

INFLUENCE OF INCLUSIVE AND SEGREGATIVE PHYSICAL EDUCATION FOR SCHOOLCHILDREN OF DIFFERENT MEDICAL GROUPS

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Abstract. *The study aimed to compare the effectiveness of inclusive and segregative physical education classes for students of various medical groups, taking into account sociopsychological indicators and indicators of psychoemotional state. The study involved 1,414 schoolchildren aged 10–16 years ($M=12.7$, $SD=1.6$). Through the survey, pupils' wellbeing, needs, motivations, and motor preferences at their leisure and physical education classes, level of situational and personal anxiety, degree of integration of the group, and motivation for success were ascertained. Data comparisons were made between schoolchildren who studied in segregated and inclusive ways of organizing physical education in schools. Attitudes towards schoolchildren's physical education and leisure patterns make it possible to assert that an inclusive model is effective. Integrative physical education classes are less mentally traumatic, more convenient, and psychologically comfortable than segregative ones. The way physical education is organized does not affect the level of anxiety and the class's degree of motivation in achieving success in schoolchildren's activities. Positive changes in the integrative conditions in the mental state come with all schoolchildren, but they are most noticeable among schoolchildren with low functional reserve capabilities.*

Keywords: *inclusion, mental state, physical education, schoolchildren.*

Introduction

Inclusive education is slowly being introduced in secondary schools in Ukraine. Its concept has noble slogans and objectives (Wilhelmsen & Sørensen, 2017; Wang, 2019). However, the individualized curricula of children who require inclusive education do not provide for physical education classes. Today, it is commonly known about the many positive effects of optimal physical activity

levels for persons of all ages, genders, and, in particular, health (Uher & Bukova, 2018; Rogowska et al., 2020). It is possible to assume that specialists' methodological work and the experience of organizing lessons in special educational institutions are not easily introduced into the practice of inclusive physical education of children with special educational needs in secondary schools (Bodnar & Prystupa, 2014).

Under the Salamanca Statement, orphans, children of migrants or displaced people, HIV-positive persons, pregnant adolescents, members of religious, ethnic, linguistic, etc. minorities also have special educational needs. Schoolchildren talented in the hard or soft sciences, who are creatively or artistically gifted, or who are athletically gifted, also require a differentiated approach in their studies. However, these categories of children rarely receive attention; inclusive education excludes them from its field of competence without considering the high social importance of the development of gifted persons. Given this, certain clarifications and distinctions are essential, as is the case for inclusive education in a narrow and broad sense (Qi & Ha, 2012; Lleixà & Nieva, 2020). The modern well-established public form of inclusive education (as education of children with special physical and psychological/developmental needs or detected disorders of health condition or various functional reserve capabilities) would be consistent with a narrow understanding of this phenomenon. Inclusive education, in its broader sense, should include differentiation of educational services (Hodge et al., 2009), taking into account the full range of characteristics of children, as called for in the Salamanca Declaration. This updated understanding of the concept of inclusive education makes it clear that the division of schoolchildren into medical groups and the differentiation of a load of physical education classes, taking into account the child's functional reserve capacity, also apply to this concept. Inclusive education has the potential to replace the long-standing system of conditional division into medical groups, which is typical of the Ukrainian system of physical education in schools.

In Ukraine, the main criterion for dividing schoolchildren into medical groups is based on the Ruffier's test results: schoolchildren with high and above-average levels of functional reserve capacities of the cardiovascular system are directed to the main medical group, with an average level – to the preparatory medical group, schoolchildren with low and below-average levels – to the special medical group (Bodnar, 2013). Schoolchildren with specific minor health problems are also included in the special medical group. According to the normative documents, pupils of the main medical group study one physical education curriculum together with pupils of the preparatory medical group. The special medical group takes part in the preparatory and final part of the physical education class. During the main part of the lesson, they do only those exercises that are not contraindicated to their health; this group of pupils will learn more

about the curriculum's content in additional physical education classes. Unfortunately, nowadays, due to a lack of resources, only some Ukrainian schools have followed these recommendations, and most schools have segregated classes with children of different medical groups, which provide for differentiation of physical load depending on the level of their functional reserve capacities. Thus, in Ukraine, there are two models of the organization of physical education – inclusive and segregated – which operate simultaneously.

The special literature provides only some data on the effectiveness of segregated or inclusive physical education. It has been proved that inclusive physical education is effective in terms of physical activity levels of low, medium, and high intensity (Pavlova, 2015; Pavlova, et al., 2016). However, the analysis of physical fitness indices does not determine one of these models' preferences. Quite ambiguous conclusions regarding the advantages of this or that model were obtained considering gender, age, level of functional reserve capacities, and individual physical qualities of children (Bodnar & Prystupa, 2014). There is a lack of groundwork concerning the influence of the inclusive model of physical education on the psychological performance of schoolchildren.

The study aimed to compare the effectiveness of inclusive and segregated physical education classes for schoolchildren in different medical groups, taking into account socio-psychological and psychosocial indicators.

Methods

Study sample

The study involved 1 414 schoolchildren aged 10–16 ($M=12.7$, $SD=1.6$). Schoolchildren studied in grades 5–9 in 9 Ukrainian secondary schools and were sent for health reasons to medical groups. All subjects and their parents gave their informed consent for inclusion before they participated in the study. The study was conducted following the Declaration of Helsinki, and the protocol was approved by the Bioethics Committee of Lviv State University of Physical Culture.

Research tools

A survey of schoolchildren was conducted to ascertain their wellbeing, needs, motives, and motor preferences at leisure and physical education classes. The level of situational and personal anxiety was determined by Spielberg's method (Spielberger, et al., 1983); respondent's wellbeing and activity – according to the “Wellbeing – Activity – Mood” test (Kokun, et al., 2011), the degree of group integration – according to the index of cohesion of K. Seashore (Axverdova, Gjulushanjan, & Kolenkina, 2006); motivation for success – by the method of V. A. Rozanova (Rozanova, 1999).

Organization of the study

Comparisons were made between schoolchildren in a segregated and inclusive school environment. Observations were taken at the beginning and the end of the school year. Obtained results in some cases were analysed taking into account the type of medical group (main, preparatory, special).

The experimental group (EG, n=694, 46.11% – females) was composed of schoolchildren who attended school under inclusive conditions. In these educational institutions, physical education classes for students of different health states were conducted simultaneously, that is, children with different levels of functional reserve capacities were engaged together, however, by differentiating/individualizing tasks. The needs and capacities of each child were considered as well. In the control group (CG, n=720, 48.05% – females), physical education for schoolchildren in main and preparatory medical groups was conducted separately from the special medical group (segregated – the class was held in different halls, at different times).

Statistical analysis

The IBM SPSS Statistics V. 23 was used for the statistical processing of data. The mean (M), and corrected standard deviation (SD) were determined. The Student's t-test was used to compare unrelated samples. The validity of the difference between the results of CG and the EG was determined by χ^2 -test. The differences were considered to be significant at least when $p \leq 0.05$.

Results

Needs, motives, and motor preferences at leisure.

Schoolchildren of the EG are more likely to help parents (by 12.8%, $p < 0.01$), spend more time walking (by 10.9%, $p < 0.01$) than those in the CG. This group (EG) also spent 11.1% more time ($p < 0.01$) on computer entertainment and social networking; visited exhibitions, museums, theatres, etc., more frequently (by 8.5%, $p < 0.01$). On the other hand, schoolchildren of the CG more often attended sports competitions as spectators and participated directly in hiking (by 4.1% $p > 0.05$; 1.4%, $p > 0.05$, respectively).

Schoolchildren of the CG who were assigned to the main medical group (by 7.8%, $p = 0.05$) and the special medical group (by 31.8%, $p = 0.07$) of the CG more often in comparison with students of the EG devoted time to reading the curriculum and fiction. In contrast, the EG students preferred searching data on the Internet. The difference between the number of active computer users among the EG and the CG students was also close to the statistically significant value ($p = 0.07$), so we can assume that the EG students found the information necessary for learning on the Internet.

The analysis of the favourite physical activity at leisure showed that students of the CG like (by 15.5%, $p<0.001$) to participate in sports games less. Schoolchildren of the CG (in particular a special medical group) more often (by 45.5%, $p<0.05$) chose physical activities such as billiards, bowling, and various kinds of fitness at their leisure time. Schoolchildren of the CG (special medical group) were 26.1% more likely ($p=0.05$) to exercise on simulators.

Needs, motivation, and motor preferences of schoolchildren at physical education classes.

Schoolchildren of the CG were less likely (by 18.0%, $p<0.001$) to feel positive emotions, vivacity, and improved mood in physical education classes. There were differences in performance of students in the main medical group, including the fact that more students of the EG considered PE classes as an opportunity to rest after mental loads (13.7%, $p<0.05$) and to socialize (by 7.6%, $p<0.05$).

In addition to the desire to improve health (the relative number of schoolchildren in the EG – 62.7%, and the CG – 49.9%) and increase the level of physical fitness (28.9% of the EG and 38.4% of the CG), among the factors that motivate participation in the PE classes was a desire to have a good time, have fun, get positive emotions (40.6% of the EG students and 44.2% of the CG students), rest after mental work (48.7% of the EG students, and 45.3% of the CG students), and improve wellbeing (42.1% of the EG students, and 32.2% of the CG students) (Table 1). In general, differences were found between the motivational priorities “improve health” and “improve wellbeing” of the EG and the CG students. The EG students often ($p<0.05$) noted that the PE classes’ attendance was important to them for this very reason.

Table 1 Motives That Encourage Students to Participate in Physical Education Classes

Motives	Relative number of persons, %			p
	EG	CG	differences between EG and CG	
Health improving	62.7	49.9	12.8	0.042
Opportunity to relax after intellectual loads	48.7	45.3	3.4	–
Communication	11.9	11.5	0.4	–
Opportunity to gain knowledge, learn something new	9.1	8.7	0.5	–
Improve the appearance	32.7	29.7	3	–
Improvement of mental working capacity	28.9	38.4	-9.5	–

Possibility to have fun	9.4	9.6	-0.1	–
Possibility to receive positive emotions self-realization	40.6	44.2	-3.6	–
Self-realization,	8.1	5.1	3	–
Improve wellbeing	42.1	32.2	9.9	0.035

The analysis of the survey results did not reveal significant differences in the reasons why schoolchildren did not like the PE classes. The main reason given by students in both groups was that they were not interested in exercising during classes.

The CG students skipped PE classes more often (by 9.2%, $p < 0.05$) than the EG students. A doctor's medical certificate was the most common reason for missing PE classes among the EG schoolchildren (48.0%). In comparison, the CG students could skip PE classes due to deteriorating health (46.0%), muscle or abdominal pain (30.0%), although they did not have any certificate from a medical specialist.

Schoolchildren in the EG were more likely to complain of their health; among the most common were complaints of pain in the joints, spine during prolonged standing or sitting (7.0%, $p < 0.05$) and eye discomfort, either during or after classes, or decreased visual acuity (5.8%, $p < 0.05$).

Characterization of psycho-emotional state

The number of persons with high levels of personal anxiety was higher in the CG ($p < 0.05$). In the EG schoolchildren, the personal anxiety level was moderate, while it was high in the CG. High indices on the sub-scales “Wellbeing” and “Mood” were more often observed in the EG students (three times more often in the preparatory medical group) and on the scale “Activity” (twice more often in the special medical group) (Table 2).

Table 2 Indicators of Psycho-emotional State ($M \pm SD$) of Students of Different Medical Groups (1 – main, 2 – preparatory, 3 – special, 4 – generalized results)

Group		Indicators						
		Motivation for success	Anxiety		Well-being	Acti- vity	Mood	Index of cohesion
			situa- tional	personal				
1	EG	128.43± 23.40	30.33± 4.84	47.60± 14.94	5.51± 1.46	4.82± 1.42	5.71± 1.34	14.45± 2.66
	KG	149.25± 25.66	28.73± 5.98	46.77± 11.89	6.22± 0.95	5.27± 1.61	6.43± 0.51	12.96± 1.8
	p	0.001	0.142	0.447	0.206	0.125	0.159	0.377
2	EG	121.50± 26.66	26.75± 8.29	43.75± 10.18	5.53± 1.72	4.56± 1.74	5.87± 1.68	9.37± 1.53

	KG	120.86± 22.41	31.33± 3.50	45.67± 21.09	6.5± 0.5	5.87± 1.1	6.67± 0.23	9.19± 1.36
	p	0.135	0.991	0.631	0.005	0.237	0.003	0.911
3	EG	125.90± 25.11	29.42± 6.10	44.92± 14.39	5.51± 1.46	4.82± 1.42	5.71± 1.34	14.45± 2.66
	KG	145.75± 28.78	29.25± 7.67	46.73± 11.92	6.22± 0.95	5.27± 1.61	6.43± 0.51	12.96± 1.8
	p	0.607	0.649	0.249	0.018	0.473	0.004	0.627
4	EG	122.25 27.67	27.68 7.35	46.63 12.01	53.79 14.91	45.90 14.22	55.96 14.69	10.62 3.68
	EG	125.03 26.49	28.05 6.93	47.16 12.13	50.48 16.83	46.25 15.82	51.97 17.68	10.57 3.60
	p	0.347	0.645	0.702	0.025	0.697	0.008	0.868

The motivation for success among schoolchildren of various groups was hardly different. Only students of the main medical group who belonged to the EG were significantly more ($p < 0.001$) motivated for success. This suggests that inclusive learning environments effectively develop the motivation to achieve success only in schoolchildren with a high level of functional reserve capacities.

An analysis of the index values of the student's degree of integration showed no students who considered the class's cohesion to be low or below the average level.

Discussion

Before introducing PE into secondary schools for inclusive children, it is relevant to compare the effectiveness of inclusive and segregated PE classes and to weigh the risks and benefits of each form for the students of each of the three medical groups. In practice, inclusive physical education in the form of differentiated PE classes (with different medical groups, as well) has existed for a long time (Haycock & Smith, 2010; Bertills, Granlund, & Augustine, 2019). Because the division into medical groups, declared by regulatory documents, but not financially supported, "works" solely on paper (only those few schools that have resolved the issue of paying two teachers per each one PE class for children of different medical groups conduct separate lessons). Therefore, almost every PE teacher has already got some experience in selecting flexible teaching methods and organization of educational environment for students in the same class with substantial reserve capacities, which are particularly acute during the classes (Smith, 2004; Hodge et al., 2009; Rekaa, Hanisch, & Ytterhus, 2019). However, the introduction of physical education in secondary schools requires a comparison of the effectiveness of inclusive and segregated lessons for each of the three medical groups, particularly the analysis of risks and benefits.

Several social and psychological indicators are not affected by how the PE class is organized in secondary school. Along with this, there have been identified many differences in the social and psychological characteristics of students from different medical groups of the EG, which were formed under the influence of participation in inclusive classes. These features of attitude towards the PE and the structure of the recreational activities of integrated students make it possible to assert that this model is more effective since it helps to establish the prerequisites for the development of such essential qualities in students, as the ability to cooperate, responsibility, responsiveness, sociability, mobility of thought, etc.

Students in the EG spent more time on computer entertainment and social networking. To determine the reason for this difference in school behavior, further research should be undertaken with the aim to find out why students of the EG need more time to meet their needs in communication: whether inclusive classes increase this need, or vice a versa, do not contribute to the level of their satisfaction (Reiner, Niermann, Jekauc, & Woll, 2013). Schoolchildren who studied in a segregated environment perceived PE classes as uninteresting, monotonous, and joyless work on improving physical qualities, which is rarely effective.

Therefore, the promotion of physical education among schoolchildren with a high level of functional reserve capacities can be recommended with an emphasis on recreation and communication at PE classes. General PE classes (for the whole class) are more conducive to fulfilling children's need for communication during physical activity (Edmunds, Biggs, & Goldie, 2013; Fibbins, Ward, Watkins, Curtis, & Rosenbaum, 2018).

More schoolchildren in the CG missed classes due to illness and did not have a medical certificate. This indicates that students with disabilities are more likely to be ill in the separate PE classes, and health complaints may be related to a reluctance to study. A factor that causes a negative change in the mental condition of schoolchildren who have studied under the segregated model can be the fact of a break with friends or the unfavourable psychological atmosphere in the classroom, leading to frustration (Biddle & Asare, 2011).

The level of anxiety in the EG students was lower than in the CG students. This indicates that schoolchildren with disabilities and limited functional reserve capacities, despite studying in an inclusive model with children who had a higher level of physical fitness, did not perceive this situation as uncomfortable, threatening, or humiliating for their dignity.

Schoolchildren involved in the PE inclusive classes felt more comfortable, energetic, and initiative than children who were separated from their peers with a higher level of health and fitness. Therefore, it can be argued that an inclusive model of physical education in schools ensures a high level of psychological

comfort for children. The intensity and quality of the interaction of children with low mental and physical capacities with the social environment in an inclusive environment increase substantially (Biddle & Asare, 2011; Rekaa, Hanisch, & Ytterhus, 2019).

Positive changes in the integrative conditions in the mental state occur in all schoolchildren; however, they are most noticeable among schoolchildren with health problems and deviations in functional reserve capacities: such children perceive physical education classes favourably, they feel safe; therefore, they are calm, and at the same time more initiative and more active. Therefore, integrative physical education classes in schools are more effective than segregated ones, particularly for children from primary and special medical groups.

Conclusions

The obtained results do not allow to unambiguously interpret the effectiveness of integrative or segregative type of learning. Additional research is needed to assess which type of training provides a more positive impact in terms of various aspects of health (physical, mental, social, etc.). However, according to the results obtained, some facts can be stated. Inclusive education has several advantages over the long-standing segregated system of conditional separation into medical groups, which is a feature of the Ukrainian system of physical education in schools:

- an inclusive model of PE is more efficient in terms of needs, motives, and motor preferences of students at leisure and during physical education classes;
- despite the indicators of schoolchildren's psycho-emotional state, the integrated PE classes are more effective than segregated ones. The PE integrated classes are more psychologically comfortable and less traumatic than segregated ones to a greater extent for students with average and lower than average levels of functional reserve capacities.

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