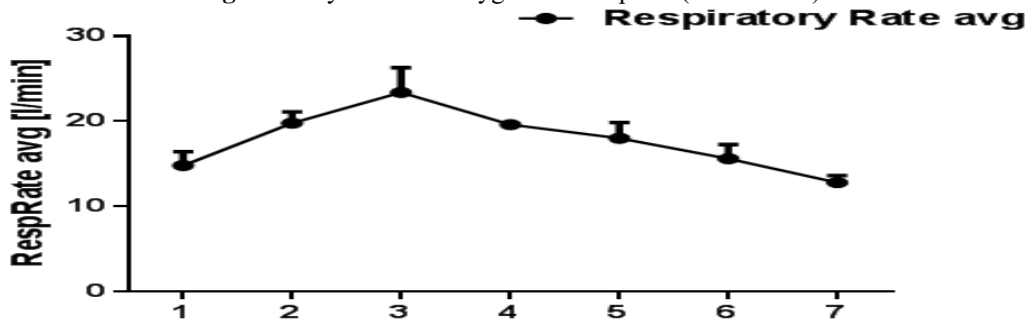


Figure 9. Respiratory rate dynamics (Mean ± SD).

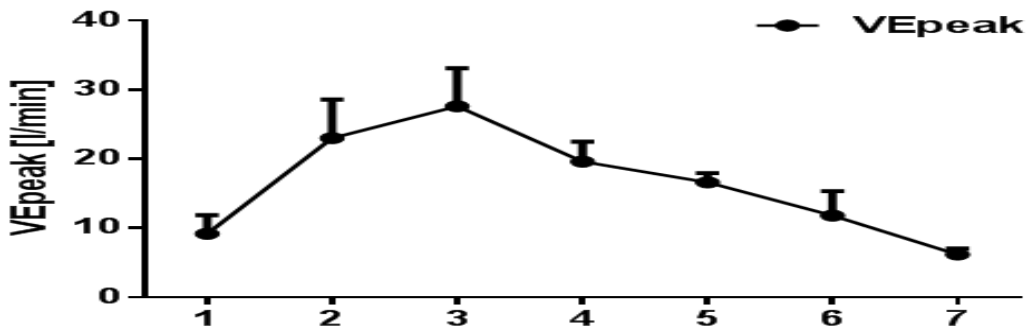


Figure 10. Dynamics of pulmonary ventilation (Mean ± SD).

Table 2. Modified pulse target zones for motor activity at pregnancy according to Davies et al. (2003) PMID: 12955865

Maternal Age	Hart Rate target zone (beats /min)	Hart Rate target zone (beats /10sec)
Less than 20	140-155	23-26
20-29	135-150	22-25
30-39	130-145	21-24
40 or greater	125-140	20-23

DISCUSSION

The data obtained for the three heart rate indicators through the two monitors during the functional control, presented graphically (see figures 1-6 with the dynamics of the heart rate and indirectly determined respiratory parameters) were analysed in terms of the intensity of the loads from the Wellness Program during Pregnancy. The dynamics of HRmax, HRmin and HRavg during all phases

of gymnastics determine the limits of adaptation. Heart rate values in the most intense phases of exercise do not exceed 150 beats / min. The working heart rate as a physiological criterion for assessing the intensity shows that the loads are carried out in a predominantly aerobic mode of energy supply, and the individual phases are characterized as light to moderate load.

Our results for pregnant women subjected to the loads of the Program show that the values of HRmax in the most active phase are close to the lower limit of the pulse zone for the respective age. According to the modified pulse target zones for pregnant women, the heart rate during aerobic exercise should be in the range of 135 to 150 beats / min for ages 20 to 29 and in the range of 130 to 145 beats / min for women aged 30 to 39 years. Modified pulse target zones for pregnant women are given in Table 2. The obtained results suggest that the Wellness exercises (program Nesheva) load from the innovative model has a beneficial effect on cardiorespiratory function and supports the maintenance of Wellness lifestyle of women with normal pregnancy.

CONCLUSIONS

The analysis for the efficiency of the applied recreational program for women with normal

pregnancy shows positive interactions after a regular practice.

The results and discussion inside of this original paper justifies the following main conclusions in summary:

1. As a tool for health prevention and functional control for women with normal pregnancy the applied recreational program Nesheva is correct and objective.
2. Indicators of blood circulation and vital capacity in relative resting conditions of pregnant women when enrolled in the gymnastics program are within the limit of normal.
3. Upon completion of the Nesheva program, a significant increase in chest circumferences, vital capacity, heart rate, and improved blood pressure control has been identified.

Table 3. Abbreviations table content

(HR) Heart rate
 (HR_I) (HR_F) Heart rate –IT, FT
 (HRavg) Mean heart rate
 (HRmax) Maximum heart rate
 (HRmin) Minimum heart rate
 (HRpost) Heart rate after exercise
 (HRpre) Heart rate before exercise
 (VC) Vital capacity
 (VC post) Vital capacity after exercise
 (VC pre) Vital capacity before exercise
 (VC_I) (VC_F) Vital capacity - IT, FT
 (VE) Pulmonary ventilation (VO₂)
 (VO₂ peak) Oxygen consumption

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