

The educational value of physical activity at school age

PIGNATO, S.¹, PATANIA, V.², SCHEMBRI, R.³, SGRÒ, F.⁴

^{1,2,3,4} Department of Health and Human Performance, Texas State University, USA

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Abstract:

Physical activity positively intervenes on the physiological, cognitive and affective - relational side of the person, aspects intrinsically linked to the achievement of psycho-physical well-being. Over the last decade, the positive correlation between physical activity and active lifestyles in children and adolescents has been the focus of various research (Gawrilow et al., 2016; Budde e al., 2008; Castelli et al., 2007; Nelson & Gordon, 2006; Sigfusdottir, Kristjansson & Allegrante, 2006) who, starting from different points of view, demonstrated the strong educational value of the physical activity. The present study, after a brief examination of the most important international documents on the educational value of physical activity, sets out the results of empirical research carried out in a secondary school in our territory, with pupils with different levels of physical activity experience. The research has allowed to record an increase in the levels of physical efficiency demonstrated by the tests submitted to the experimental group, except in the race test on the 30 m. In conclusion, It is possible to affirm that regular and vigorous physical activity allows significant improvements in motor performance.

Key words: physical activity, education, pre-adolescence, lifestyles, well-being.

Introduction

OMS guidelines recommend for children and adolescents between the ages of 5 and 17 to practice at least 60 minutes of moderate-vigorous daily physical activity and muscle-strengthening exercises skeletal at least 3 times a week. Physical activity exceeding 60 minutes, including play, structured exercise and aerobic sports, promotes active lifestyles that are reflected in psycho-physical well-being (Declaration of Bangkok, 2016). The results of the 4° Italy Report of the HBSC study (Health behaviour in School-aged Children, 2016), carried out internationally every 4 years in collaboration with the Regional Office of the World Health Organization for Europe, involves 11, 13 and 15 year olds, shows the seriousness of the situation with regard to the sedentary and wrong lifestyles of adolescents. The study of the ISS, contained in the report OKkio to Health (2018), shows that the level of moderate-intense daily activity is respected by only 9.5% of the 11-15 year old boys, which decreases with the age (11 years: 11.9%; 13 years: 6.5%; 15 years: 6.8%) and is higher in males. This behaviour is decreasing compared to 2014, the date of the last survey. The synoptic below highlights the data of boys and girls who perform physical activity just 1 hour a day, every day, and shows that with the increase in age decreases the physical activity (Table1).

Table 1 Students who train daily for 1 hour a day (OKkio alla salute, 2014)

	11 anni	13 anni	15 anni	Tot
Maschi	18,2	13,8	10,5	14,5
Femmine	10,8	6,8	6,1	8,1
M. e F.	14,6	10,3	8,3	11,3

These findings are also confirmed by WHO, which through a careful study confirms that three out of four adolescents (aged between 11 and 17 years) do not exercise. In Italy, the results of the survey OKkio alla Salute (2016) confirm the low propensity to physical activity of children: 34% devotes at most one hour for one day a week to structured physical activity. The incidence on health and lifestyles are worrying. Among children of 8/9 years, 1 in 3 is overweight. 21.3% of children are overweight and 9.3% are obese, including severely obese children who alone are 2.1% (IOTF cutoff). Even if compared to 2008/2009 the figure improves by 5.4%, our country still has very high values of excess weight. Among adolescents it has been found that compared to 2010 the number of boys performing physical activity increases; one hour three times a week in all age groups. Data in their negative complexity (increasing for children and adolescents hours spent in front of computer tools), are not attributable to individual responsibility. Not performing physical activity or practicing it in irrelevant quantities is not a personal choice, but the result of conditioning and educational choices that pertain to the family, the school, the environment, the services present in the territory. The Istat 2016 data on sport in Italy offer further food for thought. They show a strong association between the physical activity or inactivity of

parents and children; this relationship remains even when only one of the two parents is a sportsman. Young people living in families with good economic resources have higher levels of sport practice, while the most disadvantaged family economic situations are predominantly associated with sedentary behaviour; In addition, among the 3-24-year-old population practising sport, there are higher educational qualifications among parents. This underlines that the family context significantly affects the level of activity or inactivity of children. The constant practice of physical activity, in fact, is the result of collective orientations rather than individual, of cultural and educational choices that favor movement, the enhancement of the body and being well with oneself and others. Promoting actions and strategic guidelines to promote physical activity in children and adolescents is considered a priority objective that goes beyond health problems, It has positive effects on the quality of life and on individual and collective well-being.

The Strategies for Physical Activity (2016-2025) indicated by the OMS to the Member States had included in the priority area support for the development of children and adolescents, with specific interventions in the field of education: 'to make kindergartens and schools more active by providing support, adequate resources and appropriate educational opportunities; to promote the participation of children and adolescents in extra-curricula for physical activity; as well as providing subsidies for enrolment in sports clubs and gyms; promoting physical activity among adolescents, including during their leisure and leisure time». The same Toronto Paper for Physical Activity (2010) had represented the need, within the framework of Education, to support actions to prioritize the lessons of physical education curriculum of high quality, with particular attention to sports activities that are not competitive in schools and that enhance the training of all teachers with respect to the themes of physical activity. The International Paper for Physical Education, Physical Activity and Sport of UNESCO (2015) highlights the importance of the benefits of physical activity: 'Physical education, physical activity and sport can play a significant role in developing participants, literacy, well-being, health and potential through improved endurance, strength, flexibility, coordination, equilibrium and control [...]. Physical education, physical activity and sport can improve mental health, psychological well-being and complex skills of action by increasing the positive perception of one's body, self-esteem, self-efficacy, through the reduction of stress, anxiety and depression, the increase in cognitive function [...]». If placed in the right relationship, the aspects related to health and those related to the psychological state and social well-being, originate the Life enhancing physical activity (LEPA), that is the activity for the development of quality of life and the enhancement of learning behaviors (lifestyles, willingness to move) rather than learning skills (Gaetano, 2012).

In order to enhance the promotion of interventions by Member States in favour of physical activity, the World Health Organization has drafted the More active people for a healthier world (2018 - 2030), addressed in particular: groups most at risk of physical inactivity and sedentary activity, such as adult and adolescent women. The strategic objective "Promoting active lifestyles" in multiple contexts (school, work, territorial communities) programmes and opportunities, tailored to different life and age needs, to encourage individuals, families and groups most at risk of physical inactivity, to experiment with and consolidate active lifestyles». A child educated through movement, immersed in the constancy of physical activity throughout the period of its development will not only improve its health, but will have a wealth of knowledge and skills that will be its endowment capital (motivation, confidence, physical competence, etc.) which will enable him to maintain a high level of physical activity for the entire life cycle and to be able to choose behaviors and attitudes oriented to active lifestyles. Physical literacy behavior allows the subject to set goals for the planning and realization of personalized physical and sports activities at his age, state of health, physical condition, motor skills, their level of learning and, above all, to maintain their ability to «take responsibility for the purposeful maintenance of physical activity throughout their lives (Whitehead, 2013)». Literacy defines the ability to apply in precise contexts knowledge and sports skills, to reflect on them and to communicate them effectively.

Its foundation lies in the need to recognize that one of the specific functions of Physical Education, Physical Activity and Sport is to evolve the potential of the person into skills through the choice of learning tasks appropriate to each student. Physical activity in school must be the main tool to fully experience fundamental values for the educational process of the person: teamwork, inclusive practices, fair play contributes to the development of life skills essential for a correct educational growth and for the maintenance of health. In the White Paper on Sport (2007), physical activity in any case, sport and physical education are regarded as «essential elements of quality education and as a means of making school more interesting and improving student attendance». This must be translated into intensive physical education programmes with the help of local associations to offer out-of-school sports and physical activities to children and adolescents in increasingly active cities (WHO, 2008) where you can have outdoor and indoor public spaces to make possible the strategies of contrast to sedentary (Pignato, Casolo, 2019. In the recent document "Integrated Policy Addresses for School Promoting Health", approved by the State-Regions Conference in January 2019, physical activity for children is a fundamental task of the school.

This confirms the concept already expressed in the World Health Organization's Recommendations, which defines the school «place or social context in which people engage in daily activities, in which environmental, organizational and personal factors interact with each other to influence health and well-being». The school becomes a center that promotes culture, education, healthy lifestyles within a methodological

framework of real intersystemic collaboration, where each stakeholder adds specific skills, to initiate health processes and promote well-being in schools. In the light of what has emerged from our scientific research, in a gymnasium in eastern Sicily with the aim of investigating whether the physical activity regularly performed by pre-teens at school and outside school, can optimize the quality of motor experiences combining high stresses for: the improvement of physical efficiency, the coordination development and the development of psychological conditions favourable to learning and well-being. The sample (Table 2) that participated in the experiment in the year 2018 from November to May is represented by 117 students from six classes of the first grade secondary school.

Table 2 - Sample of subjects

Classe	2°a	2°b	2°c	3°a	3°b	3°c
Numero	22	18	20	19	20	18
Sesso						
M	10	9	8	10	12	7
F	12	9	12	9	8	11

Material & methods

117 students from six classes of upper secondary education participated spontaneously in the trial. The subjects all came from the same school. The sample was divided into two groups: a control group which carried out the normal activities foreseen during the physical education hour, and an experimental group which followed the research protocols. The experiment took place in the school gym. For each class a teacher representative was contacted for the project. To promote participation in the study, an information campaign was carried out to provide appropriate motivation for the children involved and their parents. A short meeting was held with parents to inform them about the aims and methods of the study. A letter of presentation of the project was delivered to the school manager, the parents of the participating children, together with the informed consent previously signed by the parents and the acquisition of their telephone number. Evaluations were performed twice, at the beginning of the trial and at the end of the training period.

The inclusion criteria for participation in the study were:

1. subjects between 12 and 14 years of age
2. subjects able to understand the coach's directions
3. individuals capable of carrying out the tests independently
4. individuals capable of carrying out the exercises proposed independently

The exclusion criteria were as follows:

- 1) subjects with current pathologies
- 2) psycho-physical non autonomous subjects
- 3) listless subjects
- 4) subjects unable to guarantee continuity in the trial

The administration of the engine tests both before and after the training period, always took place on Monday morning at 10:00, after two hours of breakfast and with the same clothing. The first evaluation procedures were performed at the gym in September, whereas the second evaluation procedures were conducted in May at the same location and in accordance with the initial conditions to ensure the validity of the research. The administration of the tests and the training sessions were carried out in a gym specially designed for research and without danger to the participants.

The following tests were used for the study:

A. Abalakov test

In this test each subject jumped by swinging his arms behind the body immediately after crouching until bending his knees to 90°. Three tests were performed spaced by three minutes. The test measurements were carried out in units of 1 cm and the higher value of the three attempts was used as a representative value (Hamano et al., 2015).

B. Race on 30 meters

In this test (specially prepared for research) every subject starting from the erect station, travels as fast as possible the predetermined distance of 30 meters, stopped or launched. In addition to the fast force, the acceleration capacity is also assessed; this is particularly true for 60 metres. After having performed 3 tests, spaced by 3-4 minutes (complete recovery), the coach calculated the average of the three tests and the obtained value represented the final result.

C. Test of Cooper

The test was used to evaluate the efficiency and functionality of the cardiovascular system. In the specific one asks the subject to cover the greatest number of Km in 12 minutes of race on a flat ground or on an athletic track. Readings of the distances travelled must be possible on this circuit, at least with marked intervals of at least 50 metres in 50 metres. It will be necessary, for the purposes of evaluation, to measure the distance travelled by the athlete at the end of the twelfth minute, with a maximum accuracy of 50 meters (Bosco et al., 1995).

D. Dexterity Circuit

The circuit has been specially prepared for research, to evaluate strength, power and endurance at the muscle level. Composed of 8 (stations), it has been completed in a time between 10 and 20 minutes, according to the set goals and the level of training. The subjects repeated the circuit 3 times in the same training session. The repetitions for each station were quantified in numbers from 12 to 20. For the realization of the circuit, they have used of the cinesini, of the circles, the mats and the balloons disposed in function of the objectives to reach. Evaluation is carried out by taking the two best tests to within a hundredth of a second.

Training program

The training was divided into three phases: a heating phase, a cardiovascular phase and a cooling phase. The 10-minute warm-up phase included aerobic exercises to prepare the body for exercises of higher intensity. Specifically, warm-up exercises were carried out in the chest and abdominal muscles, heating exercises for the upper and lower limbs. In the cardiovascular phase exercises of increasing intensity have been inserted with the scope to increase the conditional and coordination capacities. The final phase included 5-minute cooling exercises and stretching.

Results

Abalakov Test

The results obtained show differences between the two groups in the evaluation between pre and post training. In fact, in the pretest the diagram (Fig.1) evidences as the fast force, has a more or less similar course before that the programmed training for the experimentation comes administered. In the post test, the diagram (Fig.2) shows how, at the end of the training period, the experimental group had an optimal performance up to reach good and excellent parameters, while the control group had almost the same performance as at the beginning of the trial.

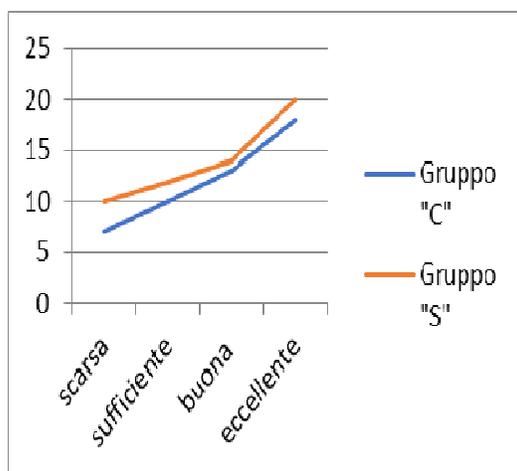


Figure 1 Pre-Test

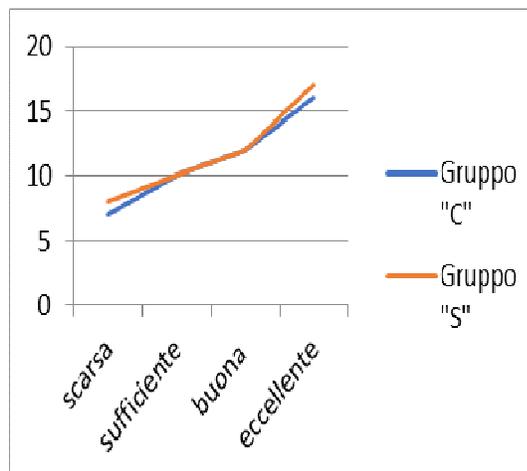


Figure 2 Post test

Race on 30 meters

The results obtained show differences between the two groups in the evaluation between pre and post training. In fact in the pre test the diagram (Fig.3) shows how the speed has had an almost similar course in the two groups taken in examination before that is administered the programmed training for the experimentation. In the post test the diagram (Fig.4) shows how, at the end of the training period, the experimental group had an optimal performance exceeding the value obtained in the entry test, while the control group had almost the same performance as at the beginning of the trial.

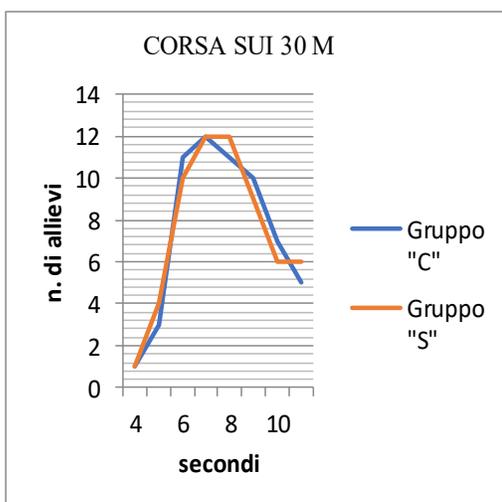


Fig. 3 Pre Test

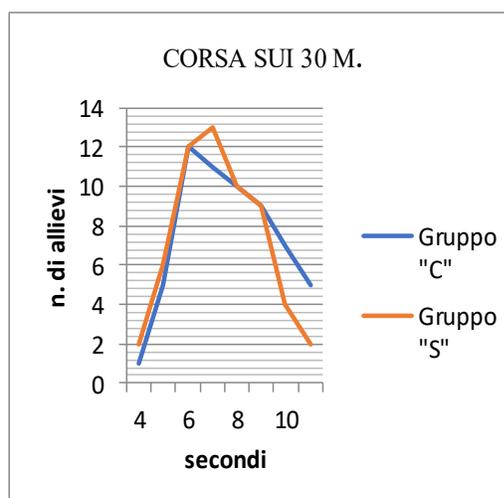


Fig. 4 Post Test

Cooper test

The results obtained show differences between the two groups in the evaluation between pre and post training. In fact in the pre test the diagram (Fig.5) shows how the resistance has had an almost similar trend in the two groups taken in examination before being administered the programmed training for the experimentation. In the post test the diagram (Fig.6) shows how, at the end of the training period, the experimental group had an optimal performance exceeding the value obtained in the entry test, thanks also to the continuous solicitations received from the sport practice, while the control group has had an involution of the performance.

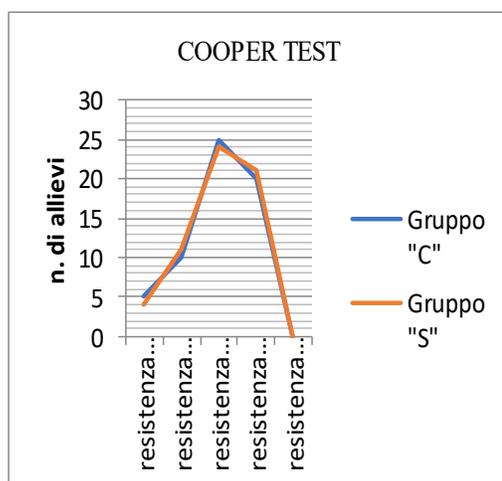


Fig. 5 Test pre

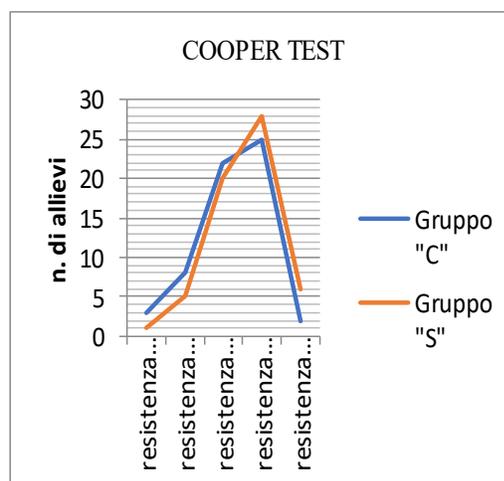


Fig. 6 Test post

Circuit training

The results obtained show differences between the two groups in the evaluation between pre and post training. In fact in the pre test the diagram (Fig.7) shows some values that have had an almost similar course in the two groups taken in examination before that is administered the programmed training for the experimentation. In the post test instead the diagram (Fig.8) shows how the two groups have reached different outcomes. In fact, the experimental group has carried out all the tests indicated by the circuit in the shortest possible time and especially with correctness of execution, achieving results higher than the average. The control group, on the other hand, spent more time making errors during execution and thus achieving below-average results.

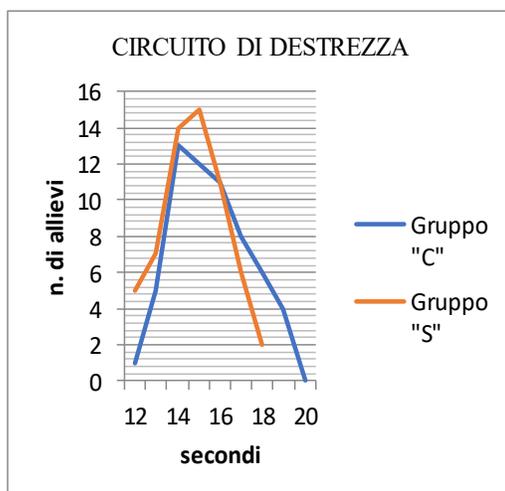


Fig. 7 Test pre

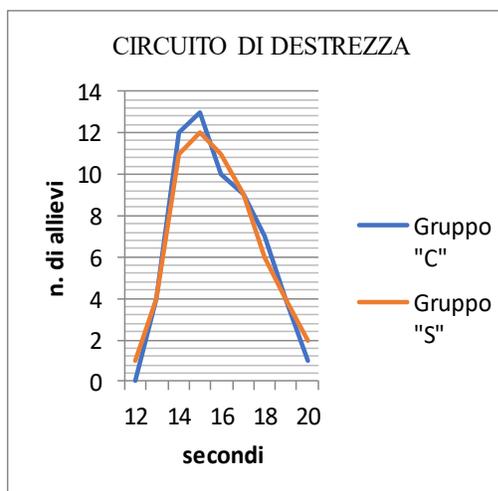


Fig. 8 Test post

Discussion and conclusions

The evidence in the literature, as well as the contribution presented in this study, inform us about the important deficiencies, in motor skills, of which the majority of children and pre- and adolescents entering primary and secondary school (D'Elia, 2019, D'Isanto, 2016, Gaetano, 2016). The results of our studies, in fact, clearly demonstrate how the performance of physical activity has produced differences in terms of improvements between pre and post evaluation in all tests. The Abalakov test reported three-point differences between pre and post for the experimental group, while the control group between pre and post maintained almost constant values. The 30 m stroke test shows improvements of 1 point or slightly more between the pre and post as shown in the graph; no change for the control group. Cooper's test reported three-point differences between the pre and post for the experimental group, but the control group got worse. We hypothesize having seen the training of the control group, that this happened due to the lack of training stimuli proposed to the boys during the hour of physical education. The results of the dexterity circuit show significant differences between pre and post. In fact from an initial score of just over 12 you get in the post to a score of just over 12. These data confirm that the variability of training is crucial in improving performance. Our results are in accordance with a scientific contribution (Ceciliani, 2019) that affirms the importance of taking into consideration, in addition to the characteristic of proposals of a playful type, for a good didactic to use the multilaterality of the proposals and, in particular, the intensive multilaterality oriented to a particular area of motor control. At an age where physical activity, energy consumption, the desire to move around relentlessly should characterize the daily life of each child, one must become aware of a flaw in the educational system (Miur, 2009; 2012) from which emerges the opposite tendency towards a life too sedentary and technological (Pignato, et al., 2016).

In response to this issue, qualitative educational models are being created, focusing on pleasure, fun, participation and customisation. Others may also contribute to such models in response to the quantity of educational action, such as enriched education or physically active teaching. In the face of a motor-physical-sports education that is increasingly and increasingly supported by pedagogy, for an approach that responds to the needs related to the age of development, it is necessary to think about didactic strategies that recover the lack of time, quantity and intensity without failing in the quality of the training (Ceciliani, 2018). In particular, it is a matter of giving life to synergistic moments in the school project with the close participation of the agencies present in the territory (CONI, sports federations, Promotion and start-up centres for sport) of strong organizational innovation, for a complex educational design, focused on versatility, to meet the needs of movement, play, recreation and health of all students. In addition to normal motor activities, through the implementation of circuit games regularly performed it has been noted that it can significantly improve the physical fitness of students, with repeated and prolonged activities over time. This can be understood because the movements made must be done in such a way that students can learn them without difficulty. In the light of the considerations made in this study, there is also a need to review the system of physical education, motor sciences, and initiation into sport at a young age. The quantity and quality of physical assets at preschool age should be reviewed with a view to acquiring active lifestyles. Those involved in motor and sports activities for the age group of development must be able to combine in practice the need for appropriate quality and quantitative standards of movement that can curb involutive trends both on the Physical efficiency for health, both on the front of the motor coordination development (Filippone et. al., 2007). The level of physical fitness is important for their physical abilities in carrying out daily activities. The greater the degree of physical fitness of

a person, the greater the capacity for physical work. In other words, his work is more productive if his physical fitness is increasing. Regular and continuous exercise is expected to influence body conditions, such as increased capacity of the cardiovascular system, increased strength, flexibility, stamina, speed of reaction and a quicker physical recovery after exercise. (Sembiring, 2019). It seems necessary, however, to network, among the various educational agencies (family, school, sport) so that common strategies, albeit in different fields and in different ways, can be applied in all life contexts of children and adolescents and guide them towards a dynamic and active approach to life. A true and proper cultural attitude, which must awaken the desire to educate in indispensable life skills, oriented to a concept of well-being that is connected to active lifestyles, as a natural way to feel good and feel good.

Author Contributions

The study is the result of collective work by the authors. The specific contribution is to be referred to as follows: S. Pignato supervised the introduction, the research of materials and the methods of application. V. M. Patania and R. Schembri have carried out on the field the exercises of the two groups and elaborated the final data. F. Sgrò has taken care of the conclusions. All authors contributed to the final drafting and revision of the manuscript.

Conflicts of interest

The authors have not any conflicts of interest to declare.

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