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Social perspective

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BRINGING THE KNOWLEDGE COMPONENTS OF PHYSICAL ACTIVITY EDUCATION (INCLUDING SPORT) TO THE PRACTICING PHYSICAL ACTIVITY EDUCATOR

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Abstract

The field of physical (activity) and health education, or whatever it is called in any one of the world's countries, has undergone a "determined" but often "confused" development in the 20th century. After Sputnik went up in 1957, the field sought help from a variety of disciplines (e.g., kinesiology) and professions (e.g., management) in an attempt to truly define itself. Building on what Arthur Steinhaus (George Williams College) stated were its four "principal principles" in the early 1950s, the author asserts that some 14 "principal principles" of the field can now be affirmed. Searching for consensus, a proposed taxonomy for "developmental physical activity in exercise, sport, and physical recreation" is offered here for consideration as the field moves along in the 21st century. The author argues that the field also needs to make available to the professional practitioner a computerized inventory of generalizations that represents a distillation of the field's scientific and scholarly literature.

Key words: *Field, discipline, profession, principle, taxonomy, generalization*

Introduction

The professional practitioner in sport and physical education, as well as the related research scientist and scholar, have been gradually overwhelmed by periodical literature, monographs, books, and similar materials. This knowledge and information is typically interesting, and much of it would undoubtedly be valuable to us if it were readily available. Such "inundation" with printed pages prevails also in almost all of our allied professions (e.g., recreation) and related disciplines (e.g., exercise science, motor learning and control)[1]

Further, because of a variety of rules, regulations, and stipulations, we are usually not made aware of many substantive research reports that should be made part of our own retrieval systems in the various sub-disciplinary and sub-professional areas of scholarly investigation (see Definitions of Terms below). Still further, and this is basic if we don't decide to do something about this untenable situation, much of the material steadily becoming available is unintelligible to the general public on whose behalf we are carrying out our professional endeavors.

To make matters worse, because of provinciality and communication barriers, we are typically missing out also on important findings published originally in other languages such as German, Russian, Japanese, and Finnish, to mention several tongues in which scholarly work is reported regularly. The assumptions seem to prevail implicitly that such knowledge will somehow be made available in English.

It is true that bibliographies of scholarly publications in several languages are occasionally made available. Further, print-outs of bibliographies on specific concepts or "uniterms" can be purchased commercially. However, a bibliography is just that – a bibliography. Such a listing is typically not annotated to offer any specific information about the topic concerned.

Still further – and this is really the most important point in this article – we simply don't

[1] This paper builds upon the author's "Relating a proposed taxonomy of sport and developmental physical activity to a planned inventory of scientific findings," *Quest*, 35, 1 (1983), 54-65.

know where we stand as a field within the profession of education in regard to an under girding body of knowledge! Such a body of knowledge is vital to both the successful practice of, and the accompanying recognition of, any profession. Nowhere do we have an inventory of scientific findings arranged as ordered principles or generalizations to help us in our work as professional practitioners – be it as teacher, coach, scholar, research, consultant, or administrator. This deficiency can – and indeed must – be rectified.

At the first possible moment, an inventoried, ordered, data base of knowledge about developmental physical activity in sport, exercise, and related expressive activities should be made readily available online to our members at cost and to non-members on a cost-plus basis as a professional service. Such knowledge could form the basis also – theory, intellectual underpinning, evidence – for an evolving professional practitioner's handbook that would very soon become an essential component of every qualified professional person's practice in the field of physical activity education.

The problem, therefore, is twofold. First, we will have to convince the established profession to implement such a development through the establishment of a systems theory approach that would gradually but steadily result in our unique field's tenable theory and research findings being made accessible to our professional practitioners. Second, we have to develop and implement a strategic marketing plan to see to it that the goal of a well-informed profession is achieved. To make matters difficult, our field (along with many others, of course) does not yet appreciate the need for the implementation of a 'total system' concept with regard to its intellectual base. Nevertheless, there are many urgent reasons why the field of physical activity education should be encouraged take a holistic view if we hope to merit increased public support in the future. Such an approach would require the concerned discipline and related profession to concern itself with the necessary components of a viable system – with input, thruput, output, and subsequent user reaction for evaluative and corrective purposes.

Definition of Terms

Some of the terms employed in this presentation will be defined because they are presently being used ambiguously. Also, certain terms described below in a (presumably logical order) are given a specific meaning that needs clarification:

- sport and physical education – the term adopted to describe the profession by the National Association for Sport and Physical Education (NASPE), the Association for Research, Administration, Professional Councils and Societies (ARAPCS), and the Research Consortium, all functioning with the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD).
- developmental physical activity in sport, exercise, and related physical activity – a term recommended for what might be called the disciplinary aspect of physical activity education.
- sub-disciplinary aspects – those aspects of developmental physical activity (as defined above) that make up the essential sub-disciplinary components of the body of knowledge upon which professional practice in physical activity education in based (e.g., the functional effects of physical activity, with physiology as one related discipline).
- sub-professional aspects – those aspects of developmental physical activity that make up the essential sub-professional components of the body of knowledge upon which professional practice in physical activity education is based (e.g., measurement and evaluation, management).
- allied professions – a field or profession that is closely related to the field of physical activity education (e.g., health education, recreation).
- related discipline – a field of scholarly endeavor or branch of learning, the findings from which are employed by professionals in physical activity education (e.g., physiology, psychology, history).
- taxonomy – a classification into categories based on natural relationships.
- inventory – a listing, accounting, or catalogue of ideas, facts, or things.

- ordered principles/generalizations – a series of verified statements or findings in a 1-2-3-4 arrangement.
- systems approach – a plan designed for the management of an operation or organization that involves the determination of exactly what is to be accomplished and how such achievement of objectives may be executed successfully. (See systems theory below.)
- systems theory – a theoretical analysis of organizational activity based on the necessity of including the basic elements of input-thruput-output into any modeling of functional accomplishment; consideration is given also to necessary adaptation so that societal support (i.e., demands and resources) will continue indefinitely. Thus, when applied, we might correctly call the result a systems theory approach.

Past Development and Present Status

Before discussing the make-up of an ordered inventory of scientific findings, as well as the plan for a systems theory approach that could provide an applied body of knowledge efficiently for the field and/or profession, it is necessary to put 20th-century development in the field in perspective. Such an investigation had originally been prepared for The American Academy of Physical Education (Zeigler, 1979, 9-16). In this historical analysis the development of three categories or subdivisions of the overall field was reported as follows: (1) the potential body-of-knowledge as characterized by its sub-disciplinary areas; (2) the concurrent sub-professional components pf the developing field (such as exist in all subject-matter fields to a greater or lesser extent); and (3) what may be called the potential allied fields and professions (such as may exist for other emerging fields of study also).

Originally the sub-disciplinary areas identified included the physiological aspects, the historical and philosophical aspects, the psychological aspects, the biomechanical aspects, the sociological aspects, and "other" disciplinary aspects (at that point not determined). The so-called concurrent sub-professional components were determined to be administration, supervision, curriculum, methods of instruction, comparative and international relations, measurement and evaluation, etc. The potential related professions were classified as (1) competitive athletics, (2) health education, (3) dance (education), (4) recreation, (5) adapted exercise (therapy), and (6) safety education.

The development of these three categories or subdivisions of the field were then traced for the following periods of time: (1) 1900-1930, (2) 1930-1960, (3) 1960-1970, and (4) 1970-1980. The conclusions reached for the most recent era at that point (i.e., 1970-1980) indicated (1) that there has been a strong disciplinary thrust in the 1960s that had tended to swing the profession's research and scholarly efforts away from the consideration of the many problems faced daily by the practicing professional (e.g., measurement & evaluation, curriculum and instructional methodology, and administration & supervision); (2) that starting with the 1970s and thereafter the sub-disciplines that began to move significantly away from physical activity education continued their movement toward the respective mother disciplines (e.g., psychology, sociology, philosophy); (3) that the six (presumably) allied professions often consolidated their positions outside the many physical (activity) education departments and similar educational units in colleges and universities; and (4) that there has been little change during the 1970s in the so-called concurrent, sub-professional components as delineated above (i.e., people specifically interested in these aspects of the profession who maintained a firm relationship with the established profession).

Tracing the history of the developing field in this way during the 20th century permitted the investigator to develop insight into what might be recommended as the most appropriate (best?) curricular taxonomy for professional preparation to be adopted for the 1980s and thereafter – or at least until changing social conditions warranted further reappraisal. In developing such a proposal, the recommendations of earlier national conferences on professional preparation held in North America were reviewed. More specifically, a careful analysis was made of the recommendations for physical education emanating from the 1967 Graduate Study

Conference sponsored by the AAHPERD. Finally, this developing matrix was correlated with the thought of the late Laura J. Huelster (Professor-Emerita, University of Illinois, Urbana-Champaign), who had played one of the two leading roles in the 1967 graduate study conference mentioned above and also in approval of the taxonomy proposed in this essay.

An examination of the outline of the proposed taxonomy, upon which the recommended inventory (Table 1) might be based, will reveal that there is a balanced approach in regard to the emphasis placed on the sub-disciplinary aspects and the sub-professional aspects of the profession's widely dispersed, under girding body of knowledge (Zeigler, 1995, 2002). By this is meant that full status is accorded to the sub professional aspects on the assumption that appropriate research methodology and accompanying techniques will be developed and regularly employed to provide the profession with its necessary theory and ordered principles in these sub-professional aspects also (i.e., curriculum, pedagogy, measurement & evaluation, management). The position being taken is that the present rift in the field, as identified in the 1979 study (Zeigler) must somehow be narrowed considerably, and eventually eliminated in the future. The development of a workable taxonomy (as proposed in Table 1 below) that could be integrated with an evolving inventory through the implementation of a systems theory approach could accomplish a great deal toward closing the present gap.

Building on the 1979 historical analysis, it will be noted in Table 1 below (see left hand column) that a new classification of the proposed areas of scholarly study and research in developmental physical activity has been proposed – new in the sense that nomenclature unique to the field of sport and physical education is employed. By this is meant that the names selected for the eight areas do not use the terms that are currently part of the names of, or the actual names of, other recognized disciplines (e.g., functional effects of physical activity instead of exercise physiology, the latter name usually being identified with the discipline of physiology).

In recommending this taxonomy for adoption by the established profession, therefore, the strong recommendation is that we in this profession should develop and then strongly promote our own unique disciplinary effort. Of course, at the same time the profession should work cooperatively with what are here being called the related disciplines and the allied professions. The rationale for recommending a unique approach for us is simple and straightforward: if people in sport and physical education always speak of sociology of sport, exercise physiology, psychology of sport, etc., it will just be a matter of time before our physical education-trained scholars will have – in a disoriented, splintered fashion – given our field's disciplinary thrust away to other disciplines without their having earned it (so to speak)!

Sound knowledge about, and the promotion of excellent techniques for employing, developmental physical activity through the media of sport, exercise, and related expressive activities throughout the lives of all people in our North American society.

Of course, some argue that the study of human developmental physical activity as described here is really not a discipline, or that at best it is a hybrid discipline with the basic elements or components basically belonging to the related disciplines (as defined above). It can be argued that permitting continued movement in this latter direction – which we may call the "that's us everywhere else" approach – might not be all that bad. However, I believe that such a development will soon cause in a "debilitating fractionizing" that will very soon result in the (what we think is a) developing field within education being regarded generally as a somewhat useful trade in society. Here the argument is that the ultimate goal of our field should be full-fledged status to be promoted enthusiastically by the education profession. This claim can be made safely because all members of our field truly believe that their efforts can result in enriched living and wellbeing for all people on earth. We believe that our best efforts can improve the quality of life for all through the medium of developmental physical activity (purposeful human motor performance, if you

will) in sport, exercise, and related physical activities.

This objective for the field of physical activity education can be carried out best with the help of-and hopefully not on the coattails of-the allied professions and the related disciplines. Further, and this could well be crucial, if we in this field must wait for others in the related disciplines and allied professions to do this for us on a piecemeal basis, such development and possible accompanying recognition of the importance of developmental physical activity within the lifestyle of the "evolving amphibian or human animal from womb to tomb" will come belatedly and will be less effective! This will be the result because of poor interdisciplinary and inter–professional articulation.

Table 1

DEVELOPMENTAL, PHYSICAL ACTIVITY (IN EXERCISE, SPORT, AND PHYSICAL RECREATION)

Areas of Scholarly Study & Research	**Subdisciplinary Aspects**	**Suborofessional Aspects**
I. BACKGROUND, MEANING, AND SIGNFICANCE	- History - Philosophy - Internationa1 & Comparative Study	- International Relations - Professional Ethics
II. FUNCTIONAL EFFECTS OF PHYSICAL ACTIVITY	- Exercise Physiology - Anthropometry & Body Composition	- Fitness & Health Appraisal - Exercise Therapy
III. SOCIO-CULTURAL & BEHAVIORAL ASPECTS	- Sociology - Economics - Psychology (individual & social) - Anthropology - Poli. Sci./Geography	- Application of Theory to Practice
IV. MOTOR LEARNIHG & CONTROL	- Psycho-motor Learning - Physical Growth & Development	- Application of Theory to Practice
V. MECHANICAL & MUSCULAR ANALYSIS OF MOTOR SKILLS	- Biomechanics - Neuro-skeletal Musculature	- Application of Theory to Practise
VI. MANAGEMENT THEORY & PRACTICE	- Management Scenice - Business Administration	- Application of Theory to Practice
VII. CURRICULUM THEORY & PROGRAM DEVELOPMENT	- Curriculum Studies - Investigation of Teaching/Learning	- Application of Theory to Practice
Developmental physical activity in (1) general education; (2) intramural sports and physical recreation; (3) inter institutional competitive sport; and (4) programs for special populations (e.g., handicapped) - - incl, curric. & instruc. method.		
VIII. EVALUATION AND MEASUREMENT	- Theory about the Measurement Function	- Application of Theory to Practice

Formulation of the Original Plan for an Inventory

The original idea for the development of an inventory of scientific findings about developmental physical activity is not unique to this field. Bernard Berelson and Gary Steiner implemented such an inventory about 40 years ago in the behavioral sciences. In their publication, Human behavior: An inventory of

scientific findings (1964), the editors and their associates reported, integrated, assessed, and classified "the results of several decades of scientific study about human behavior" (p. 3). The basic plan of this formidable undertaking was fundamentally sound; thus, many of the same ideas concerning format could be employed today in the development of a scientific inventory about developmental physical activity prior to going online with the results. Actually, it could well be carried out in all of the existing disciplines and then updated regularly on a worldwide basis in one or more agreed-upon languages. Of course, varying emphases and certain significant differences might be introduced, but the basic approach is still valid. Berelson and Steiner summarized their task as the development of "important statements of proper generality for which there is some good amount of evidence" (p. 5).

The allied professions of health, physical education, recreation, and dance can take some pride in the fact that certain steps had indeed been taken about this same time of an "inventory nature," entitled "The Contributions of Physical Activity to Human Well-Being" (Research Quarterly, May, 1960, 261-275. This fine contribution of the Research Council of the (then) American Association for Health, Physical Education, and Recreation described the status of the profession's research knowledge at that point; its intent was "to inquire into the validity of objectives which have been endorsed in our allied... . The supplement will serve to consolidate the evidence for these objectives and to point the way for further research" (Foreword). The allied fields referred to were health education, physical education, and recreation. Each section's title began with the words "The Contribution of Physical Activity to ..." The specific topical headings included were physical health, social development, psychological development, skill learning, growth, and rehabilitation. Despite the seeming importance and helpfulness of this document to practicing professionals, a paucity of evidence existed then in comparison to the availability of supportive evidence now, some 40 years later. Thus, it is understandable that this synthetic presentation was characterized by excessive generality at various points.

As can be seen, this present, more comprehensive, complex, and detailed plan had its origins during a period now described as the "knowledge explosion of the '60s," with the accompanying topical specialization that seemed appropriate for the three professions at that time. The RQ supplement should have been very helpful to the conscientious professional of that day, but perhaps it wasn't especially enthusiastically received for one or more reasons. For example, it did not include the ordered generalizations found in Berelson and Steiner. Also, the average professional then was not fully aware of the potential value of such an inventory as it might evolve. Further, rapid recall of such limited theoretical knowledge was not possible through online service at that time. Finally, specific subdivision of topics within developmental physical activity only was not envisioned adequately at that point. Whatever the situation, such a supplement – even without the ordered generalizations (principles) – was not updated regularly to reflect continued development.

As a result we have a situation today in which, even though facts and figures have become increasingly available, the professional practitioner is still at a loss when asked a specific question about some aspect of daily work performance. A reasonable answer to a particular question could be obtained from a sub–disciplinary specialist (e.g., in motor learning and control) or a sub–professional specialist (e.g., in program development), but very few people have such expert opinion close at hand. Thus, we have witnessed the development of such online services as MEDLINE, KNOWLEDGE INDEX, QL, ERIC, and PSYCH. ABSTRACTS, to which requests can be made for a particular article in those respective areas through a large library or via one's own modem. But where, specifically, can the answer to a specific question about one or more areas of professional interest be obtained right now as it may be needed?

Areas of Professional Interest & Concern

In 1951, speaking to the former College Physical Education Association, Dr. Arthur H. Steinhaus identified four "principal principles" of physical education. He explained that the term "can and does mean the most important or chief fundamental theories, ideas, or generalizations" (p. 5). With the steadily growing body of knowledge that has provided our profession with much more substantive knowledge base than existed at the middle of the twentieth century, it is now possible to claim that our "principal principles" have increased to at least fourteen (Zeigler, 1994, 1995, 2011). These principles, as indicated below, give our field support for inclusion as a mainstay in the educational curriculum. Each one could form the basis for a section or subsection of the inventory being proposed:

The Fourteen "Principal Principles" of Developmental Physical Activity.

Principle 1: The "Reversibility Principle". The first principle affirms that circulo-respiratory (often called cardio-vascular) conditioning is inherently reversible in the human body;

Principle 2: The "Overload Principle". The second principle states that a muscle or muscle group must be taxed beyond that to which it is accustomed, or it won't develop;

Principle 3: The "Flexibility Principle". This principle indicates that a human must put the body's various joints through the range of motion for which they are intended. Inactive joints become increasingly inflexible until immobility sets in;

Principle 4: The "Bone Density Principle". This principles asserts that developmental physical activity throughout life helps significantly to maintain the density of a human's bones;

Principle 5: The "Gravity Principle". This principle explains that maintaining muscle-group strength throughout life, while standing or sitting, helps the human fight against the force of gravity that is working continually to break down the body's structure;

Principle 6: The "Relaxation Principle". Principle 6 states that the skill of relaxation is one that people must acquire in today's increasingly complex world;

Principle 7: The "Aesthetic Principle". This principle explains that a person has either an innate or culturally determined need to "look good" to himself/herself and to others;

Principle 8: The "Integration Principle". Principle 8 demonstrates that developmental physical activity is an important means whereby the individual can "fully involved" as a living organism. By their very nature, physical activities in exercise, sport, play, and expressive movement demand full attention from the organism – often in the face of opposition – and therefore involve complete psycho-physical integration;

Principle 9: The "Integrity Principle". The principle of integrity implies that a completely integrated psycho-physical activity should correspond ethically with the avowed ideals and standards of society.(Thus, the "integrity principle" goes hand in hand with desirable integration of the human's various aspects <so-called unity of body and mind in the organism explained in Principle 8 immediately above);

Principle 10: The "Priority of the Person Principle". Principle 10 affirms that any physical activity in sport, play, and exercise sponsored through public or private agencies should be conducted in such a way that the welfare of the individual comes first (i.e., sport must serve as a "social servant");

Principle 11: The "Live Life to Its Fullest Principle". This principle explains that, viewed in one sense, human movement is what distinguishes the individual from the rock on the ground. Unless the body is moved with reasonable vigor according to principles 1-6 above, it will not serve a person best throughout life;

Principle 12: The "Fun and Pleasure Principle". Principle 12 states that the human is normally a "seeker of fun and pleasure," and that a great deal of the opportunity for such enjoyment can be derived from full, active bodily movement;

Principle 13: The "Longevity Principle". This principle affirms that regular developmental physical activity throughout life can help a person live longer (Zeigler, 1994, 1995); and

Principle 14: The “Physical Fitness & Learning–Correlation Principle” affirms that evidence accumulating is showing a positive relationship between physical fitness and what is termed as academic achievement (Zeigler, 2011).

How This Computerized Inventory Can Be Constructed

The development of such a computerized inventory of scientific findings about developmental physical activity arranged as ordered principles would demand the combined effort of a number of highly qualified scholars and technicians within the field of physical activity education within the education profession. In essence, this steadily developing computerized inventory would be an ongoing, "self-correcting" assessment of the present state of our scientific knowledge and scholarly thought. The people preparing the acceptable data would serve as reporters and integrators presenting what we know and what we have good reason to assert – to hypothesize – what we think and/or believe that we know! Every effort will have to be made to avoid the inclusion of what we hope to know (i.e., making it sound like a statement made a claim based on documented evidence).

The professionals who use this ostensibly simple, yet inherently complex, retrieval system will find series of verified findings, generalizations, or principles in an ordered 1-2-3-4 arrangement. In reporting the available material, the language used will be as free as possible from scientific jargon. It should be understandable to the intelligent layperson, as well as to our academic colleagues in other fields. Even making it completely intelligible to the sport and physical education professional will be difficult, because the findings range from presently accepted areas of scholarly interest ranging from physiology to philosophy to curriculum investigation in a field that presently totals a minimum of thirty areas of specialization if we encompass both its "pure", sub-disciplinary and sub-professional aspects (e.g., physiology, psycho-motor learning, curriculum studies), as well as what can be subsumed when the applied areas of these aspects are developed for the professional practitioner as well. (See the center and right columns in Table 1 above.)

What will be made available will not be available anywhere else. For example, several general theoretical propositions related to human behavior could be considered according to different categories as adapted from Berelson and Steiner. From the area of small-group research (face-to-face relations), the following theory (assumptions or testable hypotheses) might be included in an inventory:

1. That the manner in which the administrator leads his or her department is determined more by the existing regulations of the educational institution itself, and the expectations of the faculty and staff, than by the manager's own personality and character traits.
2. That a department head will find it most difficult to shift the departmental goals away from established norms.
3. That the department head will receive gradually increasing support from staff members to the extent that he or she makes it possible for them to realize their personal goals.
4. That an administrator who attempts to employ democratic leadership will experience difficulty in reaching his or her personal goals for the department if there are a significant number of authoritarian personalities in it (adapted from pp. 341-346, the original being much more detailed with direct sources based on specific research).

In reporting the available material, the language used should be as free as possible from scientific jargon. It should be understandable to the intelligent layperson and, of course, to people in the allied professions and academic colleagues in the related disciplines. This would be no mean task, because the findings would range from the background of the field to the functional effects of physical activity to investigation in program development in a field that presently includes a minimum of 30 areas of specialization. In any case, what would be presented is currently not available elsewhere in this form. This type of inventory would therefore represent a truly significant contribution to the profession of sport and physical education, the

allied professions, the related disciplines – and even to the public at large.

To explain this process a bit further, the reader should keep in mind that it may be necessary to select a particular study for inclusion in the inventory from among many similar scholarly items available in the literature of developmental physical activity – and also from studies carried out in closely related fields that have a direct bearing on the topic at hand. The synthesizer would be looking primarily for theory, findings, principles or generalizations, and propositions that apply to this field (i.e., "the art and science of developmental physical activity in sport, exercise, and related physical movement").

After accepting a finding for inclusion, it would ne necessary to condense it and other similar findings into one distinct principle (generalization). Next, the investigator would organize the material into sub-headings that could subsequently be arranged in a logical, coherent, descending manner (e.g., Proposition A1, then A1.1, A1.1a, A1.1b, A1.1c, etc., depending upon the complexity of the proposition at hand). Finally, the resultant material would be reviewed and analyzed in order to eliminate certain technical language that might only confound the majority of people for whom the computerized inventory is primarily intended.

The goal of this large project would be a computerized inventory representing a distillation of the literature of developmental physical activity in this field that would communicate what scholars believe is known about discipline to those professionals who are not specialists in the specific sub-disciplinary or sub-professional area described. This is not to say that such an inventory could not be helpful to the specialist in his or her own specialty, but that this is not the basic objective. Further, to some extent there would at first be reliance on secondary summaries of the empirical literature, but this should be kept to a minimum. However, such reliance would be necessary because of the great bulk and variety of material.

The investigators could also obtain the benefit of the evaluative judgment of the specialist who may have originally developed a summary or evaluation. Such material would be temporarily helpful in those instances where gaps in the field's own literature still exist; there are undoubtedly many of these. Then, too, as more evidence is forthcoming, it would provide a base for improved professional practice as the fundamental theory grows broader and deeper. Even then, the scholar, as well as the professional user of the generalized theory, would appreciate the necessity of using some qualifying statements in the development of order generalizations or principles (e.g., "under certain circumstances").

In addition to being able to access this with their personal computers so as to make this inventory available for their everyday professional needs, the professional association(s) could also make available an evolving professional handbook to the practitioner on the assumption that the steadily growing body of scientific findings about developmental physical activity is needed now by the many professionals in the field – be they teachers, coaches, managers, researchers, supervisors, performers, or professionals serving at YMCAs, commercial fitness centers, racquet clubs, etc. This handbook should be organized on a loose-leaf basis and updated frequently (e.g., annually).

The Need for a Systems Theory Approach

To this point an effort has been made to present the "why" and "how" of a proposed inventory of scientific findings covering developmental physical activity that could be made available on an online basis for those who use personal computers and as a professional handbook that could be updated on a regular basis. It has been recommended further that such an inventory be based on a uniquely worded taxonomy that would help the profession preserve its own identity now and in the future. Such a taxonomy (explained in Table 1 above) would include what have been called the sub-disciplinary and sub-professional aspects.

That this taxonomy could aptly reflect the areas in which research has been carried out in the field is evident from the results of a recent investigation which categorized 20 years of dissertations completed in this field by Gillis

(1987, 142-152). Although Gillis did identify what she called "hybrid specialties" in her analysis, 4,954 of a total of 5,011 dissertations categorized could be placed under the eight categories of the proposed taxonomy. A start has been made toward an inventory based on this taxonomy, although the material has not been arranged as ordered principles (Zeigler, 1995).

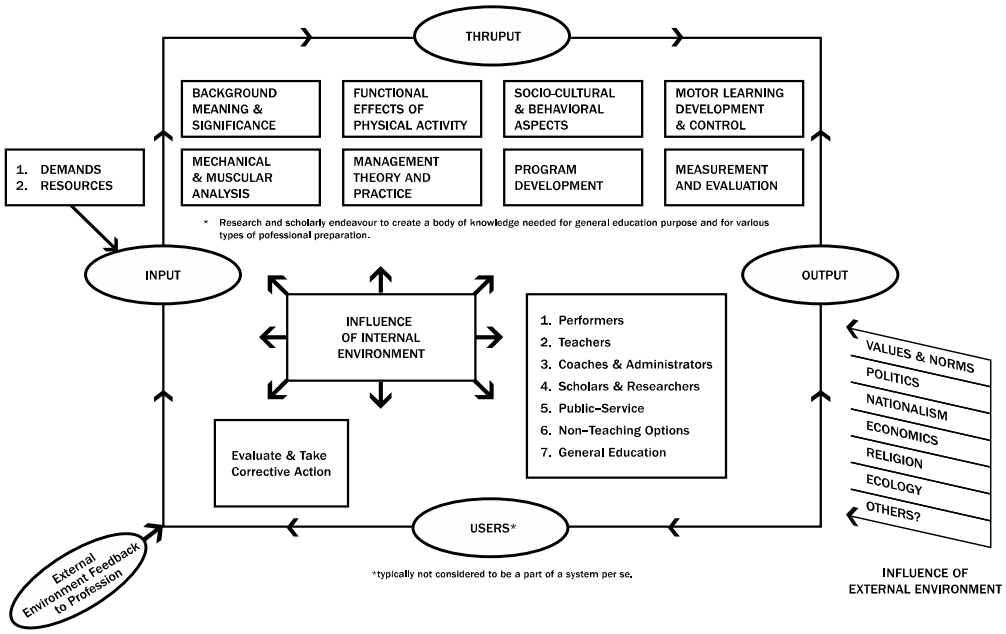
Even building on this proposed taxonomy, which could be modified if a definite need were to arise, the first such inventory developed would almost necessarily have certain gaps or deficiencies. There would be no need for apology, however, because such an effort would represent an elementary stage of advancement to what may be possible in 20, 50, or 100 years. However, this development will not come about unless substantive change occurs in present practice. To this end, a recommendation is being made here for the gradual implementation of a systems theory approach, so that university personnel, professional practitioners in the field, scholars and researchers in other disciplines, and the general public may visualize the development needed to make available as soon as humanly possible a sound, complete body of knowledge about developmental physical activity. A systems theory approach should result in both a more rapid and a more comprehensive development and use of theory and research related to this unique profession.

Along with many other fields, sport and physical education does not yet appreciate the need to promote and subsequently implement a "total system" concept. There are many urgent reasons why this field must take a holistic view if the profession hopes to merit increased support in the future. The promotion of this "evolving entity" of developmental physical activity – characterized as it is with so many dynamic, interacting, highly complex components – would require the cooperation of innumerable local, state (provincial), national, and international professional associations and societies so that full support for the total effort could be provided.

The model presented here to help achieve a common purpose for developing and using theory and research (Figure 1) explains a system with interrelated components that should be functioning as a unit – admittedly with constraints – much more effectively than they are at present. Although in practice the execution of such an approach would be very complex, the several components of the model are basically simple. As can be observed from Figure 1 below, the cycle progresses from input to thruput to output and then, after sound consumer reaction is obtained and corrective action is taken, back to input again (possibly with altered demand or resources).

Figure 1

A Systems Approach to the Development and Use of Theory and Research in Sport and Physical Education



What Appears to be Necessary

This presentation is urging strongly that the established field take action at the first possible moment to help the field move rapidly to truly recognized status within the profession of education.

The field, if we may call "professional" all of those functioning in schools and universities as professional people within a profession, that will not be sheltered indefinitely by the protective arm of the teaching profession of education. Tenured contracts are being broken, and we all recognize the instability of art, music, and physical activity education (not athletics) when financial constraints are imposed. Also, those "professing" developmental physical activity outside of education in the public and private sectors (e.g., personal trainers) have not yet joined hands with educators teaching physical activity education to demand state-by-state certification as practicing professionals.

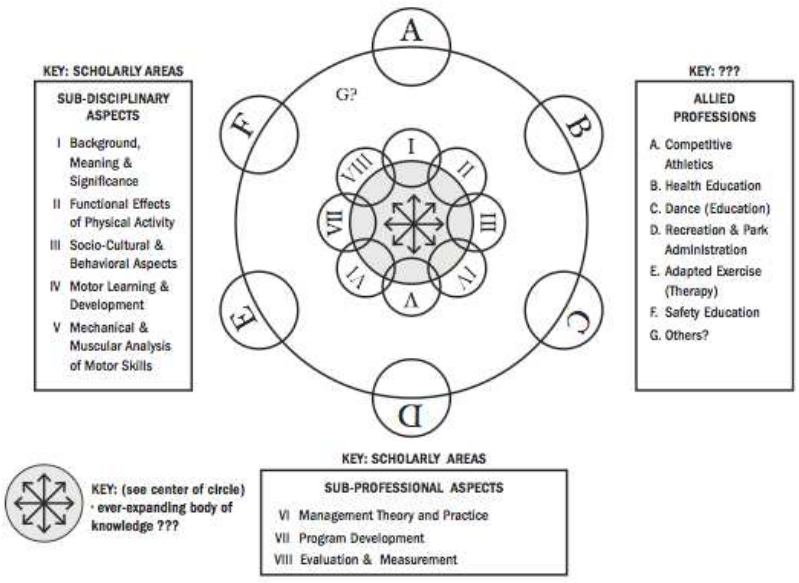
Further, unless more positive, substantive, and enlightened effort within the field is directed toward what has above been called sub-disciplinary and sub-professional scholarly endeavor, and unless the professional practitioners learns to trust and use the results of such research regularly, society will simply not recognize our field as that profession in our culture which is the leading force in disseminating sound knowledge about, and teaching and sound practice in, developmental physical activity in sport, exercise, and related expressive movement. For example, even professional medical health letters are providing specific exercise information (and even routines!) prepared by medical doctors.

It is for these reasons, therefore, that a strong recommendation is being made at this time for the serious consideration of the field with the education profession throughout North America. This recommendation is simply that an all-out effort be mounted to reverse the present trend toward continuing dispersion of the allied professions and the sub-disciplinary areas of scholarly study and research – or at the very least to bring these elements to where the centripetal and centrifugal forces maintain a desirable position insofar as the evolving profession is concerned. This relationship is delineated in Figure 2 below.

Figure 2 explains diagrammatically the specific recommendations to be achieved in the profession of sport and physical education by some mythical year (2025?).

Figure 2

Schema for the Profession's Developing Body of Knowledge



The reader will notice immediately that, instead of a continuation of the present trend toward ever-greater identification with related disciplines (e.g., sociology, physiology, psychology), concerned professionals with scholarly interests in the designated areas of research (e.g., the socio-cultural and behavioral aspects, the functional effects of physical activity) have been able to bring these areas of investigation back within the realm of research in developmental physical activity largely as part of this field's accomplishments. The recommendation is, therefore, that they should be firmly attached to the profession's theoretic or academic core.

This was characterized in Figure 2 as a "developing body of knowledge about the theory and practice of sport and developmental physical activity." It must be emphasized at once that achieving such a state does not imply little or no involvement with colleagues who identify primarily (and who are housed!) with our designated related disciplines' units. It simply means that those who consider themselves full-fledged members of the sport and physical education profession should have the greatest interest in, and knowledge and wisdom about, the field's problems; should (1) develop the greatest expertise in solving these applied problems, and (2) presumably would have the greatest interest in – and loyalty to – this profession and its attendant problems. (How the established profession should bring about this recommended state – perhaps through vastly increased emphasis on the work of AAHPERD's academies, more emphasis within the NAPEHE on sub-professional scholarship (as identified above), and more cooperation with The National Academy of Kinesiology and Physical Education, is a most important question. This question has been considered briefly by this investigator, but is basically important enough to warrant the attention of the field's professionals at a national conference.)

Concluding Statement

This analysis of the present situation argues basically that the evolving profession of sport and physical education, which is represented by NASPE, ARAPCS, and the Research Consortium within AAHPERD in the United States and CAHPERD in Canada, should start as soon as it is feasible to implement the following steps:

First, to develop a revised taxonomy of developmental physical activity in sport, exercise, and related physical activities (a proposed definition for the field's disciplinary wing).

Second, the profession should plan to an inventory of scientific findings arranged as verified, ordered principles or generalizations. This should be done because developments of the past 40 years in our allied professions and related disciplines have exceeded this profession's capability to assimilate the scientific findings,

Third, because of the communications revolution that has occurred, and especially because of the ready availability of personal computers, our profession's theoretic knowledge should be made available on an online basis through AAHPERD & PHE Canada Headquarters.

Fourth, to effect the development of an inventory before others carry out the profession's task for it (in a piecemeal fashion), it is recommended that the established profession implement a systems theory approach on the North American continent(at least).

Fifth, and finally, it is recommended that the evolving profession of sport and physical education mount an all-out effort to reverse the present trend toward dispersion of the allied professions and the sub–disciplinary areas of scholarly study and research.

At present the field is hampered immeasurably by a lack of focus on its unique mission. This continues the prevailing confusion and vitiates the field's overall effect. Also, it causes confusion for those in the allied professions, the related disciplines, and the general public. The field of physical activity education must focus on the provision of properly conceived and implemented developmental physical activity for the normal, the gifted, and the exceptional people of all ages as its unique mission. As the profession's focus becomes sharpened, the professionals within can then work to coordinate the efforts of the many

splinter groups now often working at cross purposes with poor or non-existent inter-group communication.

The field's system, both within education and in the public sector, of providing service to people of all ages and abilities can only be realized if the sub–disciplinary and sub–professional inputs are sufficient and timely. Further, the entire profession can prosper only if a satisfied public rewards it with a continuing demand for services – and accordingly provides the necessary resources for delivery of such services. A readily available inventory of scientific findings about developmental physical activity in sport, exercise, and related expressive activities is a necessary requirement for true professional status. This recommended, computerized inventory could be the beginning of regularly updated revisions that would soon reach all parts of a shrinking world. If the overall profession does not make such an effort very soon, such a golden opportunity may never present itself again.

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THE FORMS OF PHYSICAL EDUCATION THAT ARE PREFERRED BY PUPILS OF DIFFERENT DEMOGRAPHIC AND MEDICAL GROUPS, BY TEACHERS AND PARENTS

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Abstract

There are no studies based on a comparative analysis of the responses of parents, their children and teachers of physical culture. The locality of complete and accurate information makes the right choice of the means and forms of physical education of pupils rather complicated. ***Aim of research*** *− to identify the forms of physical education, which are popular among students and are appropriate according to the opinion of parents and physical culture teachers. Over 150 works of native scientists have been processed. A questionnaire of 182 physical culture teachers from 102 secondary schools in the Ukraine; 1017 pupils of middle school age and their parents has been conducted. We have used nonparametric methods. The forms of sports-oriented physical education are significantly ahead of short physical exercising and motile breaks by popularity. In the rating of parents, short physical exercise leads, and the results in this group are only slightly inferior to advocating sports sections. Teachers of physical culture also pay great attention to sports sections, sports competitions and short physical exercise. The results for pupils of the special medical group are definitely more interesting than for other children. The decline of interest in "aging" pupils is observed within all forms of physical education, but the highest reduction of interest is in the attitude of pupils to "little" forms. Sports sections, sports competitions, short physical exercise and motile breaks are the favorites among middle school age pupils. Although participation in sports competitions and advocating sports sections are more preferred by boys than girls.*

Key words: *Physical education, pupils, teachers, parents*

Introduction

During extremely limited duration of the lesson one cannot fully solve sanative tasks of physical education in schools, thus an essential factor of the pupils' health preservation and prevention of their refer to special medical groups for physical education classes is sports and recreational activities in the pupil's daily routine.

Extra-curricular work in physical education must contribute to solving a number of important interconnected tasks, such as: health promotion, hardening, increase of pupils' efficacy, the development and correction of physical and motor abilities of pupils, improvement of vital motor skills and abilities, their application in different terms, forming healthy lifestyle habits, positive attitude towards physical education, motivation and goals of the active motor activity, promoting learning of required minimum of knowledge in the field of hygiene, medicine, physical culture and sports; improvement of psycho-emotional state, moral and volitional qualities and aesthetic education; answer the communication needs of pupils, bringing up a need in regular physical exercise, striving for physical perfection, willingness to work and protect the interests of the motherland. Underestimation of the importance of extracurricular forms of physical education in present-day conditions leads to an increase in school diseases, including visual, posture and neuropsychiatric abnormalities.

A very important condition of the effectiveness of extracurricular activities in physical education is a choice of physical exercise forms, which would meet the interests of the pupils and had great sanative effect. **Analysis of recent research and publications** proves unduly low interest of researchers to the

problem. Virtually there is no data on the attitude peculiarities of children referred to various medical groups. There are no studies based on comparative analysis of the responses of parents, their children and teachers of physical culture. Locality of complete and accurate information makes the right choice of means and forms of physical education of pupils rather complicated.

Aim of research − to identify the forms of physical education which are popular among students and are appropriate according to the opinion of parents and physical culture teachers.

Research tasks:

1. To identify forms of physical education, which are popular among students of different demographic, sexual and medical groups;
2. To identify forms of physical education, which are more preferred by physical culture teachers;
3. To find out what forms of physical education are considered optimal from the point of view of the parents;
4. To compare ratings of the significance of physical education forms made by pupils, parents and teachers of physical culture.

Material and Methods. We used methods of analysis and synthesis of empirical data and literary data. In particular, over 150 works of native scientists have been processed.

A survey (questionnaire) of physical culture teachers in four regions of Ukraine has been conducted. We polled 182 respondents from 102 secondary schools located in urban and rural areas.

A total of 1017 pupils of middle school age of rural and urban secondary schools in four regions of Ukraine, including 510 girls and 507 boys has been polled. There were 365 pupils − representatives of 5^{th} grade, 7^{th} grade − 342 pupils, 9^{th} grade − 310 pupils. The sample included 671 pupils referred by doctors to basic, 327 pupils − to preparatory and 59 pupils − to special medical group (SMG). Among the parents who participated in the survey there were 13,58% of men and 86,42% − of women.

For processing of the data we have applied methods of mathematical statistics. To confirm the hypothesis about the reliability of the differences between the two averages we have used nonparametric methods.

Results. Discussion. We have found that among all forms of physical education (Fig. 1) pupils of secondary school age are the most interested in participating in sports clubs (41.9%). Every sixth pupil (37.6%) likes to participate in sports competitions directly. Significant advantage of these organizational forms, among others confirms the benefits of sports-oriented (sportized) physical education.

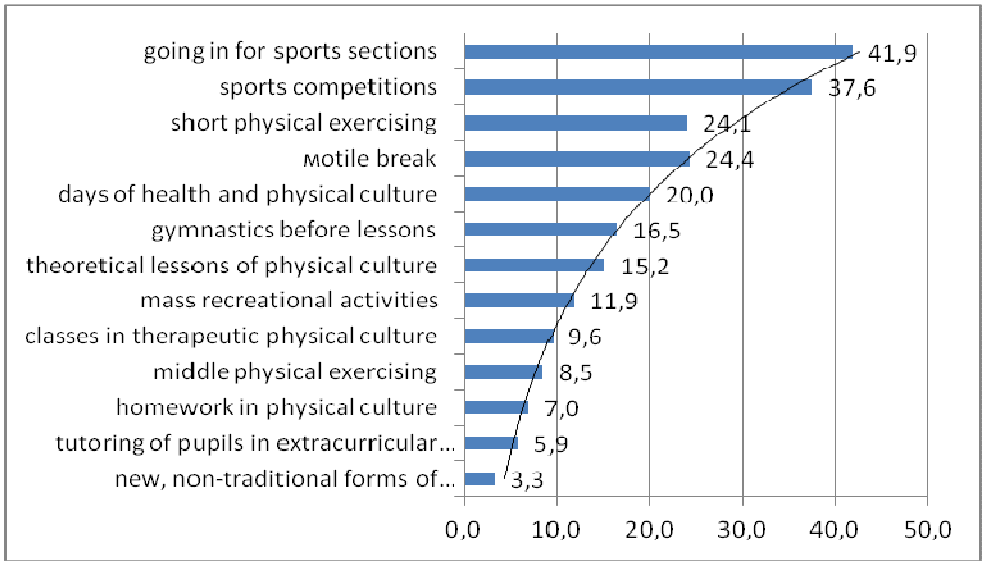


Fig. 1. Organizational forms of physical education preferred by middle school age pupils.

The value of competitions − the main attribute of sports in physical education of pupils can't be overestimated. Competitions are a good school of life, a means of personality formation. Application of competitions in academic and extracurricular activities offers great opportunities for increase of activity and improvement of pupils' emotional state. It is a well-known fact that specific competitive relations tend to reveal marginal physical and mental capabilities of every pupil up to the extreme mobilization of functional reserves of the body and thus stimulate their development. Due to this different variants of competitive forms are quite common not only in the sports movement, but in most areas of physical culture practice. In physical education competitive forms of classes are not as much a way to achieve significant sporting and technical result or sporting victory, but as a form of emotional content of communication, healthy recreation and entertainment.

Taking part in the competitions, especially with parents, pupils enrich themselves with new impressions, get to know themselves and their friends more closely, with parents experiencing the joy of victory and the bitterness of defeat. The atmosphere of competitions enables to realize the importance of physical exercise. Therefore, it is worth to apply in physical education lessons more elements of competitions and conduct the lessons with priority use of certain kinds of sport.

Other forms of physical education are significantly lacking behind ($p < 0.0000$) in the popularity from the two abovementioned. Second in the list of the most popular forms of physical education are short physical exercising, motile breaks, gymnastics before classes as well as − days of health and theoretical lessons of physical culture. Obviously, pupils feel physiological need to use exercise to relax after intellectual load and to rest by means of physical education. Performing elementary exercise during lessons (short physical exercising or middle physical exercising) and active games during breaks between lessons (while motile breaks) can significantly enhance mental performance of pupils, prevent its decline at the end of the school day, resist the appearance of scoliosis or kyphosis and poor eyesight, improve emotional state of pupils. However, in present-day schools "small" forms of physical education are practically neglected, especially – in the middle and high school [1, 2, 3, 4]. Pupils also do not perform exercises complexes of short physical exercising at home: 28% of teens do not exercise at all, and 53% of the pupils go on a break to rest only when fatigue comes, in an effort to do homework more quickly. While doing homework middle physical exercising are regularly performed only by 8% of teens and irregularly by – 11% respectively [12]. Other forms of physical education scored less than 12 percent, meaning that they became the third most popular group.

Analysis of our data showed that parents consider short physical exercising an optimal form of physical education in schools (Fig. 2). This organizational form substantially (by 4.6%) is ahead of the next in the list of parents.

Going in for sports sections are also important, according to a large part of the parents (42.4%), about the same number as among children (41.9%). Sports classes are the most appropriate to organize for well-trained children, while classes in therapeutic physical culture should be conducted for children with health deviations (39.9%), according to the parents' opinion.

The significance of dance classes (35.8%) and mobile interruptions (35.8%), and days of health and physical culture (35.2%) indicates that they constitute the fourth group in the parents' list of the most popular organizational forms of physical education.

Children's participation in sports competitions, according to 31.2% of parents is not as effective (7th place in the list), but according to their children (37.6% and 2nd place in the rating). Mass recreational activities, gymnastics before lessons, middle physical exercising, theoretical lessons of physical culture, non-traditional forms of physical education and tutoring of pupils in extracurricular time (27.1% -11.2%) are productive in the opinion of each 4-10th parent, i.e. have minor impact on pupils and, therefore, require modifications. Homework in physical education is considered an effective form of physical education by a quite small number of parents

(6.5%). Therefore, when using this form, one should also make adjustments.

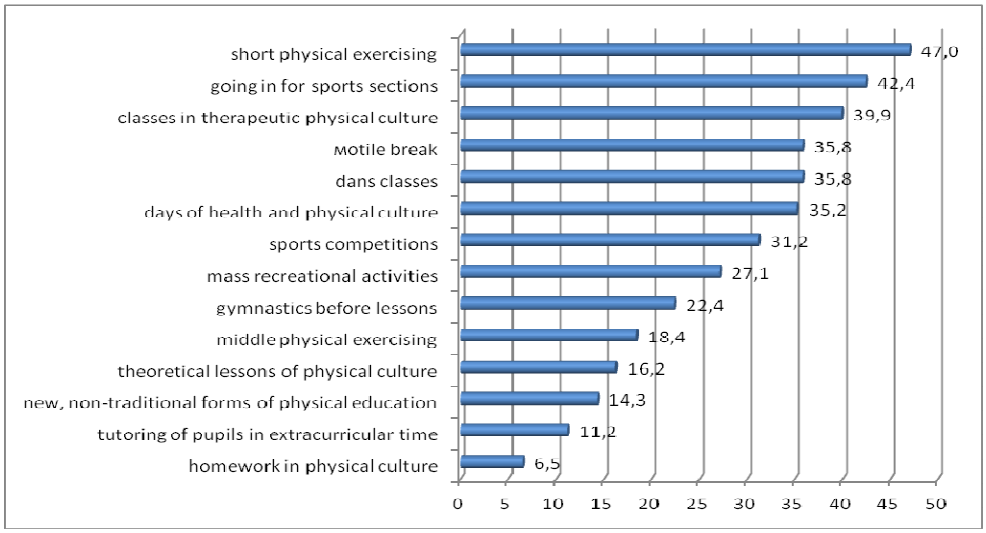


Fig. 2. Organizational forms of physical education, advisable in schools according to parents' opinion of middle school age pupils.

One should take into account the tendency in the rating of children and their parents. In the responses of children it had exponential form. This indicates a sharp decrease in the importance of forms since the second position. Parents, on the contrary, – showed an abrupt decline in the forms placed in the second half of the list.

We observe a slightly different succession of physical education forms in the list of teachers compared to the previous two. In particular, the tendency shows that physical culture teachers give much more importance to each of the abovementioned forms than parents and children do (Fig. 3). It is obvious that parents and children underestimate the value of most of them (except for dance classes and gymnastics before lessons), probably, because of the lack of awareness on these issues. As the figure shows, theoretical lessons of physical culture are not considered by parents and their children as an effective form of physical education. Therefore, it will be useful to improve the system of formation of theoretical training of pupils as they are prospective parents as well. It will be worthy to examine the dependence of their attitude towards physical education depending on their age and level of education.

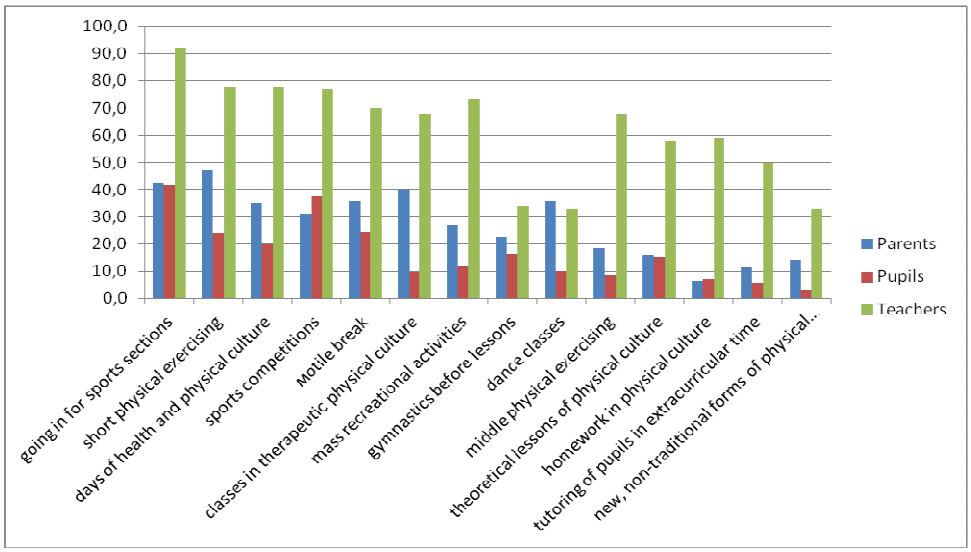


Fig. 3. Organizational forms of physical education

All the respondents in improvement of school children's health pay great attention to involvement in sports sections (Table 1). Therefore, this form is substantially ahead of the next form in the list.

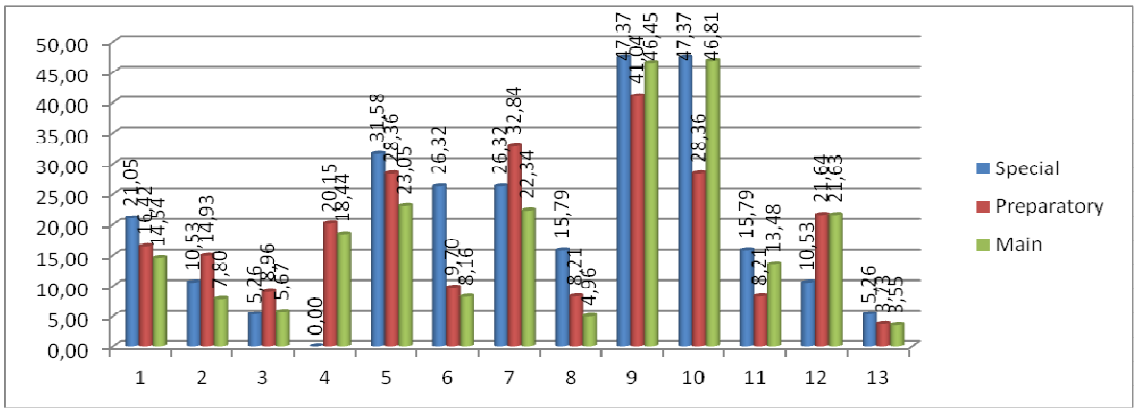
Table 1. Organizational forms of physical education, advisable in schools

General place in the rating	Organizational forms of physical education	parents	pupils	teachers
1	Going in for sports sections	2	1	1
2	Short physical exercising	1	4	2-3
3-4	Sports competitions	7	2	4
3-4	Motile break	4	3	6
5	Days of health and physical culture	6	5	2-3
6	Mass recreational activities	8	8	5
7	Classes in theraupetic physical culture	3	11	7-8
8	Dance classes	5	9	13-14
9	Gymnastics before lessons	9	6	12
10-11	Middle physical exercising	10	10	7-8
10-11	Theoretical lessons of physical culture	11	7	10
12	Homework in physical culture	14	12	**9**
13	Tutoring of pupils in extracurricular time	13	13	11
14	New, non-traditional forms of physical education	12	14	13-14

Short physical exercising were rated at highest by parents, teachers assigned them 2-3 places, children put them on the 4th place. As a result, this form is second in importance.

Teachers of physical culture give greater significance to mass recreational activities (5th place in the rating against 8th), short physical exercising (7-8th against 10th) and homework in physical culture than given by parents and children (9th position against the 14th and 12th respectively). Parents and children have higher rating in motile breaks (4th and 3rd place to 6th in the list of teachers). As a result of data processing, motile breaks share the 3rd and 4th places with sports competitions, are one of the three priority forms of physical activity at school.

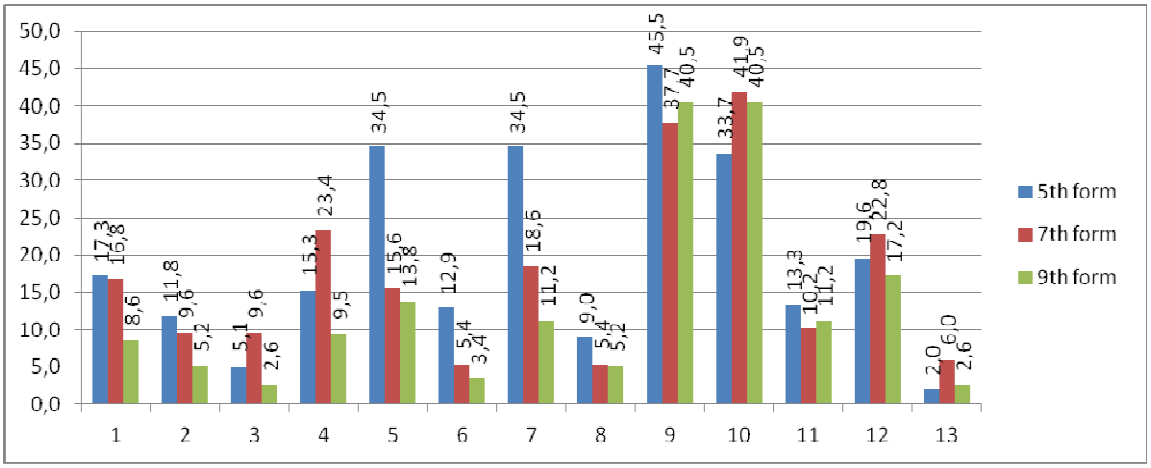
In the course of the research it was discovered that there is a dependence between the value of a particular form of physical education and the level of pupils' health (Figure 4).



1 – theoretical lessons of physical culture, 2 – classes in therapeutic physical culture, 3 – tutoring of pupils in extracurricular time, 4 – gymnastics before lessons, 5 – short physical exercising, 6 – middle physical exercising, 7 – motile breaks, 8 – homework in physical culture, 9 – going in for sports sections, 10 – sports competitions, 11 – mass recreational activities, 12 – days of health and physical culture, 13 – new, non-traditional forms of physical education

Fig. 4. Forms of physical education, which pupils of various medical groups are interested in.

Pupils of Special Medical Group (SMG) are clearly (p <0.05) more interested in theoretical physical culture lessons than others, they like to do exercises of short physical exercising (p> 0.05), and especially those of middle physical exercising (p <0.05), as well as to do homework in physical culture (p <0.05 – compared to the pupils of basic medical group). Unimportant, unlike the rest, the pupils of SMG find gymnastics before lessons and days of health (p> 0.05). However, the most interesting among physical forms in school, just like all other pupils, the pupils of SMG find going in for the sports sections and sports competitions; second the most important among children's priorities are short physical exercising and motile breaks. We have found that with age, the succession of physical education forms, which are popular with children is changing as well (Fig. 5). Most of the organizational forms of physical education lose popularity the senior children are, but the largest and most significant decline is observed in the interest of pupils to short physical exercising (p<0.000), motile breaks (p <0.001) and middle physical exercising (p <0.01) and gymnastics before lessons (p <0.01). Theoretical lessons lose their value in the 9th form (p <0.05). Therefore, it is in the methodology and the organization of these forms of physical education significant changes should be made in order to maintain the interest of pupils throughout the entire period of studying at the school.



1 – theoretical lessons of physical culture, 2 – classes in therapeutic physical culture, 3 – tutoring of pupils in extracurricular time, 4 – gymnastics before lessons, 5 – short physical exercising, 6 – middle physical exercising, 7 – motile breaks, 8 – homework in physical culture, 9 – going in for sports sections, 10 – sports competitions, 11 – mass recreational activities, 12 – days of health and physical culture, 13 – new, non-traditional forms of physical education

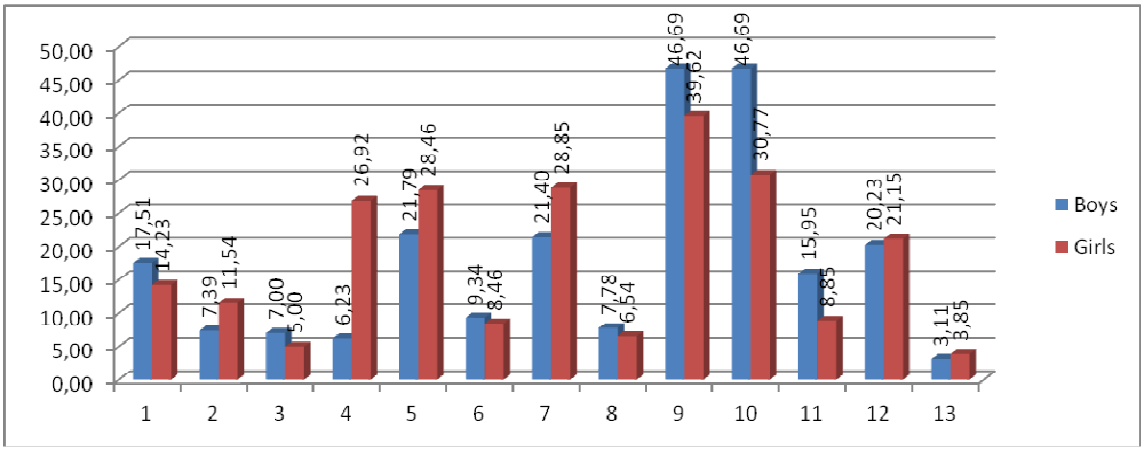
Fig. 5. Forms of physical education, which pupils of various age groups are interested in.

The obtained data allow us to conclude that there are almost no gender differences in the popularity of various forms of physical education among pupils of secondary school age (Fig. 6). The only exceptions are gymnastics before lessons that is more attractive to girls than boys (p <0.000) and sports competitions, which are more appreciated by boys (p <0.001). Gender differences viewing interest in sports sections were close to credible (P = 0.07), but were not confirmed statistically.

Conclusions. Among the pupils of middle school age, forms of sports-oriented physical education (going in for sports sections and taking part in sports competitions) are significantly (p<0.0000) ahead of short physical exercising and motile breaks by popularity. In the rating of parents, short physical exercising are leading, they are only slightly (p> 0.05) inferior to going in for sports sections. Children's participation in sports competitions, according to parents' opinion (31.2%) is not as effective (7th place in

the rating) as believed by their children (37.6% and 2nd place). Teachers of physical culture also pay great attention to going in for sports sections (92.0%), sports competitions (77.0%) and short physical exercising (78.0%).

The dependence between the importance of certain forms of physical education and level of pupils' health has been defined. For pupils of special medical group definitely (p <0.05) more interesting than for other children, are theoretical lessons of physical culture; children with health deviations prefer to do exercises of short physical exercising (p> 0.05) and middle physical exercising (p <0.05) as well as do homework in physical culture on their own (p <0.05 - with indicators of practically healthy pupils). The choice of these forms of special medical group pupils can be explained by relatively lower efficiency level and possibly by mental characteristics inherent to them.



1 – theoretical lessons of physical culture, 2 – classes in therapeutic physical culture, 3 – tutoring of pupils in extracurricular time, 4 – gymnastics before lessons, 5 – short physical exercising, 6 – middle physical exercising, 7 – motile breaks, 8 – homework in physical culture, 9 – going in for sports sections, 10 – sports competitions, 11 – mass recreational activities, 12 – days of health and physical culture, 13 – new, non-traditional forms of physical education

Fig. 6. Forms of physical education, which pupils of different gender are interested in.

The decline of interest of "aging" pupils is observed within all forms of physical education, but the highest reduction of interest is in the attitude of pupils to "little" forms (p <0,000-0,01).

Going in for sports sections, sports competitions, short physical exercising and motile breaks are the favorites among middle school age pupils, even those referred to special medical groups. Even when growing up, the pupils do not lose interest to these forms of physical education, but on the contrary ÷ the interest to sports competitions is only growing. Although participation in sports competitions (p <0.000) and going in for sports sections (p = 0.07) are more preferred by boys than girls.

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A PROFILE OF THE SPORTING HABITS OF STUDENTS BETWEEN 10-16 YEARS OLD FROM MAJORCA ISLAND

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University of Balearics Islands, Spain.

Abstract

This article is part of a wider research study about sporting habits which was carried out with young people between 10 and 16 years old from Majorca Island. In this paper we are analyzing what is the profile of Majorcan young athletes by gender, socio-demographic and sport level.

A sample of 4301 boys and girls from Majorca were surveyed. The sample was obtained from multistage sampling. A specifically designed questionnaire was used.

The results obtained in this study confirm a clear regression in physical activity to increment age of males and females. Also noteworthy are the clearly significant differences between men and women in this age group in terms of sports, frequency, and type of sport practiced. The practicing of sport by parents promotes a greater participation in children. Also, gender marks some differences in relation to the practice of sports in these ages.

Key words: *Habits, sports practice, physical activity and gender.*

Introduction

The increase in sedentary adults is due in large part to a lifestyle that begins in the early stages. The benefits of physical activity on health are based on numerous studies, Dishman, (1985); Blasco, (1994), Shephard (1996); Biddle, Fox, & Boutcher (2000). Epidemiological research available supports with great uniformity that regular physical activity represents an important health benefit, while its absence is a significant detriment (Varo, Martínez, Martínez, 2003).

According Abarca et al. (2010) recommendations for physical activity for youth are widely used to target an active lifestyle and healthy. Several institutions, including the Ministry of Health of the United Kingdom, Centers for Disease Control and Prevention of the United States and the Ministry of Health and Aging Australia and different experts indicate that children and adolescents should get at least 60 minutes (and up to several hours) of moderate intensity physical activity to intense all or most days of the week.

The latest survey of health habits among the young population of the Community of Madrid, 2009, highlights significant differences between genders. 41.3% of girls and 11.9% of boys do not perform at least three days a week intense physical activity, the survey defined as those whose energy consumption is at least five times higher than the repose. There is a 10% of young people who do not do any physical activity three or more days a week. Women double the proportion of men who confess their inactivity.

AFINOS Research states that the reduction of habitual physical activity has been strengthened as a result of the number of hours children spend sitting in school, using motorized transport to travel and with leisure proliferation of technological inciting to inactivity.

This research highlights the need to intervene on sedentary behaviours to prevent the premature development of cardiovascular risk in childhood and adolescence. Making recommendations is Essentials to reduce time that children and adolescents are inactive. In fact, only 28 percent of Spanish boys and 16 percent of girls between 12 and 17 perform the

recommended amount of physical activity for their age, i.e., 60 minutes of exercise a day at least five days week.

From a wellness-oriented perspective and contribution to personal and social development, we justify that the interest of this research is aimed at discovering generic relationship between Majorca youth and sports, and the factors that determine it, thus identifying the profile of sporting habits according to socio-demographic variables such as gender and age, educational level of parents, socioeconomic status, practice habits of parents. We are also interested to know who and how play sports, the most popular sports, the regular practice, sports facilities used, federated athletes and how to start in sports

From the data and results of other research carried out state-wide Spanish (Escudero et al., 1992; Ponseti, 1998; Palou, 2001; Puig & Campomar, 2003; García-Ferrando, 2006; López del Río, 2006; Palou & Ponseti, 2008) suggested that, at certain ages, it seems that some variables such as gender and socioeconomic status, educational level are determining factors in establishing differences in practice in youth athletes.

In 2006, García-Ferrando, in research on sports practices of the Spanish population between 2000 and 2005, points data on the evolution of the sports habitual practice among them. It concludes that the vast majority of the Spanish population, who play sports, basically makes leisure recreation.

Regarding the variable gender men follow primarily competitive model, and women make a recreational practice. Among the youngest generations, the percentage of the population whose parents do or have done sport is significantly larger that among older generations because of the great importance of sport socialization on the family model.

The aim of this research is to analyse the practice of sports habits in Majorcan youth according to their gender, age, parents sporting habits and their sociocultural and socioeconomic environment. This will be able to diagnose the current situation of the sporting habits of young people in the Balearic Islands and define the strategies needed to promote sports

MATERIAL AND METHOD

SAMPLE

The universe under study of the research is made up of primary and secondary school students of public, private and charter centres, aged between 10 and 16 from Majorca island during 2009-2010 school year (N=47847). The resulting sample was 4301 participants representing 8.9% of the total population of public, private and charter of Majorca.

The final sample was obtained from a multistage sampling rate based on a sample of schools that taught the third cycle of primary and ESO studies, according to the list provided by the Ministry of Education, Government of the Balearic Islands. The resulting mean age was 13.4 years. 51.9% were male and 48.1% female.

QUESTIONNAIRE

The test tool adopted for data collection was a specifically designed questionnaire (Ponseti et al., 1998; Palou, 2001; Palou & Ponseti, 2008), made from the consultation of questionnaires, the ‘operationalization’ of the variables, the expert consultation and the questionnaire test application. The questionnaire was distributed among the participants of the final sample and shall annex the relevant instructions for its use. All this was realized after obtaining the proper permits from the schools.

STATISTICAL ANALYSIS

Once the subjects completed the questionnaires, the statistical analysis of the collected data was passed to them. To compare qualitative variables, the Chi-square test was used and to compare mean it was used the t-student test and analysis of variance (ANOVA). The significance level was set at $p < 0.05$. In those cases where it did not meet the assumptions of normality were used for nonparametric tests. All analyses were performed using SPSS-19 for Windows.

RESULTS

First of all, the data show that a large proportion of young people among 10-16 years old from Majorca practice physical activity outside of physical education classes. We found

that 72.8% of respondents play sports outside of physical education lessons, compared to 27.2% who claims not to do any physical activity outside of school time. In terms of gender differences are noteworthy, such as the claim that men participate in any sports at 80.5% compared to 19.5% who said otherwise. On the other hand, in women 64.5% do practices and 35.5% do not.

It can be seen on Table 1, which refers to the rate of sports practice in terms of socioeconomic status and educational level of parents, that there is a difference between people of low socioeconomic status, with 56.8% of sports habit, respect to persons of other higher levels, with percentages above 70% from middle, upper middle and high. It also shows how the amount of sports practice gradually increases according to the education level of parents. So between people "uneducated" by 61.9% of participants practiced sport and this percentage rises to 80.3% if they have college-educated parents.

As for the hours spent to sports practice outside of physical education classes, the frequency of practice with a 35% majority is among 4 and 8 hours a week. According to gender, men practice during more hours than women, because 38.3% of men practice among 4 and 8 hours, along with 8-12 hours with 30.5%. Women practice mostly 2 and 4 hours 33.6% and 30.6% of 4 to 8 hours. Only 16.9% of women practicing 8-12 hours (see Table 2)

If one studies the level of sports practice related to the sporting habits of parents, it is observed that if parents practice or have practiced sport, the percentages of practitioners increased to 82.7%, otherwise the percentage is 63.1 %. This tendency is broken down by gender as can be seen in Table 3.

Based on the age, 10 years old gets the highest rate of sports practice with 88.5%, decreasing gradually up to 14 years old with 67.9%. According to gender the rate remains highest in Sports practice at 10, but the descent of the girls at age of 14 is amazing with a percentage of 56.9%, meanwhile the boys are kept in 80.8 % in this age group.

The most popular sports are soccer, swimming, basketball, tennis, biking, dancing, hiking, martial arts, skating, gymnastics, skate board, paddle tennis, athletics, football and horse racing. In According to gender differences can be seen on the sports played. The sports which are more neutral: basketball, tennis, cycling, martial arts, hiking and swimming. In males, soccer practice, football, skateboarding and handball. The skate board appears in the last two studies in Ibiza and Majorca as an emerging activity along with the increase of tennis and horse riding. In women highlights the practice of dance, gymnastics, skating and volleyball.

As for with whom play sports 51.3% practice with a team and 29.8% with a group of friends. How do the youth play sports?, mostly as a club activity or as a federation practice 54.9%, and 30% with friends, by gender men increase the percentage of a club to 61.7%.

The regularity of sports practice, 48.5% practiced all year, 34.6% during the school year, by gender, men regular practice increases to 52% and women drop to 43.7 %, during the school year. 30.6% of men practice and 40% of women.

Federated practice is 69%, the gender differences exist because men have a federated percentage of 66.3% and women 44%.

Table 1. Sports practice rates according to the indicator of self-perceived practice, (depending on socioeconomic status and educational level of parents).

	SPORTS PRACTICE		**NO SPORTS PRACTICE**		
	(N)	%	(N)	%	
	3059	72,9	1136	27,1	
Socioeconomic status					Significance
High	175	78,8	47	21,2	
Medium-high	752	79,3	196	20,7	

Medium	1875	72,1	724	27,9	P<0,001
Medium-low	211	61,2	134	38,8	
Low	46	56,8	35	43,2	
	SPORTS PRACTICE		**NO SPORTS PRACTICE**		
	(N) 3006	% 71,66	(N) 1189	% 28,34	
Parents education level					Significance
No studies	127	61,9	78	38,1	
Primary	394	52,2	360	47,8	
Elementary	1039	73,6	372	26,4	P<0,001
Higher education	596	77,8	170	22,2	
College	850	80,3	209	19,7	

Table 2. Sports practice dedication of weekly hours by gender

	Total		Men		Women		Significance
	(N) 2447	% 100	(N) 1407	% 100	(N) 1040	% 100	
Less than 2 hours	319	13	122	8,7	197	18,9	
2-4 hours	666	27,2	317	22,5	349	33,6	P<0,001
4-8 hours	857	35	539	38,3	318	30,6	
8-12 hours	605	24,7	429	30,5	176	16,9	

Table 3. Sports practice rates, according to parents sporting habits.

	CHILDREN WHO PRACTICE SPORTS		**CHILDREN WHO DON'T PRACTICE SPORTS**		
	(N) 3123	% 72,8	(N) 1165	% 27,2	
Father Sports practice					Significance
Father practices	1373	82,1	299	17,9	P<0,001
Father has practiced	700	77,1	208	22,9	
Father has never practiced	1050	61,5	658	38,5	
Mother Sports practice					Significance
Mother practices	1130	83,4	225	16,6	P<0,001
Mother has practiced	570	77,2	168	22,8	
Mother has never practiced	1423	64,8	772	35,2	
Parents Sports practice					
Parents practice	2503	82,7	524	17,3	
Parents have practiced	1270	77,2	376	22,8	Significance P<0,001
Parents have never practiced	2473	63,1	1430	36,9	

DISCUSSION

The main goal is to identify sporting habits of Majorcan youth between 10-16 years old, depending on the variables: gender, age, socioeconomic status, education level of parents and sporting habits of parents.

Highlighting the emergence of significant differences between women and men (10-16 years old) in terms of sports practice, due to the existence of almost twice as many women (35.5%) than men (19.5%) claiming no practice any sports except for school physical education sessions. These results are consistent with data from other similar researches (Blasco, 1994; García-Ferrando, 2004; Puig & Campomar, 2003; Palou & Ponseti, 2008).

Moreover people with medium high and high socioeconomic status are the people who plays sports more, resulting in a decrease in the percentage of practicing it in lower socioeconomic levels

Of note is the fact that sports practice is increased progressively among the population according with the increase of educational level of the parents, these results correspond with sociological studies (Willis and Campbell, 1992; Blasco, 1994; Puig & Campomar, 2003; Palou & Ponseti, 2008).

When it comes to analyze the influence of the sporting habits of parents about their children's sporting habits, as it increases the percentage of parents practice increases the level of engagement of the children sports corroborating data from other researches (García-Ferrando, 1990; Willis and Campbell, 1992; López del Rio, 2006; Palou & Ponseti, 2008).

The highest percentage of age of is 10 years practice, progressively decreasing levels of practice up to 16 years. The decrease in the practice is more pronounced in girls. In the school years where there is greater participation, as they get older the rate of practitioners' decreases (García-Ferrando, 1990).

From the data obtained on the sports practiced by young people from Majorca there is a trend for men to practice certain sports (soccer, football, skateboarding, handball). Other sports are practiced by girls: dance, gymnastics, volleyball, horse riding, skating and aerobics. The neutral sport is: basketball, tennis, cycling, martial arts, hiking and swimming.

Regarding how to perform sports practice, the most used way to practice is the proposed club and sports federations. Playing sports with their teams and friends, significantly leaving the family aside, has little influence on the people of this age group who are in the habit of sports practice.

Thus, we can define the sportsman profile from Majorca island as a middle-class male, whose parents have a university education and practice or have practiced sport, who spend from 4 to 8 hours a week practicing sports, which are made using a federated team and regularly throughout the school year.

CONCLUSIONS

The results show that gender and age are the most important factors when it comes to sports practice or not.

It is much more likely that a boy or a girl practices sports if their parents practice or have practiced sport.

Increasing the educational level and socioeconomic status, they also increase the levels of sports practice.

The distribution of the different sports activities are not done randomly, following guidelines set by gender, socioeconomic status, education level and family sports practice habits.

The regular practice is closely tied to participate in sports competitions federated.

There is a need to promote sports practice particularly in girls, to prevent a future sedentary lifestyle that may lead to health problems.

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LEISURE TIME ACTIVITIES AMONG YOUNG PEOPLE AGED 13-16 FROM KOSOVO, BULGARIA AND POLAND

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Abstract

This paper presents the results of the research on the physical activity of school youth in three European countries (Poland, Bulgaria, Kosovo) which are at different stages of socio-economic development and, therefore, of different possibilities and conditions in terms of leisure and mobility.

The purpose of this cognitive study was to diagnose certain aspects of the lifestyle of young people aged 13-16 from Kosovo, Bulgaria and Poland, with a particular focus on physical activity. The practical aim, however, was an indication of such actions, arising from past experience that would aim at improving lifestyle, and could lead to the elimination or prevention of certain causes of physical inactivity by the youth of the countries surveyed.

The research was conducted by the use of a diagnostic survey of a group of 524 people aged 13-16, among whom there were 88 people from Bulgaria, 136 people from Poland and 300 people from Kosovo. The research material was collected in 2012.

The research that was carried out shows that the level of wealth (not so much of the family, but of the specific country) may have an impact on the choice of activities chosen by the youth. Undoubtedly socio-cultural factors and the tradition of social life, which impose certain ways of spending leisure time (as can be seen particularly in the case of the Bulgarian and Kosovar youth) are also of great importance. The above observations, taking into account local conditions, should be the starting point for all those who plan to introduce changes in the physical education systems in each of these countries in the future.

Key words: *lifestyle, youth, physical activity, socio-cultural factors, Poland, Bulgaria, Kosovo.*

Introduction

With adolescents aged 13-16 their interests and expectations are the subjects to transformation. Young people at this age often cause problems, are difficult to communicate with, there may also occur the phenomenon of "youthful rebellion". During this period you can also see that the physical activity in their leisure time, to a large extent, will depend on a number of activities, which go beyond the team problems covered by school curriculum but deals with educational environment in which each student grows up. The development of interests takes place in various sections, clubs, interests, and circles. From the point of view of health needs, the most important part of this activity should be based on physical activities. It is known that such activities have a very positive impact on the development of biological characteristics (stimulate growth, strengthen the body, develop speed, stamina, concentration, improve reflex) [10], and psychosocial problems (self-esteem, the ability to self-control, the ability to work with other people).

For the sake of clarity, first the term of leisure requires clarification. For the first time it was defined during an international conference held in 1956. As defined by the French sociologist Dumazedier [4], leisure means all the activities taken by an individual for entertainment or self-development, voluntary participation in social life out of social and family responsibilities. This definition considers only adults. In turn, according to Dąbrowski [3] leisure time of young people is the time, which remains to their own disposal after fulfilling their body's needs and completing the duties at home and school, in

which they can conduct their activities in agreement with their tastes, related to leisure, entertainment and satisfying their own interests.

To get a fuller picture of youth's behavior in critical social, psychological and physical period of growing up, research study have been carried out in three societies (Poland, Bulgaria, Kosovo) of different degrees of political, economic and socio-cultural development. In pedagogy such comparative studies are conducted in order to identify possible trends and development paths. The first step is to identify the current state of things.

Aims of the research

The cognitive objective [2] of the present study was to diagnose certain aspects of the lifestyle of young people aged 13-16 from Kosovo, Bulgaria and Poland, with particular focus on physical activity. The practical aim was an indication of such actions, arising from past experience that would improve lifestyle, and could lead to the elimination or prevention of certain causes of not making movement activity by the youth of the countries surveyed.

Material and method

The research material was collected in the course of the surveys. A research tool used to evaluate the lifestyle of students was a questionnaire "My lifestyle", developed by a team of European researchers [Telama R., Naul R., Nupponen H., Rychtecky A.,Vuolle P., 2002] for the project and translated into Polish by the research team from University School of Physical Education. The research was conducted in the group of 524 people aged 13-16, among whom there were 88 people from Bulgaria - 35 girls (39,8%) and 53 boys (60,2%), 136 people from Poland - 49 girls (36,0%) and 87 boys (63,0%), 300 people from Kosovo - 152 girls (50,7%) and 148 boys (49,3%). The research material was collected in 2012 during the implementation of the two projects. The first project, is the Polish part of the European research project "Olympism and the integration of young people through education" (no 2010-1-PL 1-COM13-115641) under the scheme "Learning throughout life" - Comenius Regio Partnerships. The other project, during which the research material was collected, is the project "Post-Graduate Level Training of Trainers Programme in Physical Education and Sport" (no Europe Aid/130886/C/SER/KOS).

To determine the strength of the relationship between variable non-parametric test chi was used. Significance level $p < 0,05$ was accepted.

Results

Table 1 show the way on spending leisure time of young people. Frequently provided response was *listening to music*. This considers both students from Kosovo (girls 60,5%, boys 65,5%), Bulgaria (girls 71,4%, boys 45,3%), and Poland (girls 73,47%, boys 56,3%).

Other activities taken mostly in leisure time include *watching television, video* (girls from Kosovo 50,0%, boys from Poland 46,0%), *meeting friends* (girls from Bulgaria 60,0%, boys from Bulgaria 53,0%, Polish girls 63,3%) and *playing computer games* (boys from Bulgaria 57,0%, boys from Poland 49,4%). No student from Kosovo answered *I go to the disco*. A small percentage of the students pointed to the need to *visit family in spare time* - the largest percentage among the Bulgarian students (boys 16,4%, girls 11,0%).

Tab.1. Distribution of responses of students aged 13-15 to the question :"How do you spend your free time?".[%]

Leisure activities	KOSOVO		BULGARIA		POLAND	
	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS
a) listen to music	**60,5**	**65,5**	**71,4**	**45,3**	**73,4**	**56,3**
b) play instruments, sing in a choir, etc.	15,8	6,1	0,0	6,0	2,04	7,0
c) watch TV, video	**50,0**	26,0	34,3	38,0	30,61	**46,0**
d) meet friends	17,8	**29,7**	**60,0**	**53,0**	**63,3**	36,0
e) play cards or board games	2,6	4,0	6,0	17,0	2,04	1,1
f) play computer	10,5	16,2	**40,0**	**57,0**	24,5	**49,4**

g) read books, magazines	**31,0**	24,3	0,0	7,5	18,4	6,0
h) do sport in a club or sports section	**29,0**	**35,1**	14,3	23,0	**34,7**	**40,2**
i) do sport individually	14,5	**36,0**	11,4	13,2	4,08	18,4
j) attend sports events	20,0	3,4	0,0	7,5	8,2	13,0
k) go to discos	0,0	0,0	8,6	7,5	4,1	9,2
l) go to the cinema, theatre, concerts	22,0	10,1	26,0	4,0	12,2	3,4
m) spend time on hobbies	5,0	9,5	20,0	9,4	12,2	7,0
n) visit family	16,4	11,0	6,0	4,0	4,1	0,0
o) do nothing	2,0	2,0	3,0	0,0	8,2	2,3
p) play with peers	6,0	8,1	11,4	2,0	0,0	5,0
q) others	3,3	19,0	6,0	7,5	0,0	0,0

Answers do not sum up to 100% because respondents could choose three answers.

Table 2 concerned physical activity taken up in leisure time (which lasted at least 30 minutes) in the past three months. Three frequency categories were taken into consideration: category I – *never or less than once a week*, category II - *once a week, twice a week, three times a week*, category III - *five times a week, every day*. Girls from Kosovo (48,7%), Bulgaria (57,2%) and boys from Kosovo (46,7%) take physical activities *once to three times a week*. Students from Poland (boys 66,7% , girls 57,1%) and boys from Bulgaria (43,4%) take such an activity daily and *five times a week*. The differences in the responses vary at the significance level $p > 0,05$.

Tab.2. Number and percentage distribution of responses to the question "How often, over the past 3 months, did you take up motor activity in your free time? (lasting at least 30 minutes)."

Frequency of taking motor activity	**BOYS**						**GIRLS**					
	Kosovo		**Poland**		**Bulgaria**		**Kosovo**		**Poland**		**Bulgaria**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
a) never or less than once a week	44	29,7	5	5,7	12	22,6	73	48,0	4	8,2	4	11,4
b) 1-3 times a week	**69**	**46,7**	24	27,6	18	34,0	**74**	**48,7**	17	34,7	**20**	**57,2**
c) 5-7 times a week	35	23,6	**58**	**66,7**	**23**	**43,4**	5	3,3	**28**	**57,1**	11	31,4
Chi square	$Chi^2 = 45,78$ $p < 0,05$						$Chi^2 = 87,11$ $p < 0,05$					

In the next table are presented (Tab.3) the forms of physical activity taken in leisure time most often were presented. To those that are taken *often* by the surveyed boys belong: soccer (35,1% of the boys from Kosovo, 72,4% of the boys from Poland) and running (41,5% of the boys from Bulgaria). Among the forms of physical activity that are *never* taken by the boys of Kosovo we can find speed skating (95,3%). In turn, the boys from Bulgaria (87,9%) and Poland (66,7%) *never* take the form of physical activity such as snowboarding.

Tab.3. Distribution of responses of boys aged 13-15 to the question: "In which forms of leisure-time physical activity do you participate?".

Frequency of taking various forms of physical activity by boys in %									
Forms of motor activity	**Never**			**Rarely**			**Often**		
	KOS	**BUL**	**POL**	**KOS**	**BUL**	**POL**	**KOS**	**BUL**	**POL**
a) running	12,8	15,0	11,5	49,3	**43,4**	37,9	**35,1**	**41,5**	**50,6**
b) swimming	20,9	45,2	17,2	**75,7**	**43,4**	**45,9**	3,4	11,3	36,8
c) cycling	47,9	35,8	6,9	34,45	30,1	35,6	17,6	**33,9**	**57,5**
d) roller-skating	**85,8**	**75,4**	55,2	12,2	16,9	28,7	2,0	7,5	16,1
e) basketball	28,4	56,6	16,1	**58,1**	33,9	**52,9**	13,5	9,4	27,6
f) volleyball	19,6	30,1	28,7	**50,7**	**39,6**	**49,4**	**29,7**	7,5	21,8

g) football	21,6	43,4	10,3	37,8	22,6	17,2	**40,5**	**33,9**	**72,4**
h) handball	65,5	71,7	31,0	29,7	18,8	39,1	4,7	9,4	29,9
i) aerobics	**81,8**	**83,0**	59,8	13,5	7,5	26,4	4,7	9,4	13,8
j) gym	**83,1**	58,4	32,2	12,2	28,3	40,2	4,7	13,2	27,6
k)skateboarding	**86,5**	73,5	63,2	6,8	20,7	26,4	6,8	5,6	10,3
l) skating	**95,3**	66,0	50,6	4,0	26,4	36,8	0,7	7,5	12,6
m) skiing	39,2	69,8	**60,9**	**56,8**	18,8	28,7	4,0	11,3	10,3
n) snowboarding	72,9	**87,9**	**66,7**	22,9	9,4	23,0	4,0	5,6	10,3
p) gymnastics	44,6	64,1	36,8	46,6	22,6	35,6	8,8	13,2	27,6
q) martial arts	65,5	**83,0**	**63,2**	26,3	13,2	10,3	8,1	3,7	26,4
r) others	0,0	54,7	58,6	0,0	18,8	16,1	0,0	28,3	25,3

Respondents could choose three answers. The results do not sum up to 100%.

Among girls taking various forms of physical activity is as follows (Tab.4). Forms of physical activity chosen *often* in leisure time: volleyball (16,4% of girls from Kosovo) and cycling (40% of girls from Bulgaria, 44,9% of the girls from Poland). Among girls from Kosovo a form of physical activity which is *never* taken is speed skating (97,4%). Girls from Bulgaria *never* participate in the aerobics (97,1%). When it comes to Polish girls, they *never* practice martial arts.

Tab. 4. Distribution of girls' responses to the question: "In which forms of leisure time physical activity do you participate?"

Frequency of taking various forms of physical activity by girls in %									
Forms of physical activity	**Never**			**Rarely**			**Often**		
	KOS	**BUL**	**POL**	**KOS**	**BUL**	**POL**	**KOS**	**BUL**	**POL**
a) running	34,2	5,7	8,2	**57,2**	**65,7**	**59,2**	7,2	**28,6**	32,6
b) swimming	19,1	31,4	22,4	**80,9**	**54,3**	44,9	0,0	14,3	32,6
c) cycling	61,8	22,8	4,1	30,3	37,1	**51,0**	**7,9**	**40,0**	**44,9**
d) roller-skating	**94,7**	71,4	36,7	5,3	25,7	36,7	0,0	2,9	**42,9**
e) basketball	59,2	54,3	32,6	36,2	42,9	**48,9**	4,6	2,9	18,4
f) volleyball	25,0	31,4	18,4	**58,5**	**57,1**	**46,9**	**16,4**	11,4	**34,7**
g) football	63,2	48,6	36,7	25,0	22,9	36,7	**11,8**	**28,6**	26,5
h) handball	**88,2**	74,3	53,1	9,2	17,1	38,8	2,6	8,6	8,2
i) aerobics	71,7	**97,1**	48,9	25,7	2,9	36,7	2,6	0,0	14,9
j) gym	**94,7**	51,4	59,2	3,3	37,1	26,5	1,9	11,4	14,9
k) skateboarding	**96,0**	65,6	65,3	0,0	28,6	22,4	3,9	2,9	12,2
l) skating	**97,4**	62,9	42,9	2,6	31,4	40,8	0,0	5,7	16,3
m) skiing	53,4	**74,3**	53,1	45,4	14,3	32,6	2,6	11,4	14,3
n) snowboarding	**88,8**	**94,3**	**63,3**	10,5	2,9	22,4	0,7	2,9	14,3
p) gymnastics	65,1	68,6	34,7	31,6	22,9	30,6	3,3	8,6	**34,7**
q) martial arts	76,3	65,7	**73,5**	18,4	25,7	0,0	5,3	8,6	26,5
r) others	0,0	28,6	51,0	0,0	28,6	18,4	0,0	14,3	30,6

Respondents could choose three answers. The results do not sum up tp 100%.

Table 5 shows the motivation to participate in physical activities. Respondents had the option of choosing three of the 13 responses given. The factor that motivates the surveyed most to participate in a variety of physical activities is the desire to *be in good physical condition* (45,3% of the boys from Kosovo, 63,3% of girls from Poland, 55,2% of boys from Poland, 57,1% of girls from Bulgaria, 67,9% boys from Bulgaria). Quite often there were also answers: *an opportunity to meet new people* (54,6% of girls from Kosovo), *for relaxation* (59,9% of the girls from Kosovo), *desire to make sports career* (56,3% of boys from Poland), for fun (57,1% of girls from Bulgaria) and *for one's own health* (57,1% of girls from Bulgaria).

Tab.5. Distribution of responses to the question: "I participate in a variety of motor activities because: . . . " [%]

Motives to take motor activity in free time	KOSOVO		POLAND		BULGARIA	
	Girls	Boys	Girls	Boys	Girls	Boys
a) want to make a sports career	26,3	**38,5**	28,6	**56,3**	8,5	18,9
b) this is an opportunity to make new friends	**54,6**	30,4	20,4	12,6	17,1	9,4
c) like competing	15,8	**35,1**	10,2	19,5	20,0	**35,8**
d) want to be in good shape	24,3	**45,3**	**63,3**	**55,2**	**57,1**	**67,9**
e) this is relaxation for me	**59,9**	**37,8**	24,5	18,4	14,2	3,8
f) for health	25,7	33,1	**44,9**	**36,8**	**57,1**	**58,5**
g) to gain nice appearance	25,7	2,0	26,5	17,2	25,7	18,9
h) want to get a better mark in PE	9,2	10,8	8,2	4,6	14,2	15,1
i) this is an opportunity to meet friends	26,3	15,5	22,4	9,2	8,5	1,9
j) for fun	25,7	22,3	14,3	11,5	**57,1**	30,2
k) can realize in sport	3,3	10,1	18,4	13,8	2,8	16,9
l) I'm encouraged by friends and siblings	0,0	0,0	0,0	2,3	0,0	3,8
m) to gain material profits	0,7	10,1	0,0	12,6	0,0	1,9

Respondents could choose three answers. The results do not sum up to 100%.

Table 6 present with whom respondents take physical activities in their leisure time and they had five options to choose from. The vast majority of the respondents from all the three countries replied that they take movement activities in their leisure time *with her friends*. The differences in the responses vary at the significance level $p < 0,05$.

Tab. 6. The distribution of responses to the question: I take motor activities in my free time mostly with..."

I take motor activities most often with…	Kosovo		Poland		Bulgaria		Kosovo		Poland		Bulgaria	
	BOYS		BOYS		BOYS		GIRLS		GIRLS		GIRLS	
	N	%	N	%	N	%	N	%	N	%	N	%
a) with parents	8	5,4	6	6,9	6	11,3	20	13,2	3	6,1	1	2,9
b) with siblings	20	13,5	2	2,3	3	5,7	40	26,3	1	2,0	2	5,7
c) with friends	**114**	**77,0**	**61**	**70,1**	**34**	**64,1**	**83**	**54,6**	**38**	**77,6**	**25**	**71,4**
d) on my own	3	2,0	14	16,1	6	11,3	9	5,9	7	14,3	5	14,3
e) with other persons	3	20,3	4	4,6	4	7,6	0	0,0	0	0,0	2	5,7
Chi square	Chi^2= 29,37 $p < 0,05$						Chi^2=37,27 $p < 0,05$					

Table 7 concern the evaluation of one's health condition, where respondents had five options to choose from. With the exception of the boys from Poland (46,0%), who described their health condition as very healthy, the rest of the surveyed evaluated their health condition *as healthy*. The differences in the responses of the surveyed were statistically significant ($p < 0,05$).

Tab. 7. The distribution of responses to the question: "I believe I am… "

I believe I am	Kosovo		Poland		Bulgaria		Kosovo		Poland		Bulgaria	
	BOYS		BOYS		BOYS		GIRLS		GIRLS		GIRLS	
	N	%	N	%	N	%	N	%	N	%	N	%
a) very healthy	43	29,1	**40**	**46**	20	37,7	15	9,8	12	24,5	10	28,6
b) healthy	**93**	**62,8**	29	33,3	**23**	**43,4**	**98**	**64,5**	**25**	**51,0**	**22**	**62,9**
c) ill	1	0,7	5	5,7	2	3,8	0	0,0	0	0,0	1	2,8
d) cannot evaluate my health condition	11	7,4	13	15,0	8	15,1	39	25,7	12	24,5	2	5,7
Chi square	Chi^2= 23,57 p < 0,05						Chi^2= 20,56 p < 0,05					

Respondents were asked also to assess their physical condition. Table 8 show the results. The boys from Poland (39,1%), girls from Poland (40,8%) and girls from Bulgaria (34,3%) appreciated their agility as *very good*. However, the boys from Kosovo (42,6%), the boys from Bulgaria (43,4%) and girls from Kosovo (update to reach 44,7%) rated their physical condition as *good*. The differences in responses were statistically significant. (p<0,05)

Tab. 8. Distribution of responses to the question:" I evaluate my physical condition as…"

My motor skills evaluate as…	Kosovo		Poland		Bulgaria		Kosovo		Poland		Bulgaria	
	BOYS		BOYS		BOYS		GIRLS		GIRLS		GIRLS	
	N	%	N	%	N	%	N	%	N	%	N	%
a) outstanding	18	12,2	28	32,2	6	11,3	8	5,3	8	16,3	3	8,6
b) very good	61	41,2	**34**	**39,1**	16	30,2	56	36,8	**20**	**40,8**	**12**	**34,3**
c) good	**63**	**42,6**	22	25,3	**23**	**43,4**	**68**	**44,7**	14	28,6	11	31,4
d) sufficient	6	4,0	1	1,1	6	11,3	20	13,2	6	12,3	7	20,0
e) poor	0	0,0	2	2,3	2	3,8	0	0,0	1	2,0	2	5,7
Chi square	Chi^2=30,38 p < 0,05						Chi^2=15,77 p < 0,05					

Tab. 9a. Distribution of answers to the question: "Do your parents participate in various forms of motor activity?" (information about the mother and father)

Motor activity taken up by mother	Kosovo		Poland		Bulgaria		Kosovo		Poland		Bulgaria	
	BOYS		BOYS		BOYS		GIRLS		GIRLS		GIRLS	
	N	%	N	%	N	%	N	%	N	%	N	%
a) doesn't take up	**69**	**46,6**	23	26,5	**19**	**35,9**	**96**	**63,2**	11	22,5	10	28,6
b) takes up occasionally	54	36,5	**37**	**42,5**	17	32,0	49	32,2	**25**	**51,0**	**16**	**45,7**
c) takes up regularly	13	8,8	17	19,5	4	7,6	6	3,9	6	12,2	4	11,4
d) do not know	12	8,1	10	11,5	13	24,5	1	0,7	7	14,3	5	14,3
Chi square	Chi^2=22,03 p < 0,05						Chi^2=43,40 p < 0,05					

Tab. 9b. Distribution of answers to the question: ”Do your parents participate in various forms of motor activity?" (information about the mother and father)

Motor activity taken up by father	Kosovo		Poland		Bulgaria		Kosovo		Poland		Bulgaria	
	BOYS		BOYS		BOYS		GIRLS		GIRLS		GIRLS	
	N	%	N	%	N	%	N	%	N	%	N	%
a) doesn't take up	45	30,4	14	16,1	**18**	**34,0**	26	17,1	9	18,4	8	22,9
b) takes up occasionally	43	29,1	**32**	**36,8**	17	32,1	**67**	**44,1**	**21**	**42,8**	**13**	**37,1**
c) takes up regularly	**50**	**33,8**	22	25,3	4	7,5	58	38,2	10	20,4	5	14,3
d) do not know	10	6,8	19	21,8	14	26,4	1	0,6	9	18,4	9	25,7
Chi square	Chi^2=242,12 $p < 0,05$						Chi^2=74,09 $p < 0,05$					

The last table (Tab.9) presents results of responses about the taking up by the parents of the respondents different forms of physical activity (separate mother and father). Mothers of the young from Kosovo (girls 63,2%, boys 46,6%) and of the boys from Bulgaria (35,9%) have been assessed as persons not taking the activity, while the students in Poland (girls 51,0%, boys 42,5%) and girls from Bulgaria (45,7%) assessed their mothers as persons sometimes choosing physical activity. The differences in the responses vary at the significance level $p < 0,05$.

In turn, fathers were judged by the majority as sometimes taking physical activity (the boys from Poland 36,8%, girls from Kosovo 44,1%, from Poland 42,8% and Bulgaria 37,1%). On the other hand, boys from Bulgaria (34,0%) see their fathers as persons not taking physical activity, but the boys from Kosovo (33,8%) consider their fathers as persons regularly taking physical activity. The differences in the responses vary at the significance level $p < 0,05$.

Discussion and Conclusion

Leisure time is one of the major social problems. It is getting more difficult for the youth to resist the temptation of spending their leisure time in the form of passively, sedentary behaviours in a situation when on the market there are available attractive multimedia devices and companies compete in “gluing” their customers not only to the product but also to chairs or sofas. It's creates “couch potato” generation. Therefore, a very important aspect is providing a good model to imitate by parents, teachers end education.

The educational system steps into man's life in the period of its greatest spiritual and physical plasticity when one's lifestyle is created. According to Nowak-Starz [6]: “lifestyle is the image of the individual's and/or group's functioning.” The process of forming a given lifestyle runs parallel to educational activity. A very important point is the period of adolescence. The lifestyle of an individual can strengthen his/her health potential or quite the opposite can cause deterioration. That is why we can talk about its pro-health or anti-health character.

The information collected in the course of our research has made it possible to specify the leisure time, the frequency of the physical activity of the enterprise, participation in various activities, and physical activity it's taken by parents of students.

Comparing the results of the studies concerning the declared by the students physical activity taken in their leisure time, as optimistic should be considered the fact that the majority of respondents declared taking physical activity *once to three times a week*. Such a response was given by the girls from Kosovo (48,7%), girls from Bulgaria (57,2%), the boys from Kosovo (46, 7%). *Five times a week and more*, declared Polish students - boys (66,7%), girls (57,1%) and the boys from Bulgaria (43,4%). Definitely a smaller percentage of responses in the first

category was *not at all, or less than once a week*.

Obtained results indicate that the factors encouraging the surveyed to physical activity are: relaxation, good physical condition, the benefits for health, the desire to have fun and sports career. What's interesting for girls at this age getting a nice appearance is not the most motivating factor. The girls as a motivator enumerated: the desire to be in good physical condition, their health, an opportunity to meet new people, and the desire to have fun. From a study carried out by Kurzak and Pawelec [5] among middle school students in Warsaw, it appears that the Warsaw lower-secondary school students daily and at the weekends prefer sedentary lifestyle. This may result from the declared interest in serials and computer games. The way of spending weekends may reflect the lifestyle of modern families. The most common weekend pass- time preferences are connected with meetings friends and family. Leisure habits associated with physical activity are characteristic only to the fourth lower-secondary school student in Warsaw.

The results of the research correspond to the results of the studies carried out among young people by Skawiński et al. [9], who pointed out that young people spend most of their leisure time in front of the computer or TV. Similar conclusions also drew Oblecińska and Woynarowska [7] in large population studies. Also, according to a study carried out by Bajurna et al. [1] in Poland activities for lower-secondary school students are mainly various forms of physical activity, but also thematic activities. In these tests, the motor activity of youth was rated as moderate. The results of the research indicate that most frequently taken forms of spending leisure time by young people in all the countries surveyed are listening to music, meeting friends, playing computer and watching TV, video.

When analyzing the results of the research the differences in the responses mainly between the young people of Kosovo and their peers from Bulgaria and Poland were emphasized. The differences observed may be the result of differences in educational systems, as well as differences in terms of cultural, social and economic context.

The obvious reason for that may be the lack of access to such equipment or the lack of common access to the Internet. It must be assumed that further economic development will result in an increase in the percentage of young people choosing this form of leisure. Among the forms of activity never taken by lower-secondary school students from Kosovo there are: roller-skating, aerobics, skateboarding and skating, those forms can be classified as “expensive” (due to the need to have expensive sports equipment), and poorly available (fitness club, sports halls, skating rinks). None of the students from Kosovo indicated going to discos, which may result from cultural and religious differences. On the other hand, while a higher percentage of respondents among young people from Kosovo, when compared to Polish and Bulgarian peers, pointed out to reading books. Interestingly, also the youth of Kosovo in their free time are more likely to visit family, in comparison to children from Bulgaria and Poland.

Effectiveness of health education (and not only) requires compatibility between the health education realized at schools and what the student experiences in the family. A significant impact on the development of lifestyle and health behavior has a family. It has been shown that this support is beneficial as far as solidifying of good health habits is concerned. [12]. In the research, parents were asked if they take any activity (separately mothers and fathers). In the case of mothers, the answers were divided between do *not take and sometimes take*, which applies to all groups surveyed in each of the countries. In turn, in the case of the fathers physical activity, it was assessed better. Among the boys from Kosovo a large number of responses (33,8%) indicated that fathers *regularly practice* physical activity. In the case of boys from Poland, it was only 25,3% and 7,5% in Bulgaria.

This situation can be caused by different division of family duties and, in general, different perception of the traditional role of a man, the head of the family in the tested countries of so different socio-cultural and religious conditions.

The need for action for the health of young people is noted in the important international documents in which a lot of joint

recommendations are repeated on the need to improve the health care system, promote healthy lifestyles, improving life skills as a modern strategy for prevention of many disorders. An important idea is to enable young people to prioritize and build programs for the benefit of their health [11]. It seems that in some countries (Bulgaria, Kosovo) this is difficult to achieve at the present stage of the development of local education systems and often very authoritarian educational traditions. Even in Poland, which introduced democracy over two decades ago only recently the autonomy of teachers (1999), then successively of students (2009) was increased by introducing into the core curriculum the need to determine some solutions and educational plans together with students.

Bridging social inequality can contribute to the overall improvement of health of the public and selected age groups. The relationship between social factors and teenagers' health is complex. Drawing conclusions on differences depends on accepted health and social factors. It is believed that during the period of adolescence health differences show not that strongly as in early childhood and during adulthood [8]. The reason for that is smaller influence of factors connected with family life, and bigger of those connected with a peer group. The research shows that the level of wealth (not so much of the family, but of the whole country) may have an impact on the choice of activities taken by the youth. Undoubtedly, socio-cultural factors and the tradition of social life also have great impact and impose certain ways of spending leisure time (as can be seen particularly in the case of the Bulgarian and Kosovar youth). The above observations, the future taking into account local conditions, should be a starting point for those planning changes in physical education systems in each of these countries.

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THE EFFECT OF SCHOOL PHYSICAL EDUCATION PROGRAMMES ON LOW-BACK PAIN IN SCHOOLCHILDREN

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Abstract

Objective: to evaluate the efficacy of a 32-week school physical education programme on low-back pain in elementary and secondary schoolchildren. Material and methods: Forty-one elementary school children (fifth-grade, mean age of 10.27 ± 0.31 years) and 43 secondary school adolescents (two-grade, mean age of 13.46 ± 0.68 years) were assigned to the control (n = 40) or intervention group (n = 44). The intervention subjects were involved in an organised physical education programme including hamstrings stretching, endurance strength of the abdominal and lumbar muscles, and pelvic tilt during the two-weekly school physical education classes over 32 weeks. The control group was not subjected to the organized programme. Low back pain was registered and pain intensity was recorded using the Visual Analogue Scale. Results: The experimental group showed a statistically significant decrease of low back pain frequency while the control group evidenced an increase. For pain intensity no significant differences were found. Conclusion: The children and adolescents who were subjected to the school physical education programme showed a reduction of low back pain frequency, while a tendency toward the rising frequency of low back pain was detected for the control subjects.

Key words: *spine, physical exercises, children, adolescents.*

Introduction

Low back pain (LBP) is a common condition in adults, and in recent years it has also been frequently observed among children and adolescents [23]. The incidence has steadily increased in recent decades, with the greatest increase in recent years. Surveys in the literature also report a high prevalence of LBP in children and adolescents that increases with age. The prevalence varies from 10% to 70%, according to different studies and definitions of back pain [5].

Low back pain in adolescence has been linked with continuing pain in adulthood. It is important to prevent and treat LBP in children and adolescents because it has been shown that they also suffer from this condition as adults [16]. The consequences of recurrent LBP in children and adolescents include the use of medication, medical practitioner visits, and loss of participation in physical activity [17, 21, 33]. When back pain in young people is assessed, and the different anatomic areas (cervical, dorsal, and lumbar) are compared, a predominance of low back pain is found [4, 7].

The risk for developing LBP is multifactorial. Decreased muscle flexibility and trunk strength have been postulated as risk factors for low back pain [22]. Poor hamstring flexibility has been associated with low back pain in cross-sectional studies in both adolescents and adults [10, 28]. Other cross-sectional studies have found associations between LBP and reduced strength in abdominal and lumbar muscles, reduced range of lumbar extension mobility, increased range of lumbar flexion mobility [35], and reduced extensibility of the hamstrings muscles [28]. Jones et al. [19] found that hip range of motion, abdominal muscle endurance, lumbar flexibility, and lateral flexion of the spine were the best predictors of recurrent LBP in a group of adolescents. These risk indicators identify the potential for exercise as a primary or secondary prevention method.

Several authors have advocated early back pain prevention through the school system [3, 8, 23, 42] since the school is the primary societal institution with the responsibility for health promotion. Different approaches have been used to prevent back pain in schoolchildren. Primarily,

there have been attempts to prevent back pain by modifications of the school furniture since sitting is found to be strongly associated with back pain in children and adolescents [5, 38] and since inadequate school furniture is frequently taken to be the reason of posture problems and back complaints [40].

Besides modifications of the school furniture a second approach has been used to prevent back pain in schoolchildren, consisting of a variable number of hours of back education [27]. Supervised exercise therapy, brief educational interventions, and back schools have been recommended for reducing pain and improving function in subjects with sub-acute and chronic lumbar pain. Thus, the objective of this study was to evaluate the efficacy of a 32-week school physical education programme on low-back pain in elementary and secondary schoolchildren.

Material and methods

Subjects

Forty-one elementary school children (fifth-grade, mean age at baseline of 10.27 ± 0.31 years) and 43 secondary school adolescents (two-grade, mean age at baseline of 13.46 ± 0.68 years) were randomly assigned to control (n = 40) or intervention group (n = 44). Exclusion criteria included: (1) to participate in any structured physical exercise programme or sport training during the past year, and (2) if the child had physical therapy for lumbar pain during the past month before participation in the study.

Class groups of intervention and control subjects were selected by simple randomization from all class groups of three comparable schools with similar curricula. The physical education teacher and parents were blind regarding the children's groups. Because the physical education teachers collaborated during the intervention, they knew the group to which their pupils belonged, but were not aware of the study's hypotheses. The study protocol was approved by the Ethical Committee of the University of Murcia, and all the parents gave written consent for their children to take part in the study.

Procedures

Pre-test was performed at the beginning of the school year, between September and October, and post-test at the end of the school year, between May and June. The children and their parents filled in self-assessment questionnaire about the week prevalence of low back pain before and after the programme. The children completed the questionnaires at school under the supervision of their class teacher. Low back pain was defined as pain in the area from below the ribs to the hips. Week prevalence was defined as the occurrence of pain or discomfort, continuous or recurrent, at some point in the past week. The children were told that pain or discomfort due to fatigue related to a single exercise was not considered back pain. Pain intensity was recorded using a Visual Analogue Scale (VAS).

Intervention programme

Intervention subjects were involved in organised physical education programme administered by school teachers that included 3 minutes of hamstrings stretching maintaining the spine in a neutral position, 5 minutes of endurance strength of the abdominal (curl-up and isometric side support), and lumbar (lumbar extension and supine bridge) muscles, and 5 minutes of activities for anterior and posterior pelvic tilt during the two-weekly school physical education classes over 32 weeks. However, the control group was not subjected to the intervention programme.

Hamstring stretching

The stretching exercises were performed seated with knees remaining fully extended. The subjects flexed forward at the hip, maintaining the spine in a neutral position until a gentle stretch was felt in the posterior thigh. In all the stretching exercises, the stretched positions were assumed gently and slowly until the end-point of range. Once this position was achieved, the subjects held it for 20 seconds. The physical education teacher instructed them to feel a strain of the hamstring muscles without feeling pain.

Abdominal exercises

Curl up

Subjects were positioned in supine with the knees flexed to 90° and hands over the chest. Instructions were given to gently lift the head and

shoulders off the floor (keeping the head and neck as a rigid block, leaving the elbows on the floor and avoiding head/neck protraction) and concentrate on pivoting the upper body through the mid thoracic region. A normal breathing pattern was maintained throughout the ten repetitions of the curl up.

Isometric side support

Subjects rested on their right elbow and hip (with knees flexed to 90°) and braced their abdominal muscles before lifting the pelvis off the floor to achieve a position where the torso formed a straight line between the bottom shoulder, hip and knee. Verbal cues were given to form a plank with the trunk between the shoulder and knee without allowing rotation of the body. The position was maintained during 10 s in each side.

Lumbar extension

Subjects were asked to lie in a prone position. The subjects lift their shoulder-blades off the floor while holding the trunk around 15° of extension. Ten repetitions were performed.

Supine Bridge

Subjects began by lying supine on the floor with their feet flat on ground, knees bent 90 degrees, toes facing forward and hands on the floor by their sides, palms facing down. Pushing through the heels, subjects lifted their pelvis off the ground to form a plank. Subjects aimed to keep their spines in a neutral position with their legs parallel to their trunk during the bridging exercises.

Pelvic tilt

Several activities for improving anterior and posterior pelvic tilt in standing and supine resting were performed.

Data analysis

The frequencies of low back pain between groups were compared using the chi-squared test. The Mann-Whitney U test was used to compare the intensity of low back pain between groups. Data analysis was performed using SPSS for Windows, version 15.0 (SPSS Inc., Chicago, IL). The level of statistical significance was set at 5%.

Results

A decrease of low back pain frequency in the intervention group and an increase in the control group were found. In the pre-test, eight schoolchildren (9.5%) of the intervention group and ten schoolchildren (11.9%) of the control group referred low back pain. In the post-test (32 weeks after), only two schoolchildren in the intervention group (2.4%) had low back pain at the past month although this reduction was no significant. In the control group nineteen schoolchildren (22.6%) suffered low back pain at the past month ($\chi 2 = 4.43$, $p < 0.05$). For pain intensity no significant differences were found.

Discussion

The main objective of this study was to determine the influence of school postural programme in low back pain. The subjects of intervention groups showed a decrease in the frequency of low back pain, while the subjects of control groups evidenced an increase. Both groups participated in their physical education classes, with similar activities, although the intervention group performed an organized and structured programme including hamstring stretching, trunk exercises and pelvic tilt activities.

The reduced frequency of low back pain in the intervention group may be related to specific activities of the postural programme and its effects about hamstring extensibility, trunk muscles resistance and more control of pelvic tilt. However, the control group with similar curricula but without a specific postural programme showed a tendency to increase the frequency of low back pain.

In children and adolescents, Salminen [33] found a correlation between weakness of the abdominal muscles, decreased hamstring extensibility and back pain. Mierau et al. [1989] found an association of back pain with decreased extensibility of the hamstring muscles among boys aged 14 to 18 years. However, Feldman [11] found no association between LBP and hamstring flexibility measured by the sit-and-reach test.

Some studies have found an improved hamstring extensibility in subjects involved in a postural programme, while the control subjects showed a reduction [31, 36]. Modifications in the hamstring extensibility have been related to changes in the lumbo-pelvic rhythm. The

subjects with lower hamstring extensibility have shown greater thoracic kyphosis and more posterior pelvic tilt when maximal trunk flexion is performed [12, 25, 26, 32]. The higher thoracic kyphosis has been related to greater compressive and shear forces [6,20] and this fact could increase the risk of back pain. An improved control of anterior and posterior pelvic tilt in combination with higher hamstrings extensibility could be associated to healthy lumbo-pelvic posture. More neutral thoraco-lumbo-pelvic postures have been associated with less back pain [39].

The importance of trunk muscles in providing adequate spine stability has been well established. An integrated back stability programme on a chronic low back pain population has been related to significantly reduced pain and disability [29]. Theoretically the trunk exercises of the intervention programme could be related to improved muscle endurance. However, the main limitation of this study was that no measures of trunk muscle strength and endurance were done. Geldhof et al. [13] evaluated the effects of back education in elementary schoolchildren on back function. The intervention lasting two school-years consisted of a back education programme and the stimulation of postural dynamism in the class. Their results showed an increase in trunk flexor endurance in the intervention group compared to a decrease in the controls and a trend towards significance for a higher increase in trunk extensor endurance in the intervention group. In adolescents, Salminen [34] found a correlation between lower physical activity and decreased endurance of the spinal muscles. Andersen et al. [1] found that children with high isometric muscle endurance were less likely to report back pain. Back pain was associated with low isometric muscle endurance in the back extensors. However, Balagué et al. [2] did not show any correlation between isokinetic trunk muscle strength and low back pain history.

Several studies have investigated the influence of postural intervention on low back pain. Two studies found that a back school programme that teach subjects home exercises and self care techniques was related to less pain and perceived disability after the programme than control groups that did not have the training [24, 30]. Geldhof et al. [15] investigated the effects of a 2-school-year multifactorial back education programme on back posture knowledge and postural behaviour in elementary schoolchildren. They also included a control group, and found a trend for decreased pain reports in boys of the intervention group. Chometon et al. [9] showed decreased back pain prevalence and improved body mechanics in a practical test 2 years after 10–11-year-old children had followed back education. Mendez and Gomez-Conesa [35] found improved postural habits and a slight tendency to decreased medical treatment for low back pain, after following a postural hygiene programme.

Because postural habits and body mechanics are impacted on early in life, it seems reasonable that back education should begin during childhood. Geldhof et al. [14] found that multifactorial back education programme in the elementary school curriculum is effective. Whereas the obligatory curriculum provided basic postural knowledge, a back posture programme added important improvement.

School centres should promote correct posture habits, considering that physical education programme seeks to obtain the adequate musculoskeletal development of school children. The school is an ideal setting since it has the potential of optimizing environmental conditions and giving prolonged feedback that reaches a large percentage of the population [31]. Schools hold enormous potential for helping students develop the knowledge and skills they need to be healthy [18]. Because postural habits and body mechanics are impacted upon early in life, it seems reasonable that back education should begin during childhood [37, 41]. More intervention studies are needed to allow the formulation of evidence based guidelines for the prevention of back pain in schoolchildren.

Conclusion

The children and adolescents who were subjected to the school physical education programme showed a reduction of low back pain frequency, while for the controls group a tendency toward rising frequency of low back

pain was detected. These findings should alert education professionals to the need for specific health promotion programmes in schools for prevent low back pain. This observation may have important practical implications in designing school curricula, with more attention on spine health.

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The Influence of hamstring extensibility on spinal and pelvic postures in highly trained paddlers

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Abstract

Objectives. To determine whether the degree of hamstring muscle extensibility influences the sagittal spinal curvatures in standing and maximal trunk flexion on young athletes. Methods. Forty-two young elite kayakers (mean age: 15.09 ± 0.63 years) were recruited. Thoracic and lumbar curvatures and pelvic position were evaluated with a Spinal Mouse system in standing position and maximal trunk flexion with knees extended (toe-touch test) and flexed. Hamstring muscle extensibility was determined by passive straight leg raise test (PSLR). The sample was divided into two groups with regard to straight leg raise angle (PSLR < 80º, n=20, and PSLR ≥ 80º, n=20). Results. Subjects with lower extensibility presented higher thoracic angle and a more posterior pelvic tilt in maximal trunk flexion. However, no significant differences were found between both groups when standing. The lumbar curve was not affected by hamstring extensibility. Conclusions. Lower hamstring extensibility is related to increased thoracic curve and more posterior pelvic tilt when maximal trunk flexion is performed, which can overload the spine. A systematic stretching programme to improve hamstring extensibility should be incorporated into training activities.

Key words: *thoracic, lumbar, pelvic, spine, straight leg raise.*

Introduction

Sagittal spinal curvatures are geometric parameters, which influence mechanical properties [9, 18]. Sagittal alignment influences postural loading and load balance of the intervertebral disc in healthy male and female subjects [9, 22, 32]. Abnormal spinal curvatures cause increased forces to act upon the intervertebral discs. Alterations in spinal curvatures may potentially influence the development of lower back pain [7, 30].

The sagittal spinal curvatures are influenced by several factors. Hamstring muscle extensibility has been associated with changes in lumbopelvic rhythm [4] and spinal posture [13-17, 26]. Earlier studies found that hamstring muscle extensibility influences pelvic and spinal postures in maximal trunk flexion with knees extended. Lower hamstring muscle extensibility has been associated with decreased flexion range of motion of the hip and lumbar spine and increased thoracic flexion [5,6]. Other researches [10,27] have reported an association between greater lumbar spinal flexion and reduced hamstring extensibility when the sit-and-reach test is performed.

Some studies have compared the spinal and pelvic postures between subjects in relation to hamstring extensibility. Tully and Stillman [31] found differences in the spinal posture between successful and unsuccessful toe-touchers. Gajdosik et al. [6] found differences in hip (pelvis) flexion between men with or without reduced hamstring extensibility. Carregaro and Coury [1] found that the subjects with decreased hamstring extensibility adopted higher spinal angles and a limitation on pelvic movements during handling tasks. López-Miñarro and Rodríguez [15] found that hamstring criterion-related validity of the sit-and-reach and toe-touch tests is related to hamstring muscle extensibility. These tests were not valid as measures of hamstring extensibility for subjects with reduced hamstring muscle extensibility. Other studies [2, 3] found differences in pelvic movement between short and long hamstring subjects when active straight leg raise was performed.

However, all these studies analyzed non-athlete population. In paddlers, López-Miñarro and Alacid [13] found that the hamstring muscle extensibility influences the thoracic and pelvic postures when the sit-and-reach test was performed.

The relation of hamstring muscle extensibility and spinal posture in several positions should be analyzed. For this reason, the objective of this study was to compare the spinal and pelvic postures between paddlers in relation to their hamstring muscle extensibility.

Materials and methods

Forty-two young kayakers were recruited for the study (mean ± SD, age: 15.09 ± 0.63 years; height: 172.16 ± 8.70 cm; body mass: 64.01 ± 9.21 kg). The inclusion criteria were more than 4 years' paddling experience and training at least six times per week. Paddlers were excluded if they presented pain induced or exacerbated by the test procedures, injury preventing participation in paddling training before testing, or known structural spinal pathology.

Procedures

An Institutional Ethical Committee approved the study and all subjects and parents or guardians signed an informed consent form before participation. The Spinal Mouse system, a hand-held, computer-assisted electromechanical-based device, was used to measure sagittal spinal curvatures and pelvic inclination in relaxed standing, and maximal trunk flexion with knees extended (toe-touch test) and flexed. Hamstring muscle extensibility was determined in both legs by passive straight leg raise test. The measurements were made in a randomized order. No warm-up or stretching exercises were performed by the subjects prior to the test measurements. The subjects were allowed to rest briefly standing up for 5 minutes between measures. All measurements were made during the same testing session and were administered under the same environmental conditions. Participants were instructed not to undertake a weight-training session or strenuous exercise the day before testing to ensure consistent test conditions.

Prior to measurements, the principal researcher determined by palpation and marked on the skin surface with a pencil the spinous process of C7 (starting point) and the top of the anal crease (end point). The Spinal Mouse was guided along the midline of the spine (or slightly paravertebrally in particularly thin individuals with prominent processus spinous) starting at the processus spinous of C7 and finishing at the top of the anal crease (approximately S3). For each testing position, the thoracic (T1-2 to T11-12) and lumbar (T12-L1 to the sacrum) spine and the position of the sacrum and the hips (difference between the sacral angle and the vertical) were recorded. In the lumbar curve, negative values corresponded to lumbar lordosis (posterior concavity). With respect to the pelvic position, a value of 0º represented the vertical position. Thus, a greater angle reflected an anterior pelvic tilt while a lower angle (negative values) reflected a posterior pelvic tilt.

Standing

The subject assumed a relaxed position, with the head looking forward, the arms hanging by the side, the knees normally extended, and the feet shoulder-width apart (Figure 1).

Figure 1. Standing position.

Maximal trunk flexion with knees extended

Spinal and pelvic angles were measured when the subjects reached the maximal trunk flexion in standing with knees extended (toe-touch test) (Figure 2). The toe-touch test was measured as described in a previous study [19]. The subjects were required to stand with knees

straight, legs together so that the soles of the feet were flat against the end of a constructed box (ACUFLEX I Flexibility tester, height = 32 cm). With palms down, placing one hand on top of the other, the subjects slowly reached forward as far as possible sliding the hands along the box with the knees as straight as possible and held the position for approximately five seconds while the spinal curvatures were measured.

Figure 2. Toe-touch test.

Maximal trunk flexion with knees flexed in sitting

Figure 3. Maximal trunk flexion in sitting.

Spinal and pelvic angles were measured when the subjects reached the maximal trunk flexion with knees flexed in sitting position (Figure 3). The subjects sitting with knees flexed (90º) were asked to bend maximally forward. When maximal trunk flexion was achieved the spinal posture was measured.

Hamstring muscle extensibility

The criterion measure of hamstring extensibility was determined by performing a passive straight leg raise (PSLR) on each limb in counterbalanced order. While the participant was in the supine position, a Uni-level inclinometer (ISOMED, Inc., Portland, OR) was placed over the distal tibia. The participant's leg was lifted passively by the tester into hip flexion. The knee remained straight during the leg raise. The ankle of the tested leg was restrained in plantar flexion. Moreover, the pelvis was fixed to avoid the posterior pelvic tilt and an auxiliary tester kept the contralateral leg straight to avoid external rotation [28]. The criterion score of hamstring extensibility was the maximum angle (degree) read from the inclinometer at the point of maximum hip flexion. Angles were recorded to the nearest degree for each leg. Two trials were given for each leg and the average of the two trials on each side was used for subsequent analysis.

Only subjects with PSLR difference between right and left sides lower or equal to 5 degrees were included in the analysis. Two participants were excluded. The left and right PSLR measurements were then averaged. After this, the sample was divided into two groups in relation to the median value: lower hamstring extensibility group (PSLR < 80º, n = 20), and greater hamstring extensibility group (PSLR ≥ 80º, n = 20).

Statistical Analysis

The hypotheses of normality and homogeneity of the variance were analyzed via Shapiro-Wilk and Levene tests, respectively. Descriptive statistics including means and standard error of the mean were calculated. An independent t-test was conducted to examine differences between both groups for all dependent variables. The data were analyzed using the SPSS 15.0. The level of significance was set at $p \leq 0.05$.

Results

The mean values (± standard error of the mean) of PSLR angle were was 74.57 ± 1.85º for lower hamstring extensibility group and 87.35 ± 2.06º for greater hamstring extensibility group ($p < 0.001$). No significant differences were found between right and leg PSLR angle in any group.

The mean values of thoracic curve, lumbar curve and pelvic tilt for both groups are presented in figures 4, 5 and 6, respectively. No significant differences were found in standing between both groups. The thoracic curve and pelvic tilt showed the higher differences between lower and greater hamstring extensibility groups. No differences were found in lumbar curve in any position.

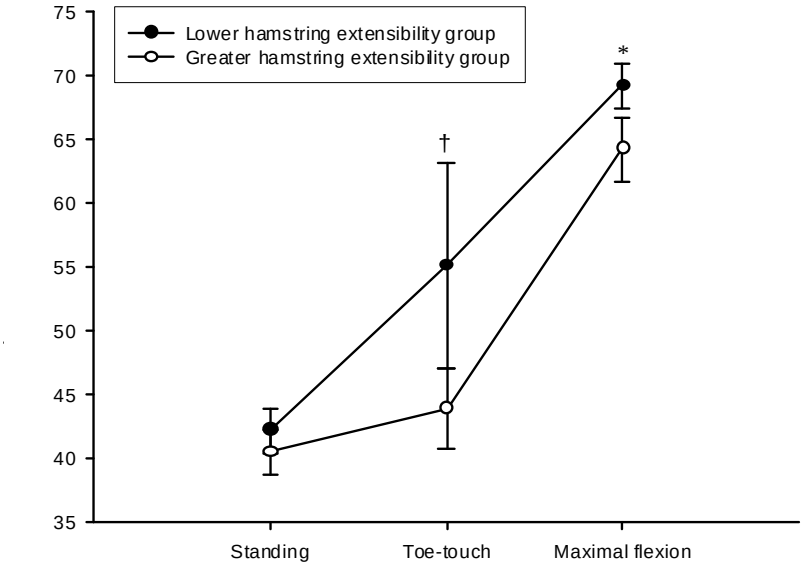

Figure 4. Mean (± standard error of the mean) of thoracic curve in standing, toe-touch test and maximal trunk flexion with knees flexed for lower and greater hamstring extensibility groups. * $p < 0.05$; † $p < 0.01$.

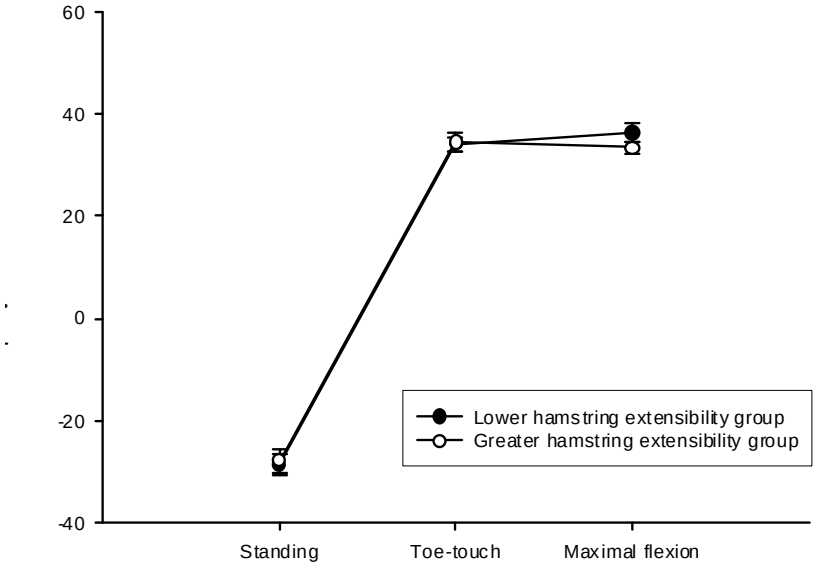

Figure 5. Mean (± standard error of the mean) of lumbar curve in standing, toe-touch test and maximal trunk flexion with knees flexed for lower and greater hamstring extensibility groups.

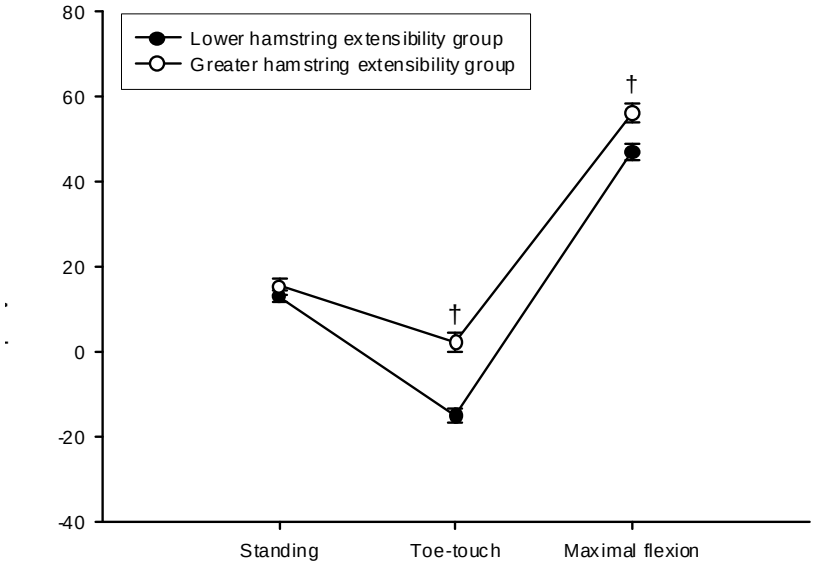

Figure 6. Mean (± standard error of the mean) of pelvic tilt in standing, toe-touch test and maximal trunk flexion with knees flexed for lower and greater hamstring extensibility groups. † $p < 0.01$.

Discussion

The objective of this study was to analyze the relation between hamstring muscle extensibility and spinal and pelvic postures in several positions. This study found that lower hamstring extensibility is associated with greater thoracic angles and more posterior pelvic tilt when maximal trunk flexion is performed. In standing, no differences were found. These results are in concordance with previous studies in younger paddlers [13] and young adults [5].

The subjects with lower extensibility presented higher thoracic angles during the flexion movements, and it could indicate that they were compensating for their pelvic restriction. Tully and Stillman [31] stated that subjects with greater ability to flex the hips with extended knees can reach their toes without needing to use the full available thoracic motion. Several studies have found that females reach lower thoracic angles when sit-and-reach tests are performed [13-17, 19, 26]. Given that females tend to have greater hamstring extensibility than males, it is possible that gender-specific postures are related to these inherent differences in extensibility.

Hamstring extensibility has been shown to affect lumbo-sacral posture due to the muscles' direct attachment on the ischial tuberosities. Previous studies found that pelvic tilt is conditioned by hamstring extensibility [1, 2, 5]. Because the hamstring muscle originates on the ischial tuberosity of the pelvis, the tension in the hamstring has a direct influence in pelvic tilt during flexion movements, especially when knees are extended. Indeed, lower hamstring extensibility was related with more posterior pelvic tilt. This posture might be associated with some risk factors. In fact, it has been recognized that, during trunk flexion, the flexed position of the lumbar spine produces larger shear forces [23].

Differences between groups were higher in the toe-touch test than maximal trunk flexion with knees flexed. When the knees are flexed, the tension in the hamstrings is reduced and the hamstring extensibility has a limited influence in spinal posture. The hamstring muscles may only influence the spinal and pelvic postures when the trunk is moderately or maximally flexed and the hamstrings are under tension. When trunk flexion is performed with knees flexed (90º) the pelvis reached a greater anterior pelvic tilt.

The hamstring extensibility appears not affect the lumbar curve in any position. Several studies referred a weak and no significant correlation between lumbar curve and hamstring

extensibility in bending postures [8, 12, 16]. However, Gajdosik et al. [6] found that lumbar flexion was influenced by hamstring extensibility during maximal trunk flexion but it had no effect on standing. Kendall et al. [10] and Sahrmann [27] found an association between excessive lumbar spinal flexion and reduced hamstring extensibility when forward bending or touching the toes.

The spinal curvatures influence intradiscal pressures, compressive and shear forces in the intervertebral discs [9,18,22,32]. Reduced hamstring extensibility is related to increased thoracic angles and posterior pelvic tilt, which can overload the spine during sport and daily activities. The restriction of pelvic movement is considered to be predisposing factor for low back pain. Thus, if the pelvic tilting is limited, the more lax spinal tissues will be stressed [21].

Systematic hamstring stretching should be included in the training program of athletes to reduce the thoracic intervertebral flexion and improve anterior pelvic tilt during trunk flexion movements. Some studies have found improvements on hamstring extensibility after a stretching program [20, 24, 25]. Li et al. [11] found that hip motion during late and total forward bending was increased after stretching program.

Conclusion

The paddlers with lower hamstring extensibility show a greater thoracic and more posterior pelvic tilt when maximum trunk flexion is performed with knees flexed and extended. Because lower hamstring extensibility is related with poor thoracic and pelvic postures, a systematic stretching programme to improved hamstring extensibility is recommended.

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A HEALTH RELATED FITNESS ASSESSMENT AT THE UNIVERSITY OF BALEARIC ISLANDS

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Abstract

Physical fitness and health are two concepts that more and more evidence show their close relationship. The main aim of this paper is to provide an assessment protocol accessible, affordable and easy to apply, to assess fitness and health.

To test the protocol, a total amount of 115 participants (59 men and 56 women) aged 25.9 years were assessed.

The assessment protocol is designed and tested for application in a population over 18 years of age. It was used to assess the University of Balearic Islands community users. Based on evidence and validated tests (Alpha and Afisal test batteries, Stepping Queen College Test), the following measures for the design of the protocol for assessing the level of fitness and health were recorded: anthropometry (weight, BMI, body fat, waist circumference), fitness (lower extremity strength, upper body endurance, hand grip strength, maximum oxygen intake, flexibility), and blood pressure.

The assessment protocol include the previous action of the reception of the participant (explanation and administering of the International Physical Activity Questionnaire and the Physical Activity Readiness Questionnaire) and an ending action where a report of the results obtained and individual recommendations to improve the overall fitness and health level is provided to each participant.

Key words: *fitness, health, assessment.*

Introduction

Physical fitness constitutes an integrated measure of all the functions and structures involved in the performance of physical activity and/or exercise. These include musculoskeletal function, cardiorespiratory function, blood flow and circulatory function, endocrine and metabolic function and psychoneurological function. Recent studies have shown physical fitness to be an important predictor of morbidity and mortality in adults [6,14].

Hence, when physical fitness is tested, the functional status of all these systems is actually being checked. This is the reason why physical fitness is nowadays considered one of the most important health markers, as well as a predictor of morbidity and mortality for cardiovascular disease (CVD) and for all causes [11].

This seems to be valid in apparently healthy individuals, and also in people with diseases, such as diabetes mellitus, hypertension, metabolic syndrome and several types of cancer. This association is also independent of the adiposity [16]. Based on this evidence, the study of physical fitness level in young populations has been of increasing interest in the last years [10].

Among the health-related physical fitness components, cardiorespiratory fitness is the one that has been studied the most. Cardiorespiratory fitness reflects the overall capacity of the cardiovascular and respiratory systems and the ability to carry out prolonged exercise [18].

AIM

The main aim of this paper is to provide an assessment protocol accessible, affordable and easy to apply, to assess the fitness and health level of participants.

MATERIALS AND METHODS

Participants:

One hundred and fifteen members of the University of the Balearic Islands (students and employers) participate in the study (59 men and

56 women). Participants were 25.9 years old. The collection data was developed during March and April 2012.

Written permission of participants was required to participate in the study. All the participants were previously informed about the protocol and purposes of the study. The study protocol was approved by the local Ethical Committee of the University of Balearic Islands.

Instruments:

The assessment protocol is designed to inform and advise the participants of their of fitness and health levels. This study shows the results of applying the assessment protocol at the University of the Balearic Islands (Spain). The program was developed by the Physical Education Department.

The study outcomes were body measurements, physical fitness and blood pressure. Data on body measurements included: height, weight, BMI, body fat, waist circumference and triceps skinfold thickness. Anthropometry was assessed using an Omrom body composition monitor BF500 and a measuring tape for body circumferences.

Physical fitness was assessed by Alpha-Fit battery test for adults [17] and Queen College Step Test [7]. Data on physical fitness included: lower extremity strength, upper body endurance and hand grip strength, flexibility of the hamstrings, maximum oxygen intake (VO2max).

Blood pressure was measured with a blood pressure computer (Omron MIT Elite Plus).

In addition, to perform a custom report that is provided to the participant immediately after completing the assessment protocol was developed using the Microsoft Office Excel software.

Procedure:

The full assessment protocol consists of three stages (Figure 1). In the first stage, an explanation of the protocol is provided to the participant, and is administered the International Physical Activity Questionnaire – IPAQ short version [1] –, as well as a questionnaire for physical activity – PAR-Q (Ministry of Health British Columbia / Canadian Society for Exercise Physiology) –, with the objective of identifying individuals at high risk cardiac and also identifies musculoskeletal problems or medication.

In a second stage we proceed, in the following order, to the assessment of health parameters, body measurements and physical fitness.

In the third and final stage, the participant receives a report with the results of the different tests done and the normative values of each test. At the same time are provided healthy recommendations to improve those parameters that require it.

This study was a non-randomized controlled trial. The study used accidental sampling methods to draw a voluntary population.

Anthropometric assessment. Participants removed shoes, heavy clothing and pocket contents.

- Body weight (recorded in kilograms) and body fat (percentage) were measured with a composition monitor (Omrom BF500). Height was measured with a tape measure affixed to the wall. Subjects stand barefoot with heels together and back as straight as possible. The participants' height was judged to be the location at which the top of his or her head intersected the tape and was recorded in inches. Height and weight were used to calculate BMI.
- Waist circumference was assessed using anatomic marks on the participant's skin and recorded in centimeters using a tape measure. Result was the mean of the 3 measurements rounded off to the nearest 0.5cm. If these 3 measurements differed more than 1 cm from each other, 2 additional measurements were performed.
- Skinfold measurement of the nondominant arm triceps was taken with Holtain skinfold caliper (Holtain Ltd., Dyfed, UK). The triceps skinfold was taken on the back of the upper arm midway between the shoulder and elbow. Two measurements are performed not consecutively and the mean is used in the analyses.

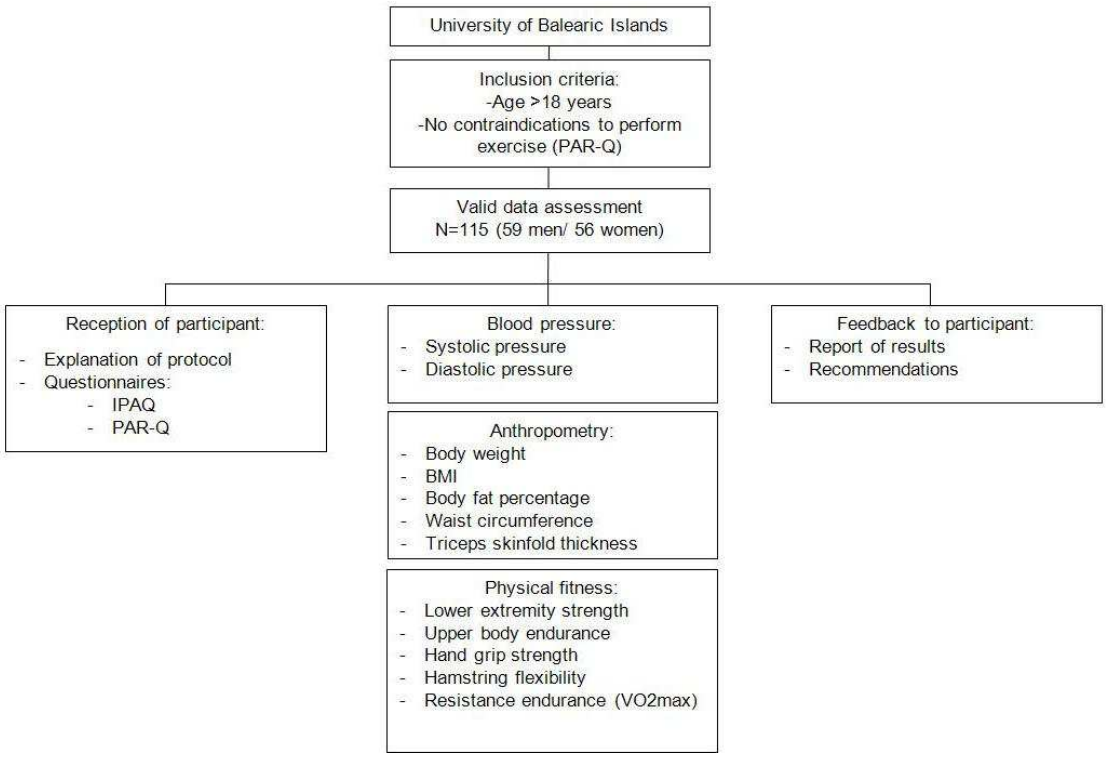

Figure 1. Study flow.

Physical fitness assessment.

- Lower extremity strength (leg extensor power) was measured with the jump-and-reach test, which the aim is to jump as high as possible. The participant stands beside the jump-board facing forward. Dominant upper extremity is raised up straight against the jumping board, and mark with magnesium powdered middle finger. The vertical difference between the "standing height" and the "jumping height" was measured in centimeters with a tape measure.
- Upper body endurance was tested with modified push-ups to measure short-term endurance capacity of the upper extremity extensor muscles and the ability to stabilize trunk. The participant lie prone on the mat, and begin the push-up cycle by clapping hands behind the back once; this is followed by a normal straight-leg push-up with elbows completely straight in the up-position, so that the participant can touch his/her either hand with the other hand. The participant ends the cycle in prone position. The number of correctly performed push-ups completed in 40 seconds was counted.
- Hand grip strength was measured with a hand dynamometer (TKK-5001). The participant stands in an upright position with the dynamometer in the preferred hand. The arm is straight and slightly away from the body the scale facing the tester. The better result of two attempts was the score recorded in kilograms.
- Queen's College Step Test was conducted for indirectly estimating the maximum oxygen intake [7] (Vo2max). The participant steps up and down on a platform (16.25 inches) at a rate of 22 steps per minute for females and at 24 steps per minute for males. Participants are to step using a four-step cadence, "up-up-down-down" for 3 minutes. Heart beats are counted from 5-20 second of recovery.
- Flexibility of the hamstrings (knee flexors) and the trunk was assessed using sit-and-reach test, with a box (35 cm long, 45 cm wide and 32 cm high) with a mobile rule 1 m (within 0.5 cm) at the top. This test involves sitting on the floor with legs stretched out straight ahead. Shoes were removed. The soles of the feet were placed flat against the box. Both knees were locked and pressed flat to the floor. With

the palms facing downwards, and the hands on top of each other or side by side, the subject reached forward along the measuring line as far as possible. Position of the hands was controlled to be at the same level, not one reaching further forward than the other. The subject reaches out and holds that position for at one-two seconds while the distance is recorded [13].

Blood pressure assessment. Blood pressure was measured with a blood pressure computer (Omron MIT Elite Plus).

Statistical Analyses:

The analyses were performed with those participants that had complete data using PASW (Predictive Analytics SoftWare, formerly SPSS), version 21.0 SPSS Inc., Chicago, IL, USA. The level of significance was set at <0.05 for all the analyses. The t-test was used for comparison of variables for gender.

RESULTS

The total amount of participants was 115 (59 men and 56 women) aged 25.9 years.

Results shows that participants expend 4149 METs per week, but there are significant differences by gender (p=0.011). Men expend 4885 METs compared to women whose expend 3423 METs. According to the guidelines for data processing and analysis of the IPAQ, the 10.4% of participants are included in the category of low level of physical activity; 18.3% in the moderate level, and 70.4% in the high level.

Anthropometric parameters

The average of the anthropometric parameters of participants was 23.6 (SD=3.34) for BMI; 25.42 (SD=9.53) for body fat percentage; and 78.3cm (SD=9.83) for waist circumference. Significant differences were found by gender in body fat percentage (p=0.001) and waist circumference (p=0.001). No differences were found in BMI (p=0.244).

According to BMI categories, 3.5% of participants had underweight (<18.5); 71.3% normal weight (18.5-24.9); 23.5% overweight (25-29.9); 0.9% obesity class 1 (30-34.9%); 0% obesity class 2 (35-39.9); and 0.9% obesity class 3 (>40).

Physical fitness parameters

The average of the fitness parameters of participants was 31.18 cm (SD=8.88) of flexibility; 14.99 push-ups (SD=5.40) of upper body endurance; 36.14 cm (SD=12.36) of lower extremity strength (vertical jump); 36.38 L/min of VO2 max (SD=10.89); and 36.38 of hand grip strength (SD=11.74).

Blood pressure parameters

In reference to blood pressure, means were 123 mmHg for systolic and 76 for diastolic pressure. Significant differences appear in systolic pressure by gender (p=0.012), where women obtain lower scores. No differences were found in diastolic blood pressure. According to the Hypertension Spanish Association [15] ranges, 40.9% of participants have optimal blood pressure; 19.1% normal; 16.5% normal-high; 20.9% hypertension grade 1; and 2.6% hypertension grade 2.

Table 1. Characteristics of sample and comparisons between gender.

	Men		Women		*p*=
	Mean	(SD)	Mean	SD	
METs / week	4885.96	(417.08)	3423.51	(432.69)	0.011
Age	24.32	(0.89)	26.75	(1.36)	0.027
Systolic blood pressure	126.7	(1.59)	118.9	(2.39)	0.012
Diastolic blood pressure	75.58	(1.45)	75.93	(1.70)	0.991
Body mass index (kg/m2)	23.96	(0.29)	22.29	(0.40)	0.244
Waist circumference	82.54	(0.82)	72.12	(1.33)	0.001
Body fat (%)	19.05	(0.74)	31.01	(1.04)	0.001
Hand grip strength	43.66	(1.37)	28.55	(1.10)	0.001
VO2 max	53.60	(1.30)	37.74	(0.58)	0.001
Flexibility	30.35	(1.23)	33.09	(1.28)	0.175
Modified push-ups	17.63	(0.70)	11.61	(0.53)	0.001
Vertical jump	45.81	(1.14)	27.16	(0.96)	0.001

DISCUSSION

The results show that participants have an average BMI of 23.6 (normal weight range 18.5-24.9). However, it is noteworthy that 25.3% is in ranges of overweight and / or obesity. Overweight and obesity are linked to increased risk of morbidity from hypertension, dyslipidaemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnoea and respiratory problems, and endometrial, postmenopausal breast, prostate, and other cancer [3, 12]. In addition, obesity is associated with increased overall mortality [4].

Body fat percentages by gender were 18.9% in men and 32.3% women. Both values are placed at the upper limit of healthy (in man 8-20% and women 21-33%) [5].

Although the blood pressure values may look good, according to the Spanish Hypertension Society [15], with 40.9% of optimal values and 19.1% of normal values. It's necessary to highlight the high values obtained (23.5% with hypertension) considering that the average age of the participants was 25.9 years.

In physical fitness testing results show that men are, in all tests, above the 50th percentile, unlike women who are slightly less in flexibility test and lower extremity strength (vertical jump). It's important to highlight the inclusion of the handgrip test, which is one of the most used tests for assessing muscular fitness in epidemiological studies. In adults, handgrip strength has been reported to be a strong predictor of morbidity and life expectancy [8].

CONCLUSION

The assessment protocol of fitness and health corresponds with the main objective stated to be an accessible, affordable and easy to apply to assess the physical fitness and health level of the participants, and also to inform and advise them about their health and raise awareness of the importance of adopting healthy lifestyles.

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Social Perspective

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We are planning to issue a volume including materials concerning the **education, improvement of qualifications and the work of physical education teachers in different countries**.

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- the age of retirement;
- the results of research projects, as well as the characteristic problems of publications concerning this profession; the results of research projects, as well as the characteristic problems concerning publication within the profession

2. Studies preparing for the above mentioned profession

- types of schools educating/training physical education teachers;
- the structure of the studies' programs (names of subjects, the scope of the classes that realize their programs);
- the professional titles of graduates;
- the results of research and the characteristics of problems concerning the education of physical education teachers;

3. Improving the professional qualifications of physical education teachers

- normative settlements regarding this problem;
- programs and the organizational form of courses for physical education teachers;
- the results of research and the characteristic problems concerning this issue.

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