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EXPLORING CHALLENGES IN AUSTRALIAN PHYSICAL EDUCATION CURRICULA PAST AND PRESENT

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Abstract

Australian physical education (PE) is experiencing its second national curriculum reform attempt, with schools around the country at various stages of exploration and implementation of the Curriculum for Health and Physical Education (Australian Curriculum and Assessment Authority, 2014). This paper explores some of the challenges in physical education curriculum implementation past and present. The PE teacher is explained as the key architect of curricula at the school level and therefore the challenge of new curriculum implementation is not so much in the 'rolling out' of the artefact but in developing the subject expertise of PE teachers to be able to bring to life the curriculum expectation in the situated realities of the everyday pragmatics of the PE teacher. Principally, I argue the PE teacher must see their role as that of educational designer.

Key words: *Physical education, sport, games, design, models*

Introduction

The purpose of this paper is to explore two recurring discourses, the problematisation of an historically common physical education (PE) method and curriculum reform in the context of a new curriculum; in this case the Curriculum for Health and Physical Education (ACHPE) (Australian Curriculum and Assessment Authority ACARA, 2014) implementation. In setting out the arguments in this paper Emmel's (1979) question to whether PE could resolve "the significant degree of contradiction" reflected in practioners values and actions so that PE could successfully 'stand on its own feet' at the XII Australian Council for Health, Physical Education and Recreation (ACHPER) Conference, is recalled (Emmel, 1979, p. 42). Considering that challenge further, we can also ask whether the delivery of PE and the design of PE programs in schools has substantially changed since Mutton (1981) expressed his concerns about the teaching status of PE to a committee of inquiry into PE and sport in schools. Mutton concluded that vague notions of playing games and sports are no longer adequate attitudes to Australian PE. Literature suggests however, that there is little evidence of change aside from initiatives largely isolated to the individual teacher and occasionally a school being driven to change by a lead teacher, and there is not change that is evident more broadly through the Australian PE community of practice. This will be explored in more detail later in the paper.

In writing this paper, an historical ontology is assumed whereby there is a 'reality' that is captured. This is a reality shaped over time into social structures that are taken as 'real'. In the case of PE, this 'reality' is captured in the PE crises discourse of Kirk (e.g. 2006; 2010) and descriptions of PE as historically grounded in the order, routine and compliance typical of its origins as physical training and gymnastics. It is also captured in the critical theorising about a subject historically at the margins of the educational intentions of schooling, such as by Kirk and Tinning (1990), Kirk (e.g. 1988) and Tinning (e.g. 2010). This is not an entirely new argument. For example, Scott and Westkaemper (1958) suggested that the school subject called PE developed from an "unappreciated, unwanted appendage of the curriculum" (p. xii). A common theme in critical theorising is that PE has been about schooling for a certain type of citizen,

variously described as “healthy, compliant yet productive citizens” (Kirk, 1988, p. 135), or in other words ‘busy, happy, good’ (Placek, 1983). Assumed in this theorising is a common PE method (Metzler, 2011).

From the nineteenth century objective of keeping young people morally and physically trained, physical activity during curriculum time evolved towards intellectual objectives such as knowledge and understanding, and developmental objectives like physical, social and emotional ‘growth’. A recognised program of study called PE emerged. It is beyond the scope of this paper to outline that history, and readers are directed to (for example) Kirk (2010) for an overview of the history of the subject development. What will be concentrated on in this paper is a consideration of the description of PE by researchers since Emmel (1979) called for reform to resolve the rhetoric and reality of Australian PE.

Historical Ontology - A Common Physical Education Method

The term PE Method is taken from Metzler (2011) who explained an historically common form of PE pedagogy typified by a directive style of student-teacher interaction and a largely repetitive drill practice learning experience as the ‘PE method’. Tinning (2010) described this pedagogical expression as demonstrate-explain-practice (DEP). The primacy of student demonstration of replication of fundamental and sport specific technical or mechanical models of movement led Kirk (2010) to describe this expression of PE as sport-as-sport techniques. With regard to the Australian context, Alexander (2008; 2013) summarised the problematisation of PE existing in a dominant programming format labelled as ‘multi-activity’ (MAP), where individual units of work are not long enough to teach substantive skill competency while the teacher curriculum plans cover lots of forms of physical activity but lack coherent complexity as the content is unrelated and frequently disconnected. It is suggested that the content of PE curricula frequently lacks coherence to what is available to students in their community and ‘life beyond the school gate’ (Drummond & Pill, 2011). Alexander, Taggart and Medland (1993) invoked Crum’s (1993) assertion of a self-reproducing failure of PE to suggest Australian PE teachers lacked ‘teaching perspectives’. By this Alexander et al. (1993) meant that PE was characterised by practices such as the grading of students on perceptions of effort and compliance and not demonstrations of evidence of learning and learning content of substance.

When questioned about the posited shortcomings of PE, teachers blame the attitude of students or the school for providing insufficient time for PE while few blame the construction of PE itself; however, it is the PE teacher that designs and enacts the PE experience. PE teachers should examine what they put forward as programs of learning and what students engage with as a consequence. Emmel (1979) drew attention to this when he suggested:

> *“physical educators have always had a great deal to complain about; particularly regarding the lip service which has been paid to Physical Education by governments and educational decision makers. Unfortunately we have always tended to blame outsiders, and have been reluctant to introspect in case we might discover that some of our grievances are self propagated” (Emmel, 1979, p. 70)*

A participant in MacDonald’s (1995) research commented that PE teaching was not taken seriously within Australian schools, and it is seen to be a ‘Mickey Mouse’ subject. In the Australian context, something is said to be ‘Mickey Mouse’ if it is a bit weak, lacking strength. Placing this in a recent historical perspective, it is suggested that the claimed benefits of PE have not matched the reality of the experience (Hickey, 1994). This is because many students leave compulsory PE after eleven years of Foundation-to-Year 10 compulsory PE having learnt what they can’t do rather than what is possible (O’Connor, 2006) due to long identified programmatic deficits in a MAP program design and a behaviorist teaching orientation. Alexander (2013) has gone as far as to assert that many Australian school HPE programs keep ‘secrets’ from outsiders:

1. Due to MAP they struggle to show confirmation of PE’s evidential contribution to motor skills development;

2. Due to substantially directive and practice style pedagogy emphasising technical reproduction of stylised sport specific movements they don't develop game performance (as this requires a conceptual-tactical focus uncommon in many MAPs);
3. That while often tested, they don't develop fitness due to the dominance of drill and practice style tasks that invoke low levels of moderate-to-vigorous physical activity (MVPA).

Pascual (2006) captures the common belief that education is a process that encapsulates the notion of transformation (in the sense of improvement) in every area (or ability) – the cognitive, emotional, motor/movement, social, by means of experiences and valuable activities, with the aim of performing better. However, it may not be unfair to suggest that the PE critical theorising positions the historically common PE Method as an example of what Wiggins and McTighe (2007) called hands-on without minds-on activity orientated teaching - leading to claims that PE as an educative endeavor is historically more rhetoric than reality in many Australian school settings.

It is little wonder then that not so long ago Australian PE was considered to be in a state of crisis and quality decline with children's skill level and physical fitness waning (Commonwealth of Australian, 1992; Tinning, Kirk, Evans & Glover, 1994; Dinan-Thompson, 2009). A recent study suggests similar skill level and physical fitness declines continue to be of concern (Rudd, 2015). Further, Penny, Emmel and Hetherington (2008) wrote of the marginalisation of Australian PE in education policy and curriculum development, an issue not unique to Australia (Hardman, 2008). Sheehy (2011) suggests that globally, PE faces the common problem of marginalisation because assessment of students commonly does not demonstrate the educative benefit of a PE program, the grading of students is often different to the system of assessment used in so called 'core' subjects, and PE teachers are not good at informing parents of how PE is different from what the parent may have experienced when a student.

It is acknowledged that PE teachers derive personal and professional identity from a sense of belonging to their subject (Banfield & Brown, 1996) and a need to feel competent (Hellison, 1977), and that PE is often taught by teachers sharing a common background evidencing success in sport and games, and this may contribute to the struggle to envisage alternative curricula. This is why it is interesting to note Curtner-Smith and Meek's (2000) finding that specialist PE teachers from non-traditional PE backgrounds place a greater emphasis on learning (Curtner Smith & Meek, 2000). However, it is Ennis' (2008) opinion that developing the curricular coherence that leads to substantial learning outcomes requires more pedagogical expertise than most PE teachers possess (Ennis, 2008). It appears that like elsewhere in the world, Australian PE teaching struggles for legitimacy (Stolz, 2009)

Fishburne and Hickson (2005) advised that if the concerns about a common PE method are accepted, then it is PE teachers who have the responsibility to change. Therefore, having positioned the concerns about Australian PE teaching's struggle for legitimacy (Stolz, 2009) I will now briefly consider what teachers are instead being told about how to teach PE in contemporary times before considering the challenge of reforming practice presented by the ACHPE.

Contemporary Messaging - What Are Australian PE Teachers Being Told About How to Teach PE?

Three of the common 'directions' for PE teaching existing in the literature suggested as assisting engagement with the emerging curriculum challenge that is ACHPE implementation are; constructivist perspectives, Arnoldian concept of PE, and Models Based Practice.

Constructivist perspectives on teaching and learning

The ACHPE is designed with constructivist teaching and learning perspectives. Generally, within contemporary 'constructivist' perspectives on teaching and learning, teachers are being advised to develop a teaching and learning praxis that I summarise here in three parts. 1. Identify the desired achievement standard, competency or outcome; 2 List essential questions that will guide the learner to

understanding; and 3. Focus on descriptions of evidence of learning. It is anticipated that this will lead to a coherent curricular with clear distinctions between big ideas, essential questions and content. There will be a visible connection between educative purpose and learning experiences. Content is thus (in theory at least) selected because it enhances the sense of curriculum purpose and meaning for students (Pill, 2007).

PE teachers are also being told that possibly the most 'powerful' factor in students learning within the influence of the teacher is explicit teaching (Archer & Hughes, 2011; Hattie, 2003; Rosenshine, 1986). Explicit teaching is characterised by unambiguous instructional design and delivery, and is not be confused with a direct or practice teaching style (Mosston & Ashworth, 2002). Explicit teaching involves coherent scaffolding to guide learning and clear statements about the purpose, function and requirement for what is being learnt. PE teachers should tell students about big ideas and essential questions, performance requirements, and evaluative criteria before instruction commences. Students should be able to describe the goals (big ideas and essential questions) and performance requirements of the unit or course.

The learning environment should have high expectations and incentives for all students to come to understand the big ideas and answer the essential questions. Using teaching approaches informed by constructivist learning theory to teach for understanding using a pedagogical emphasis such as guided participation (Mascolo, 2009) should not be confused with the need for having clear expectations for what students should be doing, and establishing with students clarity of expectations and options for responses within a set of clearly communicated expectations. Constructivist informed 'student-centred' teaching does not abdicate a teacher from being clear or having clear and explicit expectations for performance.

An Arnoldian concept of PE

The principles and guidelines for the Australian national curriculum development state that a hallmark of the curriculum is deep knowledge, understanding, skills and values that will enable advanced learning and an ability to create new ideas and translate them into practical applications (National Curriculum Board, 2009). In conceptualising PE within the ACHPE (ACARA, 2012) an Arnoldian construct of learning in, through and about movement (Arnold, 1979) is evident. This construct posits PE as multi-dimensional and as such substantially more than physical activity accumulation and/or the accumulation of experiences with movement forms. Expressed initially as "value learning in, about and through movement" (ACARA, 2012, p. 4), together with four other propositions, the inter-related dimensions of learning in, through and about movement are positioned to guide the philosophical, practical and pragmatic pedagogical and design matters concerning implementation of the ACHPE physical education component in Australian schools. The ACHPE expresses its Arnoldian construction as learning encompassing three strands; 1. Moving our body; 2. Understanding movement; and, 3. Learning through movement (ACARA, 2015).

Models based practice

Reflecting the pedagogical demands of the United Kingdom national curriculum, Curtner-Smith, Todorovich, McCaughtry and Lacon (2001) suggested that teachers would need to shift from an almost exclusive use of direct 'teacher-centred' pedagogy. We can hypothesise a similar shift will be suggested as necessary in Australia to bring the pedagogical demands of the ACHPE towards achievement of the curriculum standards. How then does the PE teacher determine a pedagogical 'model' to enable them to design and enact curriculum for student accomplishment of the curriculum achievement standards? Currently, PE literature seems to be suggesting 'models based practice' (MBP) as the answer to the design and enactment question, as well as addressing questions as to the educational value of PE (Kirk, 2013). A model of PE identifies tight alignment between learning outcomes, educational design and pedagogical enactment, and subject content. This alignment is posited as providing a 'blueprint' for teaching practice as design and enactment will either align with the distinctive features of the model, or not (Metzler, 2011).

Several well-research PE models do exist (Kirk, 2013). I argue that three models seem particularly suitable to the ACHPE and its propositions, to shape the design of the PE curriculum within a learning area amalgam called HPE. The first of those models is the Sport Education model (SEM) (Siedentop, Hastie, & van der Mars, 2012). It is possibly the most theoretically and pedagogically developed and justified of all the MBP (Kirk, 2013). The model aims for competent (tactical + technical skills), literate (understand history + culture, ritual, tradition of sport, engagement in personal and social skill learning) and motivated (enthusiastic) sport participants. It has been shown that the SEM offers beyond the common 'PE method' a broad range of additional learning experiences, such as the development of social skills and critical consumerism, and for girls, lower-skilled and non-participating students a gain in important benefits in terms of participation and learning outcomes. The research evidence suggests higher levels of student engagement (enthusiastic participants), and the SEM has been successfully applied beyond team sport to outdoor and adventure activities, gymnastics, swimming, and athletics (Hastie, 2012; Penney, Clark, Quill & Kinchin, 2005).

The Australian 'tactical model' (Metzler, 2011), the Game Sense approach, seems particularly suited to the tactical and technical game and sport skill learning intentions of the ACHPE as it provides a physically active context for problem posing and guided exploration of game problems, as well as fundamental and more advanced skill learning of personal motor coordination dynamics. Further, students are provided opportunities to think deeply about performance in context and apply knowledge to achieve meaningful game solutions within a learning environment characterised by higher levels of moderate-to-vigorous physical activity (MVPA) than achieved in the more common directive and drill based PE method. A Game Sense approach has been connected to 'quality teaching' dimensions as a productive pedagogy through which to teach for effective games and sport learning in Australian PE (Light et al., 2014; Pearson, Webb & McKeen, 2006; Pill, 2011).

The third model that appears well suited to the expressions of student learning in the ACHPE is Health Promoting PE, particularly within the curriculum aim of valuing learning through movement and the curriculum's intention for Health Education and PE to be interwoven where possible. Fundamentally important in the ACHPE is learning to value a physically active life. Educating through movement in the ACHPE should lead students to value and practice appropriate physical activities that enhance health and wellbeing now and in the future. The ACHPE suggests that this is best achieved where the subject intentions of Health Education and the subject of PE are integrated where possible within the learning area of HPE (ACARA, 2015). Examples of well-developed health promoting models of PE include Corbin & Lindsay's (2007) Fitness for Life, positive youth development through sport (Danish, 2004), and Healthy Active Kids (Australian Institute of Sport, 2015).

New Challenges - Implementing a New Curriculum Framework and Educative Reform

The MBP 'blue prints' (Metzler, 2011) concept for PE teachers seems to imply that PE teachers lack the capacity or subject mastery to be educational architects and subject knowledge brokers. It provides limiters on the range of learning outcomes, content coverage and pedagogy and it is not too far a slide for PE teaching and content questions to become about adherence to the tenets of the model and not about the intended student learning standard described for students in the curriculum document. Most of the research into MBP appears to occur without reference to student achievement of prescribed curriculum outcomes or standards at benchmark reference levels. The research is about the validation of the model as an alternative to the common PE Method. However, there is a well held belief by some that Australia PE curriculum and pedagogical reform at the 'classroom level' is necessary and MBP is the path to that reform.

Some have suggested a re-imagining of PE as Health Promoting PE to accomplish an integrated HPE that moves away from, for

example, a sport-as-sport techniques emphasis. It could also be argued that unlike sports, which when taught well evidence a cognitive complexity (think about the way a tennis player couples information as perceptual judgment and anticipation in reading the play in a time-compressed performance context to a complex motor response in order to meet a momentary configuration of play) and ethical notions such as equality, fairness, rule-abiding action are necessary, are educationally valued characteristics that are not usually explicitly taught in health promoting PE where individualised health activities are often accentuated. Maybe, as some PE philosophers have argued, these health promoting physical activities are valuable but not educationally valuable because they lack what might be called cultural significance or cultural capital (McNamee, 2005). However, I suggest that the health promoting model of PE has a place in the integration of health messaging and healthy behaviours to achieve both 'health education' achievement standards and/or their integration within PE units of work.

The ACHPE continues a shift from teacher-centred curricula grounded in an 'objectives' perspective predicated on teacher assumptions to implementation of a competence-based curriculum via student achievement standards begun by the curriculum profile for Australian schools (Curriculum Corporation, 1994). This movement in Australia is consistent with global educational reforms that have seen most OECD countries promote a shift from curricula grounded in 'objectives' to curricula grounded in competencies and standards (Hardman, 2001; Kirk, 1993, Klein, 1997; Tinning, 2001; Macdonald, 2003). However, history has shown that a new curriculum document of itself is not sufficient to bring about change as the PE Method still dominates. Brooker and Clennett (2006) suggested that frequently, new curricula has "limped along in the shadow of old knowledge and past practice and was never brought to full bloom" (p.12), leaving new directions and pedagogical imperatives marginalised in the curriculum-making process. Macdonald (2003) cautions that nationwide curriculum reform agenda can be a 'chookhouse' that returns to its normal routine after a flurry of chaotic activity. Changing curriculum requires altering teacher thinking to change what teachers do in their curriculum making and pedagogical expression of that design.

The challenge to be a content expert speaks to the important role of domain knowledge in the curriculum and pedagogical practice of teachers. Expert teachers are more likely to challenge students to master rather than to perform, to engage rather than participate, and to set challenging goals rather than encouraging students to 'have a go' or 'do your best'.

It is recognised that student attitudes to PE are influenced first by the teacher (Hellison, 1995; Silverman & Subramaniam, 1999), then by the school setting (Cothran & Ennis, 1998) and third by the structure of the curriculum as it creates the educational climate (Cothran & Ennis, 1998; Martinek,1996/2000; Piéron et al., 2001). Subject experts are more comfortable in their pedagogical duties and in accommodating a greater range of learner abilities. Subject experts have amassed a large quantity of knowledge that provides a framework for attending to what matters. They have a deeper understanding of higher-order principles basic to their discipline. Subject experts translate their expertise into pedagogical activities in ways not accessible to non-experts. Expert teachers are concerned with engagement while less/non-expert is more focussed on content (Schempp, Manross & Tan, 1998). However, the organisational centre for most PE programs remains content, evidenced by the way most PE teachers typically recall content when asked to recount how they plan for teaching (Haerens, Kirk, Cardon & Bourdeaudhuij, 2011). It needs to be noted that generally, students report enjoying participating in classes which they perceive as more serious and consequential (Hastie et al 2011).

What teachers know, do and care about is powerful in the student learning equation. Expert, as opposed to experienced teachers, have more understanding of the 'how' and 'why' of student success and so are more proficient in creating environments for student learning. Expert teachers are more likely to challenge students to master rather than to perform, to engage rather than participate, and to set challenging goals

rather than encouraging students to 'have a go' or 'do your best' (Hattie, 2003). I argue that the challenge to move from the margins involves the PE teacher being able to clearly define their program outcomes and how the program outcomes are measured, and are willing to hold programs and PE teachers accountable for effective teaching. To remove PE from the margins of educational discourse is less about the development of new curricula, and more about moving from the 'thinness' of some curriculum accounts of PE that are little more than a list of activities with ambitions (teacher objectives) for students to have fun, be busy and be good. If PE is to move 'from the margins' to be fully supported, physical educators must be able to clearly define their program outcomes and how the program outcomes are measured, and be willing to hold programs and PE teachers accountable for effective teaching (Rink, 2013). I argue that PE teachers need to see themselves as educational designers.

PE Teachers as Educational Designers

Sparkes (1991) argued that change involves transformation of beliefs, a position also supported by Fullan (2001). This inevitably involves the loss of previously held beliefs and views, which is hard (Fullan, 1982). The process of leaving behind habits of being, and creating new habits which can be translated into practice based on what PE teachers are currently told about how to teach within the context of a new curriculum artefact while setting out student performance standards to result from the teaching is a large ambition. What might happen if PE teachers considered 'yesterday's practice' was for 'yesterday's students,' and instead considered that students today are radically different to last century's students, and how their early engagement in digital games contrasts to the order, control, compliance and replication expectations of the common PE Method?

Prenksy (2005) challenges all educators to think of themselves as educational designers. Just like the games and sport common to PE, online and digital games are a goal-directed and competitive activity participated in within a framework of agreed rules establishing the constraints on behaviour in the game (Lindley, 2003). Gee (2003) suggests the challenge facing digital game designers is to have players learn something that takes a long time to master, is hard and complex, and yet to enjoy it. I argue that is the same challenge PE teachers face in enacting the curriculum.

Gee (2003) suggests that the designers of popular digital games use good learning principles supported by research in the cognitive sciences, as digital games are in fact knowledge-centred environments – a similar view of sports as knowledge-centred environments exists in skill acquisition literature referencing the ecological systems perspective of sport as a non-linear dynamic system. Digital game play, however, may be encouraging young people into play in different ways from that valued in enactment of the PE Method. Gee (2005), for example, asserts that digital game designers deliberately use research from the cognitive sciences on discovering how to engage players in order to learn and enjoy it. These principles include:

- Players engage through an environment where they act through their commitment to a strongly formed and appealing identity;
- A context for interaction exists in which nothing happens until the player makes a decision, after which the game or another player in the game reacts;
- Games permit players to be co-designers by virtue of the decisions they make during gaming;
- Risk taking is encouraged by lowering the consequences of failing, with failure seen as an opportunity to gain feedback about the progress of skill mastery and game understanding;
- Players commence by customising a game to fit their learning and playing styles - players thus feel a real sense of control over what they are doing
- The problems players face are sequenced in order of difficulty, so that solutions to earlier problems are well understood, enabling the development of knowledgeable decision making when confronted by harder problems at the next level;
- Games pose a set of challenges and let players solve those challenges with repetition through variation until solutions are routinised,

with new challenges only then presented and able to be pursued;
- Play is the basis for game interaction and so the game mostly provides information when the player is ready for it and can use it - games therefore situate meaning in the context of the action of the play;
- Games remain motivating by synchronizing with a player's perception of achievement in the game;
- Games encourage players to think about the relationships between players, the objects within the game and the objectives of the game;
- Games encourage players to explore thoroughly before moving on and thus good game design supports players in their play before they are competent
- Players engaged in multi-player games each choose an identity with specialised skills and functions, which each player then makes available to the team, and
- Players develop team affiliations through a common endeavour or quest.

The list of educational design principles suggests that the experience of digital gaming provides players with self-regulated interactivity, initiative, and control of learning through a balance of customisable and structured progressions with 'just in time' feedback or tuition options (Adams, 2010; Bates, 2004; Gee, 2003; Hopper, 2009; Salen & Zimmerman, 2004). In comparison, the traditional instruction model of the PE Method with MAP design is based on unsubstantiated assumptions about games and skill learning, skill development and the promotion of activity participation (Trost, 2004). I am not in any way arguing that games and sport as the content of the PE curriculum lead to the educational thinness of PE, rather, that it is the persistence of design and pedagogical emphasis on reproduction that compromises PE on what it claims to be – an educative enterprise.

Thinking like a game developer means planning carefully before delivery (Kapp, 2011). Careful planning is the foundation upon which good digital games are built to provide players with good learning (Gee, 2003, 2005, 2007), meaning that teaching that is guided and organised by principles empirically confirmed by research provides effective and deep learning (Bransford, Brown, & Cocking, 2000; Gee, 2009). Using game designer as a metaphor (Keramidas, 2010) for PE curriculum design, PE teachers would 1. Purposefully use play to feed learning intentions; 2. Encourage immersion through challenge, engaging student curiosity and capacity to customise the play experience; 3. Design play within the boundaries of action (or constraints) for the challenge point of the students; 4. Recognise and reward player achievement; and 5. Provide students with quantifiable outcomes, which Adams (2010) called victory conditions and mastery conditions (Pill, 2014).

Conclusion

The design work of the school PE program is the jurisdiction of the PE teacher as it is they who are the active curriculum architects, making content selections and choosing its pedagogical expression. I am therefore suggesting that, as I stated earlier in the paper, the ACHPE of itself will not change the form or function of PE in schools. Competing alternatives for the form and function of PE exist, with sport, health promotion and educative discourses, in their own way trying to shape and position the identity of PE. The ACHPE appears to offer the potential for the design and enactment of curricula that will be different to the 'traditional practices' that were spoken of early in this paper as it is an opportunity to challenge the common pedagogical perspectives of PE. In this paper, I have suggested that it is PE teachers' subject mastery and therefore the teachers' capacity to be explicit with and about matters related to the expected student learning which will be located within any reform movement existing with the ACHPE implementation. However, I have also proposed that the challenge of reforming curriculum and pedagogical practice is not one of curriculum documentation reform but of the development of PE teachers as content experts who think like educational designers.

This paper has highlighted that Australian PE has long been positioned by critical theorists as somewhat generally lacking in meaningful educative realities due to two factors: the absence of content coherence in the dominant of

the MAP model and the teaching perspectives of PE teachers. I have summarised three of the common 'directions' for PE teaching existing in the literature that could assist engagement with the ACHPE and local curricula that departs from the thinness of MAP without real curriculum coherence in content or complexity - Constructivist perspectives on teaching and learning, an Arnoldian concept of PE, Models Based Practice, and Education through movement. The ACHPE contains inviting possibilities through which to advance the practice and status of Australian PE; however, it is PE teachers and not the curriculum document who continue to be the key players in the realisation of the possibilities.

BIBLIOGRAPHY/REFERENCES

1. Adams, E. (2010). *Fundamentals of game design* (2nd ed.). Berkeley, CA: New Riders.
2. Alexander, K. (2008). *Is there a role for tactical and sport education models in school physical education?* Keynote Paper presented at the Asia Pacific Sport in Education Conference, Flinders University, Adelaide. Retrieved from http://caef.flinders.edu.au/sie2008/Presentations/Ken%20Alexander%20Keynote%20Address.pdf
3. Alexander, K. (2013).Some seed fell on stony ground-three strikes. In the 28th ACHPER International Conference Proceedings (pp. 1-8). 27-29 November, Melbourne.
4. Alexander, K., Taggart, A., & Medland, A. (1993). *Sport education: Try before you buy.* Paper presented at the AARE Conference. Retrieved from http://www.aare.edu.au/93pap/alexk93002.txt
5. Amade-Escot, C., & Amans-Passaga, C. (2006). Quality physical education: a review from contemporary situated research (1995-2005). *International Journal of Physical* Education, a Review Publication, 43(4), 162- 172.
6. Archer, A., & Hughes, C. (2011). Explicit instruction: Effective and efficient teaching. Guilford Press.
7. Arnold, P. (1979). Meaning in movement, sport and physical education. Lon: Hienemann Australian Curriculum and Assessment Authority. (2012). *The shape of the Australian* curriculum: Health and Physical Education, August 2012. Sydney, NSW:
8. Australian Curriculum and Assessment Authority.
9. Australian Government Independent Review Panel. (2009). *Future of sport in Australia.* Commonwealth of Australia, from www.sportpanel.org.au
10. Australian Institute of Sport. (2015). *Healthy active kids*. Retrieved from https://www.healthyactivekids.com.au/
11. Banfield, G., & Brown, R. (1996). Subject culture, professional identity and curriculum change – the case of health education and physical education. *Teaching and Teachers* Work: A Publication on Professional and Pedagogical Issues, 4(2/3), 1-13.
12. Bates, B. (2004). *Game design* (2nd ed.). Boston, MA: Thomson.
13. Bransford, J., Brown, A., & Cocking, R. (2000). *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academy Press. Retrieved from http://www.nap.edu/catalog.php?record_id=9853#toc
14. Brooker, R., & Clennett, A. (2006).Curriculum knowledge and understanding change: Two significant discourses in health and physical education curriculum making in *contemporary school education.* Paper presented at the Australian Association for Research in Education (AARE) conference, Adelaide, November.
15. Capel, S. (2000). Approaches to teaching games. In S. Capel & S. Piotrowski (Eds.*), Issues in physical education* (pp. 588-592). Lon: Routledge.
16. Commonwealth of Australia. (1992). Physical and sport education - A report by the senate standing committee on environment, recreation and the arts. Canberra: Senate Printing Unit.
17. Corbin, C., & Lindsey, R. (2007). *Fitness for life.* Champaign, Ill: Human Kinetics.
18. Cothran, D.J., & Ennis, C.D. (1998). Curricula of mutual worth: Comparisons of students' and teachers' curricular goals. Journal of Teaching in Physical Education, 17(3), 307-327.
19. Crum, B. (1993). Conventional thought and practice in physical education: problems of teaching and implications for change. *Quest, 45*(3), 339-356.
20. Curriculum Corporation (1994). Health and physical education – a curriculum profile *for Australian schools*. Melbourne, VIC: Curriculum Corporation.
21. Curtner-Smith, M., & Meek, G. (2000). Teachers' value orientations and their compatibility with the national curriculum for physical education. *European Physical Education Review, 6*(1), 27-45.

22. Curtner-Smith, M., Todorovich, J., McCaughtry, N., & Lacon, S. (2001). Urban teachers'use of productive and reproductive teaching styles within the confines of the national curriculum for physical education. *European Physical Education Review, 7*, 177-190.
23. Danish, S., Forneris, T., Hodge, K., & Heke, I. (2004). Enhancing youth development through sport. World Leisure Journal, 46(3), 38-49.
24. Dinan-Thompson, M. (2009) Health and physical education: Issues for curriculum in *Australia and New Zealand.* South Melbourne, Vic: Oxford University Press.
25. Drummond, M., & Pill, S. (2011). The role of physical education in promoting sport participation in school and beyond. In S. Georgakis & K. Russell (Eds.), *Youth sport in Australia* (pp. 165-178). NSW, Aus: Sydney University Press.
26. Dudley, D., Okely, A., Pearson, P., & Cotton, W. (2011). A systematic review of the effectiveness of physical education and school sport interventions targeting physical activity, movement skills and enjoyment of physical activity. *European Physical* Education Review, 17(3), 353-378.
27. Emmel, J. (1979). Physical education programs: Introduction and position statement. In J. Emmel, D. Molyneux & N. Wadrop (Eds.), Values into Action – Proceedings of the XII ACHPER Biennial Conference (p. 42), Adelaide, January 14-19.
28. Emmel, J. (1979). Physical education in schools: Introduction and position statement. In J. Emmel, D. Molyneux & N. Wadrop (Eds.), Values into Action – Proceedings of the XII ACHPER Biennial Conference (p. 70), Adelaide, January 14-19.
29. Ennis, C. (2008). Examining curricular coherence in an exemplary elementary school program. Research Quarterly for Exercise and Sport, 79(1), 71-84.
30. Hickson, C. and Fishburne, G. (2005). Teacher development: enhancing effective teaching in elementary school physical education. *Research Quarterly for Exercise and Sport, 76* (1), 32-40.
31. Fullan, M. (1982). *The meaning of educational change*. New York, NY: Teachers College Press.
32. Fullan, M. (2001). *The new meaning of educational change*. 3rd ed. New York, NY: Teachers College Press.
33. Gee, J. P. (2003). What video games have to teach us about learning and literacy. *ACE Computers in Entertainment,1*(1). doi:10.1145/950566.950595
34. Gee, J. P. (2005). Learning by design: Good video games as learning machines. *E–Learning, 2* (1). Retrieved from http://www.wwwords.co.uk/pdf/validate.asp?j=elea&vol=2&issue=1&year=2005&article=2_Gee_ELEA_2_1_web
35. Gee, J. P. (2007). *Good video games and good learning*. Retrieved from http://www.academiccolab.org/resources/documents/Good_Learning.pdf
36. Gee, J. P. (2009). Deep learning properties of good digital games: How far can they go? Retrieved from http://www.jamespaulgee.com/sites/default/files/pub/Ritterfeld_C005.pdf
37. Green, K. (1998). Philosophies, ideologies and the practice of physical education. *Sport,* Education and Society, 3(2), 125-143.
38. Haerens, L., Kirk, D., Cardon, G., & De Bourdeaudhuij, I. (2011). Toward the development of a pedagogical model for health-based physical education. *Quest, 63*(3), 321-338.
39. Hardman, K. (2001). Comparative physical education and sport. *International Journal of* Physical Education – a Review Publication, 38(3), 96-103.
40. Hardman, K. (2008). Physical education in schools: A global perspective. *Kinesiology*, *40* (1), 5-28.
41. Hastie, P. (2012). *Sport education: international perspectives*. New York, NY: Routledge.
42. Hastie, P.A., Martínez, D. & Calderón, A. (2011). A review of research on sport education: 2004 to the present. Physical Education and Sport Pedagogy, 16, 103-132.
43. Hattie, J. (2003). Teachers make a difference: what is the research evidence? Paper presented at the Australian Council for Education Research (ACER) conference, Melbourne, 19-21 October.
44. Hellison, D. (1977). Teaching physical education and the search for the self. In D. Allen & B. Fahey (Eds.), *Being human in sport* (pp21-29). Philadelphia: Lea & Febiger.
45. Hellison, D. (1995). *Teaching responsibility through physical activity*. Champaign, Ill.: Human Kinetics
46. Hickey, C. (1994). The moment of reconciliation? The current debate about good practice in *physical education*. Paper presented at the AARE International Research Conference. Retrieved from http://www.aare.edu.au/94pap/hickc94169.txt
47. Hickey, C. (1995). Can physical education be physical education? *Healthy Lifestyles Journal*, *Spring*, 4-7.
48. Holt, N. (2008). *Positive youth development through sport.* New York, NY: Routledge.
49. Hopper, T. (2009, July). Game-as-teacher in TGfU and video-games: Enabling constraints in *learning through game-play*. Extended paper based on keynote address, ACHPER 2009, Brisbane, Australia. Retrieved from http://www.educ.uvic.ca/Faculty/thopper/Australia/Keynote_paper-AUST.pdf
50. Kapp, K. (2011). Improved training: Thinking like a game developer. Retrieved from http://www.nxtbook.com/nxtbooks/trainingindustry/tiq_2011fall/index.php?startid=32

51. Keramidas, K. (2010). What games have to teach us about teaching and learning: Game design as a model for course and curricular development. *Currents in Electronic Literacy*. Retrieved from http://currents.cwrl.utexas.edu/2010/keramidas_what-games-have-to-teach-us-about-teaching-and-learning
52. Kirk, D. (1993). Curriculum work in physical education: Beyond the objectives approach? Journal of Teaching in Physical Education, 12(3), 244-265.
53. Kirk, D. (1998). Schooling bodies; School practice and public discourse, 1880-1950. London: Leicester University Press.
54. Kirk, D. (2006). Physical education, curriculum and culture: Critical issues in the *contemporary crisis.* New York, NY: Routledge.
55. Kirk, D. (2004). New practices, new subjects and critical inquiry: possibilities and progress. In J. Wright, D. Macdonald & L. Burrows (Eds.), *Critical inquiry and problem solving in physical education* (pp. 199-208). Lon: Routledge.
56. Kirk, D. (2010). *Physical education futures.* New York, NY: Routledge.
57. Kirk, D. (2013). Educational value and models-based practice in physical education. Educational Philosophy and Theory: Incorporating ACCESS, 45(9), 973-986.
58. Kirk, D., & Tinning, R. (1990). Physical education, curriculum and culture: Critical issues in *the contemporary crisis.* New York, NY: Falmer Press.
59. Klein, G. (1997). Physical education policy: a compromise between political realism and pedagogical humanism. Journal of Comparative Physical Education and Sport, 19(1), 28-41.
60. Lindley, C. (2003). Game taxonomies: A high level framework for game analysis and design. Retrieved from http://www.gamasutra.com/features/20031003/lindley_01.shtml
61. Light, R. (2008). Complex learning theory- its epistemology and its assumptions about learning: implications for physical education. *Journal of Teaching in Physical* Education, 27(1), 21-37.
62. Light, R. (2013). Game sense: pedagogy for performance, participation and enjoyment. New York, NY: Routledge.
63. Light, R., Curry, C., & Mooney, A. (2014). Game sense as a model for delivering quality teaching in physical education. Asia Pacific Journal of Health, Sport and Physical Education, 5(1), 67-81.
64. Macdonald, D. (1995). The role of proletarianization in physical education teacher attrition. Research Quarterly for Exercise and Sport Science, 66(2), 129-141.
65. Macdonald, D. (2003). Curriculum change and the post-modern world: is the school reform project an anachronism? Journal of Curriculum Studies, 35(2), 139-149.
66. Martinek, T. (1996). Why kids participate in physical education? José Maria Cagigal Lecture addressed at the AIESEP International Seminar, Lisbon, 1996, In M. Piéron & M.A. Gonzalez Valeiro (Eds.), Diez anos de conferencias académicas "José Maria *Cagigal*" (187-202). Universidade da coruna: AIESEP.
67. National Curriculum Board. (2009). *Shape of the Australian curriculum*. Australian Capital Territory: Commonwealth of Australia.
68. Mascolo, M. (2009). Beyond student-centred pedagogy: Teaching and learning as guided participation. Pedagogy and the Human Sciences, 1(1), 3-27.
69. McNamee, M. (2005). The nature and values of physical education. In R. Bailey & Kirk, D. (Eds.). The Routledge physical education reader (pp. 9-28). Oxon, England: Routledge.
70. McTighe, J., & Wiggins, G. (1999). *The understanding by design handbook*. Alexandria, V: Association for Supervision and Curriculum Development.
71. Metzler, M. (2011). *Instructional models for physical education*, 3rd Ed. Scottsdale, Arizona: Holocomb Hathaway.
72. Mosston, M., & Ashworh, S. (2002). *Teaching physical education, 5th edn*. San Francisco, Ca: Benjamin Cumming.
73. Mutton, H. (1981). Physical education and sport in South Australian schools. Adelaide, SA: South Australian Education Department.
74. O'Conner, J. (2006). Making sense of teaching skills, games and sports. In R. Tinning, L. McCuaig & L. Hunter (Eds.), Teaching health and physical education in Australian *schools* (pp. 192-199). Frenchs Forest, NSW: Pearson Education Australia.
75. Pascual, C. (2006). The initial training of physical education teachers-in search of the lost meaning of professionalism. Physical Education and Sport Pedagogy, 11(1), 69-82.
76. Pearson, P., Webb, P., & McKeen, K. (2006). Linking teaching games for understanding and quality teaching in NSW secondary schools. In R. Liu, C. Li & A. Cruz (Eds.), Teaching Games for Understanding in the Asia-Pacific Region (pp. 37-46). Hong Kong: The Hong Kong Institute of Education.
77. Penney, D., Clarke, G., Quill, M. & Kinchin, G. (2005). *Sport education in physical* education. research based practice. New York, NY: Routledge.
78. Penney, D., Emmel, J., & Hetherington, S. (2008). The curriculum future of health and physical education in Australia: How influential can a national professional association be? Australian Association for Educational Research Conference. Retrieved from http://www.aare.edu.au/publications-

database.php/5742/The-curriculum-future-of-Health-and-Physical-Education-in-Australia:-How-influential-can-a-national-professional-association-be

79. Piéron, M., Telama, R., Almond, L., Ledent, M., & Carreiro da Costa, F. (2001). *Involvement* of children in sport and physical education. Comparative analysis of youth lifestyle in *selected European countries*. Paper presented at the International AIESEP Conference, Proceeding (pp. 460-464). Taipei, 20-23, June, Taiwan.
80. Pill, S. (2007). Physical education – what's in a name? A praxis model for holistic learning in physical education. Healthy Lifestyles Journal, 54(1), 5-10.
81. Pill, S. (2011). Seizing the moment: can game sense further inform sport teaching in Australian physical education? Physical & Health Education Academic Journal, 3 (1). http://ojs.acadiau.ca/index.php/phenex/article/view/1327
82. Pill, S. (2014). Game play: What does it mean for pedagogy to think like a game developer? Journal of Physical Education, Recreation & Dance, 85(1), 9-15, DOI: 0.1080/07303084.2013.838119
83. Placek, J. (1983). Conceptions of success in teaching: Busy, happy and good? In T. Templin & J. Olson (Eds.), *Teaching in physical education* (pp. 46-56). Champaign, IL: Human Kinetics.
84. Prensky, M. (2005). Engage me or enrage me: What today's learners demand. *Educause Review, 40*(5): 60-64.
85. Rink, J. (2001). Investigating the assumptions of pedagogy. *Journal of Teaching in Physical* Education, 20(2), 122-128.
86. Rink, J. (2013). Measuring teacher effectiveness in physical education. *Research Quarterly* for Exercise and Sport, 84(4), 407-418
87. Rosenshine, B. (1986). Synthesis of research on explicit teaching. *Educational Leadership*, April, 60-69.
88. Rudd, J. (2015). Can't throw, can't catch: Australian kids are losing that sporting edge. *The Conversation,* January 29, 2015. Retrieved from http://theconversation.com/cant-throw-cant-catch-australian-kids-are-losing-that-sporting-edge-36822
89. Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. Cambridge, MA: MIT.
90. Schempp, P., Manross, D., & Tan, S. (1998). Subject expertise and teachers' knowledge. Journal of Teaching in Physical Education, 17, 1-15.
91. Sheehy, D.A. (2011). Addressing parents' perceptions in the marginalization of physical education: The influence of parents- over policymakers, other parents, and their children's attitudes - cannot be ignored. *The Journal of Physical Education,* Recreation and Dance, 82(7), 42.
92. Scott, H., & Westkaemper, R. (1958). From program to facilities in physical education. New York, NY: Harper and Row..
93. Siedentop, D. (1996). Valuing the physically active life. Contemporary and future directions. *Quest, 48,* 266-274.
94. Siedentop, D., Hastie, P., & van der Mars, H. (2012). *Complete guide to sport education*. Champaign, Ill: Human Kinetics
95. Silverman, S., & Subramaniam, P.R. (1999). Student attitude toward physical education and physical activity: a review of measurement issues and outcomes. *Journal of Teaching* in Physical Education 19(1), 97-125.
96. Spark http://www.sparkpe.org/
97. Sparkes, A. (1991). Curriculum change: on gaining a sense of perspective. In: N. Armstrong and A. Sparkes (Eds.), *Issues in Physical Education* (pp. 1-9). London: Cassell Education.
98. Stolz, S. (2009). Physical education and the national curriculum. *Professional Educator 8*(4), 44–47.
99. Thornburn, M. (2007). Seizing the moment; improving curriculum and pedagogy prospects for physical education in Scotland. *Forum, 49*(3), 305-310.
100. Tinning, R. (1987). *Improving teaching in physical education*. Melbourne. Deakin University Press.
101. Tinning, R. (2001). Physical education and the making of citizens: Considering the pedagogical work of physical education in contemporary times. José Maria Cagigal Lecture addressed at the AIESEP International Congress, Proceeding (pp. 4-14). Taipei, 20-23, June, Taiwan.
102. Tinning, R. (2010). Pedagogy and human movement: Theory, practice, research. Lon: Routledge.
103. Tinning, R., Kirk, D., Evans, J., & Glover, S. (1994). School physical education: A crisis of meaning. *Changing Education, 1*(2), 13-15.
104. Trost, S. (2004). School physical education in the post report era. *Journal of Teaching in* Physical Education, 23, 318–337.
105. True Sport http://www.truesportpur.ca/en/principles
106. Wiggins, G., & McTighe, J. (2007). *Schooling by design*. Alexandria, VA: Association for Supervision and Curriculum Development.

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HIERARCHY OF PHYSICAL EDUCATION GOALS AS AN EXPRESSION OF EDUCATIONAL PRIORITIES AMONG POLISH TEACHERS

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Abstract

The work of teachers has to be purposeful and well thought-out in order to achieve desired results. Both theory and practice show that achieving success must be combined with the adequate setting of educational goals and their organization within a specific hierarchy. The crucial research issue here consists of diagnosis of preferences concerning the hierarchy of physical education goals. A questionnaire developed by the European Physical Education Association has been used as the research tool. Teachers perceived the goal of "encouraging students to lead an active, healthy lifestyle" as the most important consideration. The lowest rank was applied to goals connected with shaping the social competences of pupils.

Key words: *physical education, hierarchy of goals*

1. Introduction

Teachers' work, as with every form of human activity, has to be purposeful and well thought-out in order to achieve assumed results. The element preceding any activity is motivation, which triggers the launch of behaviour dedicated to achieving a goal. In modern psychology, motivation to achieve has been defined in a number of ways. The definition which represents consensus from a range of perspectives is based on theses by McClelland2, Heckhausen3, Atkinson and Feather4. The most important factor which tied to the achievement of success, is the maintaining of an activity aimed at a selected goal over a long period of time.

Theory and practice indicate that achieving success is combined to a large extent with the setting of adequate goals; the results of research show that people without any clear long-term goals often change the direction of their actions. However, setting a long-term goal without short-term goals usually leads to idleness. According to Locke12 and Latham13, people should set themselves difficult but achievable goals. In such a situation, the goal is realised with increased persistence and great effort. However, when the goal is easy to achieve or perceived as unachievable, a lack of motivation to act occurs. The choice of goals is also connected with their value and assigning them to a specific hierarchy.

Teachers with high levels of teaching efficacy maintained personal achievement goals for their teaching even when their schools placed emphasis on conflicting goals16.

The psychological theory behind setting goals7,8 and the theory of motivation14 allow for pinpointing in this work the crucial research problem, in the form of diagnosing preferences concerning the hierarchy of physical education goals. Verification of the defined problem requires an answer to the following research questions:

1. Which goals of physical education have the highest declared rank according to the teachers' hierarchy?
2. Do gender and years of professional experience translate into a different hierarchy of physical education goals?

3. Does the environment of teachers' work (lower-primary school, higher-primary school, secondary school) constitute a factor influencing the hierarchy of physical education goals?
4. To what extent are the physical education goals, which have been analysed, actually achieved?

2. Methods

2.1. Participants

The research upon which this article draws, comprised 444 physical education teachers in south-west Poland working in lower-primary, higher-primary and secondary schools. The demographic characteristics of the research are shown in Table 1.

Table 1. Demographic data of the tested groups

	Female	Male	Total
	n (%)	*n* (%)	*n* (%)
Type of school			
lower-primary	98 (22.1)	94 (21.2)	192 (43.2)
upper-primary	66 (14.9)	72 (16.2)	138 (31.1)
secondary	46 (10.4)	68 (15.3)	114 (25.7)
Years of professional experience			
≤ 5	46 (10.4)	20 (4.5)	66 (14.9)
6-10	36 (8.1)	62 (14.0)	98 (22.1)
≥11	128 (47.3)	152 (34.2)	280 (63.1)
Total	210 (47.0)	237 (53.0)	444 (100)

Teachers participating in the research graduated from studying a 3-year higher education course (2,700 hours of courses) and a 2-year Master's Degree course (1,500 hours of courses). Respondents were classified into three groups due to their period of professional practice in teaching as follows: beginner teachers (interns and contract teachers – up to 5 years of professional experience), nominated teachers (6-10 years of professional practice), and chartered teachers (over 11 years of professional practice). Uneven distribution reflects the present structure of employment in the system of education and results from a failure to enrol new teachers into the profession.

2.2. Measures

The method of diagnostic poll the questionnaire technique was applied in the research. The questionnaire, developed by the European Physical Education Association (EUPEA)17,18, was applied as a research tool. It comprised 13 physical education goals adopted as joint goals for European Union countries, that were presented to respondents in the following order: (1) "To develop a feeling of personal well-being/wellness"; (2) "To spread values among students which are connected to participation in sport: solidarity and fair play"; (3) "To ensure students' safety during classes"; (4) "To develop a broad repertoire of students' competence in movement"; (5) "To show to students the cross-curricular links between physical education and other school subjects"; (6) "To promote among students the social and cultural importance of sports and physical activity"; (7) "To develop students' ability to evaluate their own and others' performance"; (8) "To develop group management skills and the ability to organize

others"; (9) "To appreciate the value of fitness and health"; (10) "To develop the capacity to apply and develop skills in specific forms of physical activity"; (11) "To foster the sense of citizenship"; (12) "To provide opportunities for satisfactory participation in classes to all students, regardless of ability, gender or social and cultural background"; (13) "To encourage students to follow an active and healthy lifestyle." The respondents' task was to order them into a hierarchy. The second part of the questionnaire was dedicated to testing teaching results. Teachers were invited to assess the possibility of efficient realisation of the analysed goals by selecting one answer from among the following: "Unreachable", "Partly reachable", "Fully reachable".

2.3. Procedures

Research was conducted by the authors with the participation of a trained group of colleagues during the period from September 2010 to the end of January 2011. The selection of the research group was deliberate and it resulted from co-operation with teachers tested at the Faculty of Physical Education and Physiotherapy of the Opole University of Technology, concerning the education of students with whom they had contact through pedagogical internships in selected schools. Research was voluntary and teachers consent to participate was given. It was conducted in compliance with the requirements of the Bioethical Commission in Opole.

Percentage values, arithmetic mean and standard deviations were calculated for the analysis of the data. Statistically significant differences in age, gender and years of professional experience were examined using STATISTICA 8 software, using the following analysis: the Kruskal – Wallis test and the Mann-Whitney U test.

3. Results

Classification of the goals mentioned by teachers shows a group of dominating goals (1, 4, 10, 2, 5) which have an educational nature, a group of goals concerning sports (3, 7, 11) displaying a medium value assigned in the hierarchy and a group of less frequently selected goals (12, 9, 6, 13, 8) mainly concerning social skills (see Table 2).

Table 2. Teachers' assessment of attainability of physical education goals, *N* = 444

Hierarchy of goals	Reachability of goal			
	Unreachable *n* (%)	Partly *n* (%)	Fully *n* (%)	Mean range
1. To develop a feeling of personal well-being/wellness	14 (3.2)	356 (80.2)	74 (16.7)	3.74
4. To develop a broad repertoire of students' competence in movement	8 (1.8)	314 (70.7)	122 (122.5)	4.89
10. To develop the capacity to apply and develop skills in specific forms of physical activity	12 (2.7)	332 (74.8)	100 (22.5)	5.77
2. To spread values among students which are connected to participation in sport: solidarity and fair play	6 (1.4)	334 (75.2)	104 (23.4)	5.93
5. To show to students the cross-curricular links between physical education and other school subjects	12 (2.7)	358 (80.6)	74 (16.7)	5.93
3. To ensure students' safety during classes	10 (2.3)	344 (77.5)	90 (20.3)	6.79
7. To develop students' ability to evaluate their own and others' performance	56 (12.6)	350 (78.8)	38 (8.6)	7.05
11. To foster the sense of citizenship	30 (6.8)	350 (78.8)	64 (14.4)	7.72
8. To develop group management skills and the ability to organize others	20 (4.5)	310 (69.8)	114 (25.7)	7.85
13. To encourage students to follow an active and healthy lifestyle	36 (8.1)	360 (81.1)	48 (10.8)	8.11
6. To promote among students the social and cultural importance of sports and physical activity	34 (7.7)	294 (66.2)	116 (26.1)	8.89
9. To appreciate the value of fitness and health	14 (3.2)	326 (73.4)	104 (23.4)	8.97
12. To provide opportunities for satisfactory participation in classes to all students, regardless of ability, gender or social and cultural background	44 (9.9)	352 (79.3)	48 (10.8)	9.34

The most important among the group of dominating goals in the context of physical education were issues connected to health, which is corroborated by the selection of goal 1 as the most important in the hierarchy; it concerns preparing students for an active and healthy lifestyle. Goal (10) had third place in the hierarchy; it is also connected to health issues and emphasises the need to maintain fitness and look after one's health. Teachers perceived health aspects of physical education and lifelong activity as the most important goals in the realisation of school physical education. In the hierarchy of goals, those connected to the organisation of the didactic process and concerning safety during classes and developing a feeling of personal well-being/wellness were also ranked highly. They emphasize a broad diversity of physical exercises, educational functions and numerous requirements for the proper organization of a lesson (goals 2 and 4). Creating grounds for lifelong physical exercise recreation, which can be assured through a comprehensive skill set and the attaining of this as a result of physical education, has also been highlighted by teachers; respondents placed the goal comprising this content (5) in fifth place.

The second group comprised classification of goals which disseminate values linked to sports (such as solidarity and the fair play rule). Respondents, who assigned a special rank to those goals, perceived the promotion of various exercise activities through sport at school as important. In the third group, the least frequently selected goals, goal 12, concerning fostering the sense of citizenship was the least frequently selected; supposedly, teachers do not see a close relationship in the content of this goal with physical education. Similarly, the skill of managing a group and indicating a relationship between physical education and other school subjects was perceived as less important by teachers. It is surprising that goal 13, which touched on a very important issue concerning the creation of equal opportunities for all students regardless of ability, gender or social and cultural background, was also classified at a very low 10th place in the hierarchy (see Table 2).

Five goals which were perceived by respondents as being the most important were subject to detailed analysis; the first variable was the type of school. The most important goal in the hierarchy 1 – To encourage students to participate in an active and healthy lifestyle – received similar notes by teachers of all levels of education (lower-primary school, upper-primary school and secondary school). The analysis of multiple comparisons with the Kruskal – Wallis test has shown a value close to the significance level ($H = 6.19$, $p = 0.045$); however, detailed comparison of groups did not show statistically significant differences in the responses of teachers from various types of schools. Consequently, we have to assume that goal 1 is commonly perceived as the most important by teachers from lower-primary schools, upper-primary schools and secondary schools.

The next two places in the hierarchy were occupied by goals (4) – concerning the ensuring of students' safety during classes and (10) – appreciation of the value of fitness and health; however, no statistically significant differences were evident in the performed hierarchy depending on the type of school. The levels of education caused significant variations in teachers' answers concerning goals 2 and 5. Goal 2 ($H = 6.73$, $p = 0.035$) – to develop a feeling of personal well-being/wellness turned out to be the most important for teachers in secondary schools (the lower mean was artithmetic, while the higher was the rank of the goal). Teachers who worked with the oldest adolescents at schools perceived the fostering of a good atmosphere during classes as very important, which may have a significant impact on students' attitudes to the subject and active participation in classes. From among the three types of schools, students in secondary schools show the highest expectations of the subject and the teacher; at the same time, in this type of school, a high level of absenteeism was observed in physical education classes19. Those factors may have an impact on the high rank attributed to this goal in the performed hierarchy. They emphasise the necessity to deliver classes in such a manner as to trigger positive emotions in students and increase self-motivation to actively participation in classes. Statistically

significant differences appeared in the evaluation of this goal by secondary and primary schools ($p = 0.031$), where teachers gave the lowest ranking to this goal.

Goal 5 – to develop a broad repertoire of movement competence: the achieved result of analysis indicates that teachers of upper-primary schools have a specific need to develop the physical skills of students ($H = 20.39$, $p = 0.0000$). In upper-primary schools, this goal received the highest rank, showing the willingness to provide upper-primary school students with the largest possible resources in terms of physical skills. Students' comprehensive preparation in this scope will enable them to undertake various forms of physical activity in the future. In assigning specific ranks to this goal, responses have shown statistically significant differences among teachers of lower-primary and upper-primary schools ($p < 0.001$) and upper-primary and secondary schools ($p < 0.001$), where this goal received the lowest ranking.

Further analysis of the hierarchy of goals revealed that the years of professional experience of respondents were accounted for. The analysis of results with the application of the Kruskal – Wallis test shows that in the evaluation of five goals recognized by respondents as the most important, there were no statistically significant differences in the performed hierarchisation. Consequently, we may assume that years of professional experience did not significantly differentiate the hierarchy of the most important goals of the subject.

In the consecutive part of research, analysis was undertaken based on one further variable – gender. The findings did not reveal any statistically significant differences in the performed hierarchisation of 13 goals as well. Men and women participating in the research assigned the same rank to the analysed goals.

Hierarchisation of physical education goals was the first stage of research. Based on respondents' answers, the ranking of the particular content of goals was established revealing the picture of educational priorities. During further research, teachers were asked to provide their opinion concerning the possibility of successful realisation of the analysed goals. The answers provided were placed on a three–level scale: "not achievable", "achievable to a satisfactory degree", "fully achievable". Based on respondents' declarations, we suggest that it is possible to achieve all the goals presented in the research to a satisfactory degree. Detailed analysis indicated that a lower level of achievability concerns the goal connected with promoting the social and cultural significance of sports and physical activity among students. Fifty six teachers (12.6%) recognized this goal as not achievable. The highest level of achievability concerned the goal which was connected to the need to assure the safety of students performing exercises during classes, with 122 teachers (27.5%) perceiving this goal as fully achievable (see Table 2).

4. Discussion

The results of research into the hierarchy of physical education goals which are presented in this work provide valuable information concerning current priorities in the scope of physical education. From among thirteen goals subject to analysis, teachers perceived the goal "to encourage students to active and healthy lifestyle" as most important. Its realisation should result in students' lifelong physical activity and healthy lifestyle. This goal has also been indicated as the most important in the European research, where it was accorded first place in the hierarchy17.

Researchers in European countries have assumed that the profile of students' competences may be evaluated by research into the hierarchy of subject goals with the aim of revealing which goals, when fully realised, ensure that students with the required competences will be able to participate actively in physical culture.

In Poland, differences between assumed and actual physical education goals were described by Bukowiec21 who, based on research, drew the conclusion that the school system of physical education is inefficient in preparing students for participation in physical culture.

Bronikowski22 reported similar results in his research among physical education teachers into the realisation of operational goals according to their hierarchisation among respondents. He

observed that the most important goals were those concerning shaping attitudes, followed by goals connected to movement skills. In the opinion of five Polish theoreticians of physical education participating in the research by Frołowicz23, the most important subject goal turned out to be developing recreation competences, and next, health competences. The author described recreation competences as "forming an individual who understands the meaning and also knows valuable manners of recreation after work and has a rest with the benefit for his body" 23 (p.59). Similar answers were provided by teachers participating in this research: 75% of them perceived recreation competences as the most important, followed by medical competences (prophylaxis) and finally, health competences.

Teachers in south-west Poland gave the lowest ranking to social competences. Fostering the sense of citizenship, developing group management skills and the ability to organize others and actions connected with indicating links among physical education and other school subjects were perceived as being the least important. In the evaluation of those goals, the same tendency was noticed in the European research, in which teachers from 20 participating countries provided an identical hierarchy to those goals which were placed in the last three locations of the ranking. A significant difference between the European research and the one presented in this current work concerns the goal "to provide opportunities of satisfactory participation in classes to all students, regardless of ability, gender or social and cultural background". Polish teachers did not pay any particular attention to the content of this goal and placed it in tenth position in the hierarchy. In the European research, this goal was placed second with its high rank possibly being connected to the fact that the population structure in European countries is different, and a greater level of ethnic and cultural diversification is observed than in Poland.

5. Conclusions

1. The priority of Polish physical education teachers is to encourage students to take an active and healthy lifestyle.
2. The lowest rank has been assigned to goals connected with shaping the social competences of pupils.
3. Women and men participating in the research assigned the same rank to the analysed goals.
4. Professional experience did not significantly differentiate the hierarchy of the most important goals of the subject.
5. The lower level of achievability concerns the goal connected with promoting the social and cultural significance of sports and physical activity among students.
6. The highest level of achievability was connected to the need to assure the safety of students performing exercises during classes.

BIBLIOGRAPHY/REFERENCES

1. Kotarbiński T. Traktat o dobrej robocie [Treatise on good work]. Wrocław: Zakład Narodowy im. Ossolińskich; 2000.
2. McClelland DC. Human motivation. Glenview, IL: Scott Foresman; 1995.
3. Heckhausen H. The anatomy of achievement motivation. London: Academic Press; 1967.
4. Atkinson JW, Feather NT. A theory of achievement motivation. New York: Wiley; 1966.
5. Pintrich PR, de Groot EV. Motivational and self-regulated learning components of classroom academic performance. J Educ Psychol 1990;82:33-40.
6. Greene BA, Miller RB, Crowson HM, Duke BL, Akey KL. Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. Contemp Educ Psychol 2004;29(4):462-482.
7. Bandura A. Self-regulation of motivation through anticipatory and self-reactive mechanisms. In: Diensbier RA (Ed.). Perspectives on Motivation. Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press; 1991, p. 69-164.
8. Bandura A. Social cognitive theory of self-regulation. Organ Behav Hum Decis Process 1991;50:248-287.
9. Ames C. Achievement goals, motivational climate, and motivational processes. In: Roberts G (Ed.). Motivation in sports and exercise. Champaign, IL: Human Kinetics Books; 1992, p. 161-176.

10. Dweck CS. Self-theories and goals: Their role in motivation, personality and development. In: Dienstbier RA (Ed.). Perspectives on Motivation. Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press; 1991, p. 199-35.
11. Urdan T, Maehr ML. Beyond a two-goal theory of motivation and achievement: A case for social goals. Rev Educ Res 1995;65(3):213-243.
12. Franken RE. Human Motivation. Belmont, CA: Wadsworth/Thomson Learning; 2002.
13. Locke EA, Latham GP. A theory of goal setting and task performance. Englewood Cliffs, NJ: Prentice-Hall; 1990.
14. Maslow AH. Motivation and Personality. New York: Harper & Row; 1970.
15. Łukaszewski W. Motywacja w najważniejszych systemach teoretycznych [The most important theories of motivation]. In: Strelau J (Ed.). Psychologia. Podręcznik akademicki. Gdansk: GWP; 2000, p. 427-68.
16. Cho YJ, Shim SS. Predicting teachers' achievement goals for teaching: The role of perceived school goal structure and teachers' sense of efficacy. Teaching Teach Educ 2013;32:12–21.
17. Fisher R, Repond RM, Diniz J. A Physically Educated Pearson. In: Hardman K, Green K (Eds.). Contemporary Issues in Physical Education: International Perspectives. Maidenhead: Meyer & Meyer Sport; 2011, p. 69-89.
18. Repond RM. Current trends and future directions of School Health and Physica Education In Europe. Global Forum on Physical Eductaion Pedagogy, Northem Iowa University; 2010.
19. Kuśnierz C. O przyczynach niechęci młodzieży szkolnej do lekcji wychowania Fizycznego [On reasons for school adolescents reluctance to physical education classes]. In: Bartoszewicz R, Koszczyc ST, Nowak A. (Eds.). Dydaktyka wychowania fizycznego w świetle współczesnych potrzeb edukacyjnych. Wrocław: Wrocławskie Towarzystwo Naukowe Wydawnictwo; 2005, p.129-35.
20. Delignieres D, Garsault C. Libres propos sur l'Education Psyhique. Paris: Editions Revue EPS; 2004.
21. Bukowiec M. Postulowane, założone i rzeczywiste funkcje wychowania fizycznego w przygotowaniu do uczestnictwa w kulturze fizycznej [Postulated, assumed and factual functions of physical education in preparation for the participation in physical culture]. Kraków: AWF; 1990.
22. Bronikowski M. Hierarchia celów operacyjnych wychowania fizycznego w ocenie nauczycieli wychowania fizycznego [Hierarchy of physical education operative goals in the evaluation by physical education teachers]. Poznań: AWF; 2005.
23. Frołowicz T. Edukacyjne intencje nauczycieli wychowania fizycznego. Między deklaracjami a działaniami [Educational intentions of physical education teachers. Between declarations and actions]. Gdańsk: AWF; 2002.

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PHYSICAL ACTIVITY OF SCHOOL-AGED CHILDREN AND ADOLESCENTS IN LIECHTENSTEIN

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Abstract

This paper analyses the frequency and extent of physical activity (PA) among school-aged children and adolescents in Liechtenstein by regarding selected socio-demographic factors (gender, age and parents' sports activity). The cross-sectional study is based on an online survey conducted in 2015 among 11-, 13- and 15-year-old pupils (N = 448). According to our findings, children and adolescents do sports in their leisure time 3 ½ days a week, resulting in 6 hours per week on average; the percentage of pupils who do not participate in any sport is less than 5 % in total. Despite high sport participation, only a quarter achieved the WHO recommendation of at least 60 min of moderate-to-vigorous physical activity (MVPA) per day. However, a significant decrease in physical and sport activities together with increasing resignation from sport clubs is shown in secondary schools. As a result of this inadequacy, at the end of the compulsory school period, adolescents should be considered as one of the important target groups for health promotion programs. In addition, the relation discovered between the activity level of adolescents and the sport status of their parents emphasizes the high relevance of parents for their childrens' PA socialisation.

The ***Key words:*** *physical activity, sports participation, school-aged children, Liechtenstein.*

Introduction

Physical activity (PA) is essential for healthy development in school-aged children and their long-term well-being [29]. Regular and various exercise stimuli promote motor skills, strengthening the cardiovascular system along with the musculoskeletal structure [9, 12]. Together with the improvement of physical parameters among physically active children and adolescents, positive effects on mental health, school performance and cognitive achievement can also be detected [1, 4, 8, 23]. Due to the fact that PA habits are formed at a young age and transferred with a high probability to later periods of life, childhood is regarded as a key period for health promotion [27, 28]. Current WHO-recommendations suggest that children and adolescents should achieve at least 60 minutes of moderate-to-vigorous physical activity (MVPA) daily [29].

Adolescents' interest and involvement in sports, as in other areas of their lives, are significantly affected by sociodemographic factors such as gender, age, nationality, social-economic status, and socialization of parents [3, 6, 11, 13, 14, 15, 20, 24]. There is consistent evidence which shows that boys and younger children show a higher involvement. Moreover, children from socially disadvantaged groups with a migration background (especially girls), and with parents who have a low sport-affinity, have a clearly lower sports participation than children from privileged and sport-active families. For the majority of children, sport activities seem to play an important role within their leisure time settings [6, 14, 20, 25]. Many adolescents, however, do not reach health-enhancing activity levels. According to findings of the current HBSC survey

[11], on average only a minority of 25 % of 11-year-olds, 20 % of 13-year-olds and 15 % of 15-year-olds in Europe and North America achieve the WHO recommendation [29]. With this background in mind, the purpose of this paper was to clarify the following research issues: a) How many schoolchildren in Liechtenstein do actually achieve the WHO activity guidelines and b) which differences of childrens‘ PA can be shown depending on gender, age, and in relation to the parents’ sports activity?

Methods

Sample, inclusion and exclusion criteria

On behalf of the Liechtenstein Government the Liechtenstein Institute has designed a system of indicators titled ‘‘Sport Monitoring Liechtenstein’’ (SPOMOL) allowing the collection, the analysis, and publication of data on key aspects of sports and PA, which has to be periodically revised [5]. Within the framework of this designing process, an online survey (SoSciSurvey) was also conducted among students in 5th, 7th and 9th grades between April and June 2015 on their sports habits and physical activities. The participation of the selected classes (cluster sampling) and pupils was voluntary, but presupposed the written consent of their parents. Only fully completed questionnaires (N = 448; 46 % boys, 54 % girls) were accepted for analysis, which corresponds to a participation rate of 67 %. Regarding the representative nature of the sample, no statistical differences within the reference characteristics of gender and age in comparison to the national school statistics could be detected.

Documentation and analysis of the physical and sports activities

The young peoples’ PA was determined (following the German KiGGS-study [21]) with the question, “On how many days during a regular week are you physically active for a total of at least 60 minutes?”. The question was introduced by giving some examples of activity and defining MVPA (i.e. any physical activity which temporarly increases your heart rate or gets you out of breath). Frequency and duration of sport during leisure time were asked based on the Swiss HBSC study [16] as follows: ‘‘On how many days and for how many hours a week do you practise sport during your free time (outside school), so that you sweat or get out of breath?’’. pThe level of Parental interest in sport was established through the following two questions: ‘‘Do your parents do sport on a regular basis (i.e. minimally once a week)?’’ and ‘‘Are your parents members of a sports club?’’ using dichotomous answers (father/mother: yes/no). Data analysis was performed using SPSS (version 21) and Chi-Square Test and non-parametric methods (Mann-Whitney-U and Kruskall-Wallis-Test), drawn at significant level of $p < 0.05$.

Results

Sport involvement

Sports are considered to be one of the main leisure-time activities for children and adolescents in Liechtenstein, and are excercised on average for 6 hours and on 3 ½ days per week (table 1). About a quarter of respondents (23.8 %) has a high extent of more than 7 hrs./week; the proportion of adolescent 11- and 13-year-olds who fail to participate in any sport activity is below 3 %; for 15-year-olds it is below 8 %.

Generally, as well as in the age groups 11- and 13-year-olds, boys practise significantly more sports than girls. In addition, there is a significant decrease during school age. Along with gender and age, engagement in sports also varies depending on the parental sport affinity (table 1). Children from sport-active parents are more likely to practise sports than children from inactive parents. This parental role model effect is independent of childrens’ gender.

Table 1. Amount of weekly sport involvement (outside school time) of 11-to15-year-olds in Liechtenstein

	sports activity/week					**mean±sd/week**	
variables	> 10 hrs.	> 7-10 hrs.	> 3-7 hrs.	≤ 3 hrs.	0 hrs.	hours	days
11-year-olds[b*]	**18.3 %**	**10.1 %**	**43.1 %**	**27.5 %**	**0.9 %**	**6.8±5.1**[b**]	**4.3±1.7**
boys[a*]	29.8 %	10.6 %	42.6 %	17.0 %	0 %	8.8±6.2[a***]	4.8±1.7
girls	9.7 %	9.7 %	43.5 %	35.5 %	1.6 %	5.2±3.5	3.9+1.7
13-year-olds	**13.5 %**	**12.1 %**	**50.4 %**	**21.3 %**	**2.8 %**	**6.6±4.9**	**3.8±2.0**
boys[a*]	20.8 %	13.9 %	50.0 %	12.5 %	2.8 %	7.9±5.7[a**]	4.1±1.9
girls	5.8 %	10.1 %	50.7 %	30.4 %	2.9 %	5.2±3.5	3.5±2.0
15-year-olds	**7.7 %**	**12.3 %**	**41.0 %**	**31.8 %**	**7.2 %**	**5.2±4.3**	**3.1±1.8**
boys	8.3 %	14.3 %	44.0 %	23.8 %	9.5 %	5.4±3.9	3.0±1.8
girls	7.2 %	10.8 %	38.7 %	37.8 %	5.4 %	5.1±4.5	3.1±1.8
all (n = 445)	**12.1 %**	**11.7 %**	**44.5 %**	**27.4 %**	**4.3 %**	**6.0±4.7**	**3.6±1.9**
boys[a***]	17.7 %	13.3 %	45.8 %	18.2 %	4.9 %	7.1±5.3[a***]	3.8±1.8[a]
girls	7.4 %	10.3 %	43.4 %	35.1 %	3.7 %	5.1±4.0	3.4±1.8
parents' sports affinity	**12.1 %**	**11.7 %**	**44.5 %**	**27.4 %**	**4.3 %**	**6.0±4.7**	**3.6±1.9**
no sports	6.8 %	11.9 %	44.1 %	23.7 %	13.6 %	5.0+4.7	2.7±1.9
one parent active[1]	8.9 %	12.2 %	38.2 %	38.2 %	2.4 %	5.5+4.5	3.5±1.9
both active[2]	9.0 %	12.9 %	47.2 %	27.0 %	3.9 %	5.8+4.5	3.5±1.7
both active[3c***]	27.1 %	8.2 %	48.2 %	15.3 %	1.2 %	7.9+5.3[c**]	4.5±1.8[c]

significant differences by sex[a], age[b] and in relation to parents' sports-affinity[c]; * p < .05, ** p < .01, *** p < .001

[1]in or without sports club, [2]without or only one parent being member in sports club; [3]both members in sports club

Participation in sports clubs

Across all age groups, on average 72.5 % are active in at least one sports club; of which 25.6 % are even active in several sports clubs. The highest rate of membership (84.7 %) is found in primary schools (11-year-olds). At 81 %, membership among 13-year-olds is still at a high level, before revealing a significant decrease to 59.5 % by the end of compulsory schooling (9th grade, 15-year-olds). No gender difference in sports participation could be detected. However, an essential factor influencing the membership in sports clubs can be seen in the sportiness of parents: children of active and sports clubs attending families (i.e. both parents are members) are significantly more often active in sports clubs than children from parents without membership ($p < .001$).

Physical activity

Table 2 shows on how many days per week the survey participants were active according to the WHO guideline [29]. 62.1 % of 11-year-olds, 53.6 % of 13-year-olds and 42.1 % of 15-year-olds are physically active in the manner recommended for a minimum of five days a week; however only 22.8 % of all the children and adolescents are active every day of the week. There is a continous decline through adolescence: whereas a third of 11-year-olds achieve the MVPA guideline, it is only 14 % of

15-year-olds; on the other hand, there is an increase in the proportion with a relative low PA level (0 – 2 days) from 11.7 % to 22.6 %. In other words, primary school children (5th grades) are twice as active as adolescents (9th grades) at the end of secondary school.

In all age groups, boys reported more often at least 60 minutes of MVPA/day, but only reached statistical significance among 13-year-olds ($p = 0.012$). In addition, membership in a sports club and sport-active parents are positively associated with the level of childrens' activity (table 2): members of sports clubs and children of parents with a high sports affinity (i.e. both active and members in sports clubs) are almost twice as active in the recommended manner as non-members or children of inactive parents. Figure 1 displays a comparison of our results with the findings of the recent HBSC study [11], especially with our neighbouring countries, Switzerland [15] and Austria [2].

Table 2. Proportion of 11- to 15-year-olds, who achieved the WHO guideline (≥ 60 min. of MVPA/day)

	complying the WHO-guideline [29]				**activity days**
variables	7 days/week	5-6 days	3-4 days	0-2 days	mean±sd
11-year-olds	**34.2 %**[b***]	**27.9 %**	**26.1 %**	**11.7 %**	**5.1±1.8** [b***]
boys	38.8 %	26.5 %	30.6 %	4.1 %	5.3±1.6
girls	30.6 %	29.0 %	22.6 %	17.7 %	4.8±1.9
13-year-olds	**25.4 %**	**28.2 %**	**34.5 %**	**12.0 %**	**4.7±1.8**
boys	34.2 %[a*]	26.0 %	30.1 %	9.6 %	5.1±1.8[a*]
girls	15.9 %	30.4 %	39.1 %	14.5 %	4.4±1.8
15-year-olds	**14.4 %**	**27.7 %**	**35.4 %**	**22.6 %**	**4.1±1.9**
boys	16.2 %	25.2 %	34.2 %	24.3 %	4.1±1.8
girls	11.9 %	31.0 %	36.9 %	20.2 %	4.1±1.9
all (n = 448)	**22.8 %**	**27.9 %**	**32.8 %**	**16.5 %**	**4.5±1.9**
boys	26.2 %	28.2 %	33.0 %	12.6 %	4.7±1.8
girls	19.8 %	27.7 %	32.6 %	19.8 %	4.4±1.9
sports club membership					
yes	26.2 %[c**]	30.5 %	34.2 %	9.2 %	4.9±1.7[c***]
no	13.8 %	21.1 %	29.3 %	35.8 %	3.7±2.0
parents' sports-affinity					
no sports	16.9 %	18.6 %	39.0 %	25.4 %	4.0±1.9
one parent active[1]	21.6 %	23.2 %	30.4 %	24.8 %	4.2±2.0
both active[2]	21.3 %	35.4 %	30.3 %	12.9 %	4.7±1.8
both active[3d**]	31.4 %	25.6 %	37.2 %	5.8 %	5.0±1.7[d**]

significant differences by sex[a], age [b], sports club membership[c] and in relation to parents' sports affinity[d]; * $p < .05$, ** $p < .01$, *** $p < .001$

[1]in or without sports club, [2]without or only one parent being member in sports club; [3]both members in sports club

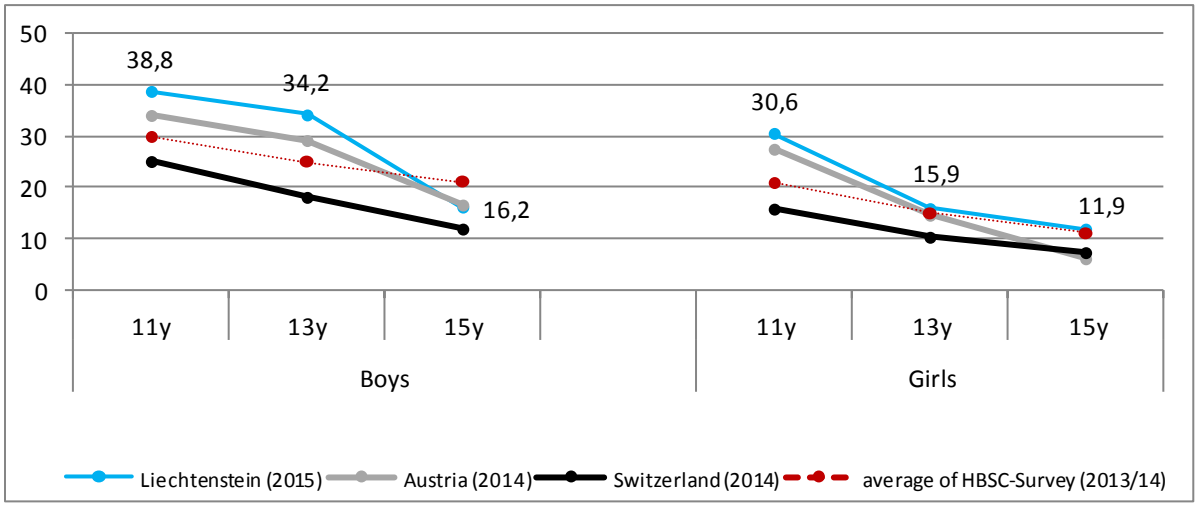

Figure 1. Percentage of children and adolescents who achieved the WHO guideline [29] compared with current data from our neighbouring states Switzerland [16] and Austria [2] as well as average of HBSC-survey [11].

Discussion

The majority of young people in Liechtenstein are active in sports. 44.5 % of all 11-, 13- and 15-year-olds practise sports for 3 to 7 hrs./week, and almost a quarter with a high level of more than 7 hrs./week (table 1). The total proportion of a complete lack of participation in sports is below 5 %. Current findings in the Swiss HBSC study 2014 [16] show that 14.2 % of 11- to 15-year-olds in our neighbouring countries are active for 7 hrs./week and more than 5.6 % do no sports at all.

Confirming findings from other studies [6, 14, 20, 25] our survey demonstrates a higher sports commitment amongst boys together with a continuous decline during adolescence. Besides this well-known disparity, our data also indicates a lack of classic gender differences [22] in sports club membership. No significant gender differences could be detected. As previously documented in earlier surveys [17, 18], the leveling tendency became even stronger in the year 2015. Obviously, sport activities organized by clubs in Liechtenstein seem to equally satisfy the needs of today's girls and boys. Furthermore, in comparison with these older studies, the current data 2015 show an increase of 10 % in the participation in sports clubs among 11- and 13-year-olds and an unchanged/stable development among 15-year-olds over the last 12 years. The next evaluation will clarify whether this encouraging trend is sustainable.

The peak of sports club membership is at the age of 11 years (5th grade). In Switzerland, the highest percentage of membership [20] is at the age of 11-12; among adolescents in West Germany it is around the age of 12 [7]. The membership quota of 11- to 13-year-olds in Liechtenstein with percentages of 85 % and 81 % respectively are about 20 % higher than in current data from Switzerland [20]; among 15-year-olds the findings (FL: 59 % and CH: 52 %) are similar. This high proportion of sport club memberships could be explained, on the one hand, by the peculiarity of the sport landscape in Liechtenstein, and on the other hand, by the obviously successful efforts of the sports associations and clubs in attracting the attention of as many adolescents as possible (regardless of gender and nationality). Despite its small area of merely 160 km2 and population of 37,000 inhabitants, the country presents a high number of associations and sports clubs, together with a

remarkable variety of well-equipped sports facilities within short distance. Due to this high density of sports clubs, which is probably unique in Europe, the population of Liechtenstein has access to a wide range of sport disciplines.

Despite high sports participation, only a quarter of Liechtenstein's school children achieved the WHO recommendations of at least 60 min. of MVPA per day (table 2). Although the proportion of sufficiently active children and adolescents (figure 1) is generally above national reference levels for our neighbouring states, Switzerland [16] and Austria [2] – particulary with regard to the age group of 11-year-olds – there is a need for action. As shown in the engagement in sports and in accordance with other studies [6, 11, 16], the level of PA shows a significant decline during adolescence ($p < .001$). This decline in PA and sports participation could be explained due to biological changes in adolescence, along with rising study requirements (mainly during the transition to apprenticeship), as well as by a growing sense of autonomy in combination with changes in social networks [6, 11]. These changes of living conditions also influence health-related behaviour, and the general reduction of PA in daily life contributes to an increased prevalence of weight increase at this critical stage of life [10]. According to current findings, 16.6 % of all children and adolescents aged 5, 10 and 14 years in Liechtenstein are overweight (incl. obese); whereas the prevalence of 24.6. % among 14-year-olds (secondary school) is 2.2 times higher than in kindergarten [19]. This trend is also found in a recent Swiss study [26], showing 12.3 % of children at primary level (mean 5.9 years) and 20.5 % at secondary school (mean 14.8 years) to be overweight (incl. obese). Due to the obvious decline in sports activities, the increased rejection of club sports and the higher prevalence of weight increase towards the end of obligatory schooling, adolescents should therefore be an important target group in the focus of health promotion.

The demonstrated association between sport involvement, the level of PA of school-aged children, and the sport affinity of their parents underline the importance of parents as an area of socialisation. In accordance with other studies [15, 20], children of active parents practice significantly more sports than those from inactive parents. Based on this important model function and the “inheritance of sport enthusiasm” [20], awareness-raising measures for parents should be enhanced. A further essential area of action, which influences the health awareness and movement behaviour of adolescents is the school [11, 29]. In this major biographic setting, all children and adolescents can be addressed regardless of their social and cultural background. Although there are currently a number of projects for PA promotion in schools (cf. www.bfschule.ch, www.schulebewegt.ch, www.schoolsforhealth.eu), it seems that this offer is being insufficiently implemented, especially in secondary schools.

This study is a first inventory for Liechtenstein, and the cross-sectional design does not permit causal conclusions. Furthermore, it must be considered that our data is derived from a rural region with only 37,000 inhabitants and represents specific local circumstances, and therefore cannot be generalized for other European regions.

Conclusion

Our analysis allows for the first time a differentiated insight into the PA patterns of school-aged children in Liechtenstein in the important transition period from primary to secondary school. In order to solidify today`s knowledge and to analyse trends, continuous monitoring (ideally including more age groups, i.e. 5- to 10- and 16- to 20-year-olds) would be desirable.

BIBLIOGRAPHY

1. Ahn S., Fedewa A. (2011). A meta-analysis of the relationship between children's physical activity and mental health. J Pediatr Psychol.:1-13.
2. Bundesministerium für Gesundheit (BMG) (Ed.) (2015). Gesundheit und Gesundheitsverhalten von österreichischen Schülerinnen und Schülern. Ergebnisse des WHO-HBSC-Survey 2014. Wien: BMG.
3. Burrmann U. (2005). Zur Vermittlung und intergenerationalen „Vererbung" von Sport(vereins)-engagements in der Herkunftsfamilie. Sport und Gesellschaft, 2:125-154.
4. Eime RM., Young JA., Harvey JT., Charity MJ., Payne WR. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. Int J Behav Nutr Phys Act., 10:98.
5. Frommelt C. (2015). Sportmonitoring Liechtenstein. Bestandesaufnahme 2015. Liechtenstein-Institut.
6. Gerlach E., Brettschneider WD. (2013). Aufwachsen mit Sport. Befunde einer 10-jährigen Längsschnittstudie zwischen Kindheit und Adoleszenz. Aachen: Meyer & Meyer.
7. Gogoll A., Kurz D., Menze-Sonneck A. (2003): Sportengagements Jugendlicher in Westdeutschland. In: Erster Deutscher Kinder- und Jugendsportbericht, W. Schmidt, I. Hartmann-Tews und W.D. Brettschneider (Eds.), Schorndorf: Hofmann: 145-165.
8. Haapala E. (2012). Physical activity, academic performance and cognition in children and adolescents: a systematic review. Baltic Journal of health and physical activity, 4:53-61.
9. Herrmann D., Buck C., Sioen I., Kouride Y., Marild S., Molnar, D. et al. (2015). Impact of physical activity, sedentary behaviour and muscle strength on bone stifness in 2-10-year-old children-cross-sectional results from the IDEFICS study. Int J Behav Nutr Phys Act., 12:112.
10. Hills AP., King NA., Armstrong TP. (2007). The contribution of physical activity and sedentary behaviours to the growth and development of children and adolescents: implications for overweight and obesity. Sports Med., 37:533–545.
11. Inchley J., Currie D., Young T., Samdal O., Torsheim T., Augustson L., Mathison F., Aleman-Diaz A., Molcho M., Weber M., & Barnekow V. (Eds.). (2016). Growing up unequal: Gender and socioeconomic differences in young people's health and well-being. Health Behaviour in School-aged Children (HBSC) study: International report from the 2013/2014 survey. (Health Policy for Children and Adolescents, No. 7). Copenhagen: WHO Regional Office for Europe.
12. Janssen I., LeBlanc AG. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged chil-dren and youth. Int J Behav Nutr Phys Act., 7:40.
13. Jekauc D., Reimers AK., Wagner MO., Woll A. (2012). Prevalence and socio-demographic correlates of the compliance with the physical activity guidelines in children and adolescents in Germany. BMC Public Health, 12:714.
14. Jekauc D., Reimers AK., Wagner MO., Woll A. (2013). Physical activity in sports club of children and adolescents in Germany: results from a nationwide representative survey. Journal of Public Health, 21: 505-513.
15. Klein M., Fröhlich M., Emrich E. (2011). Sozialstatus, Sportpartizipation und sportmotorische Leistungsfähigkeit. Sport und Gesellschaft, 8:54-79.
16. Archimi A., Eichenberger Y., Kretschmann A., Delgrande Jordan M. (2016). Habitudes alimentaires, activité physique, usage des écrans et statut pondéral chez les élèves de 11 à 15 ans en Suisse - Résultats de l'enquête «Health Behaviour in School-aged Children» (HBSC) 2014 et évolution au fil du temps (Rapport de recherche No 78). Lausanne: Addiction Suisse.
17. Kühnis J. (2006). „Und sie bewegen sich doch!" Zentrale Ergebnisse der landesweiten Jugendsportstudie auf der Sekundarstufe I+II. Vaduz: Ressort Sport der liechtensteinischen Regierung.
18. Kühnis J., Bürgler A., Britschgi M., Dermon F., Imholz J., Marty J. et al. (2013). Physical activity patterns of primary school children in everyday life. A cross-sectional study among 5th grades in Liechtenstein and the canton of Schwyz. Schweizerische Zeitschrift für Sportmedizin und Sporttraumatologie, 61:23-27.
19. Kühnis J, Erne S. (2014). Stabilising trends of overweight and obesity among 5-14-year-olds in Liechtenstein between 2004 and 2012. Journal of Physical Education & Health, 3:47-52.
20. Lamprecht M., Fischer A., Wiegand D., Stamm H. (2015). Sport Schweiz 2014: Kinder- und Jugendbericht. Magglingen: BASPO.
21. Manz K., Schlack R., Poethko-Müller C., Mensink G., Finger J., Lampert T. (2014). Körper¬lich-sportliche Aktivität und Nutzung elektronischer Medien im Kindes- und Jugendalter. Ergebnisse der KiGGS-Studie – Erste Folgebefragung (KiGGS Welle 1). Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheits¬schutz, 57:840–848.
22. Rose L. (2002). Alles anders? Überlegungen zum Stellenwert des Sports in den modernen Mädchen- und Jungenwelten. Sportunterricht, 45:349-356.

23. Singh A., Uijtdewilligen L., Twisk JW., van Mechelen W., Chinapaw MJ. (2012). Physical activity and performance at school. A systematic review of the literature including methodological quality assessment. Arch Pediatr Adolesc Med., 166:49-55.
24. Schmiade N., Mutz M. (2012). Sportliche Eltern, sportliche Kinder. Die Sportbeteiligung von Vorschulkindern im Kontext sozialer Ungleichheit. Sportwissenschaft, 42:115-125.
25. Schmidt W. (Ed.) (2009). Zweiter Deutscher Kinder- und Jugendsportbericht. Schwerpunkt: Kindheit. (2. Auflage). Schorndorf: Hofmannn.
26. Stamm H., Gebert A., Guggenbühl L., Lamprecht M. (2014). Excess weight among children and adolescents in Switzerland – prevalence and correlates fort he eearly 2010s. Swiss Med Wkly., 144:w13956.
27. Telama R. (2009). Tracking of physical activity from childhood to adulthood: a review. Obes Facts, 2:187–195.
28. Tremblay MS., LeBlanc AG., Kho ME., Saunders TJ., Larouche R., Colley RC. et al. (2011). Systematic review of sedentary behaviour and health indicators in school-aged children and youth. Int J Behav Nutr Phys Act., 8:98.
29. World Health Organisation (WHO) (2010). Global recommendations on physical activity for health. Geneva: WHO.

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HIGH INTENSITY STRENGTH TRAINING IN OVERWEIGHT ADULTS IN THE WORKPLACE: A PILOT STUDY

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Abstract

The aim of this pilot study was to determine (a) the effects of high intensity strength training in the workplace on blood pressure, fat percentage and physical fitness in overweight adults, and (b) the influence of this intervention on the blood pressure in a subsample of hypertensive subjects. Overweight adults (n=15) aged 42.8 years underwent anthropometric assessment (weight, fat percentage, waist circumference, and triceps skinfold), physical fitness assessment (leg extensor power, upper body endurance, hand grip strength and Vo2max) and blood pressure assessment before and after 8 weeks of high intensity resistance training in the workplace. Each training session consisted of 16 sets of 45 repetitions performed at 1 repetition per second, decreasing load at the point of muscular failure starting at 60% of repetition maximum (RM). The effects of the intervention were analyzed by paired sample t-tests. For exploratory purposes, a non-parametric test was also performed (Wilcoxon matched-pair signed-rank) to examine if this decision could affect the results. Weight, body fat percentage, and triceps skinfold decreased significantly with the high intensity resistance training protocol in the workplace (all P<0.05). Performance in physical fitness tests increased significantly with training (all P<0.05), except for handgrip strength. Both systolic and diastolic blood pressure decreased significantly with R-HIRT in the workplace (all P <0.05) in hypertensive subjects (n=10). This protocol performed in the workplace in this pilot study produces health and fitness benefits in overweight and hypertensive people.

Key words: *endurance, health, hypertension, physical fitness.*

Introduction

The problems of weight increase and obesity are linked to raised risk of morbidity from hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, and endometrial, postmenopausal breast, prostate, and other cancers (1, 29). In addition, obesity is associated with increased overall mortality (10).

Benefits of increased muscle mass and muscle strength have been reported recently (36). Higher levels of muscular strength, independent of aerobic fitness level, are associated with a general lower level of mortality rates in men and women (28, 31). Muscular strength has been shown to be inversely related to excessive body fat and abdominal fat (18), both of which are associated with increased risk for chronic diseases and adverse events that include heart disease (37), type 2 diabetes (7), cancer (30), and stroke (34). Muscle strength becomes especially important for preventing falls (12).

High intensity progressive resistance training (HI PRT) is associated with substantial gains in appendicular lean mass and losses of total and special trunk fat mass (22). Heavy resistance strength training can cause decreases in metabolic risk factors related to body composition, blood pressure and glucose and insulin metabolism (32, 33). However, the optimal type and intensity of resistance training that should be used to maximize health weight loss and other health benefits in overweight people is unclear (20).

Exercise intensity is important for increasing metabolic rate; high intensity exercise increases metabolic rate higher than low intensity exercise, and vigorous intensity and high duration programs have shown greater benefits in

overweight sections of the population (19). This type of intensity helps spare lean mass, maintain nitrogen balance and compensates blood glucose concentration with fatty acids and ketones at rest (5).

Obesity and weight increase affects the lives of many adults of working age. Action is therefore imperative to provide preventive strategies to reduce the trend. Activity habits of overweight people must change at home and in the work place (13, 16). Feasible ways of introducing exercise in the workplace are through strength training, which can be implemented in a small place, over a short period of time (2), and with a diverse group of people working at a time, with great benefits for health and fitness and even reducing work absenteeism (38).

The primary purpose of this study was to examine the effects of a high intensity resistance training program in the workplace, on body fat percentage, blood pressure, and physical fitness in overweight adults. By combining previously established evidence in Regressive High Intensity Resistance Training (R-HIRT) effects, we tested the following primary hypothesis: R-HIRT reduces BMI, Blood pressure, Fat percentage and increases performance in tests of physical fitness. Furthermore we hypothesize that R-HIRT is a determinate dose of high intensity exercise that can affect blood pressure in our hypertensive subjects.

MATERIALS AND METHODS

Experimental Approach to the Problem

The present study was developed as a pilot study to test the possible effectiveness of R-HIRT program in overweight and obese adults. It was performed at the University of Balearic Islands (Majorca, Spain) from March to June of 2010. The target group was overweight university employees.

The study outcomes were body measurements (anthropometry) and physical fitness. Data on anthropometric characteristics included: weight, BMI, body fat, waist circumference, hip circumference, mid-upper arm 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 an battery test for adults (35) and Queen College Step Test (24). Data on physical fitness included: lower extremity strength, upper body endurance and hand grip strength.

The R-HIRT program consisted in 16 sessions (two per week), in which participants were evaluated twice: before the intervention (baseline, Week 0) and after the intervention (post-test, Week 8). The sessions were provided early in the morning at the university sport facilities before the start of the working day and supervised by a specialist. An informative session was held with the participants in order to explain in detail the procedures, aims and characteristics of the intervention program. Written information was also delivered to the participants.

The R-HIRT program was based on current scientific literature (8, 11, 14, 17, 19, 20, 23, 27, 32) and the amount of exercise carried out was strength training involving 18 sets of 45 repetitions, starting at 60% (1 RM) and decreasing the intensity at the point of muscular failure or inability to follow the 1 second repetition rhythm. This dose (>9 MET) allows the patient to expend calories on average at about 400 kcal. per session. The R-HIRT intends to consume as many High-energy phosphates as possible in every set.

Subjects

Fifteen obese adult university employees participated in the study. A total of 19 participants completed the baseline assessment and 15 participants (10 men and 5 women) completed the assessment at post-test (dropout rate=21.05%).

Participants were 42.83 years old (SD 5.81) and had 81.64 kg (SD 13.73), 163.93 cm (SD 7.09), 30.27 kg/m2 (SD 4.12) and 34.51 % of weight, height, body mass index (BMI) and percentage of body fat respectively.

Procedure

This study was a non-randomized controlled trial. The University of the Balearic Islands has a medical service available to employees. The study used accidental sampling methods to draw a voluntary population, from which the medical service selected participants according toy the following inclusion criteria: (i) age between 18

and 65 years; (ii) BMI equal to or greater than 25 kg/m2; (iii) do not have any medical contraindications to performing high-intensity exercise; (iiii) not participating in any weight reduction program. Study flow is depicted in Figure 1.

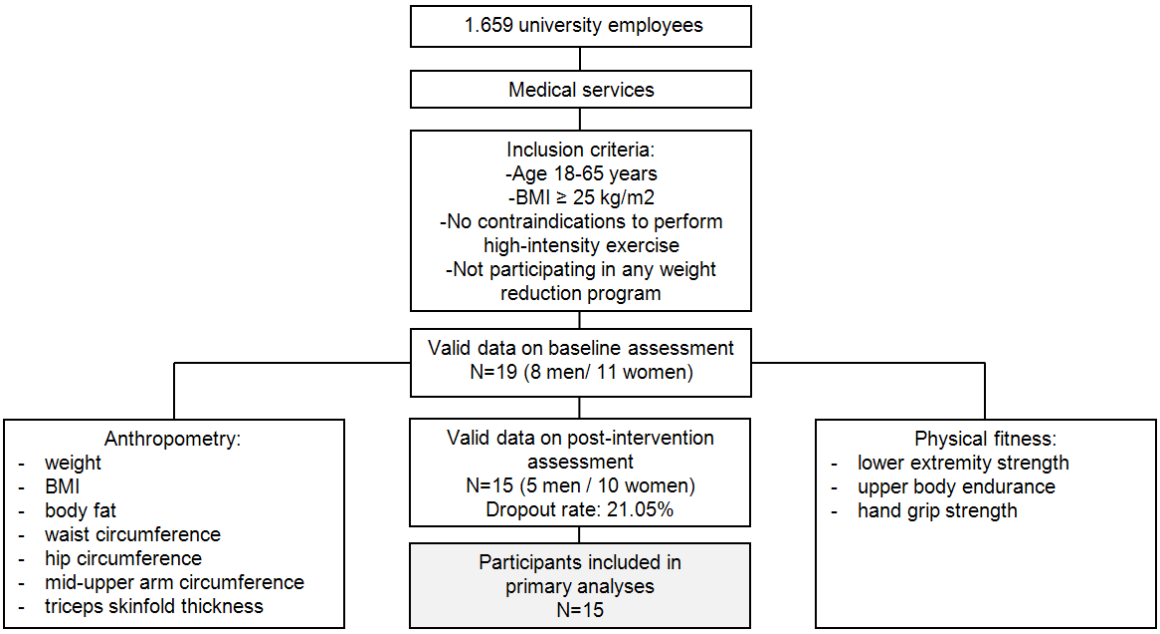

Figure 1. Study flow.

Anthropometric assessment. Participants removed shoes, heavy clothing and contents of pockets. 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 stood 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, hip circumference and mid-upper arm circumference were 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 0.5 cm. 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 a 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 were not performed consecutively and the mean was used in analyses.

Physical fitness assessment. Lower extremity strength (leg extensor power) was measured with the jump-and-reach test, the aim of which 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 marked with a 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 the trunk. The participant lies prone on the mat, and begins 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 one 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 maximum oxygen intake (24) (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.

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

Statistical Analyses

The analyses were performed of those participants that had complete data at the two measurement points (baseline and post-test) using PASW (Predictive Analytics SoftWare, formerly SPSS), version 19.0 SPSS Inc., Chicago, IL, USA. The level of significance was set at <0.05 for all the analyses.

The effects of the intervention were analyzed by paired sample t-tests. For exploratory purposes, a non-parametric test was also performed (Wilcoxon matched-pair signed-rank) to examine if this decision could affect the results.

Ethics

Written permission of participants was required for participation in the study. All participants had been previously informed about the protocol and purposes of the research. The study protocol was approved by the local Ethical Committee of the University of Balearic Islands and performed in accordance with the ethical standards of the Helsinki Declaration.

RESULTS

Anthropometric parameters

Weight (-1.46 ±2.14), BMI (-0.54 ±0.83), body fat (-1.68 ±0.93) and triceps skinfold thickness (-7.71 ±2.59) decreased after intervention ($p<0.05$). Waist circumference (-1.77 ±7.16) and hip circumference (-1.41 ±6.55) decreased slightly ($p>0.05$), and mid-upper arm circumference (+0.93 ±0.92) increased ($p>0.05$) (Table 1).

Physical fitness parameters

Lower extremity strength (+2.85 ±2.61), upper body endurance (+4.86 ±3.21) and Vo2max (+2.81 ±4.06) increased after intervention ($p<0.05$), and hand grip strength (+0.25 ±3.97) increased slightly ($p> 0.05$) (Table 1).

Table 1. Characteristics of the study sample at pretest and posttest

	Pretest	Posttest	Relative	Absolute	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean	P=
Weight (kg)	81.64 ± 13.73	80.18 ± 13.83	-1.46 ± 2.14	-0.02 ± 0.02	0.019
Body mass index (kg/m2)	30.27 ± 4.12	29.73 ± 1.02	-0.54 ± 0.83	-0.02 ± 0.02	0.026
Body fat (%)	34.51 ± 6.02	32.83 ± 1.59	-1.68 ± 0.93	-0.05 ± 0.03	0.000
Waist circumference	93.47 ± 12.21	91.69 ± 11.12	-1.77 ± 7.16	-0.01 ± 0.08	0.354
Hip circumference	108.4 ± 10.29	107.0 ± 10.73	-1.41 ± 6.55	-0.01 ± 0.07	0.419
0.01 ± 0.03	32.67 ± 3.17	32.76 ± 2.68	0.09 ± 0.92		0.701
-0.28 ± 0.09	28.55 ± 7.91	20.83 ± 7.18	-7.71 ± 2.59		0.000
Vertical jump	21.85 ± 6.85	24.69 ± 8.15	2.85 ± 2.61	0.13 ± 0.14	0.002
Modified push-ups	10.93 ± 6.07	15.79 ± 4.85	4.86 ± 3.21	0.49 ± 0.39	0.000
Hand grip strength	34.82 ± 9.23	35.07 ± 10.50	0.25 ± 3.97	0.01 ± 0.12	0.818
VO2 max	22.15 ± 4.73	24.96 ± 6.49	0.12 ± 0.19	2.81 ± 4.06	0.036
Systolic blood pressure	131.93 ± 16.45	124.07 ± 11.87	-0.04 ± 0.07	-5.79 ± 9.72	0.044
Diastolic blood pressure	89.67 ± 10.35	81.93 ± 9.74	-0.09 ± 0.08	-8.21 ± 8.20	0.002

Blood pressure parameters

Systolic pressure (-5.79 ±9.72) and diastolic pressure (-8.21 ±8.20) decreased after intervention ($p < 0.05$) (Table 1).

A subsample of subjects with high blood pressure was extracted from total sample to determine the effects of the intervention in this sample concretely. Systolic pressure (-8.50 ±10.84) decreased slightly ($p=0.062$), and diastolic pressure (-11.62 ±9.27) decreased after intervention ($p=0.009$) (Figure 2).

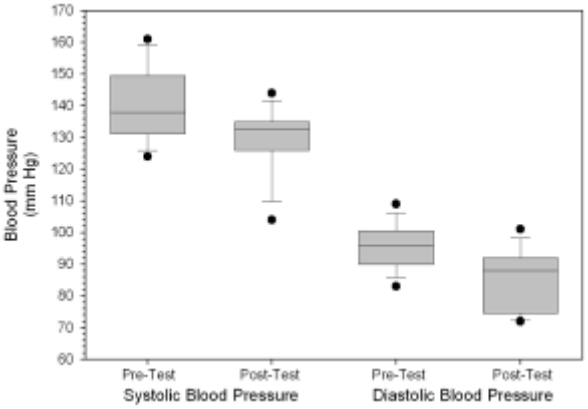

Figure 2. Intervention effects on sub-sample of subjects with high blood pressure.

DISCUSSION AND CONCLUSION

The findings of this study support the hypothesis that high intensity resistance training with a regressive intensity modulation, (R-HIRT) reduces BMI, Blood pressure, fat percentage and increases performance in tests of physical fitness, and this dose of exercise reduces Blood pressure in the sub-sample of hypertension subjects.

These results suggest that the efficacy of high intensity resistance training in the workplace to reduce weight, fat percentage, blood pressure and increase fitness performance as shown in this pilot study can lead to a larger scale study.

Our Regressive High Intensity Resistance Training protocol produced findings that are supported by some investigations, meaning that high energy expenditure dose of exercise leads to a decrease in body weight (23), body fat, triceps skinfold, waist circumference and hip circumference (22,25). None of the investigations we know of to date have tested the effects of this kind of exercise dosage. The innovation of this high intensity resistance training rests in the administration of the work load (9); starting the set at 60%RM, the subject is able to complete about 15 repetitions at one repetition per second; to complete the rest of the set, the subject must decrease the intensity until he or she is able to complete a 45 set. This regressive protocol creates a pre-exhaustion effect and the intensity of the set is very high (>9 MET). This can explain the results, but we cannot generalize our findings due to the limitation of the sample size.

The improvements in physical fitness through strength training are well documented, the increase in upper body endurance and handgrip strength in our subjects with this pre-exhaustion training are not new (3). We can explain these results by the effect of the first 15 repetitions in every set at 60% (RM), when the balance of nitrogen is bigger and the enlargement of muscle fibers is greater (5, 26).

Few studies have addressed the importance of vo2max adaptations that occur with strength training, which may make an important contribution towards improving physical fitness. Our findings suggest that this dosage of exercise increases endurance performance, supporting the findings of other studies (15, 21).

The effects of our protocol with regard to blood pressure in people with hypertension are similar to the findings of Sillanpää et al. (32) with the main difference that their study was conducted on healthy people, and the protocol included endurance training. The effect on high blood pressure of high intensity training amongst people with hypertension may lead to confusion, due to the different utilization of the concept intensity; the maximum load we have used in the study is 60% RM, but the intensity in MET's is >9, considered a high intensity work load. This intensity may cause a large increase in mitochondria, oxidative enzymes, and the number of capillaries per muscle fiber.

The prescription of the training required to achieve a specific goal (weight loss, reduction of blood pressure or increase Vo2max) has been largely instinctive, resulting from years of personal experience. The 45 set training load in

our protocol of regressive high intensity strength training corresponds to the direct observation on speed performance during the complete abduction and adduction phases (4). One repetition per second aims at the consumption of maximum ATP molecules in every set.

The workplace has been considered a valuable intervention site for a number of reasons, including the amount of time people spend at work, access to populations that may be difficult to engage in different settings, and the opportunity to utilize peer networks and employer incentives (16). For workers, an unhealthy lifestyle and being overweight not only affect risk of cardiovascular disease, but may also have major disadvantages related to work (6,13). Thus, changing body weight and physical fitness, and reducing blood pressure amongst hypertensive workers has many benefits, including work absenteeism rates (38). Our findings suggest that the high intensity intervention amongst these workers improved different aspects of health and fitness in overweight men and women, thereby potentially providing other work-related benefits. These findings are supported by other investigations in the workplace using resistance training. Zavanela et al. (38), for example, used progressive resistance training; however, the main difference is that in our study we developed a protocol based on high energy expenditure, due to the overweight nature of the subjects. Our protocol suggests that was effective when performed in the workplace; at least in our study group. The strengths of the present study include the originality of the protocol (45 repetition sets decreasing at the point of muscular failure from 60%RM at a 1 second repetition), and the supervised training period in the workplace, that allows a difficult to engage population to achieve health and fitness goals.

The limitations of the study are those characteristic of design or methodology that set parameters on the application or interpretation of results; that is, the constraints on generalizability and utility of findings that are the result of the devices of design or method that establish internal and external validity. There are two limitations related to the ability to draw descriptive or inferential conclusions from sample data. One of those is the study design a without control group, and consequently the data results should be interpreted with caution. The other limitation is the relatively small sample participating in this study.

On the other hand, this is a pilot study and the aim was to test a new research hypothesis initially among a small number of subjects. This avoids spending too many resources on finding an association between a factor and a disorder when there really is no effect. However, clear associations were found in the pilot study and it encourages the implementation of a larger confirmatory study.

Our results suggest that exercise prescription has health benefits in overweight adults. The training protocol used in this study is of high intensity and allows the participant to consume as many phosphates as possible in every set; that means sets of around 45 seconds of a very high intensity.

Workplace is a great opportunity to engage this traditionally hard to reach population. This intervention can be performed in a short period of time (approx. 20 minutes), the time invested is not a barrier and the motivation of the participants increases with the training supervised. Workplace regressive high intensity resistance training intervention is a facilitator for the fulfilment of health and fitness goals for an overweight population. Clearly, additional investigation is warranted to confirm or contradict our findings.

CONFLICT OF INTEREST DECLARATION

All the authors have substantially contributed to this work. They are all fully aware that the manuscript is to be submitted to the Journal and none of them has any conflict of interest. The experiment reported has been undertaken in compliance with the current laws of Spain, where the experiment was performed.

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BIBLIOGRAPHY

1. A clinical guideline on the identification, evaluation, and treatment of overweight and obesity in adults: executive summary. Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults. Am J Clin Nutr. 1998;68(4):899-917..
2. Barr-Anderson DJ, AuYoung M, Whitt-Glover MC, Glenn BA, Yancey AK. Integration of short bouts of physical activity into organizational routine a systematic review of the literature. Am J Prev Med. 2011;40(1):76-93.
3. Beniamini Y, Rubenstein JJ, Faigenbaum AD, Lichtenstein AH, Crim MC. High-intensity strength training of patients enrolled in an outpatient cardiac rehabilitation program. J Cardiopulm Rehabil. 1999;19(1):8-17.
4. Borresen J, Lambert MI. The quantification of training load, the training response and the effect on performance. Sports Med. 2009;39(9):779-795.
5. Brooks GA, Fahey TD, Baldwin KM. Exercise physiology : human bioenergetics and its applications. 4th ed. Boston: McGraw-Hill; 2005.
6. Buchberger B, Heymann R, Huppertz H, Frieportner K, Pomorin N, Wasem J. The effectiveness of interventions in workplace health promotion as to maintain the working capacity of health care personal. GMS Health Technol Assess. 2011;7:Doc06.
7. Carey VJ, Walters EE, Colditz GA, et al. Body fat distribution and risk of non-insulin-dependent diabetes mellitus in women. The Nurses' Health Study. Am J Epidemiol. 1997;145(7):614-619.
8. Daly RM, Dunstan DW, Owen N, Jolley D, Shaw JE, Zimmet PZ. Does high-intensity resistance training maintain bone mass during moderate weight loss in older overweight adults with type 2 diabetes? Osteoporos Int. 2005;16(12):1703-1712.
9. de Souza TP, Jr., Fleck SJ, Simao R, et al. Comparison between constant and decreasing rest intervals: influence on maximal strength and hypertrophy. J Strength Cond Res. 2010;24(7):1843-1850.
10. Flegal KM, Graubard BI, Williamson DF, Gail MH. Cause-specific excess deaths associated with underweight, overweight, and obesity. JAMA. 2007;298(17):2028-2037.
11. Geisler S, Brinkmann C, Schiffer T, Kreutz T, Bloch W, Brixius K. The influence of resistance training on patients with metabolic syndrome--significance of changes in muscle fiber size and muscle fiber distribution. J Strength Cond Res. 2011;25(9):2598-2604.
12. Gillespie LD, Gillespie WJ, Robertson MC, Lamb SE, Cumming RG, Rowe BH. WITHDRAWN: Interventions for preventing falls in elderly people. Cochrane Database Syst Rev. 2009(2):CD000340.
13. Groeneveld IF, Proper KI, van der Beek AJ, Hildebrandt VH, van Mechelen W. Lifestyle-focused interventions at the workplace to reduce the risk of cardiovascular disease--a systematic review. Scand J Work Environ Health. 2010;36(3):202-215.
14. Hanson ED, Srivatsan SR, Agrawal S, et al. Effects of strength training on physical function: influence of power, strength, and body composition. J Strength Cond Res. 2009;23(9):2627-2637.
15. Hurley BF, Seals DR, Ehsani AA, et al. Effects of high-intensity strength training on cardiovascular function. Med Sci Sports Exerc. 1984;16(5):483-488.
16. Hutchinson AD, Wilson C. Improving nutrition and physical activity in the workplace: a meta-analysis of intervention studies. Health Promot Int. 2011.
17. Irving BA, Davis CK, Brock DW, et al. Effect of exercise training intensity on abdominal visceral fat and body composition. Med Sci Sports. 2008;40(11):1863-1872.
18. Jackson AW, Lee DC, Sui X, et al. Muscular strength is inversely related to prevalence and incidence of obesity in adult men. Obesity. 2010;18(10):1988-1995.
19. Jakicic JM, Marcus BH, Gallagher KI, Napolitano M, Lang W. Effect of exercise duration and intensity on weight loss in overweight, sedentary women: a randomized trial. JAMA. 2003;290(10):1323-1330.
20. Johnson JL, Slentz CA, Houmard JA, et al. Exercise training amount and intensity effects on metabolic syndrome (from Studies of a Targeted Risk Reduction Intervention through Defined Exercise). Am J Cardiol. 2007;100(12):1759-1766.
21. Kraemer WJ, Patton JF, Gordon SE, et al. Compatibility of high-intensity strength and endurance training on hormonal and skeletal muscle adaptations. J Appl Physiol. 1995;78(3):976-989.
22. Lemmey AB, Marcora SM, Chester K, Wilson S, Casanova F, Maddison PJ. Effects of high-intensity resistance training in patients with rheumatoid arthritis: a randomized controlled trial. Arthritis Rheum. 2009;61(12):1726-1734.
23. Lemmey AB, Williams SL, Marcora SM, Jones J, Maddison PJ. Are the benefits of a high-intensity progressive resistance training program sustained in rheumatoid arthritis patients? A 3-year followup study. Arthritis Care Res. Jan 2012;64(1):71-75.
24. McArdle WD, Katch FI, Pechar GS, Jacobson L, Ruck S. Reliability and interrelationships between maximal oxygen intake, physical work capacity and step-test scores in college women. Med Sci Sports. 1972;4(4):182-186.

25. Mougios V, Kazaki M, Christoulas K, Ziogas G, Petridou A. Does the intensity of an exercise programme modulate body composition changes? Int J Sports Med. 2006;27(3):178-181.
26. Pescatello LS, Kelsey BK, Price TB, et al. The muscle strength and size response to upper arm, unilateral resistance training among adults who are overweight and obese. J Strength Cond Res. 2007;21(2):307-313.
27. Quinn TJ, Klooster JR, Kenefick RW. Two short, daily activity bouts vs. one long bout: are health and fitness improvements similar over twelve and twenty-four weeks? J Strength Cond Res. 2006;20(1):130-135.
28. Rantanen T, Masaki K, He Q, Ross GW, Willcox BJ, White L. Midlife muscle strength and human longevity up to age 100 years: a 44-year prospective study among a decedent cohort. Age. 2012;34(3):563-570.
29. Renehan AG, Tyson M, Egger M, Heller RF, Zwahlen M. Body-mass index and incidence of cancer: a systematic review and meta-analysis of prospective observational studies. Lancet. 2008;371(9612):569-578.
30. Ruiz JR, Sui X, Lobelo F, et al. Muscular strength and adiposity as predictors of adulthood cancer mortality in men. Cancer Epidemiol, Biomarkers Prev. 2009;18(5):1468-1476.
31. Ruiz JR, Sui X, Lobelo F, et al. Association between muscular strength and mortality in men: prospective cohort study. Bmj. 2008;337:a439.
32. Sillanpaa E, Hakkinen A, Punnonen K, Hakkinen K, Laaksonen DE. Effects of strength and endurance training on metabolic risk factors in healthy 40-65-year-old men. Scand J Med Sci Sports. 2009;19(6):885-895.
33. Sillanpaa E, Laaksonen DE, Hakkinen A, et al. Body composition, fitness, and metabolic health during strength and endurance training and their combination in middle-aged and older women. Eur J Appl Physiol. 2009;106(2):285-296.
34. Suk SH, Sacco RL, Boden-Albala B, et al. Abdominal obesity and risk of ischemic stroke: the Northern Manhattan Stroke Study. Stroke. 2003;34(7):1586-1592.
35. Suni JH, Oja P, Miilunpalo SI, Pasanen ME, Vuori IM, Bos K. Health-related fitness test battery for middle-aged adults: associations with physical activity patterns. Int J Sports Med. 1999;20(3):183-191.
36. Williams MA, Haskell WL, Ades PA, et al. Resistance exercise in individuals with and without cardiovascular disease: 2007 update: a scientific statement from the American Heart Association Council on Clinical Cardiology and Council on Nutrition, Physical Activity, and Metabolism. Circulation. 2007;116(5):572-584.
37. Yusuf S, Hawken S, Ounpuu S, et al. Obesity and the risk of myocardial infarction in 27,000 participants from 52 countries: a case-control study. Lancet. 2005;366(9497):1640-1649.
38. Zavanela PM, Crewther BT, Lodo L, Florindo AA, Miyabara EH, Aoki MS. Health and fitness benefits of a resistance training intervention performed in the workplace. J Strength Cond Res. 2012;26(3):811-817.

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EVALUATION OF EFFORT TOLERANCE AMONGST SUFFERERS OF BRONCHIAL ASTHMA

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Abstract

Introduction: Asthma is one of the most common diseases of the respiratory system. Its chronic nature and periodic intensification influence patients' quality of life. During the last decade, the role of physiotherapy has become more important as it is more effective in treating people who suffer from asthma as well as its complications.

Aim: The aim of the presented article is the evaluation of effort tolerance amongst patients before and after eighteen days of the application of a set of exercises.

Methods: Sixty patients in the state of remission who suffer from chronic asthma were examined. Patients were classified under model C and D. The described program was realized for six days per week and then for a further 3 weeks. The effectiveness of physiotherapy on effort tolerance was evaluated.

Submission: The data presented indicates that patients who were treated according to the program managed to walk in a six-minute test much faster than the rest of the patients.

Conclusions:

1. Results show that physiotherapy of patients who suffer from asthma treated under model B or C present observed improvement of effort tolerance.

2. Comprehensive application of model C and D proves an increased ability amongst patients to walk much faster during the six-minutes test.

Key phrases: Asthma, effort tolerance, physiotherapy

Key words: *bronchial asthma, tolerance of effort, physiotherapy*

Introduction

Asthma is one of the most common diseases of the respiratory system. It is a problem in terms of health, the economy and society. The number of people who suffer from asthma is high [1]. Oversensivity and increased reactivity of the respiratory system are the symptoms of asthma. Meiosis of bronchibial tubes, wheezing, dyspnoea, and tightness of the chest are observed [2].

Physiotherapy among these patients is a multidisciplinary action that provides an opportunity for a more active and independent way of life [3].

Physical activity has a significant influence on the quality of a patient's life and decreases the number of exacerbations of the disease [1, 2, 3, 4, 5]. It is claimed that physiotherapy improves effort tolerance and the action of lung ventilation. There is no extensive research that refers to the effects of physiotherapy after doing exercises, or of forms and methods of rehabilitation.

It has been decided to evaluate treatment of those who suffer from asthma and those who have used models of physiotherapy that differ in intensity, length and form of activities.

Aim

The process of progressive treatment of patients who do physical exercises. The aim of the article presented is evaluation of the degree of effort tolerance after and before eighteen days of treatment of asthma patients.

Sources and research methods

Sixty patients were examined (36 women and 24 men, mean age: 69 ± 4), who suffer from chronic asthma in the state of remission, treated in MSWiA Hospital in Głuchołazy, Poland. Patients were classified according to "GOLD" guidelines. Examinations were conducted by physiotherapists. Parameters refer to effort tolerance, and the action of lung ventilation. The six-minute test was used to measure effort tolerance. Patients had to walk as fast as they were able to during six minutes. The examination was carried out in a hall 60 meters long. Before and after walking, pulse and central blood pressure were taken sitting down. The research described was carried out on the first and final days of rehabilitation.

Training loads and intensiveness were determined for each patient. For this aim, the "MET" method was used. Training loads depended on the training method that was implemented (60-80 % of maximum load accepted during exercise length).

Training loads and intensiveness were estimated by the Carvema formula.

[(HR exercise capacity – resting HR)/] + resting HR (according to Cavonema)*

C model - 60 %

D model – accelerated pulse during exercise about 30 % compared to resting pulse.

There was no difference among patients' age and lung ventilation. FEV was estimated between 52 – 56 % (59 ± 7). Shortness of breath is a subjective feeling and was checked with Bogra's 10 sliding scales, its result being 2-3. 30 of 60 patients were classified according to C model but the other 30 to D model. Treating C model patients included: breathing exercises 1 per day for about 30 minutes; 6 times per week of general rehabilitation – 1 per day for about 30 minutes; 3 times a week: walking, recreational activities, inhalation, drainage and percussion. Treating D model patients included: aerobic exercises 2 times per week for about 30 minutes; 6 times a week of specific respiratory workouts, inhalation, drainage and percussion. The physiotherapy program was used six days a week, 3 weeks in accordance with the patients' model. Before and after three weeks of physiotherapy, the collected data was classified and statistically analyzed. For each parameter the mean value and standard deviation have been calculated. The degree of relevance in groups was determined with the T – student test.

The result and its discussion

Walking distance in the six-minutes test and energy consumption is presented in MET.

Determined average walking distance performed by C model patients was 460 (± 85), after physiotherapy it was 523 (± 152). A higher ratio (12%) is observed and it is statistically relevant ($p<0,001$) (Tab. 1).

It is shown that determined average distance made by D model patients was 435 (±49), after physiotherapy this was 478 (±60). Higher ratio (9%) is observed and statistically relevant ($p<0,001$) (Tab. 2).

The result of research shows that average MET value before rehabilitation in C model patients was 5 (±2) but after rehabilitation it was 7 (± 3). Higher MET's ratio in the described group is statistically relevant and it is 1 (± 1, $p<0,001$) (Tab.1).

It is declared that the average MET value in D model patients before rehabilitation was 5 (± 2), after physiotherapy it was 6 (±2). Increased MET ratio in presented group is also statistically relevant and it is 5, 5 (±1, $p<0,001$) (Tab. 2).

Tab. 1. Comparison of the results in the group of C model patients before and after rehabilitation.

Before rehabilitation [m]	After rehabilitation [m]	Before rehabilitation [MET]	After rehabilitation [MET]	Arithmetic mean
460 ± 85	523 ± 152	5 ± 2	7 ± 3	
492 ± 45		1 ± 1		Difference
12%		29%		Difference %
p<0,001		p<0,001		T

Tab. 2. Comparison of the results in the group of D model patients before and after rehabilitation.

Before rehabilitation [m]	After rehabilitation [m]	Before rehabilitation [MET]	After rehabilitation [MET]	Arithmetic mean
435 ± 49	478 ± 60	5 ± 1	6 ± 2	
457 ± 30		5,5 ± 1		Difference
9%		17%		Difference %
p<0,001		p<0,001		T

The research conducted shows that comprehensive pulmonary physiotherapy has a significant influence on effort tolerance. On the basis of examinations carried out, doing exercises that are classified according to model C or D has a positive effect on patients. The system presented system helps patients who suffer from asthma to improve the effect of the training. Physiotherapists are able to determine exercises according to the patient's level and evaluate physiotherapy [6].

Conclusion:

1. It is shown that physiotherapy conducted according to model C or D has a significant influence on improvement of effort tolerance.
2. It is stated that a comprehensive model for treatment of asthma increases the walking distance that patients are able to achieve in the six-minutes test.

BIBLIOGRAPHY

1. Kielnar R.: Rehabilitacja w chorobach płuc. Praktyczna Fizjoterapia & Rehabilitacja 2010; 7-8: 37-41.
2. Rutkowski R.: Wybrane zagadnienia rehabilitacji oddechowej. Fizjoterapia Polska 2009; 9; 1: 21-30.
3. Jurczak A.: Wpływ leczenia sanatoryjnego na jakość życia pacjentów z astmą oskrzelową. Family Medicina and Primary Care Review 2011; 13; 4: 703-707.
4. Farnik M., Trzaska-Sobczak M., Pierzchała W.: Kwalifikacja i ocena przebiegu rehabilitacji w chorobach układu oddechowego. Balneologia 2008; 2: 103-107.
5. Gajewski P.: Skurcz oskrzeli indukowany wysiłkiem fizycznym i podsumowanie wytycznych American Thoracic Sociaty 2013. Medycyna Praktyczna 2013; 11: 36-42.

6. Pawełczyk W., Bajowska J., Wójtowicz B., Bogacz K. i wsp.: Ocena zastosowania biofeedbacku oddechowego w fizjoterapii chorych na POChP. Fizjoterapia Polska 2013; 4: 12-18.
7. Chełmińska M., Warachowska L., Niedoszytko M., i wsp.: Jakość życia chorych na astmę dobrze i źle kontrolowaną. Pneumonolol Alergol Pol 2007; 75: 70-75.
8. Cohen J.: Odetchnij spokojnie. Charaktery 2014; 9: 42-45.
9. Dorosz W.: Astma. Wydawnictwo Lekarskie PZWL 2007.
10. Gaszyński W.: Intensywna terapia i wybrane zagadnienia medycyny ratunkowej. Wydawnictwo Lekarskie PZWL 2008.
11. Gr V.: Skąd ta astma?: hipoteza higienicznego podłoża choroby coraz bardziej się chwieje. Świat Nauki 2011; 5, 26-27.
12. Kwolek A.: Rehabilitacja medyczna. Elsevier Urban & Partner 2007.
13. Lewandowska K., Kuziemski K., Górska L., i wsp.: Jakość życia u chorych na astmę oskrzelową. Pol Med. Pal 2006; 5: 71-75.
14. Milanowska K.: Kinezyterapia. Wydawnictwo Lekarskie PZWL 2008.
15. Nieckuła E.: Głęboki oddech. Wprost 2007; 34: 60, 62.
16. Wrzosek Z., Bolanowski J.: Rehabilitacja. Akademia Medyczna 2008.
17. Rutkowski S., Rutkowska A., Łuniewski J., Szczegielniak J.: Analiza chodu chorych na przewlekłą obturacyjną chorobę płuc. Fizjoterapia Polska 2014; 4: 24-33.
18. Walenda I., Trzcińska S., Kiljański M., Kiebzak W.: Zastosowanie terapii sprawności oddechowej u pacjentów ze skoliozą idiopatyczna. Fizjoterapia Polska 2013; 4: 6-11.
19. Szczegielniak J., Pawełczyk W., Łuniewski J., Wdowiak A. i wsp.: Ocena wydatku energetycznego w teście 6MWT i ISWT. Fizjoterapia Polska 2013; 1: 1-5.
20. Wojciechowski K., Kiljański M., Kałuża-Pawłowska J., Szczegielniak J: Profil chorych kierowanych do leczenia w zakresie rehabilitacji ogólnoustrojowej. Fizjoterapia Polska 2015; 1: 48-56.

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QUALITY OF LIFE AMONGST CARE GIVERS FOR PATIENTS WITH PARKINSON'S DISEASE

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Abstract

Parkinson's disease (PD) is a neurodegenerative disease. Due to a constantly growing rate of incidence and the lowering age of PD patients it is becoming a more serious social problem. The aim of this study is to assess the quality of life amongst care givers for people suffering from Parkinson's disease. The work includes research on the influence of physical rehabilitation of PD patients on the quality of life of their care givers. The research covered care givers (n=50) of PD patients diagnosed with third stage PD according to the Hoehn and Yahr classification. The diagnostics survey with a questionnaire addressed to care givers looking after PD patients was used. The questionnaire was created by the authors of this paper. The survey consisted of two parts, in which the first was to obtain basic information on the present status of the care giver, while the other was to verify life satisfaction level, using Jurczynski's Scale of Life Satisfaction. Statistical analysis showed significant differences in all analyzed statements between groups. Better effects were observed in the group participating in rehabilitation. Care for people suffering from PD affects the quality of life of caregivers. Participation in the process of rehabilitation of patients with PD improves the quality of life of caregivers.

Key words: *Parkinson's disease, quality of life, caregivers, life satisfaction.*

Introduction

Recently, there have been an increasing number of studies concerning life quality, which is a multi-dimensional concept. It reflects a subjective evaluation of a person`s satisfaction and concerns in various domains of life [1, 9, 11].

This issue of life quality is becoming particularly important with the lengthening of human life expectancy. Moreover, it involves an increasing number of people reaching old age and suffering from diseases associated with it. Currently, it is estimated that nearly 600 million people aged 60 years and over live in the world, and the number is expected to double in 2025 [22]. In the aging body, many degenerative changes, including those of the nervous system take place [8, 21].

One of the most common diseases of the nervous system is Parkinson`s disease (PD). According to current data, in Poland there are approximately 80000 people suffering from Parkinson's disease, and every year about 4-8 thousand new cases are diagnosed. On a global scale it is estimated that the disease affects approx. 0.1-0.2% of the population. The disease mainly affects people over the age of 55; therefore, due to an aging population, it is becoming an increasingly important social problem [9,12].

The inevitable progress of the disease causes the patient great difficulties, challenges and fatigue, particularly as it develops into its more advanced stages. Parkinson's disease is progressive, so patients need a greater availability of care givers, assistance and psychological support [14, 16]. It happens that the help of one person is not enough and should involve all of his or her family and friends. This has a significant influence on the family, who must redefine and share their responsibilities. Another phenomenon associated with caring for

a PD patient at home is that the care giver must resign from their full time employment in order to take care of patients. Chronic stress resulting from the challenge of caring also has negative consequences in the area of mental and somatic health. Care givers are among the group of people facing developing anxiety disturbances, depression, sleep disorders, and cognitive efficiency degradation [2, 3, 17, 20].

Quality of life is an important evaluation tool concerning the actual abilities of carrying out long-term care. A high quality of life amongst care givers has a positive influence on the health condition of the patient, increases the standard of care, and reduces the risk of institutionalization of the patient. The study of quality of life and health conditions amongst health attendants aims at assessing their performance efficiency in the provision of care, identifying their needs, and finally on this basis, working out a plan and creating adequate support systems. Improving quality of life can be an important goal of treatment, providing optimal patient care in home conditions [4, 10, 11]. The aim of this study is to assess the quality of life of care attendants of people suffering from Parkinson's disease. The work includes research on the influence of physical rehabilitation of PD patients on the quality of life of their care givers.

The following questions have been raised in the work:

1. Does taking care of a person suffering from Parkinson's disease affect the quality of life of their care givers?
2. Is there any difference in terms of quality of life amongst those care givers whose patients participate in rehabilitation and amongst those who don't?
3. What is the satisfactiory level of life amongst care givers whose patients participate or do not participate in rehabilitation?

Material and methods

A diagnostics survey with questionnaire addressed to care givers looking after PD patients was used. The questionnaire was worked out by the authors of this paper and then verified with regard to accuracy and reliability on the basis of piloted research. The survey consisted of two parts, in which the first was to obtain basic information concerning the present status of the care giver while the other was supposed to verify their level of life satisfaction, using the Scale of Life Satisfaction - SWLS by Jurczynski [23].

The research covered care givers of PD patients who were members of the Silesian Society for People Suffering from PD and was approved of by Bioethics Committee at the University of Physical Education in Katowice. The examinations included 50 care givers out of whom 66% were women (33 people) and 34% men (17 people). The age distribution was as follows: 10% - under 35 years of age, 22% - 11 people between 35-54, 28% - 14 people between 55 - 64, 30% -15 people between 65-75 and 10% - 5 people over 75. 54% of givers live in towns, while 46% live in the country. 28% had university education, 36% - high school, 2%8 - vocational education and 8% - elementary school.

In order to obtain full information on care givers, degree of kinship was established and this revealed that 56% were spouses and 30% were their children, and the remaining 14% were grandchildren, neighbors and distant family.

Employment status was considered an important aspect of research and it showed that 28% were employed on a full time basis, 16 % - part time, 46% were retired and pensioners, 4%- unemployed and 6% had decided to quit their jobs to look after the patients.

Duration of the care period was also examined and it revealed that 2% had worked for less than 1 year, 14% - from 1 year up to 3, 18% - from 3 to 5 years, 36% - from 5 to 10 years and 30% - longer than 10 years.

In order to define the stage of the disease of patients, the 5 degree Hoehn-Yahra [21] scale was used where “O” means no symptoms, and “5” means total disability. All examined patients were classified as third degree, of whom there were 19 women aged 65,33+/-6,21 with a disease duration of 5,64+/-2.65 and 31 men, aged 64,23+/-4,97 with a duration of 6,10+/-5,02. As far as participation in rehabilitation exercises was concerned, 26 patients (56%) declared twice weekly participation for 60 min. and the remaining 24 people (48%) did not participate.

Analysis of results

Obtained results were statistically analyzed both for care givers of PD patients participating in rehabilitation (group A) and those not participating (group B). Basic statistical measures were taken and the Komogorow-Smirnow test was used to examine the distribution of data, and finally data obtained were compared using the Chi Square test.

The analysis showed that time devoted to care of PD patients in groups A and B differed statistically significantly (p=0.001). In group A, 54% of examined care givers declared that the time of care was less than 6 hours daily and only 2% of them declared more than 12 hours. In group B, only 22% spent less than 6 hours daily with patients, but 25% stated that they had to be with patients more than 12 hours a day.

Care givers' quality of life substantially depends on the duties they have to face when helping PD patients, and the extent to which a patient can manage themselves has a considerable influence on the well-being of relatives. Help in the simplest of activities is not required because the patient is able to cope with everyday tasks quite well. The care attendants were asked in what fields their patients needed help and the answers in both groups were similar: in cleaning, running the house and financial matters. However, a significant difference between both groups was found as group A patients more seldom required help in everyday duties (fig.1).

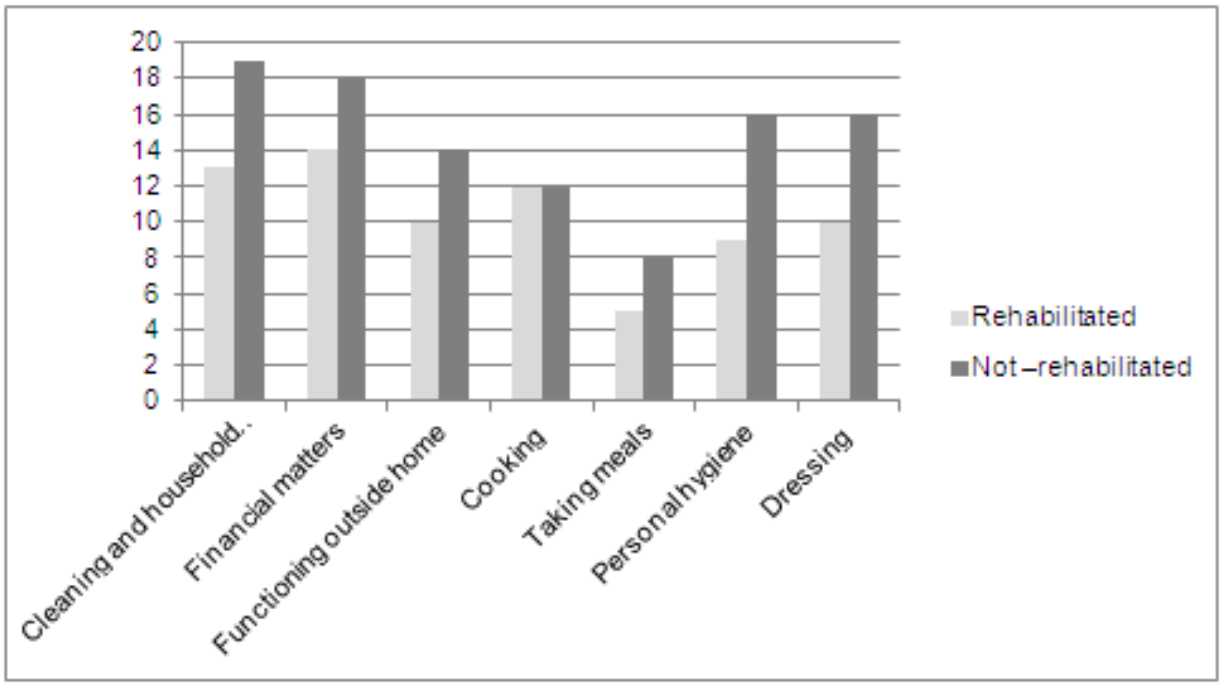

Fig.1. Forms of assistance provided to PD patients by care givers.

Next, family relations and attendant-patient relations preceding the appearance of the disease were evaluated. In group A, 19% declared a clear worsening; 31% declared slight worsening; and 50% claimed there was no change. In group B, as many as 62% of examined patients declared apparent worsening of relations; 21% noticed some worsening; and 17% declared no change.

The following question asked concerned subjective feeling of fatigue resulting from taking care of the patient. In group A, the majority (31%) declared they were never tired; seldom – 19%; sometimes – 15%; often – 27%; and always – 7%. In group B , the answers ‘‘seldom’’ and ‘‘never’’ were never given; the answer ‘‘always’’ was given by 29% and ‘‘sometimes’’- 17 %.

The other part of the survey included SWLS Scale of Life Satisfaction, worked out by E.Diener, R.A Emmons, R.J Larson and S. Griffin with the adaptation of Zygfryd Jurczynski [23]. The scale contained 5 statements, with which the participants could agree or disagree. The given digits mean: 1-totally disagree, 2 disagree, 3 rather disagree, 4-neither agree nor disagree, 5-rather agree, 6-agree, 7-fully agree. Statistical results of obtained answers is presented in Tab. 1.

Tab.1. Statistical characteristics obtained in SKWL test.

SWLS scale	Arythmetic mean		Median		SD		Variance		Kurtosis		Chi square
	A	B	A	B	A	B	A	B	A	B	p
Question I	4.68	2,7	4	3	1,18	0,82	1,39	0,68	1,1	0,58	0,002
Question II	4,56	3,13	4	3	1	0,76	1,01	0,57	0,14	0,47	0,001
Question III	5,36	3,74	6	3	1,08	1,6	1,16	2,57	0,14	-0,09	0,005
Question IV	4,72	3,52	5	4	1,1	1,12	1,21	1,26	-0,79	-0,46	0,001
Question V	4,96	2,65	5	3	1,4	1,27	1,96	1,6	-1,26	-1,23	0,007

Question I- In many aspects my life is close to ideal

Question II – My life conditions are perfect

Question III – I am satisfied with my life

Question IV – In my life I have achieved what I wanted

Question V- If I were to live again, I would hardly change anything

Statistical analysis showed significant differences in all analyzed statements between groups.

Clear differences appeared in the first statement in both groups, as in group A the most frequent answers were ‘‘disagree’’ – 46% and ‘‘rather disagree’’ – 37.5%. In group B, the most frequent answers were ‘‘neither agree, nor disagree’’ – 35%and ‘‘agree‘‘– 27%.

The second statement received the following answers in group A – ‘‘neither agree, nor disagree’’ – 38%, and ‘‘rather agree’’ – 35%. There were no answers like ’’totally disagree’’ or ‘‘disagree’’. In group B, answers ‘‘neither agree, nor disagree’’ were given by 21% and ‘‘rather disagree’’ – 58%. No answers ‘‘agree’’ or ‘‘totally agree’’ were given.

The third statement was answered ‘‘agree’’ by 50% in group A, ‘‘rather agree’’ by 23% and there were no answers ‘‘totally disagree’’ and ‘‘disagree’’. In group B, the most frequent answer was ‘‘rather disagree’’ – 37.5%, and ‘‘neither agree, nor disagree’’ –17 %, and ‘‘disagree’’ – 12.5 %

The analysis of answers to the fourth question did not show such big differences between groups as compared to previous questions. In group A, the answer ‘‘neither agree, nor disagree’’ – was given by 36%, and by 33% – in group B, the answer ‘‘rather disagree’’ – 26% – group A and 24% in group B. Despite those similarities, all differences in answers were statistically significant.

However, the biggest differences in answers between groups were found in the fifth statement as in group A there were no answers ‘‘totally disagree’’ or ‘‘disagree’’, while in group B, nobody answered ‘‘agree’’ or ‘‘totally agree’’. Further analysis showed that in the group 46% answers were ‘‘rather disagree’’ or ‘‘agree’’. It is worth noticing that 15% declared that their life is ideal and would not like to change anything. In group B, 26% answered ‘‘totally disagree’’, and ‘‘rather disagree’’ and 25% – ‘‘neither agree, nor disagree’’. There were no answers ‘‘totally agree’’.

Discussion

The studies allow evaluation of the quality of life as well as satisfaction of people with PD. It is understood that long-term care may cause deterioration of life quality. Taking the two groups

into comparison: amongst caregivers of people with PD participating (group A) and not participating in the process of rehabilitation (group B), it was found that caregivers of people not involved in exercises spend more time caring, are frequently tired, and their relationships with loved ones are significantly worsened. The majority of them declared that they are always or very often tired of care. The results of the group of caregivers of people not involved in the rehabilitation process indicate a significant decline in the quality of life and satisfaction with it. Only 25% of all respondents in this group showed a minimal level of satisfaction with life. The remaining 75% have a negative attitude towards their situation. Whereas those dealing with patients suffering from PD, who participated in rehabilitation, have more free time for their own needs, they do not feel too tired to care as opposed to those from group B. Often, their relationships do not change. In group A, amongst caregivers of people involved in rehabilitation, 81 percent declared their satisfaction with life. This data show a significant influence of rehabilitation on the lives of people taking care of the patient. Improving motor skills and self-reliance ease the burden of care.

The research of O'Reilly et al. [15] is the confirmation of results obtained in the work on the impact of care for people with PD on the life quality of caregivers. In the studies the researchers presented the effects of care for patients with PD with regard to the mental and physical conditions of the examined person. The study was conducted in 1992-1994 on a selected representation of the population of the UK and Ireland. In this study, respondents were most often spouses living with a sick person, and the care of the patient was taken mainly by women. The results showed that an increase in the length of care caused both a decline in social contacts and the reduction of free time spent on visits, trips or meetings. The work often referred to variations between young people, who had just taken care of patients with PD and those who had been caring for many years. It has been shown that young caregivers who have just started are more resistant to depression and mental disorders. It was also observed that an increase in length of care is followed by a five-fold increase in the risk of developing mental illnesses. The study did not reveal what reaction would be the most advantageous in order to improve the well-being of the caregivers.

Rivera-Navarro et all. Benito-Leon [16] who examined the caregivers of those with PD as well as those with multiple sclerosis, observed the progression of cognitive disorders, depression and tiredness in parallel with the length of the disease. According to the authors, men dealt better with caring for the sick. It was also observed that caregivers of patients with MS are not as mentally burdened as the caregivers of those with various types of dementia or Parkinson's disease. The result obtained was justified by a higher incidence of dementia amongst people with PD, which affects the emotional state of the family. According to the authors, a solid family structure is an important source of support for caregivers [6].

In 2008 McCabe et all. [11] conducted a study the purpose of which was to examine the effect of the disease on work and rest for both patient and caregiver. The study included patients with 4 types of neurological diseases. The observation was attended by 28 people with multiple sclerosis, 27 patients with motor neuron disease, 31 people with PD and 24 people with Huntington's disease. 57 patients admitted that the disease had forced them to give up their jobs, and the quality and efficiency of their work had dropped significantly. Despite resigning from their jobs, 13% of patients admitted that the new situation forced them to change their lifestyle and they perceived this change positively. On the other hand, the remaining patients presented a number of negative changes. Lack of work led to frustration, anxiety, depression and social isolation. They lost self-esteem due to lack of earnings and thus felt a great sense of guilt. This led to isolation, introversion and denial as well as reluctance to accept support. Social isolation was often caused by a lack of financial resources for social gatherings and a lack of confidence. It was observed that the majority of respondents did not continue their hobbies, became passive, reluctanct and unwilling to take visits or trips. An aversion to public speaking was also revealed.

Fifteen of the surveyed caregivers declared that they had to abandon full employment in order to take care of the sick person. Some of them were forced to close their business. A significant number of caregivers reported reducing the number of working hours for the care of the sick or had to take over the household chores previously performed by the partner. 14% of the respondents did not experience any negative feelings in relation to the disease. They claimed that their relatives were happy with earlier retirement or dismissal. However, the vast majority experienced rather negative emotions. Only a few caregivers discerned the positive aspect of a new situation. They perceived the possibility of spending more time together as a positive side aspect.

The life quality of caregivers of people with PD has been evaluated by several researchers [13, 18]. In the research presented in the literature available, the participation of people with PD in the rehabilitation process was not taken into consideration. There is a common belief about the positive effects of exercises on the delay of the rate of progression of the disease. It has been proven that physical activity of people with PD improves their physical performance and functional independence [5]. The slowdown in the rise of symptoms undoubtedly has the effect of extending patient autonomy. Maintaining motor skills of a patient suffering from PD slows down the beginning of necessary care for the sick, which undoubtedly influences the quality of life of caregivers [10, 19].

Conclusions

Based on the findings of this study, the following conclusions can be drawn:

1. Care for people suffering from PD affects the quality of life of caregivers.
2. Participation in the process of rehabilitation of patients with PD improves the quality of life of caregivers.
3. Caregivers of people with PD who are involved in the rehabilitation process are more satisfied with life in relation to caregivers of people with PD not involved in this process.

BIBLIOGRAPHY

1) Argimon J.M., Limon E., Vila J., Cabezas C.(2005). Health-related quality of life of care-givers as a predictor of nursing-home placement of patients with dementia. Alzh Dis Assoc Disord, 19: 41-44.
2) Bacher-K.(2009): Self management of chronic disease. Alzheimer's Disease. Springer; 67-70.
3) Baumgarten M.(1989): The heath of persons giving care to the demented elderly: a critical review of the literature. J Clin Epidemiol, 42:1137-1148.
4) Cash T.V., Ekouevi V.S., Kilbourn C., Lageman S.K.(2016): Pilot study of a mindfulness-based group intervention for individuals with Parkinson's disease and their caregivers, Mindfulness, 7(2): 361-371.
5) Cholewa J., Gorzkowska A., Szepelawy M., Nawrocka A., Cholewa J.(2014): Influence of functional movement rehabilitation on quality of life in people with Parkinson's disease. J Phys Ther Sci, 26(9): 1329-31.
6) Compston A., Cole B.(2002): Multiple sclerosis. Lancet; 359: 1121-1131.
7) Critchley M.(1929): Arteriosclerotic parkinsonism. Brain, 52: 23-83.
8) Hugues A.J., Daniel S.E., Lees A.J.(2001): Improved accuracy of clinical diagnosis of lewy body Parkinson"s disease. Nerology, 57: 1497-1499.
9) Jellinger K.A.(2002): Vascular parkinsonism – neuropathological findings. Acta Neurol Scand, 105: 414-415.
10) Jenkinson C., Dummett S., Kelly L., Peters M., Dawson J., Morley D., Fitzpatrick R..(2012): The development and validation of a quality of life measure for the carers of people with Parkinson's disease (the PDQ-Carer). Parkinsonism Relat Disord, 18(5): 483-7.
11) McCabe M.P., Roberts C., Firth L.(2008): Work and recreational changes among people with neurological illness and their caregivers. Disabil Rehabil, 30(8): 600-610
12) Marras C., Lang A.(2003): Changing concepts in Parkinson disease. Neurology, 70: 1996-2003
13) Morley D., Dummett S., Peters M., Kelly L., Hewitson P., Dawson J., Fitzpatrick R., Jenkinson C.(2012): Factors influencing quality of life in caregivers of people with Parkinson's disease and implications for clinical guidelines. Parkinsons Dis, 2012:190901. doi: 10.1155/2012/190901.

14) Muller T., Woitalla D.(2010): Quality of life, caregiver burden and insurance in patients with Parkinson's disease in Germany, Eur J Neurol, 17(11): 1356-1359.
15) O'reilly F, Finnan F, Allwright A. The effects of caring for a suppose with Parkinson's disease on social, psychological and physical well-being. Br J Gen Pract, 46(410): 507-12.
16) Rivera-Navarro J, Benito-Leon J, Pardo J. Burden and health-related quality of life of Spanish caregivers of persons with multiple sclerosis. Multiple sclerosis, 15(11): 1347-1355.
17) Sibon I., Tison F.(2004): Vascular parkinsonism. Curr Opin Neurol. 17(1): 49-54.
18) Thomas P., Lalloue F., Preux P.M., Hazif-Thomas C., Pariel S., Inscale R., Belmin J., Clement J.P., Thomas P., Lalloue F., Preux P.M., Hazif-Thomas C., Pariel S., Inscale R., Belmin J., Clement J.P.(2006): Dementia patients caregivers quality of life; the PIXEL study. Int J Geriatr Psychiatry, 21: 50-56.
19) Vossius C., Nilsen O.B., Larsen J.(2009): Parkinson´s disease and nursing home placement: the economic impact of the need for care. Eur J Neurol, 16(2): 194-200.
20) Wolters E.Ch., Bosboom J.L.(2007): Parkinsonism. Parkinsonism and related disorders. VU University Press; Amsterdam: 143-58.
21) Zijlmans J.C., Daniel S.E., Hughes A.J.(2004): Clinicopathological investigation of vascular parkinsonism, including clinical criteria for diagnosis. Mov Disord, 19: 630-640.
22) www.who.int (22.05.2016)
23) http://www.practest.com.pl/swls-skala-satysfakcji-z-zycia (12.01.2016)

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