Series on Biomechanics, Vol.38, No.2 (2024), 23-28
DOI:10.7546/SB.03.02.2024

Sustainable quality of SPA programs through benchmarking the biomechanical profile of a new aqua spinning methodology

Bistra Dimitrova

Faculty of Public health, Health care and Tourism, National Sports Academy "Vasil Levski", Sofia, Bulgaria

Received: 01 July 2024 *Accepted: 25 July 2024* **Corresponding Author*

Abstract

Objective: The aim of this study was to assess the sustainable quality of SPA programs through benchmarking the biomechanical profile of a new aqua spinning methodological approach. **Materials and methods:** Our scientific interests were focused on developing content for a new aquapractices methodology. The study was conducted among 97 students in the faculty Sports and the faculty of public health, health care & tourism. The subjects were predominantly Bulgarians, with an average age of 26 years and all females. **Results:** This is achieved by creating new Aqua spinning program that cater to diverse job roles and skills. To promote a healthy lifestyle contributing to the improvement of the nation's Wellbeing index, innovative teaching methods and extensive research are required to determine their effectiveness. Implementing specialized innovations in the content of Biomechanics modules forms the personnel's knowledge, thus enhancing their professional competencies. **Discussion:** The results of the study clearly demonstrated the effective connection of applied knowledge from Biomechanics modules with the quality of recreational programs. **Conclusion:** The benefits of recreational physical activity on the health of participants lead to increased demand, respectively, revenues, and the need for competent personnel in Niche tourism.

Keywords: Innovations in SPA, Water culture, Aqua spinning, health prevention, biomechanics' profile.

1. Introduction

By understanding the mechanics of the human body, biomechanics plays a crucial role in reducing injuries, identifying potential risk factors in movements and correcting them to apply prevention. Biomechanics helps recreation programs based on precise biomechanical analysis to ensure better recovery and prevent recurrence. Biomechanics has a significant impact on youth and the Bulgarian Mechanics community established (in 2013 by Acad. Yatchko Ivanov) an award to be granted annually to a young researcher for outstanding achievements in the field [1,10]. Over the past 5-7 years, aquatic physical activity has been gaining popularity across Europe [14,16]. This has directed our scientific interests towards studying the Bulgarian market and the specific interest of customers in aqua practices [2,4]. These services are relatively new in the SPA industry and are not as widely known as other activities, such as the influence of aqua practices on pregnant girls or adolescent development [9,11]. Among the various options for rejuvenating and revitalising physical activity in water, aqua spinning has shown the most effectiveness. As stated, There are no dangerous exercises as long as they are properly implemented, performed gently, and in moderation [12,19]. However, for aqua spinning to become a preferred activity, it is essential to address the accompanying issues in Bulgaria [5,8]. The first issue involves identifying the types and quality of aqua spinning programs available. The second issue focuses on adapting these programs to meet the individual needs of customers [15]. Spa represents an ancient and marvelous tradition, offering the ultimate antidote to modern stress and its detrimental effects on human health. Modern SPA & Wellness methods serve as alternatives to societal stress, considering their financial accessibility [2,18]. Additionally, a third aspect involves the development of new marketing and management strategies to promote SPA within the leisure industry throughout the entire Balkan region [13]. In terms of SPA, contemporary individuals

prioritie recreational health, beauty, and preventative care through personal relaxation time [17]. SPA treatments have a revitalising effect on the skin, body, and mind, employing a wide range of programs, some with roots dating back centuries and others more recently developed [3]. It is worth noting that even the legendary Cleopatra indulged in donkey milk baths, marking a new era in the thinking and lifestyle of modern Bulgarians [2]. Previously, SPA focused primarily on traditional practices; however, there is now a noticeable demand for incorporating healthy sports activities tailored for girls [6]. In essence, SPA embodies age-old goodness, yet today it is enriched with the transformative effects of aquaculture practices [19]. Unlike activities like Wellness activities, which can be integrated into school curricula, aquaculture practices are not as easily implemented in educational settings [7,13]. Nonetheless, it is crucial to understand that SPAs are frequented not only by those seeking to maintain their health but also by individuals looking to recover from the stresses of daily life, both social and professional [14].

2. Methods

2.1. Our working hypothesis is founded on the premise that the creation of tailored aquaspinning program content with a health effect information module will enable the optimisation of recreational offerings, providing modelling programs for health prevention and Wellness lifestyle promotion.

2.2. The Objective of this study was to assess the impact and long-term quality of aqua spinning programs integrated with SPA services, focusing on benchmarking the biomechanical profile of a newly established aqua spinning author’s methodology.

2.3. Specificity of the New Proprietary Methodology

The methodology involves establishing a dedicated wellness program for aqua spinning. We targeted women under 30 who seek to reduce cellulite in the abdominal-pelvic region. We created tailored aqua spinning program content with a cognitive module that provides information on the health benefits of regular practice. During the session, 500 ml of water are required to be consumed. The new wellness program includes 3 minutes of anaerobic work after every 15 minutes of underwater body work.

2.4. Expertise and funding

The study aimed to investigate the effects and benefits of a specialised aqua spinning program designed for use in the recreational industry. By innovating the content of the aqua activity, we established benchmarks through biomechanical analysis. Bachelor's and master's students at NSA "V. Levski" participated regularly in the new aqua spinning program with a health effect information module. Scientific experts for conducting the study were selected through a public announcement to support the goals of the first Bulgarian Center of Excellence, Heritage BG. Participants in the study provided informed consent for the publication of their data.

2.5. Duration

The study was conducted from June 2023 to September 2023. We involved expert assessments of the innovations in content and coaching approaches for creating the biomechanical profile. The scientific experiment spans three months, with the target groups participating twice a week, totaling 24 sessions in the specialised aqua spinning new program. Our team of interdisciplinary specialists conducted an experiment to gain insights into the effect of the new program. The practitioners were selected as subjects of study organised in the capital of Bulgaria, at the Pool "Spartacus". The control group was selected from the private school of the renowned Bulgarian synchronised swimmer Assia Stoycheva.

3. Results

The indicators in this report unveil the internal strength and intensity of the cardio program developed with a health effect information module for application through aqua spinning techniques.The study focuses on various muscle groups in the body and the creation of specialised sets of aqua spinning exercises combined with a health effect information aimed at promoting Wellness lifestyle for our clients. To monitor the effectiveness of aqua spinning program, the group employed standard psychometric and functional experimental methods. This report provides a partial overview of our regular customers in the aqua spinning program. The analysis of results is based on values obtained after mathematical and statistical data processing. Through correlation analysis, we calculated the relationships between the studied indicators for individuals participating in the aqua spinning program. The correlation coefficients indicate a strong positive relationship between aqua spinning modeling programs for weight loss and the circumference of the pelvis (r = 0.778), as well as for the circumference of the thigh and abdomen of the clients (r = -0.739). Additionally, there is a very high correlation between weight loss programs paired with SPA services (r = -0.919), such as hydro jet impingement and spray beating, which are consciously targeted primarily at the studied areas. Many direct relationships were found when combining effects (both motor and restorative), including herbal teas and additional regulated water intake of 30 ml/kg body weight (r = -0.882). Integrating SPA services after aqua spinning content aims to enhance the psychophysical status and personal motivation of the majority of our clients (54.8% to 59.5%). This combined option appeals to customers with specific expectations regarding emotional and psychological Wellness. It is correct to say that this author's aqua spinning program is typically more expensive than simply practicing physical activity through aqua spinning alone. This is because it offers higher efficiency in targeting areas affected by cellulite, although significant results are typically observed only after the 15th session. We are making the first attempt through the analysis of data from the calculated contingent to assess the effectiveness of a new proprietary methodology for aqua spinning. The results of the benchmark analysis for the functional indicators of the Control group (CG) and the Experimental group (EG) at the study end, after three times a week regular participation for a duration of three months in aqua spinning sessions, are presented with the specific indicators (see Table 1):

Table 1
Benchmark analysis of the functional indicators for EG and CG at the end of the experiment

Functional indicators - End	$\overline{X}_{CG}$	S CG	$\overline{X}_{EG}$	S EG	Diff-ce	t	P(t)
1. Forward bend /inclination Depth	52,12	8,97	54,12	8,78	2,00	0,80	57,1%
2. Raising from lying down / Benchpress	30,52	6,04	35,56	4,13	5,04	3,44	99,9%
3. Front supports / Pushups	17,88	6,63	18,92	5,19	1,04	0,62	46,0%
4. Abdominal presses/Crunches	18,12	2,52	21,20	2,94	3,08	3,97	100,0%
5. Squats	23,92	2,56	25,00	1,68	1,08	1,76	91,5%
6. Long jump	144,94	14,26	149,26	19,74	4,32	0,89	62,1%
7. Sprint 20m	4,26	0,32	4,05	0,20	0,21	-2,79	99,2%

At N 48 and α=0.05, the critical value of α is 2.01.

Regarding "the strength of the back muscles and the mobility of the spine" started the experiment with a better average result, 31.60 cm compared to 28.28 cm for the CG. Accordingly, we observed a difference in this indicator during the initial testing. At the study end, the average result improved in both groups, but more pronouncedly in the EG (CG: 30,52 and EG 35,56). We believe this is due to the fact that in the experimental group, we focused on exercises aimed at developing the strength of individual muscle groups, particularly the back muscles. Consequently, during the second testing, the difference between the average levels was again statistically significant (Dif.: 5,04; t: 3,44; P(t): 99,9%). Regarding the strength and muscular endurance of the upper extremities, EG started the experiment with a lower average result than CG (13.68 compared to 14.64). The difference at the study end is small and we do not observe statistical significance (P(t): 46%). After the intervention, the achieved results in both groups increased, but this time

in favor of EG – 18.92 compared to 17.88 for CG, but is statistically significant comparing the beginning and after the applied author's aqua spinning program (Dif.: 5,24; t: 3,54; P(t): 99,9%).

Tracking the dynamics of strength and muscular endurance of the abdominal muscles reveals no statistically significant difference between the two assessed groups during the initial testing. However, by the end of the study, a significant difference is observed (see Table 1). Initially, the girls from the Experimental Group (EG) achieved a better average result—16 crunches—compared to 14.88 crunches in the Control Group (CG). In the second testing, the average result in CG improved by 3,24 crunches, whereas in EG, it improved by 5.20 crunches, thereby increasing the difference between the average levels of the groups. The Student's t-test confirms that this difference has become statistically significant (see Fig. 1). This provides a basis to conclude that the aqua spinning complex focusing on strength development has enhanced the functionality of the abdominal muscles in the EG girls to a greater extent. For the lower extremities, this quality is tracked using the indicator "maximum number of squats".

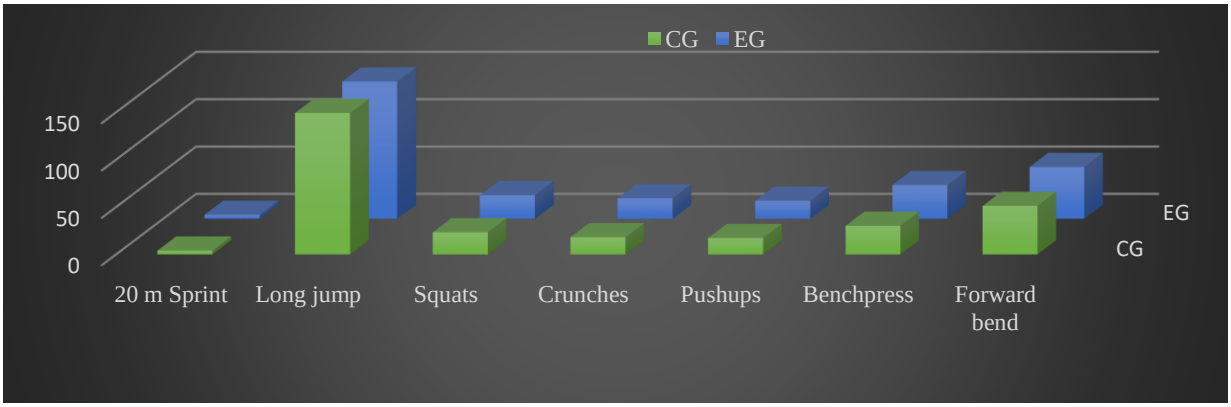


Fig. 1. Visualisation of the Benchmark analysis of the functional indicators at the end of the experiment

Both groups began the experiment with squats having insignificant differences in their average levels—20.92 repetitions in the Control Group (CG) and 21.44 repetitions in the Experimental Group (EG). By the end of the experiment, an increase in these values was observed in both groups, reaching 23.92 and 25 repetitions, respectively. However, the difference remains statistically significant (4.18 squats more), suggesting that the author's aqua spinning program has developed this quality to a greater extent than the tprogram in the CG (see Table 1). The development of the "standing long jump" indicator initially shows an insignificant difference between the average levels of the two groups—135.88 cm for CG and 140.76 cm for EG. At the end of the experiment, both groups exhibited almost identical increases in their average values. Despite this, there is a statistically significant difference of 8.5 cm in favor of the EG between the 1st and 2nd testing. This confirms our working hypothesis that the author's aqua spinning program had a modeling impact on the experimental group (EG). The dynamics of the subjects' speed capabilities were tracked using the "20 meters sprint" test. At the beginning of the experiment, a significant difference in the average levels of the two groups was observed, with EG achieving a much better average result—4.05 seconds compared to 4.26 seconds for CG. In the second test, both groups showed improvement, with CG improving by 0.06 seconds and EG by 0.03 seconds (see Table 1). This indicates that the functional-oriented new aqua spinning complex applied to EG develops speed qualities to a greater extent. By the end of the period, the difference between the two groups remains statistically significant for all studied indicators.

4. Discussion

4.1. The summarized results of the study highlight the significance of broadly disseminating modeling aqua spinning programs through SPA centers and 4 or 5 stars hotels equipped with swimming pools. An essential aspect is the continuous development of these programs to cater to diverse target groups, including those aiming to lose, gain, or maintain their weight. Biomechanics in sport has had a profound social impact, influencing various aspects of performance, injury prevention, and broader societal health and well-being. In Bulgaria, the development of aqua practices within the SPA industry is hindered by the lack of specific

information and advertising strategies tailored to appropriate media channels. We present the specific equipment of the pool with water wheels for practicing aqua spinning, as well as the underwater movements of the upper limbs during the workout. The modeling program is applicable for both genders.

4.2. How to Assist Weight Loss: To support weight loss, regular exercise with aqua spinning can significantly aid in reducing body fat and shedding pounds by burning an average of 450 to 700 calories per hour. However, exercising in water can increase appetite, so it is crucial to monitor food intake carefully. Restricting calorie intake is essential for achieving weight loss goals, as excessive eating can negate the benefits of exercise. It is advisable to avoid exercising on an empty stomach or immediately after a meal. Safety precautions, as recommended by the Red Cross, should be observed when practicing aqua spinning in water. Ideally, meals should be consumed approximately 45 minutes before or after exercise. Opt for nutritious options such as vegetables, fish, and dairy products. If cravings for something sweet arise, choose healthier alternatives like raisins or a small teaspoon of honey.

5. Conclusions

Based on our analysis, we can draw the following conclusions in this report for the Wellness benefits of practicing aqua spinning:

- proves to be effective for preventive health measures in aquatic environments, enhancing overall quality of life when incorporated into daily routines;
- serves as an interactive psychomotor activity, offering a means to combat female cellulite;
- clients feedback highlights the importance of developing and utilising diverse pricing packages for the programs combined with SPA procedures;
- the author's program contribute to weight loss and is deemed safe for the legs and spine;
- the program implementation adds a musical and aesthetic dimension to the experiences of its practitioners.

Acknowledgements:
Conflict of Interest: No conflict of interest was declared by the author and the institution.
Financial Disclosure: The developed analysis is under project BG05M2OP001-1.001-0001 "Building and developing a Centre of Excellence "Heritage BG", funded by the Operational Program" Science and Education for Smart Growth.
Declarations of informed consent have been signed regarding the publication of survey data.

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Information about the author

Bistra Dimitrova - Prof., D. Sc., Aquatic sports Chair, Faculty of Public health, Health care and Tourism, National Sports Academy "Vassil Levski", Expert evaluator at the EC, DG "Research", dimitrova.bistra@yahoo.com; 21, Acad. Stefan Mladenov str., Studentski grad, 1700 Sofia, Bulgaria, https://ORCID.org/0000-0003-3152-983