



RESEARCH ARTICLE

The Effect of Different Physical Education Class Hours Applied in Secondary Education on Certain Physiological and Physical Parameters

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Abstract

This study investigates the effects of different physical education lesson hours applied to secondary school students on some physical and physiological parameters. A total of 36 secondary school students voluntarily participated in the study: respectively, 18 from Group 1 and 18 from Group 2 (age: 14.94±0.41 / 14±0.34 years; height: 175.22±7.62 / 169.33±6.95 cm; weight: 61.95±9.07 / 56.83±6.33 kg). While Group 1 students received 8 hours of physical education lessons per week, Group 2 students were given 2 hours of physical education lessons according to the Ministry of National Education curriculum. Body weight (kg) and body fat percentage (%) were determined using the Inbody 270 professional body analysis device. A portable dynamic balance device was used to determine the students' balance. The test results were analyzed using the SPSS Statistics software. Non-parametric tests were employed since the data did not show a normal distribution. The Mann-Whitney U test was used to test the significance of the difference in balance and body fat percentage (BFP) level averages between the two independent groups. Upon evaluating our data, it was statistically ascertained that the dynamic balance (Balance) values of Group 1 secondary school students were significantly higher when compared to Group 2 students. However, no statistically significant difference was found in body fat percentage (BFP) values between Group 1 and Group 2. As a result, it is seen that increasing physical education lesson hours in secondary education contributes to some physical development of young individuals.

Keywords

Balance, Exercise, Secondary Education

INTRODUCTION

Childhood is a pivotal phase during which an individual undergoes rapid and influential development that has lasting implications for their future. Providing fundamental sports training and fostering the necessary interest in sports from childhood and sustaining it through physical activities are of great importance, leaving lasting impacts on individuals' lives with their gains

(Sever, 2018). Physical activity during this stage is instrumental for dynamic engagement within the social milieu, fostering socialization (Sever and Barkan, 2022, Akçakoyun et al., 2016 & Gökşen, 2014). Education, defined as the formal and informal transmission of knowledge and insights from preceding generations, shapes desired behaviors in individuals (Ercan, 1998 & Aydın, 2016). The primary objectives of education are to orient and cultivate individuals towards specific

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goals and to establish a contemporary, healthy paradigm congruent with the existing world (Ergün & Ersoy, 2014). Thus, by imparting quality education to younger generations, society benefits substantially (Aktug et al., 2017).

In this context, physical education and sports activities emerge as vital facets of individual and societal development. Such activities hold prominence throughout one's educational journey (Yavuz et al., 2019). A structured integration of movement and physical education within the broader educational curriculum significantly enables students to hone movement skills, sustain physical fitness, attain health awareness, develop essential life skills, and nurture social competencies (Pangrazi, 2001 & Aynacıyan and Özer, 2020).

Physical education is an indispensable avenue for individuals to engage in physical activity (Özcan and Üstündag, 2017). Tailored to individual needs, it stands as a cornerstone of holistic education. In childhood, physical education facilitates self-expression, creativity, mind-body harmony, growth, development, and emotional regulation (Bucher, 1987 & Demirel, 2010). The curriculum that children are exposed to in their early educational years is predominantly game-centric (Temel & Avşar, 2009). The underlying objective of this game-focused approach is to nurture movement skills. Such foundational skills pave the way for healthier and more fulfilling lives (Temel & Avşar, 2009 & Silverman and Scrabis, 2004).

Contrary to the misconception of training students in specific sports, the primary goals of physical education are to offer a respite from rigorous classroom settings, transition students from sedentary to active lifestyles, enhance health factors, foster a problem-solving ethos, and build resilience against prospective challenges. This groundwork is also crucial in preparing the subsequent generations to become adept educators (Özşaker & Orkun, 2005). The present study seeks to discern the disparities between middle school students undergoing two hours of physical education weekly and those engaged for eight hours, explicitly focusing on balance and body mass index.

For this purpose, the hypothesis of our study is that the dynamic balance parameters of sports high school students will be better than regular high school students.

MATERIALS AND METHODS

Research model

In this investigation, aligned with the curriculum set forth by the ministry of national education, initial assessments were conducted to gauge participants' dynamic balance, height, weight, and body fat percentage. Following an 8-week physical education intervention, these metrics were reassessed. Students from sports-centric high schools engaged in physical education for 8 hours weekly, unlike their counterparts in conventional high schools, who participated for 2 hours weekly. The ministry of national education's curriculum encompasses domains such as movement skills, movement concepts, associated life skills and principles, strategies and tactics related to movement, habitual physical activity, fundamental principles of physical activity and related life skills, cultural heritage and values, and the understanding and organization of sports.

Research group

The study cohort comprised thirty-six volunteer students, indiscriminately chosen from both Ali Fuat Kadirbeyoğlu Anatolian High School and Gümüşhane sports high school in Gümüşhane, Türkiye. These students exhibited no known health concerns. Based on their instructional schedules, they were categorized into two distinct groups. The first group was subjected to 8 hours of physical education weekly, whereas the second group participated for 2 hours. All physical education sessions were orchestrated in compliance with the curriculum delineated by the ministry of national education.

Ethical approval was obtained for this study and the study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent explaining the study steps and objectives was signed by all participants.

Table 1. Demographic variables for participants

	Grup	N	Min.	Max.	Mean	Sd
Age (years)	1	18	14	16	1.94	±0.41
	2	18	13	15	14	±0.34
Height (cm)	1	18	160	189	175.22	±7.62
	2	18	157	181	169.33	±6.95
Weight (kg)	1	18	48	75	61.95	±9.07
	2	18	45	69	56.83	±6.33

Data collection tools

Anthropometric measurements

Participant Height: Participants' heights were measured in centimeters using a wall-mounted stadiometer by Holstein Ltd, England. Measurements were taken with the participant in an anatomical position: barefoot, heels together, holding their breath, and their head aligned in the frontal plane, ensuring the vertex touched the measuring board (Söyler, 2022 & Mor et al., 2022).

Body Composition Analysis: To determine the body weights (in kg) of the athletes participating in the study, we used an Inbody 270 brand body analysis device from Japan (Sassi et al., 2011).

Data analysis

The statistical analysis of the data was conducted using the SPSS 16.0 software package. To evaluate the normality of the data, the Shapiro-Wilk test was employed. As the data did not show

a normal distribution, non-parametric tests were used. In the study, the Mann Whitney U test was utilized to test the significance of differences in average balance and BFP levels between two independent groups; a p-value greater than 0.05 was considered non-significant.

RESULTS

When Table 2 was examined, the average balance values for Groups 1 and 2 were determined to be 2.98 ± 0.87 . When the balance values of Groups 1 and 2 were compared, it was determined that the balance value was statistically higher. When Body Fat Percentage was examined, the average Body Fat Percentage for Groups 1 and 2 was 11.31 ± 2.70 . When the Body Fat Percentage values of Groups 1 and 2 were compared, no statistically significant difference was observed ($p > 0.05$)

Table 2. Analysis results of the comparison between groups regarding dynamic balance (TOGU) and body fat percentage values

Variable	Group	n	X	Sd	Min	Max	Rank. Avg.	U	P
Balance	1	36	2.98	± 0.87	1.35	4.75	23.44	73.00	0.04
	2						13.56		
Body Fat Percentage (%)	1	36	11.31	± 2.70	5.70	16.30	17.36	141.50	0.52
	2						19.64		

DISCUSSION

In the investigation, the experimental group consisted of eleven female and nine male athletes, whereas the control group comprised eleven female and eight male athletes. Athletes from the experimental cohort had an average height of 130.75 ± 4.84 cm, while those from the control cohort registered an average of 127.84 ± 4.54 cm. The findings indicated a notable increment in body weight for both the experimental and control cohorts between the preliminary and concluding tests ($p < 0.05$). Nonetheless, when comparing the initial and final tests, no statistically significant variance was identified in body weight between the athletes of both cohorts ($p > 0.05$). Study of Başal & Yüksel (2021) with 12-13-year-old students mirrored these findings, indicating no significant disparities in body weight metrics. Similarly, study of Yüksek (2020) by involving female participants undergoing basketball training

did not unveil any body weight variances after 12 weeks. Such observations align seamlessly with our research outcomes. The discerned statistical significance between the cohorts' initial and final test results can arguably be attributed to the natural progression during the research duration.

Contrastingly, study of Anamurluoğlu (2020) which scrutinized the impact of foundational classical ballet training supplemented with pedagogical games on 3-5-year-old children, identified significant variances in body weight metrics ($p < 0.05$). It's postulated that discrepancies between Anamuroğlu's investigation and the present study might stem from differences in age brackets and game methodologies.

Upon assessing Table 2, it becomes evident that the Body Fat Percentage metrics of the experimental cohort athletes remained consistent between the initial and final tests ($p > 0.05$). On the other hand, the control group showcased a marked rise in Body Fat Percentage metrics between these

tests ($p < 0.05$). Both cohorts, however, did not display significant disparities in Body Fat Percentage metrics for the initial and final tests ($p > 0.05$). A literature review emphasizes that most studies predominantly focus on BFP (Promsri et al., 2020) as a crucial parameter. Table 2's analysis revealed a stable trend in power metrics between the preliminary and concluding tests for the control group ($p > 0.05$), in stark contrast to the experimental group, which displayed a considerable upsurge ($p < 0.05$). Furthermore, no significant variances in power metrics were identified between the two groups during these tests ($p > 0.05$).

In a 2018 study with 12-14-year-olds, Balcıoğlu pinpointed substantial differences in BMI and anaerobic power levels. Likewise, Kırıştı (2019) investigation involving 12-14-year-old females, unveiled notable group differences. Cirav's (2018) research, which evaluated the repercussions of pedagogical games on 9-10-year-old children, discerned significant variations in the vertical jumps of the control group ($p < 0.05$). In a study exploring the ramifications of pedagogic game-based training on the motor skill evolution of judo starters, salient differences were observed in the vertical jump metrics of the experimental cohort when juxtaposed against the control group (Steidl-Müller et al., 2019).

Erturk et al. (2021) compared some parameters on the shooting performance of air rifle athletes according to gender and competition categories, and found that 20 air rifle athletes had negative and high scores between male participants' serial shooting scores and right foot dynamic balance ($r = -0.790$; $p < 0.05$) measurements. They determined that there was a statistically significant relationship at the level. Scrutiny of Table 2 deduced that both cohorts of athletes did not exhibit substantial shifts in flexibility metrics between the preliminary and concluding tests ($p > 0.05$). Moreover, no significant disparities were observed between the two groups for these tests ($p > 0.05$). Past research involving 7-8-year-olds undergoing pedagogical games found consistent results in the sit-reach test comparisons (Bilgiç et al., 2016 & Kusan et al., 2018). Study of Uurlu (2014) 10-12-year-olds also reinforced these findings, indicating no notable class-based differences. Bayrakdaroğlu et al. (2021) in their study examining the performance responses to 8-week terabant exercises applied to football players,

they could not detect the effect of terabant exercises on the balance parameters of 14-year-old children.

Conclusion

We believe that this study on different physical education class hours will contribute to the literature, and the findings will pave the way for similar studies in the future.

Conflict of Interest

This study there is no conflict of interest. There is no financial support provider.

Ethics Committee

This study is approved by Bayburt University, Ethical Committee approved the study protocol (2023/decision 269-14/E-15604681-100-150129), and the study is conducted in accordance with the principles of the Declaration of Helsinki II. Written informed consent that explains the study steps and aims were signed by all participants. All authors have read and agreed to the published version of the manuscript.

Author Contributions

Study Design, MOS; Data Collection, MOS, MS, YEC, EB; Statistical Analysis, YEC, MS, EB; Data Interpretation, YEC, MS, EB; Manuscript Preparation, MOS, MS, YEC, EB; Literature Search, MOS, MS, YEC, EB. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to legal restrictions.

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