

Enhancing health in primary school: Unveiling the impact of the “Physical Snack” Project

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Abstract

This study aimed to evaluate the impact of the "Physical Snack" Project in Apulia, Italy, on the physical fitness development of primary schoolchildren. The sample comprised 765 children (399 males, aged 11.20 ± 1.72 ; 366 females, aged 11.32 ± 1.76), drawn from three primary and secondary schools. The intervention protocol, implemented between March and June 2022, included active breaks, physically engaging lessons, and additional active breaks before and after school. The evaluation at two time points (t0 and t1) encompassed anthropometric measurements and a battery of physical fitness tests, namely standing long jump, medicine ball throw (2 kg), 6-min walking test, sit-ups, 10×5 shuttle run, and hand grip. The findings revealed a statistically significant enhancement in standing long jump ($p < 0.05$) and the 6-min walking test ($p < 0.01$). The preliminary outcomes of the "Physical Snack" project underscore the importance of a robust methodological–didactic structure in motor task implementation, especially in how they are presented by teachers, to intentionally foster specific components of physical fitness. The observed improvements in physical fitness, considered an indicator of health status, emphasize the potential of incorporating active breaks and "active" school interventions for schoolchildren. This approach not only contributes to the betterment of physical health but also creates opportunities to encourage and extend the duration of physical activity among students.

Key words: active breaks, active lessons, health promotion, physical fitness, primary school children.

Introduction

International literature has highlighted many types and strategies of intervention aimed at promoting physical activity in different educational contexts: school, sport, public health, leisure, etc (Fletcher & Ní Chróinín, 2022; Arufe-Giráldez, Sanmiguel-Rodríguez, Ramos-Álvarez, & Navarro-Patón, 2023). Particularly, in the school setting, physical activities can be promoted during the curriculum, breaks and breaks. Alternating and integrating the usual and traditionally theoretical teaching with "active" teaching strategies (i.e., physically active lessons, active breaks, active recreation, lessons of and. physics in class, etc.) some subjects of disciplines such as mathematics, geography and foreign languages can be contextualized in the motor field, expanding and enhancing the relationship between learning (Vazou et al., 2020). Rizal, Hajar, Muhamad, Kueh, & Kuan (2019) define, in fact, the active breaks as a mode of didactic-educational intervention that can significantly improve the cognitive and physical development-children’s motor, with important benefits on the general health status.

Moreover, according to the American Academy of Pediatrics: (a) recreation is considered a significant moment in the school day, functional to the social, emotional, physical and cognitive development of the child, (b) school performance is strongly influenced by the frequency and duration of breaks during the curriculum, (c) recreational activity, structured and not, carried out during recreation is not a "substitute" for physical education, despite its important contribution to the promotion of physical activity and the reduction of overweight, (d) recreational activities foster the learning and interaction of life skills and the goals of school experiences related to communication, cooperation, sharing and problem solving (Murray & Ramstetter, 2013).

Present paper describes the results of the Physical Snack Project aimed at improving physical fitness – as health status indicator – in primary and secondary school children. The project, with as partner the University of Foggia (Department of Humanities, Department of Clinical and Experimental Medicine and Laboratory of Didactics of Motor Activities) provides for the involvement, the creation and synergistic interaction of a network of School Institutes in Apulia Region (Southern Italy).

The aim of this study is to assess the effects of active breaks on the development of physical fitness of primary and secondary school students. The hypothesis is that increasing opportunities to be physically active at school has positive effects on physical efficiency.

Materials and Methods

Sample

sample involved 37 primary and secondary school classes, for a total of 765 children (male = 399, age = 11,20±1,72 years old; female = 366 females, age = 11,32±1,76 years old), recruited from three primary and secondary schools in an Apulia province (Foggia).

Table 1 provides a descriptive sample's distribution.

Table 1. Sample's anthropometric characteristic

	Sample				
	N	Age	Weight	Height	BMI
Male	399	11,20±1,72	45,28±3,12	1,55±0,05	17,39±2,17
Female	366	11,32±1,76	41,60±4,46	1,48±0,07	17,25±2,34

Procedure

The project was proposed to the school in March to June 2022 for twelve weeks. The intervention protocol provided the following classroom's activities:

1. active breaks: short periods of physical activity during the intervals between two curricular courses with the integration of specific contents of disciplinary learnings (5 to 10 minutes active breaks);
2. physically active lessons: active lessons based on the learnings outcomes, i.e., foreign language, geometry and mathematics, science, etc. (20 to 30 minutes of activity);
3. active breaks before and after school: physical activity at the end and at the beginning of curricular school's activities (10 to 15 minutes of activity).

Each activity was carried out twice a week for 12 weeks and were conducted by twelve Graduates in Preventive and Adapted Motor-Sport Science with many years of experiences in the field of the didactic of basic motor activity and physical education.

Measures

The assessment involved anthropometric data and physical fitness test. A calibrated stadiometer and a balance scale were used to evaluate standing height and body weight, while BMI value was obtained by dividing the body weight (kg) by the body height squared (m²) (Khosla & Lowe, 1967).

Physical fitness assessment involved the standing long jump, 10x5 shuttle run, sit up and hand grip test – as a part of the Eurofit Fitness Testing Battery (Council of Europe, 1993)- the medicine ball throw test (Morrow, Mood, Disch, & Kang, 2015) and 6minutes walking test (Kasović, Štefan, & Petrić, 2021).

The assessment was conducted during the first and the latest week of intervention during curricular physical education lessons in March and June 2022 both by Graduates in Preventive and Adapted Motor Sciences and physical education teachers.

Data Analysis

verifying the normality data distribution with the Saphiro-Wilk test, excluding abnormal and minimum/maximum values, the results of the descriptive analyses were reported in terms of mean and standard deviation (M±SD). After verifying homoscedasticity condition (Levene test), simple t-test with repeated measures was performed to compare physical fitness before and after the intervention protocol. The analysis was conducted using SPSS ver.25 software setting significant valute at $p < .05$.

Results

Physical assessment results are showed in Figure 1-6.

Figure 1. Standing long jump assessment in t₀ and t₁

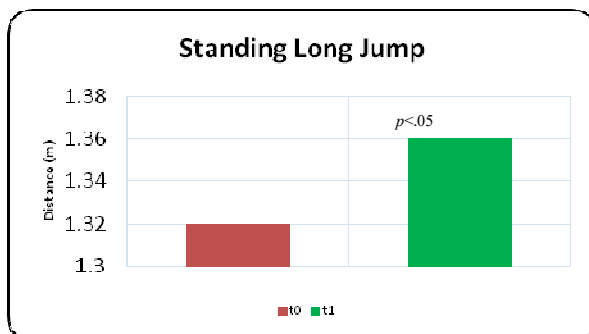


Figure 2. Medicine ball throw assessment in t₀ and t₁

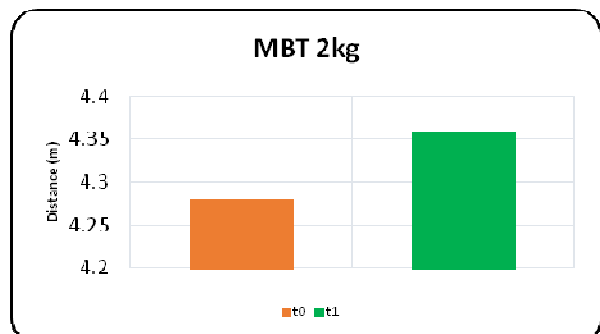
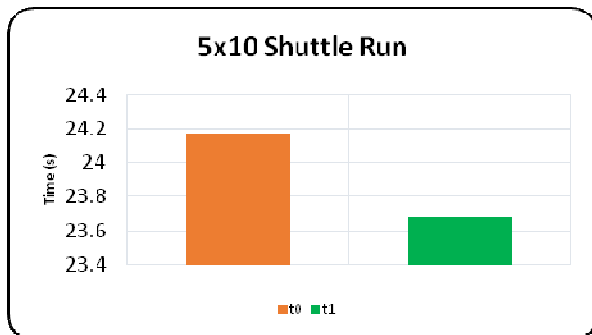
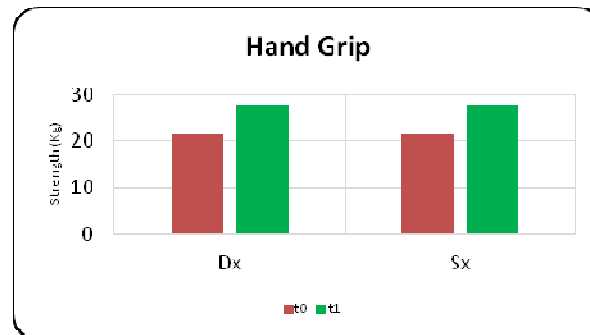
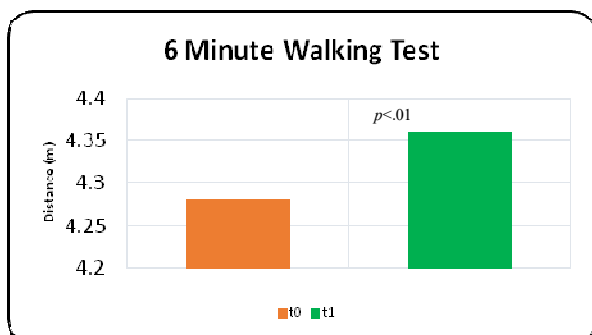
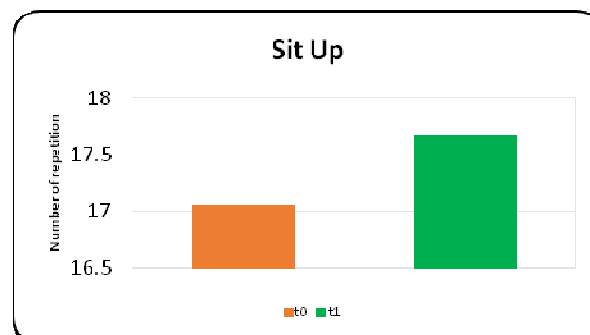


Figure 3. 5x10 shuttle run assessment in t_0 and t_1 Figure 4. hand grip dx/sx assessment in t_0 and t_1 Figure 5. 6Minute walking test assessment in t_0 and t_1 Figure 6. Sit up assessment in t_0 and t_1 

The analysis of the results shows that children's motor performance improved in almost all physical fitness test from t_0 to t_1 with significant p value in standing long jump and 6 Minute walking test.

Discussion

the present study children showed better motor performance after an intervention protocol based on active breaks and active lessons in the class. However, despite the improvement in physical fitness in the post-intervention, statistically significant results were found only for the standing long jump and the 6 minutes walking test as indicator of lower limbs muscular strength and cardiorespiratory fitness, respectively.

This would suggest not only that the improvement of the opportunity to be physically active in school represents a great strategy to enhance motor performance in primary and secondary school children, but arise the needs to program and structured protocols during the medium/long term to have a positive and significant effects on all the components of physical fitness (strength, endurance and speed).

These results are consistent with other international research.

The study of Bonnema, Coetzee & Lennox (2022) analyzed the effect of a three-month active breaks intervention program on physical fitness in a sample of 126 children (experimental group = 79 and control group = 47). Physical fitness was assessed with the Eurofit test battery. The results showed a statistically significant difference in favor of the experimental group for body fat percentage, balance, plate tapping, sit-and-reach, standing jump, sit-ups and shuttle run and between the pre-and post-test.

Another study (González-Fernández et al., 2021) assessed the effects of 8 weeks active breaks on physical performance in high school students (aged 15-17 years old) using the Alpha-Fitness battery (physical fitness) and the Psychomotor Vigilance Task (vigilance performance). Compared to pre-post test results highlighted better and faster performance in vigilance tasks in high school students.

The study of Zerf (2018) involved 120 male students aged 13-15 years old in a active breaks intervention protocol, as follows:

- active breaks based on conversation games;
- active breaks based on singing games;
- active braks based on role-playing games.

Activities were conducted two times per day for 10 minutes each for two months. Results revealed the effectiveness of active breaks role-playing games for enhancing motor performance and physical fitness in middle schools. However, international literature has showed the role of active breaks as a recommended strategy that can help children to increase daily levels of physical activity in the school setting.

The study Masini et al. (2020) showed the feasibility and efficacy of an active breaks program in reducing sedentary behaviour, increasing the daily number of steps and time spent in moderate to vigorous

physical activity (MVPA) weekly. In addition to the effects on physical fitness and levels of physical activity, another important variable is teachers and students' perception of active breaks programs. Mullins, Michaliszyn, Kelly-Miller, & Groll (2019) in their study - conducted on 254 primary school children and 18 teachers - reported not only that all students involved enjoyed the classroom active breaks, but also that teacher considered active breaks supportive for learning achievement without hindered classroom learning.

Conclusions

Research has shown that the Physical Snack Italian represents a safe program for reducing inactivity and increasing physical fitness in primary and secondary school children. Designing structured and flexibly adapted active breaks to meet the needs of the school curriculum could increase the feasibility and acceptability of this intervention strategy in schools. From a methodological and didactic point of view, another element to consider is the relationship between the type of active breaks - or the motor task proposed during the active breaks - and the motor ability that teacher wants to solicit. In this case, further studies could be conducted to define a repertoire of active breaks aiming at the development of cardiovascular endurance, strength, flexibility, joint mobility, or motor coordination (motor combination, orientation, rhythm, etc.).

This study also demonstrated the effectiveness and feasibility of the Physical Snack protocol in primary school children, thanks to its simple application and sustainability, defining the active breaks as possible intervention to reduce inactivity, helping to reach the MVPA target of 60 minutes per day and enhance physical fitness.

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