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Memo_Move: Effect of a dual-task exercise program on physical fitness in people aged ≥ 65 years from the community

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ABSTRACT

The elderly experience a progressive loss of cognitive and physiological functions, including cognitive impairment and loss of functional motor skills. It is estimated that by 2050 the number of people with dementia will reach 131.5 million worldwide (World Health Organization, 2015) . In addition to cognitive and behavioural deficits, people with dementia have increased deficits in balance, gait and motor coordination, leading to an increased risk of falls. Physical activity offers several important benefits for individuals with Dementia. The aim of this study was to determine the effect of a tailored dual-task exercise program on physical fitness in people over 65 years of age in the Fundão community. There was an overall improvement in all tests from pre-test to post-test. Significant differences were found in all the physical fitness tests, 6-minute walk, bending the arms, sitting and walking 2.44 m, sitting and getting up from a chair, sitting and reaching and reaching behind the back (*p* & lt; .05). There were significant improvements in cognitive functions in the parameters Visuospatial/executive, Nomination, Attention: sequence of numbers, Attention: subtraction, Abstraction: similarities, Memory: deferred recall, Orientation, MOCA Total Score, MOCA1 Normative Score (*p* & lt; .05). Dula task exercise programs may Exercise improves cognitive and physical functions and is an important contributor to functional independence.
Key words: Mild cognitive impairment, Physical fitness, Aging.

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INTRODUCTION

Dementia is a cognitive disorder that affects more than 55 million people worldwide, with more than 60% living in low- and middle-income countries. It disrupts learning, memory, attention, executive function, language, motor perception and social cognition, affecting daily activities. Dementia is the seventh leading cause of death and one of the main causes of disability and dependency among the elderly (WHO, 2015). Physical activity offers several important benefits for individuals with dementia (Rondão, Mota, & Esteves, 2022). Regular physical activity can help control symptoms and improve overall well-being in people with dementia by improving cognitive function, mood, independence, sleep, social engagement, cardiovascular health and stress reduction. Engaging in activities that challenge the brain may also provide additional cognitive benefits.

The aim of this study was to determine the effect of a tailored dual-task exercise program on physical fitness in people over 65 years of age in the Fundão community.

MATERIAL AND METHODS

The cross-sectional study included elderly people aged ≥ 65 years. Twenty-four community residents (mean age 75.12 years) of both sexes participated in this study. All participants received a six-month individualized exercise program. Physical fitness was assessed at the beginning and at the end of the test, using the Rikli & Jones Test for cognitive functions, using the MOca test battery.

Test procedures

All the experimental procedures were approved according to the Declaration of Helsinki (UNESCO. Universal Declaration on Bioethics and Human Rights 2006) and were carried out with the approval of the Ethics Committee of the University of Beira Interior (reference code No. CE-UBI-PJ-2019-021).

Anthropometric measurement Height (cm) was measured with a stadiometer (Cabral, model 14) with a scale of 0.10 cm, and total body weight (kg) was measured to the nearest 0.1 kg on a digital scale (Tanita, type BF511). Subjects were measured wearing shorts and t-shirts (shoes and socks were removed).

The physical test was carried out using the Rikli and Jones battery (Rikli & Jones, 1999)), which involves six tests to assess aerobic endurance, muscle strength and flexibility. Cognitive function was assessed using the Montreal Cognitive Assessment (Hobson, 2015), a brief tool developed to identify intellectual deficits. The assessment measures various cognitive domains, with a maximum of 30 points, and a maximum of 26 points considered normal.

A multicomponent exercise intervention was implemented in people with cognitive deficits (PLD) to improve cognitive functions. The intervention included cognitive stimulation techniques such as word games, puzzles and computer exercises, combined with physical exercises. The equipment used included Cogweb games, brain on track, Blaze pod and a balance platform. The exercises were introduced gradually, with two sessions a week, alternating between aerobic and strength exercises. The participants underwent physical training for 24 weeks, with two sessions per week, 45-50 minutes per session, on non-consecutive days, with an intensity that varied from moderate to low.

RESULTS

There was an overall improvement in all tests from pre-test to post-test. Significant differences were found in all the physical fitness tests, 6-minute walk, bending the arms, sitting and walking 2.44 m, sitting and getting up from a chair, sitting and reaching and reaching behind the back ($p < .05$). There were significant improvements in cognitive functions in the parameters Visuospatial/executive, Nomination , Attention: sequence of numbers, Attention: subtraction, Abstraction: similarities, Memory: deferred recall, Orientation, MOCA Total Score, MOCA1 Normative Score ($p < .05$).

DISCUSSION

This study allows us to understand how the community in general over the age of 65 presents itself on a physical and cognitive level, as well as identifying those programs such as Memo_Move are very important to have in order to help prevent possible pathologies.

The training intervention program used was Dual Task, which combines physical exercise and cognitive stimulation to support people with DCL, with the aim of helping participants improve their physical and cognitive abilities.

Based on this analysis, the MEMO_MOVE intervention program is designed to be applied to people who live in the community in the first instance, or in residences for the elderly, and who then self-manage the program.

CONCLUSIONS

This trial of a personalized dual-task exercise intervention presents preliminary evidence that this intervention can improve physical fitness in the elderly, which may decrease the prevalence of falls, a very common accident in this population.

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Objective internal load in female skydiving athletes

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ABSTRACT

The study's objectives were: to know the HR (Max. Min. and AVG) in female parachuting athletes and to analyse the HR (Max. Min. and AVG) during the different moments of the jump. Three skydivers with an advanced level of experience (competition athletes) aged between 20 and 45 participated in the study. After collecting sociodemographic and BMI data, the WIMU devices were placed before the first jump of the day in order to collect HR measurements at different times. Exploratory descriptive analyses of the mean and standard deviation were used. We recorded an HR AVG during all moments of the jump of 140bpm, with moment 3, which corresponds to the moment of free fall, being recorded as the highest HR AVG with a value of 156bpm. We conclude that a parachute jump produces cardiac stress, manifested by an increasing increase in HR moments before entering the plane until the moment the parachute opens, stabilizing until the moment of landing and decreasing slightly after landing.
Keywords: Skydiving, Objective internal load, HR.

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INTRODUCTION

Based on the data obtained by Machado et al., (2021), it was found that in scientific investigations in the form of skydiving, the subjects in the sample were mainly men, with women representing only 31% in all studies. Machado et al., (2022) found that this modality causes an increase in HR in its practitioners, particularly from the moment the skydivers prepare to board the plane until the moment they free fall. This result may be derived from the organism's adaptive reaction during practice, activating the Autonomic Nervous System (Ivashchenko et al., 2016), and the link between the sympathetic and adrenal functional systems that manage the autonomic regulation of HR.

Based on the analysis of previous investigations, there are no studies that analyse the variation in HR at different moments of a jump in female parachutists. Based on this assumption, 2 specific objectives are formulated: i) to know the HR (Max. Min. and AVG) in female skydiving athletes; ii) analyse the HR (Max. Min. and AVG) during the different moments of the jump.

MATERIAL AND METHODS

Participants

The study included 3 female parachutists of Portuguese nationality, aged between 20 and 45 years old with an advanced level of experience (all athletes have already performed more than 200 jumps), holding "*C*" qualification federative licenses, with an average number of jumps of 467.

Instruments

The following instruments were used: WIMU PROTM which contains four 3D accelerometers, as well as other sensors (three 3D gyroscopes with 8000º/s and full-scale output range, a 3D magnetometer, a 10 Hz GPS, a 20 Hz UWB.), body mass monitor (TANITA model BC418-MA, Tokyo, Japan) and a sociodemographic questionnaire.

Procedure

Initially, the parachutists filled out the sociodemographic questionnaire and underwent a body assessment. Finally, the WIMU PROTM devices and heart rate monitor bands were placed.

Data analysis

Basic methods of exploratory and descriptive analysis were used. Data were processed using the statistical program SPSS v 25.0 (IBM Corp. 2017. IBM SPSS Statistics for Windows, version 25.0. Armonk, New York: IBM Corp.).

RESULTS

Observing Table 1, it can be seen that the HR AVG was 140bpm for all moments of the jump. The data shows that at moment 0, which corresponds to the 15 minutes prior to the plane's entry, the paratroopers' HR AVG registered a value of 113 bpm. There is an increase in HR AVG from moment 0 to moment 3, with the highest value being recorded at 156bpm, decreasing to 148bpm, after the two minutes following landing.

Table 1. HR of the entire sample and at different moments of the jump.

Total	**Moments**													
	Sample		0		1		2		3		4		5	
FC	*M*	*DP*	*M*	*DP*	*M*	*DP*	*M*	*DP*	*M*	*DP*	*M*	*DP*	*M*	*DP*
Max	151	6.45	120	8.60	142	8.00	155	6.62	162	6.59	163	8.18	163	8.60
Min	131	6.34	108	7.53	123	7.82	130	7.54	149	8.07	144	8.65	136	7.29
AVG	140	6.21	113	7.76	133	7.94	138	6.97	**156**	7.48	153	8.24	148	7.40

Note. Moment 0- fifteen minutes before boarding the plane; Moment 1- plane take-off phase; Moment 2- two minutes before the parachutists exit the plane; Moment 3- free fall; Moment 4- two minutes after the parachute opens; Moment 5- Two minutes after contact with the ground.

DISCUSSION

The results suggest that the sport of parachuting generates an increase in HR in its practitioners, particularly from the moment before entering the aircraft until the moment of free fall. This evidence by González-Moro, et al. (2020) also recorded the most significant increase between the moment before leaving the plane and the moment of free fall, that is, between moments 2 and 3, recording an increase of 18 bpm in a period of less than 1 minute.

More significant differences were recorded when comparing with the study by Cavalade et al., (2015), who before the jump obtained HR AVG values of 93bpm, during the jump of 121bpm and after the jump of 97bpm, differences that could be explained by the great experience in the sport with an average of 1300 jumps by the parachutists who make up the sample and they are all male.

CONCLUSIONS

Significant increase in FC AVG from the moment the plane enters until the moment of free fall, stabilizing immediately after the opening of the parachute and a slight reduction after the next 2 minutes after landing. A high HR AVG value was recorded in the 15 minutes prior to entering the aircraft when the parachutists were at rest. These results lead to the conclusion that, even though this modality is characterized by a low level of physical activity, it generates high inputs of sympathetic activity, inducing an increase in HR. It is important to study the possible reasons (speed, decision making, uncertainty in opening the parachute, ...) that trigger high HR values, particularly during free fall.

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Inclusion in physical education: Teacher profile

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ABSTRACT

The subject of Physical Education (PE), due to its characteristics, dynamics and values, can be a powerful support for inclusion. Thus, the challenge for the teacher is to demonstrate the ability to incorporate different resources, strategies and methodologies into their pedagogical practices that respond to diversity. However, little is known about the particularities and specificities that should characterize the PE teacher who aims for inclusion. The present study aimed to identify and understand what training, values, practices and representations are likely to be associated with the profile of the inclusive PE teacher. Mixed research design was used, combining qualitative and quantitative methodologies. 3 university teachers participated in this study, to whom semi-structured interviews were administered, 151 PE teachers who responded to a questionnaire and 7 PE teachers specializing in inclusion to whom a semi-structured interview was administered. Analysis of the results allowed us to identify the following: 1) there are deficits in training for inclusion; 2) the profile of the inclusive teacher is characterized by valuing the dimensions of human values, inclusive mentality and being ethical; 3) the ethical dimension is an important catalyst for inclusion. In conclusion, it is inferred that the success of inclusion in PE closely depends on the teacher's operational intentionality and modelling action in mitigating barriers.

Keywords: Teacher training, Physical education, Inclusive education, Inclusive ethics, Inclusive teacher profile.

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INTRODUCTION

Fulfilling the aspiration of a society that seeks to be increasingly fair and egalitarian requires from the school, as a social element, assertive responses from all its stakeholders. Due to its unique characteristics and values, the discipline of physical education (PE) is a powerful tool for achieving this goal. However, the sparse research carried out in this context has identified a set of constraints, difficulties and limitations felt by these teachers in developing inclusive processes in their classes. On the other hand, it is noted that the investigations carried out only analyse in isolation the implicative variables, implicit determinants, or related dimensions that underlie the problem. Consequently, in inclusive PE, lines of research associated with multidimensional teacher training and their training to intervene in inclusive contexts are left unexplored. In view of the above, the objective of this study was to identify and understand which training, values, practices and representations are likely to be associated with the profile of the inclusive PE teacher.

MATERIAL AND METHODS

Considering the nature of the research and its objective, we intend for our study to be closer to a research design with mixed characteristics of a parallel type (Shorten & Smith, 2017). That is, being able to combine, in the same time and space, two types of approaches, one of a quantitative nature, with a descriptive approach and another of a more qualitative nature.

Participants

This study included: 3 university professors, with an average age of 53 ± 13.49 years and 20 ± 19 years of teaching service in higher education; 7 licensed PE teachers, with an average age of 49 ± 4.7 years, with 24 ± 6.29 years of service in total and 13 ± 5.1 years of service as inclusion specialists in PE. These were selected because they are: i) permanent teachers at Portuguese public schools; ii) PE graduates; and iii) master's degrees in adapted physical activity (or similar) or in special education. Finally, 145 PE teachers from different regions of the country, belonging to teaching groups 260 and 620, with 23.6 ± 8.1 years of teaching service, 96.5% of whom had already taught students with Specific Health Needs.

Measures

Interview guides were prepared and applied to university teachers and PE teachers specializing in inclusion. Their preparation was supported by a literature review related to the topic and following the study's objectives. Concerning the questionnaire applied to the 151 PE teachers, its preparation was based on the reference literature in this field of study, the research objectives and following the methodological procedures for preparing questionnaires, proposed by Glhiglione and Matalon (2001).

Procedures

After prior contact with the teachers, who were presented with the study's objectives and asked to sign the informed consent statement, we carried out the interviews and audio recorded them for later transcription. The interviews were recorded and transcribed, and after validating the content of their statements, the participants became the corpus of analysis for this study, which was subjected to the content analysis technique (Bardin, 2008). After obtaining the link to access the questionnaire, requests for collaboration were emailed to the Associations of Physical Education Teachers (APEF) presidents in various regions and districts of Portugal, asking their PE teachers to share it. The response to the questionnaire was free and informed.

Analysis

To analyse and process the information collected from the interviews, the content analysis technique was used, with the categorical system being constructed a priori and a posteriori (Bardin, 2008; Ghliglione & Matalon, 2001). Regarding the analysis of questionnaire data, two distinct but complementary approaches were followed: i) quantitative – statistical analysis; ii) qualitative – content analysis of responses to open questions.

RESULTS

In aggregate, the most significant results obtained with this group of teachers allow us to identify the recognition of deficits in training for inclusion, the defence of the human dimension, as a unique, distinctive characteristic of the profile of the inclusive PE teacher and valuing the ethical dimension as a catalyst for inclusion.

DISCUSSION

It is identified that training deficits in the context of special educational needs constitute an important barrier to the assertive development of inclusive processes in PE. This fact aligns with research carried out in this context (Pocock & Miyahara, 2018). It is also important to highlight the importance that teachers give to the practical dimension in context as an essential requirement in the comprehensive training of PE teachers (Rekaa et al., 2019). From another perspective, it is identified that the profile of the inclusive PE teacher is characterized by a strong connotation of human values. This representation is based on the fact that the teaching profession is inherently a profession of human interaction, in which the ethical dimension is present (Castilho, 2018) and emerges as an important modeller for educational success and inclusion. In effect, it is inferred that the ethical dimension arises with the need for the teacher to use interrogation and reflection in their educational practice, seeking, in this way, professional and personal virtue.

CONCLUSIONS

In short, the inclusive PE teacher must distinguish themselves by their intentionality in thinking, being and acting, resulting from the confluence of the integrated development of different areas of activity. Therefore, it seems essential for the teacher to look at the inclusive act from a bio-psycho-socio-axiological perspective. That is, the profile of the inclusive PE teacher must have reinforced not only the scientific, pedagogical and didactic knowledge underlying PE but also strengthened a set of humans, ethical and deontological values that must characterize your intention of wanting to make inclusion happen in your context of action. Conclusively, we recognize with this study that inclusion in PE is a multifactorial process, however, its success is closely dependent on the teacher's operational intentionality, as well as his modelling action in mitigating barriers.

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Despite everything... competing is important

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ABSTRACT

Competition is one of the most used words in the history of life on earth (and mankind), both in a positive and negative sense. Through competition, the mythological and utopian universe was formed; species, it seems, evolved; the economy/productivity, the media, ideological and political theories and practices emerged; the axiological sense clarified and diversified; culture/cultures emerged, these extraordinary creations of humanity in "*confrontation/complement*" with nature. Through competition, games/physical education/sports were structured. Although there are pedagogical positions for and against competition in play/physical education/sport, in this reflection we are going to praise competition. In spite of everything... competing is important. The main aim of this reflection, in the form of a short essay, will be to help raise awareness of the importance of competition in games, physical education and sport. The methodology used is based on theoretical/hermeneutic reflection on the praxis of competition and the possibilities it can contain for the Game, Physical Education and Sport to be humanly rewarding. It is a reflexive, qualitative methodology that departs from the canons of scientific/empirical/quantitative research methodology. We believe that play, physical education and sport absorb and reflect individual, community, social, political, economic, ideological and cultural issues in an effervescent (animal/human) way. Competition enshrines the "*game*" - be it a social, organizational, business, pedagogical or sporting game.

Keywords: Game, Physical education, Sport, Competition, Nature, Evolution.

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INTRODUCTION

Competition, like other biotic dimensions (predation, parasitism, cooperation, mutualism, commensalism), is one of the structuring dimensions of human life and nature. Serres (2004, 2019) states that man has reached where he is thanks to training, technique, repetition, cooperation and competition. Through competition and (cooperation) the educational ideology was established: from the Greek Paideia/Aretê, the Latin Instructio, the German Bildung - metaphor for the journey, the New School to the Modern School and with it technique and technology, multiculturalism, integration and equality. Competition is an existential desideratum. It is a marker, a foundation, an inscription that structures the perpetuation of the life of nature and the life of men/women. Therefore, the main aim of this reflection, in the form of a short essay, will be to help raise awareness of the importance of competition in games, physical education and sport.

MATERIAL, METHODS AND PROCEDURES

The methodology used is based on theoretical/hermeneutic reflection (Weller, 2007) on the praxis of competition and the possibilities it may contain for the Game, Physical Education and Sport to be humanly rewarding. It is a reflective, qualitative methodology that departs from the canons of a scientific/empirical/quantitative research methodology. On the contrary, in addition to the reflections of the authors of the text, it calls on other authors - from philosophy, sociology, anthropology, education and sport - in an attempt to support the text and the main objective.

RESULTS

Defining competition - its vocabulary

Consulting the Portuguese dictionary, we find that competition refers to: "*act or effect of competing; dispute between two or more persons or groups for the same objective; contest with possible prize; (ecology) interaction of individuals of the same or different species (human, animal or plant) who dispute something; struggle, conflict; opposition; simultaneous claim to the same power, the same dignity or title etc.; (economics) struggle or rivalry for the conquest of markets; (sports) competition that puts two or more persons or groups in competition with regard to certain aptitudes or physical or athletic qualities*" (Competição, 2005, p. 400).

Competition - between the human and the inhuman

The competition dimension is not without its contradictions and paradoxes of representation and language. The essence of competition is the dispute, the individual and collective "*struggle*" where winning and losing are at stake and where the pursuit of victory and the avoidance of defeat are the maxims of the game, when played within the stipulated and so-called civilized rules and behaviours (sportsmanship; fair play) - human maximization - real, instrumental, symbolic. There is, however, another side - the side of false competition, where (in the case of sport) violence, doping, corruption, cheating, often end up coming into play. The essence of competition is lost; the essence of something rational and civilizing gives way to a return to savagery.

Competition - the real and the symbolic

From a symbolic, anthropological and sociological point of view, competition represents a return to the world of conflict, expectation and tension (simulating war); but at the same time to the world of conviviality, cordiality, courtesy and empathy - becoming a person. Competition thus appears as a real manifestation - a lived experience and a symbolic experience. This sense will illustrate competition as a practice and result in

the field of sport, where the body and movement express themselves in the most varied ways - individually and collectively. It is in this individually and collectively lived experience that we can see the social dimensions in the most diverse areas - whether of production, efficiency, performance, or in the relational, ethical (axiological) and aesthetic sense - an illustration and preparation for real life.

DISCUSSION

Recovering some of the substance of the topics/items developed earlier, we can see that the real and the symbolic, the positive and the negative, the rational and the paradoxical explain the idea of competition/fighting. We can see games, physical education and sport as times and spaces for this struggle. Sport manifests itself as a moderate struggle, a moment of discord and envy between intrinsically human and animal values, which we can call positive competition; but it can also turn into an extreme, inhuman, unethical struggle - negative competition. In this context, Damatta (1994) considers that competition plays a highly modernizing/civilizing role due to the equal opportunities it would provide. By referring to sport (organized in rules - internal/external) as a field based on merit (talent, competence, virtue, value, ability) where the idea of winning and winning is sustained in alternation. This also raises the idea of democratization and social justice, defeating the idea of relationships that support personal, group and corporate favouritism. Thinking in this way, competition is a way of becoming a person and is therefore a modernizing and civilizing manifestation (De Chardin, 2012; Vaz, 1991, a, b).

CONCLUSIONS

We can say that play, physical education and sport absorb and reflect individual, community, social, political, economic, ideological and cultural issues in an effervescent (animal/human) way. Competition enshrines the "game" - be it a social, organizational, entrepreneurial, pedagogical or sporting game. One of the central cores of competition, as we have seen, is the idea of winning/losing based on a dialectic: me/us and other/you. The idea of victory/winning and defeat/loss is associated with other variables, such as affirmation, overcoming, catharsis, asceticism, work, effort, resilience, etc. This brings with it an educational and pedagogical dimension (teacher/coach) to take into consideration: there is only true competition when there is a balance between individuals and teams, so that the possibilities of success and defeat are present - this alternation. When this doesn't happen, all the talk of "*sportsmanship*", "*fair play*", can be called into question, just as the slogans of sport and the call for moderation can be called into question: winning and losing is sport; the important thing is to take part; it doesn't matter if you win, the important thing is to compete, etc.; and that can ultimately become violent language.

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The return to physical activity, leisure and sports in nature: The necessary (re)encounter

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ABSTRACT

Nature is now beginning to be seen not as an object to be exploited, but as a "*subject of rights*" who must be respected, welcomed and protected. Physical, leisure and sporting activity in nature is yet another link between man and nature. A link that benefits both. For nature, through care, protection and interaction; for man/woman (children, the elderly) through the quality of life it provides - particularly in terms of mental, emotional and relational quality of life. The methodology used is based on theoretical/hermeneutic reflection on nature and the possibilities it can contain so that Physical Activity, Leisure and Sport are humanly rewarding. It is a reflective, qualitative methodology. The main aim of this reflection, in the form of a short essay, was to help raise awareness of the importance of nature - and the possibilities it contains for physical, leisure and sporting activity. We believe that physical, leisure and sporting activity in nature is certainly an activity that suits men and women (children, young people, adults and the elderly). It's good for their mental, physical, emotional and relational health; it's good for protecting and respecting nature itself and, above all, it's good for giving nature/humanity a future. These conveniences need to be (are beginning to be) on the political, educational, sporting and social agendas.

Keywords: Man/woman, Nature, Care, Relationship, Quality of life, Physical activity.

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INTRODUCTION

Nature. Primitive man called it Mother Nature, Bulfinch (2006); the Greeks called it Gaia, Aristotle (1990); Spinoza (2009) gave it divine status - God Nature; Pope Francis (2022) calls it the Common Home. Other representations will look at it as the "*first home*" par excellence. There, we find the meaning of life, the material and spiritual dimension, the totality that humanizes us, the metaphorical, symbolic, immanent, transcendent revelation. Becoming aware of this dimension (nature) inevitably leads to the need to protect, respect and interact with it. In this context, physical, leisure and sporting activities in nature have received a great deal of attention because they have shown themselves to be a stage, a locus where we can turn to maintain and recover these (and other) existential meanings, such as: our physical and mental health; our need to live together (conviviality, participation, citizenship, politics); our "*need*" for play - to play, to compete, to cooperate. Thus, the central aim of this reflection, in the form of a short essay, was to help raise awareness of the importance of nature - and the possibilities for physical activity, leisure and sport - that it contains. To this end, in addition to our own personal reflections, we have drawn on a number of authors - from philosophy, sociology, anthropology and education - who have tried to support the text and this objective.

MATERIAL, METHODS AND PROCEDURES

The methodology used is based on theoretical/hermeneutic reflection (Weller, 2007) on nature and the possibilities it may contain for making physical activity, leisure and sport humanly rewarding. It is a reflexive, qualitative methodology that departs from the canons of scientific/empirical/quantitative research methodology.

RESULTS

A look at nature

What is nature? Nature as: original, ready-made, closed, open, real/natural, real/artificial, objective, open, subjective, intersubjective, constructed, being, totality, universe, cosmos, supernatural, material, mental, spiritual, emotional, immanent, transcendent, artificial (technique, technology), knowledge. These are, among others, some of the representations we find, for example, in Aristotle (1990); Nietzsche (2004); Spinoza (2009); Bulfinch (2006); Marx (2008); Costa (2002); Padilla (2015); Darwin (2004) and Esposito (2010). The most traditional and common representation is to look at nature as something that is outside of us - the sky, the sun, the rain, the plants, the animals, etc. But nature is also something that belongs to us, to what is inside us, immanent to us and transcendent of us. Physical, leisure and sporting activity in nature - often unconsciously - synthesizes all these dimensions and with it, well-being and balance are present. That's why there's an urgent political, educational, research and social need to stimulate and create the conditions for this to happen.

The relationship with nature

Our relationship with nature is ambiguous. We either feel we own it or we feel part of it. Either we use it for our own needs or we consider ourselves part of a harmony that surrounds and transcends us. Jonas (2012), drawing inspiration from the Greeks, says that the main cause of our decadence is that we have abandoned our natural life, that we have distanced ourselves from and destroyed (through greed, profit, power, selfishness, extreme competition) nature. Nature, its protection and the necessary positive interaction (return to the original) thus appear as an ethical dimension - which helps us to become human.

Returning to the whole/nature - a necessary reunion

We like the idea of nature (in its natural and anthropological sense) as a Whole. The Whole is everything that exists, regardless of whether we call it God, Nature or Being. However, knowing the whole (the result of our incompleteness) is an impossible process. And so, we endow everything we can't understand with mystery. This is how the various forms of knowledge were born: doxa, religion, art, literature and science. All of them have tried and are trying to go further, to bring new knowledge - this continuity of existence: jumping from knowledge to knowledge. Now, physical, leisure and sporting activity in nature is also a form of knowledge, a way of broadening the ontological horizons of the human being.

DISCUSSION

Physical, leisure and sporting activity as an expression of the human cannot forget that nature is the mother who allowed these expressions of the body and movement to become established. Let's not forget that *homo-ludens* (the first man) appeared at the same time as *homo-naturalis* (man-nature). It was during this original time that man began to humanize himself. In this way, to appeal to the nature of something, of anything, is to try to reach its most genuine meaning, with its original truth. An original truth that would define the human in its pure state - the urgent need to return there.

CONCLUSIONS

Physical, leisure and sporting activity in nature is certainly an activity that suits men and women (children, young people, adults and the elderly). It's convenient for their state of mental, physical, emotional and relational health; it's convenient for protecting and respecting nature itself and, above all, it's convenient for giving nature/humanity a future. These conveniences need to be (are beginning to be) on the political, educational, sporting and social agendas.

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The body/movement object and instrumental reason: Implications for physical education/sport

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ABSTRACT

The body has always been the object of representation and analysis, particularly in Physical Education and Sport. When we look at the history of the body, we see that there are three major representations: i) the negative body - the body seen as a receptacle for the soul, as something fragile, manipulable, an instrument, an object, a machine - "*the object body*". This representation lasted until modern times; ii) the positive body - the body seen with respect, as something to be treated/care for, protected, with the same dignity as thought and soul - "*the subject body*"; iii) the body as language/text - the body as a form of communication, dialogue, argument, emotion, feelings - diversity and plurality of bodies - the bodies of today/post-modern bodies. Our reflection focused on the representation of the body/movement object (machine) that exists and subsists today in many areas of human activity (almost all of them) and also in Physical Education and Sport. Thus, the main objective of this study was to reflect on/contribute to the awareness that the paradigm of the object body/machine body (fuelled by instrumental reason), despite being predominant in schools and clubs, should not be the only and exclusive one. The methodology used is based on theoretical/hermeneutic reflection on the body and movement object and instrumental reason. We believe that it is essential for Physical Education and Sport with children and young people to teach how to live and feel natural, phenomenological, hermeneutic and existential corporeality. To this end, we need to look at "*other forms*" of curriculum orientation and construction.

Keywords: Body, Movement, Physical education, Sport, Object, Instrumental reason.

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INTRODUCTION

When we look at the Physical Education and Sport curricula, perhaps we can say that, in the experiences contained in the theoretical-didactic-pedagogical-methodological relationship between the body of the teacher, who teaches, and the body of the student, who learns, there is clearly/predominantly a praxis, where the "*object/movement body*" is present. A body/movement based on the paradigm of technical, objective/scientific, measurable rationality. A body/movement with its stages, models, sequences and causal explanations. However, this path/paradigm can be detrimental - an obstacle - to the creative, innovative, critical, liberated sense of the body and movement as a human manifestation. Therefore, the main aim of this reflection was to help raise awareness that the paradigm of the object body/machine body (fuelled by instrumental reason), despite being predominant in schools and clubs, should not be the only and exclusive paradigm. The "*body/movement-subject*" is the first expression of the individual. This is where children's creative and transformative power lies and, in this sense, it should be the first to be stimulated.

MATERIAL AND METHODS

The methodology used is based on theoretical/hermeneutic reflection (Weller, 2007) on the body and the movement object and instrumental reason. It is a reflexive, qualitative methodology that departs from the canons of a scientific/empirical/quantitative research methodology. On the contrary, in addition to the reflections of the authors of the text, it calls on other authors - from philosophy, sociology, anthropology, education, sport - in an attempt to support the text and the main objective.

RESULTS

Looking at the history of the "object body" (negative view)

Since Ancient Greece (Lesky, 1995; Abbagnano, 2007), the body has been represented in a negative light (in Western culture), reinforced later in the Middle Ages as a mere receptacle for the soul and even in modern times with Descartes (2001), when he praised reason. The soul shapes the body and the body is assumed to be a receptacle, a tomb, a prison, a worthless object, criticized for its sensitive and instrumental reality, fragile and ephemeral (Plato, 2001). It is the body without value, or with little value in itself - "*the object body*". Thus, in Ancient Greece, this representation is found, for example, in the Orphic theory and in the theory of reminiscence, as presented in Plato's (1970). Plato says (Fédon 66ª, p.33): "*In order to have a pure knowledge of something, we have to get rid of the body and contemplate things for themselves with the soul for itself*". These views also emerge in other Classical Greek thinkers, such as Aristotle (despite his sensitive empiricism), Epicurus, Socrates, Plotinus, Stoics. In this period, only the valorisation of the body in Sparta and Rome (the warrior body) stands out, highlighting its instrumental function. In the Middle Ages, St. Augustine, St. Thomas Aquinas, St. Bonaventure and St. John Scotus emphasized reason and faith in explaining the existence of God. In this context, the body is constituted as an instrument of the soul - the soul as the body's form or reason for being. We thus have a time and a space (a long one) in which the body was considered "*negative*", followed by another time and space in which it was valued. However, it will not escape other forms of devaluation either, namely the body of work and all the deformations and illnesses it suffers.

The object body likes the instrumental reason

This concept of instrumental reason was conceived by the Frankfurt School (critical theory) in particular by two authors, Horkheimer & Adorno (2000). The authors went on to criticize modern reason - scientific reason (profoundly instrumental), pointing out that it is used to achieve a certain goal. Its main objective is to control nature and man himself (human beings). For them, instrumental reason feeds power and control and was

responsible for the emergence of totalitarian/fascist regimes (Germany, Italy). In fact, the body and movement in Physical Education and Sport (curriculum, school but also in the club) are today very much centred on the scientific language of technical and prescriptive rationality (coming from outside) which ends up having very well-defined objectives, where efficiency, yield, performance, are present and where the body subject of individual creation and potential is neglected.

DISCUSSION

From the above, the body/movement object seems to inscribe the idea of "*moving*", which translates the meaning of "*outside in*". We are thus faced with scientific, positive, technical, prescriptive knowledge - told from the teacher to the student and realised in clock time (Chronos). The body/movement, at this level, is something thingified, restricted to anatomical-physiological standards - fragmentation of body awareness. In this representation and its praxis, the body/movement provides some ideas, e.g.: "*body-mind dualism*", "*conceptual body*", "*body-machine*", "*controllable*", "*predictable*", "*stereotyped*", "*object*". All of this is far removed from the structuring principle of being-in-the-world, the condition of the first and perpetual human existence (Serres, 2019). With this, we are not denying the view of positive science, which is also important in the formative and educational act. However, it shouldn't be the only one. Science can do something, but it can't do everything. In fact, the object body/machine body (fuelled by instrumental reason) could perhaps serve high-performance physical activity, but not a path to be implemented in school education - as seems to be the case.

CONCLUSIONS

The idea of the object/machine/instrumental reason body in Physical Education and Sport is, in our view, very reductive. It seems essential that Physical Education and Sport with children and young people teaches them to live and feel natural, phenomenological, hermeneutic and existential corporeality. To this end, there is a need to look at "*other ways*" of orienting and building curricula, so that instinctive, rudimentary, fundamental, specialised experiences (movements); so that motor skills, coordinative and conditional abilities, games and games have new praxis. A need and an urgency that children themselves - their nature - seem to demand. A need that calls for the body and movement, a subject that enjoys communicative reason.

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The body/movement subject and communicative reason: Implications for physical education/sport

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ABSTRACT

The body has always been the object of representation and analysis, particularly in Physical Education and Sport. When we look at the history of the body, we see that there are three major representations: i) the negative body - the body seen as a receptacle for the soul, as something fragile, manipulable, an instrument, an object, a machine - "*the object body*". This representation lasted until modern times; ii) the positive body - the body seen with respect, as something to be treated/care for, protected, with the same dignity as thought and soul - "*the subject body*"; iii) the body as language/text - the body as a form of communication, dialogue, argument, emotion, feelings - diversity and plurality of bodies - the bodies of today/postmodern bodies. Our reflection will centre on praising the representation of the positive body - the body looked upon with respect, as something to be cared for, to be protected, with the same dignity as thought and soul - the subject body. This subject body is "*nourished*" by a type of language/reason that we will call communicative reason and, consequently, has particular implications for the educational, pedagogical and didactic act. Thus, the central objective of this reflection was to contribute to the realisation that the "*body-subject*" is an ideal path for the total and global/integral expression of the student. The methodology used is based on theoretical/hermeneutic reflection on the body and subject movement and communicative reason. We believe that it is essential for Physical Education and Sport with children and young people to teach them how to live and feel natural, phenomenological, hermeneutic and existential corporeality.
Keywords: Body, Movement, Physical education, Sport, Subject, Communicative reason.

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INTRODUCTION

When we look at Physical Education and Sport curricula, we can perhaps say that, in the experiences contained in the theoretical-didactic-pedagogical-methodological relationship between the body of the teacher, who teaches, and the body of the student, who learns, there is clearly/predominantly a praxis, where the "*object/movement body*" is present. A body/movement based on the paradigm of technical, objective/scientific, measurable rationality. In this reflection we intend to eulogise another body/movement: the subject body/movement - its intrinsic powers. The human being as a "*being-in-the-world*", where an understanding of the body and movement dwells in its multiplicity of experiences, interpretations, meanings and senses. The body is our means of communication - with ourselves, with others and with the world. Thus, the central aim of this reflection, in the form of a short essay, was to contribute to the realisation that the "*body-subject*" is an ideal path for the total and global/integral expression of the person (student), drawing on their ontology, phenomenology and hermeneutics - where the structuring "*cement*" of motor activity is to be found. It is, therefore, a body that precedes the object-body that performance so favours.

MATERIAL, METHODS AND PROCEDURES

The methodology used is based on theoretical/hermeneutic reflection (Weller, 2007) on the body and subject movement and communicative reason. It is a reflexive, qualitative methodology that departs from the canons of a scientific/empirical/quantitative research methodology. On the contrary, in addition to the reflections of the authors of the text, it calls on other authors - from philosophy, sociology, anthropology, education, sport - in an attempt to support the text and the main objective.

RESULTS

Looking at the history of the "subject body" (positive view)

The positive (evaluative) representation of the body (Lesky, 1995; Abbagnano, 2007) was inaugurated with modern/Enlightenment thinking (17th century, which did not forget the seeds that came from before, namely the Renaissance). This cultural, social, educational and scientific movement (Natural Sciences and Human Sciences) (re)placed reason as the guiding compass: "*praise for reason*", "*reason leads to liberation*", the "*fire of reason*", "*liberation from dogma and prejudice... these iron laws*!", "*fiat lux/let there be light*" - expressions that were structured as Enlightenment maxims. This "*new reason*", beyond its more "*classical*" dimension - mind, thought, reflection, enlightenment, autonomy - will summon the body to this task (Espinosa, 2009). Thus, with modernity, the body is taken centre stage, which hasn't prevented other forms of denial, control and exploitation from emerging and which are still a reality; or even new realities that are paradoxical - sometimes liberating, sometimes imprisoning - as is the case with new technologies.

The subject body enjoys communicative reason

This idea of communicative reason appears in Habermas (2001) and in Arendt (2001) with the idea of active life and contemplative life. Habermas - the second generation of the Frankfurt School - will inherit the critique of modern (instrumental) rationality but, will defend the action of reason in other ways - communicative reason. For him, this idea of communicative reason has the power to actively intervene, through dialogue, argument (good arguments - moral and ethical), respect for the other's position. Here there is no hierarchy, no power, no fear, no vanity, no instrument, no exploitation. It is through communicative reason that freedom is perpetuated, being a good - one of the greatest human goods. In fact, the body and movement in Physical Education and Sport (curriculum, school, but also in the club), despite today being very much centred on scientific language - very well-defined objectives, where efficiency, yield, performance, are present - should

not/cannot forget the communicational dimension, between student-student; teacher-student; teacher-student-curriculum; coach-athlete.

DISCUSSION

From the above, the subject's body/movement seems to inscribe the idea of "*if-movement*" - a term coined by Kunz (2015) referring to the idea that the child/young person has a body and a movement in potency that needs to appear - from potency to act. It is an appearing, if you like, from the "*inside out*", specifically the possibility of the child understanding themselves, the Other and the world, through intentional, relational and dialogical events before any rationalisation. Events that grant authenticity and are realised in times and spaces where opportunity (the time of opportunity - Kairós) is present. Free play is a paradigmatic example. In this "*if-movement*" is present the idea/ praxis based on the: "*lived-world*", "*body-self*", "*body-subject*", "*body-monist*", "*body-experimentation*", "*body-relational*", "*perception*", "*intentionality*", "*dialogue with the world*", among others. Merleau-Ponty (2006) tells us: "*I am not in front of my body, but I am my body*". A body (movement), always, in a dynamic of creation, of unprecedented creation.

CONCLUSIONS

The idea of the body as object/subject/communicative reason in Physical Education and Sport seems to be much broader and of interest to children and young people. It is essential that Physical Education and Sport with children and young people teach them to live and feel natural, phenomenological, hermeneutic and existential corporeality. To this end, there is a need to look at "*other ways*" of orienting and building curricula, so that instinctive, rudimentary, fundamental, specialised experiences (movements); so that motor skills, coordinative and conditional abilities, games and games have new praxis. A need and an urgency that children themselves - their nature - seem to demand. A need that calls for the body and movement, a subject that enjoys communicative reason.

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Perceptions about physical education classes and its relationship with the construction of professional identity in future teachers

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ABSTRACT

Physical Education (PE) teachers have previous experiences that condition their pedagogical practice. The students, far from being a "*blank slate*", show how their previous period of socialization, their subjectivities and identities create a particular culture of PE teaching. The objective of this study is to understand and deepen the previous ideas that future Physical Education teachers have and that condition their pedagogical practice and intentionality. 23 second-year students of the teacher's degree, PE specialty, participated in a qualitative design, using a questionnaire, a life history and a semi-structured individual interview as data collection tools. The results show that the participants approach the profession from different professional perspectives: a sports perspective, a health-oriented perspective, a pedagogical perspective and a perspective oriented to critical pedagogy and social change from PE. Keywords: Professional identity; sport; health; initial training; reasons for professional choice. Physical Education (PE) teachers have previous experiences that condition their pedagogical practice. The students, far from being a "*blank slate*", show how their previous period of socialization, their subjectivities and identities create a particular culture of PE teaching. The objective of this study is to understand and deepen the previous ideas that future Physical Education teachers have and that condition their pedagogical practice and intentionality. 23 second-year students of the teacher's degree, PE specialty, participated in a qualitative design, using a questionnaire, a life history and a semi-structured individual interview as data collection tools. The results show that the participants approach the profession from different professional perspectives: a sports perspective, a health-oriented perspective, a pedagogical perspective and a perspective oriented to critical pedagogy and social change from PE.
Keywords: Professional identity, Sport, Health, Initial training, Reasons for professional choice.

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INTRODUCCIÓN

Several studies indicate that previous experiences as students influence the attitudes, beliefs and practices of future teachers (González Calvo, Barbero González, Bores Calle, & Martínez Álvarez, 2014; Korthagen, 2009; Virta, Hökkä, Eteläpelto, & Rasku- Puttonen, 2019). In this way, it is common for students who access initial teacher training programs to do so with deep-rooted conceptions about teaching and learning, of which they are sometimes not even aware (Feiman-Nemser, 2001). In this sense, Fernández-Balboa (1998) and González-Calvo and Fernández-Balboa (2018) maintain that, in teaching, the personal and the pedagogical cannot be separated and that what happens in one area deeply affects the other. As teacher educators in the area of Physical Education, our own identities are strongly aligned with socially critical and just approaches to teaching and learning. In our particular case, we are strongly committed to exploring and promoting pedagogical practices that work to include, support learning and constitute positive physical identities regardless of gender, ability, socioeconomic status or any other. The construction of one's own pedagogical identity is positively affected by (auto)biographical narratives, especially from a critical perspective, since it has been shown that these help to theorize the concept of professional identity (Fletcher & Temertzoglou, 2010) to the point of be conceived as "*important constituents in the formation of professional teaching identity*" (Beijaard, Meijer, & Verloop, 2004, p. 109). Consequently, it could be said that the investigation of the lived teaching experience, from an (auto)biographical and critical perspective in any aspect related to the educational profession, constitutes both an example of human science for a pedagogy of sensitive action ("*human science for an action sensitive pedagogy*") (van Manen, 1997), as a double process of embodied learning ("*embodied learning*") (Stolz, 2015) and pedagogical praxis (Fernández-Balboa, 1998).

MATERIAL AND METHODS

A narrative, reflective and autobiographical approach was adopted to delve into the personal and pedagogical worlds of the participant (Delle Fave, 2009; Pérez-Samaniego, Devís-Devís, Smith, & Sparkes, 2011). This approach places the subject in the foreground, asserting his own voice as a tool of investigation and interpretation. Thus, participants, through a deep and prolonged process of introspective reflection, can confront their own experiences and actively extract various meanings from them. The data, obtained from a total of 23 participants (14 women and 9 men) come from three sources: a simple questionnaire of five open questions, a semi-structured personal interview in which the main aspects that led the participant to pretending to be a PE teacher, and writing a life story.

RESULS

The analysis of the data reveals different main themes in relation to the development of teachers' professional identity and the effects on their future pedagogical practice. The analysis thus considers specific factors of professional identity that can be categorized into four different levels: (a) sports identity and its influence on the development of professional identity; (b) health identity and its influence on the development of professional identity; and (c) pedagogical identity and its influence on the development of professional identity.

DISCUSSION

Conceptions about teaching influence teaching performance, so it seems appropriate to study how they affect teacher training and the quality of the education they provide. It is therefore important that, as those

responsible for the training programs of future teachers, we take into account the prior knowledge and beliefs that our students bring, since new ideas and approaches have to compete with previously developed beliefs and theories. tacit and implicit in their own history as students, throughout their experience as students in the educational system. In the line that we have followed in our work, we understand that those who can offer us the most precise vision about the state in which Physical Education is currently found are the future teachers in charge of teaching it, who have experienced it from within as students and who will transform and/or reproduce their past experiences around the subject. Our work advocates knowing these previous experiences as a starting point to make changes and improvements in the initial training of teachers as a solution to current shortcomings (Casey & Fletcher, 2012; González Calvo et al., 2014).

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Step by step: An ecological momentary assessment physical activity in rural elderly

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ABSTRACT

The adoption of a sedentary lifestyle has led to significant health consequences for the population. However, research shows that being more physically active can help prevent falls, improve cardiovascular capacity, and increase muscle strength in older adults. To better understand these behaviours, it is important to consider the social and environmental context in which they occur. The aim of this study was to describe the daily physical activity of older adults living in rural areas of Portugal using ecological momentary assessment. A total of 19 participants with an average age of 74.7 years (SD = 8.5) were included in the study. Data were collected using diary entries at 20-minute intervals. Results showed that older adult's physical activity is mainly focused on housework, tending the vegetable garden, and occasional outdoor walks, most of which take place at home and occasionally outdoors. This information demonstrates the importance of promoting physical activity specifically to ensure the overall health and well-being of this population.
Keywords: Ecological momentary assessment, Patterns, Physical activity, Elderly.

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INTRODUCTION

Addressing sedentary behaviour (SB) and understanding the nature of physical activity (PA) in older adults are critical aspects of promoting their well-being (Ramalho et al., 2018). Ecological momentary assessment (EMA) has been shown to be effective in capturing these behaviours across the day (Maher et al., 2018; Haskell, 2012; Shiffman et al., 2008). The purpose of this study is to explore the daily PA of older adults living in rural areas using EMA and to gain insight into the contextual aspects of their behaviours.

MATERIAL AND METHODS

Participants

Nineteen individuals from a rural region (Beira Baixa) in Portugal with a mean age of 74.7 years (*SD* = 8.5), including nine men and ten women, participated in this retrospective cross-sectional study. Participants were selected using a snowball system, and informed consent was obtained according to the guidelines of the Declaration of Helsinki.

Measures

EMA was conducted using daily data entry forms. Participants were given registration sheets developed by the authors, meticulously following explicit guidelines. These sheets were distributed to all participants.

Procedure

Participants were given a comprehensive diary in which they recorded their behaviour, location, and social environment for five days on randomly selected weekdays and weekends. In the diary, participants had to answer three key questions each day: "*What are you doing right now?*", "*Who are you with?*", and "*Where are you?*".

Analysis

Diary data were carefully analysed using thematic analysis to identify common behaviours and patterns. Time spent in each category was calculated (the number of episodes reported was multiplied by 20) and results were reported in minutes per day.

RESULTS

The study thoroughly analysed the PA habits of elderly people living in rural areas of Portugal, both on weekdays and weekends. The main activities of this population included housework (85.6 minutes per day; 37.1%), gardening (61.8 minutes per day; 26.8%), walking (38.6 minutes per day; 16.7%), and shopping (13.7 minutes per day; 5.9%). Weekends were dominated by housework (66.3 minutes per day; 31.7%), walks (63.7 minutes per day; 30.5%), and gardening (53.7 minutes per day; 25.7%). On both weekdays (48.76%) and weekends (43.82%), the home environment was the most important place for PA, while the street and the garden were other preferred places. Participants spent most of their PA time alone (61.92% on weekdays and 58.05% on weekends), followed by family members (25.93% on weekdays and 38.58% on weekends) and friends or others (12.16% on weekdays and 3.37% on weekends).

DISCUSSION

The prevalence of PA is highest in older adults in the form of housework, followed by walking and gardening, both on weekdays and weekends. This study highlights the effectiveness of using EMA diaries to gain deeper

insights into the multifaceted nature of PA among older adults, which includes various domains such as leisure, transportation, self-care, and household activities (Haga et al., 2018; Eckert & Lange, 2015). Understanding the environmental factors associated with different types of PA is critical for older adults because it allows them to reflect on how their social and physical environments influence their PA choices and opportunities (Sallis et al., 2006; Haga et al., 2018). By examining their daily routines, individuals can gain valuable insight into their sedentary and active behaviours and identify specific contexts in which these behaviours occur (Sallis et al., 2006; Owen et al., 2011; Haga et al., 2018). This knowledge is critical for promoting higher levels of PA and recognizing the influence of personal circumstances on daily activity (Bredland et al., 2018).

CONCLUSIONS

Results showed that older adult's physical activity is mainly focused on housework, tending the vegetable garden, and occasional outdoor walks, most of which take place at home and occasionally outdoors. This information demonstrates the importance of promoting physical activity specifically to ensure the overall health and well-being of this population. In addition, the elderly spent most PA time at home and alone and engaged in various PA behaviours. These findings provide valuable information for developing targeted interventions to increase PA among rural elders and improve their overall well-being.

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Youthful souls: Gerontopsychomotricity intervention in institutionalized elderly

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ABSTRACT

This intervention project aimed to improve psychomotor factors in older people living in nursing homes. We carefully randomly selected six participants to obtain a heterogeneous group consisting of three women and three men with an average age of 86 years (SD = 1.4 years). In order to assess the effect of psychomotor activities, we conducted an initial study using the Geronto-Psychomotor Examination. At the end of the project, a re-evaluation was conducted to measure the effectiveness of the intervention. The intervention consisted of weekly sessions over a three-month period, with each session lasting 45 minutes. We developed a comprehensive application protocol based on a thorough assessment and observation methodology that included both quantitative and qualitative measures. The results of our study suggest that this intervention project has the potential to make a positive contribution to the well-being of older people in residential care, particularly in a preventive context. We believe that these findings should be incorporated into programs for the elderly to better serve this population.
Keywords: Aging, Play, Intervention, Psychomotricity, Functionality.

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INTRODUCTION

Gerontopsychomotricity aims to improve the connection between the individual and his/her body, focusing on the enjoyment of movement (O'Toole et al., 2015). This approach has been shown to benefit older adults by promoting body awareness, increasing confidence in mobility, and providing more variety in movement (Olalla, 2009). To facilitate this process, a project was developed with fun activities and games that create a positive environment and encourage active participation. The main goal of the project is to improve psychomotor factors in older adults, focusing on activities of daily living such as eating, personal hygiene, and writing.

MATERIAL AND METHODS

Participants

The participants in this study were six elderly nursing home residents aged 65 years or older, with a mean age of 86 years (*SD* = 1.4). The participants included three women and three men. They were randomly selected and all gave their informed and voluntary consent in accordance with the Declaration of Helsinki for human studies. The study also included detailed information about each participant's physical characteristics and medical history, including pre-existing health conditions.

Measures

To measure psychomotor abilities, the study used the Geronto-Psychomotor Examination, a comprehensive instrument that assesses multiple domains in individuals over 60 years of age, with each domain rated on a scale of 0 to 6 points (Morais et al., 2016).

Procedure

The intervention consisted of weekly sessions lasting 45 minutes over a three-month period (March, April, and May 2023). The sessions focused on psychomotor stimulation through specific exercises tailored to maintain and improve participants' skills. To ensure effective supervision, a maximum of three participants attended each supervised session.

Analysis

The analysis included a comprehensive psychomotor assessment and observation method in which both quantitative and qualitative scores were assigned. The assessment protocol assigned points to the different tasks, and the sum of these tasks contributed to the total score for each domain, which eventually resulted in the final total score for the participants.

RESULTS

The psychomotor profile of the six participants improved from the first to the last assessment, highlighting the importance of gerontopsychomotricity, which includes cognitive, social, and motor aspects. The detailed results can be found in Table 1.

DISCUSSION

The intervention project in gerontopsychomotricity aimed to promote group interactions and connections to create a sense of belonging (Vásquez & Mila, 2014). It was intended to increase self-efficacy and produce

physical, psychological, and emotional improvements (O'Toole et al., 2016) while counteracting potential social isolation at this stage of life (Papageorgiou et al., 2016).

Table 1. Comparison of the initial and final assessment.

Domain	Subject 1		Subject 2		Subject 3		Subject 4		Subject 5		Subject 6	
	I	F	I	F	I	F	I	F	I	F	I	F
Static Balance I	6	6	6	6	6	6	6	6	6	6	6	6
Static Balance II	2	3	2	3	2	3	2	3	3	3	2	1
Dynamic Balance I	5	6	4	4	6	6	6	6	6	6	6	6
Dynamic Balance I	3	3	0	1.5	6	6	3	6	6	6	3	3
Upper Limb Mobilization	6	6	6	6	6	6	6	6	6	6	6	6
Upper Limb Mobilization	6	6	5.5	6	6	6	4	6	6	6	5	6
Fine Motor Skills of Upper Limbs	4.5	5	5	5.5	2.5	4.5	4	5	4.5	5.5	2.5	5
Fine Motor Skills of Upper Limbs	6	6	6	6	5	6	6	6	6	6	6	6
Praxis Body Parts Awareness	4	4.5	5	4.5	5	5.5	3	4	5	5	4.5	5.5
Vigilance Praxis	4.5	6	6	6	6	6	4.5	5.5	5	6	5.5	6
Body Parts Awareness	4.5	6	4.5	6	5	6	5	6	4.5	6	4	6
Perceptual Memory Spatial Domain	2	3.5	2	5	3	5.5	2	4.5	3	3	2	5.5
Verbal Memory	4.5	5.5	5.5	6	5	6	5	5.5	5	5.5	4.5	5.5
Perceptual Memory Spatial Domain	5	6	4	5	5	6	5	4	3	4	3.5	4
Verbal Memory	2.5	5.5	5	5.5	5	6	5.5	6	4	5.5	5.5	6
Temporal domain	1.5	5	3	5	6	6	4	4	4	4.5	5	6
Communication	4	6	4	6	4	6	4	6	4	6	4	6
Psychomotor Profile (0-102)	71	89	73.5	87	83.5	96.5	75	89.5	81	90	75	89.5

CONCLUSIONS

The intervention project shows promise for impacting older people in residential care, particularly in improving psychomotor skills. It can be seamlessly integrated into aging response programs.

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Making a splash: A multiple case study on the acute mood-boosting effects of aquarobics in seniors

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ABSTRACT

In this study, we aimed to examine the effects of aquarobics on the mood of elderly people. Using the POMS – Profile of Mood States questionnaire, we collected data from three participants, two men and one woman, all over 65 years old. The questionnaire was completed at four different time points: 5 minutes before water exercise, 5 minutes after, 30 minutes after, and 60 minutes after. Our results showed that a single session in water had a positive effect on the state mood of seniors. It was observed that fatigue, depression and tension decreased, while vitality increased. These results are of great importance to medical professionals, sports scientists and advocates of active aging, especially with regard to psychological and emotional well-being.
Keywords: Aging, Acute effects, Mood, Aquarobics.

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INTRODUCTION

As we grow older, mood swings can affect our well-being and sleep. Hence, it is important to explore techniques for healthy aging and positive mood (Morais et al., 2019). However, older adults have difficulty engaging in physical activity because they have limited access to it and feel excluded (Nouchi et al., 2020). Previous research has mainly focused on the immediate benefits of aerobic exercise, neglecting the potential benefits of exercises that combine aerobic and anaerobic capacities (Nouchi et al., 2020). Therefore, this study aims to examine the potential positive effects of aquarobics on mood in the elderly.

MATERIAL AND METHODS

Participants

The participants were three individuals, two males aged 65 and 70 years and one female aged 66 years. One male participant had a history of a herniated disk, myocardial infarction, and heart murmurs, while the other male participant had a history of heart murmurs but no current physical or mental illness. The female participant had a history of thyroid and bladder surgery and was currently treating her hypertension with medication. All participants were married and engaged in regular light to moderate physical activity.

Measures

The study used the Profile of Mood States (POMS) (Viana et al., 2001).mood scale to assess participants' mood. It consists of six subscales: Tension, Depression, Hostility, Vitality, Fatigue, and Confusion. The POMS scale included 42 items, and participants rated each item on a 5-point scale. In addition, six items from the Raglin and Morgan (1989) scale were included in the depression, confusion, and fatigue subscales.

Procedures

The assessment was administered at various time points, including 5 minutes before a single 45-minute aquarobics session and 5, 30, and 60 minutes after its completion (Bartholomew et al., 2005).

Analysis

Descriptive statistics were used for analysis to summarize and present the data collected, providing valuable insight into the sample and overall population.

RESULTS

As for the "*tension*" factor, subjects 1 and 2 maintained their tension, while subject 3 showed a decrease in tension 60 minutes after the session. Regarding the "*vitality*" factor, subject 1 showed a constant value of 18 both 5 minutes before and after the session; however, 30 and 60 minutes after the session, the values decreased slightly to a value of 17, which corresponds to a negative change of -1 when comparing the values from 5 minutes before to 60 minutes after the session. In subject 2, however, vitality improved. Her score increased by 6 points from 9 at the beginning of the session to 15, 60 minutes after the session. A more detailed breakdown of the results can be found in Table 1.

DISCUSSION

The results suggest that aquarobics has a positive effect on the mood of the elderly, with a decrease in tension, depression, and fatigue observed. Comparing our study with others, similar improvements in mood were observed in the controlled groups during the different exercise interventions (Morais et al., 2019; Nouchi

et al., 2020; Petruzzello & Motl, 2011). Of note, participants' vitality increased significantly after aquarobics training. However, there were no changes in the factors of hostility and confusion.

Table 1. Results at different assessment moments.

POMS	5' Before Exercise	5' After Exercise	30' After Exercise	60' After Exercise	Variation (5' Before and 60' After)
Tension					
Subject 1	1	1	1	1	0
Subject 2	1	2	0	1	0
Subject 3	3	1	1	1	-2
Depression					
Subject 1	3	0	0	0	-3
Subject 2	0	0	0	0	0
Subject 3	0	0	0	0	0
Hostility					
Subject 1	0	0	0	0	0
Subject 2	0	0	0	0	0
Subject 3	0	0	0	0	0
Vitality					
Subject 1	18	18	17	17	-1
Subject 2	9	18	15	15	+6
Subject 3	18	16	18	18	0
Fatigue					
Subject 1	0	2	0	0	0
Subject 2	0	3	5	1	+1
Subject 3	1	3	1	0	-1
Confusion					
Subject 1	2	2	2	2	0
Subject 2	2	3	6	2	0
Subject 3	2	2	2	2	0

CONCLUSIONS

Overall, the results suggest that a 45-minute aquarobics session can alleviate depression, tension, and fatigue and significantly improve the emotional state of people aged 65 and older.

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Exercising the blues away: A multiple case study on the acute mood-boosting effects of multi-component exercise in elderly women

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ABSTRACT

In this study, we examined the effects of multi-component training on the mood state of older women. As part of a multiple-case study, we collected data from three elderly women over the age of 65 using the Profile of Mood States (POMS) questionnaire. The questionnaire was completed at four different time points: 5 minutes before exercise, 5 minutes after, 30 minutes after, and 60 minutes after exercise. The results showed that multi-component training had a positive effect on the vitality-activity factor, as all participants experienced improvements. These results have important implications for medical professionals, technicians, and sports scientists interested in promoting active aging, especially from an emotional perspective.
Keywords: Aging, Acute effects, Physical exercise, Mood.

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INTRODUCTION

Aging is often associated with an increased prevalence of mood disorders, requiring research on strategies to promote healthy aging and improve mood (Nouchi et al., 2020). However, older people may find obstacles when engaging in physical activity, which may affect their psychological well-being. Therefore, the purpose of this study was to examine the effects of multi-component physical training on mood in older women.

MATERIAL AND METHODS

Participants

Three elderly people participated in this study: a 72-year-old woman (height: 1.60 m, weight: 70 kg) who is currently not physically active but remains active and independent, an 81-year-old woman (height: 1.60 m, weight: 54 kg) who is very active and independent and walks one hour daily, and a 70-year-old woman (height: 1.65 m, weight: 80 kg) who is not physically active but leads an independent lifestyle.

Measures

To assess participants' mood states, we used the Profile of Mood States (POMS) scale. This scale includes six subscales for mood states: tension, depression, hostility, vitality, fatigue, and confusion. The entire POMS scale includes 42 items, with each item rated on a 5-point scale from 0 (not at all) to 4 (extremely). Some items are reverse scored before being included in the total scale (Viana et al., 2001).

Procedures

The training program focused on improving strength, balance, flexibility, and aerobic endurance. Participants performed each activity at home wearing appropriate clothing and footwear in a safe and well-lit environment. The exercise session lasted one hour and included various exercises such as walking, towel twisting, weightlifting, squats, stair climbing, and stretching. Mood was assessed at different time points using the POMS questionnaire: 5 minutes before the exercise began and 5, 30, and 60 minutes after the session ended (Bartholomew et al., 2005).

Analysis

Descriptive statistics were calculated to summarize the data and provide valuable insight into changes in participants' mood over time.

RESULTS

Regarding the tension-anxiety factor (T), subject 1 showed no changes, while subjects 2 and 3 improved. Similarly, all three subjects exhibited no changes in the depression-melancholia factor (D). For the factor hostility-irritability factor (H), there were no changes in subjects 1 and 3, but subject 2 showed improvement. In contrast, improvements in the vitality-activity factor (V) were observed in all participants. Subjects 1, 2, and 3 showed no changes in the fatigue-inertia factor (F). Lastly, there was improvement in the confusion-disorientation factor (C) for all participants. The detailed results can be found in Table 1.

DISCUSSION

Research suggests that certain types of exercise, such as dancing, running, walking, water aerobics, and strength training, can have a positive effect on mood in older people (Youngstedt, 2010). However, caution is warranted in the general application of these findings, as they may not account for factors such as clinical

depression. Study participants exhibited only mild depressive symptoms prior to exercise, and positive effects were consistently rated as zero by all three subjects in the 5 minutes prior to exercise. In addition, only women were included in the study. Nonetheless, the results suggest that participation in multicomponent training can significantly improve the mood state of older women, even after accounting for potential limitations.

Table 1. Results at different assessment moments.

POMS	5 minutes before	5 minutes after	30 minutes after	60 minutes after	Variation (from 5 minutes to 60 minutes after)
Tension					
Subject 1	0	0	0	0	0
Subject 2	2	1	0	0	-2
Subject 3	2	2	1	1	-1
Depression					
Subject 1	0	0	0	0	0
Subject 2	0	0	0	0	0
Subject 3	0	0	0	0	0
Hostility					
Subject 1	0	0	0	0	0
Subject 2	1	0	0	0	-1
Subject 3	0	0	0	0	0
Vitality					
Subject 1	22	23	23	24	+2
Subject 2	14	15	22	24	+10
Subject 3	11	12	14	18	+7
Fatigue					
Subject 1	6	2	4	1	-5
Subject 2	0	0	1	0	0
Subject 3	0	0	0	0	0
Confusion					
Subject 1	2	2	1	0	-2
Subject 2	3	2	0	0	-3
Subject 3	5	4	3	2	-3

CONCLUSIONS

In conclusion, our results suggest that participation in a multi-component physical training can significantly improve the mood state of older women, even after accounting for observed limitations.

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Happy feet: A multiple case study on the acute mood-boosting effects of a physical exercise session in institutionalized elderly

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ABSTRACT

The aim of this study was to examine whether physical activity has a positive effect on the mood of elderly people living in institutions. The Profile of Mood States (POMS) questionnaire was used to study a sample of three individuals over the age of 65. The questionnaire was completed at four different time points: 5 minutes before an aquatic exercise session, 5 minutes after the session, 30 minutes after, and finally 60 minutes after the session. The results of the study showed that depression and fatigue decreased significantly, while little change was observed in tension, hostility, vitality, and confusion. These findings have important implications for medical professionals, exercise scientists, and professionals working with older adults. In particular, they offer insights into promoting active aging, especially with regard to psychological and emotional well-being.
Keywords: Physical exercise, POMS, Mood, Depression, Fatigue.

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INTRODUCTION

Mood disorders are common in older people and can affect their quality of life and sleep patterns (Byers et al.,2010). However, research has shown that physical activity can positively affect cognitive function and mood (Sofi et al.,2011). The purpose of this study was to examine whether a single bout of physical activity has a positive effect on the mood of older people living in an institution.

MATERIAL AND METHODS

Participants

Three elderly people from a nursing facility participated in this case study, including two men and one woman between the ages of 65 and 84. One of the participants had a history of mental decompensation, which made the study even more unique.

Measures

The study used the Profile of Mood States (POMS) scale to assess various mood states, including tension, depression, hostility, vitality, fatigue, and confusion. In addition, six items from Raglin and Morgan's (1989) scale were used to measure feelings of worthlessness, uselessness, guilt, misery, inefficiency, and apathy. The POMS scale consisted of a total of 42 items rated on a 5-point scale ranging from 0 (never) to 4 (extremely). Some items were reverse scored prior to analysis (Viana et al., 2001).

Procedure

Participants completed the questionnaire at four specific time intervals during the training session: 5 minutes before, 5 minutes after, 30 minutes after, and 60 minutes after the training session (Bartholomew et al., 2005). The training session included warm-up exercises, lower limb strength exercises using a handrail for stabilization, upper limb strength and coordination exercises using sand-filled bottles, and an adapted seated bocce game. The session ended with stretching exercises and relaxation.

Analysis

After data collection, descriptive statistics were calculated and presented in one table to summarize the data and provide insight into the characteristics of the sample and the population.

RESULTS

In subject A, tension-anxiety (T) increased after the activity, whereas subjects B and C showed no change. In all three subjects, scores for the depression-melancholia factor (D) decreased. Subjects B and C showed an increase in the factor hostility-rage (H), while subject A showed the lowest values. For the vitality-activity factor (V), there were no changes in subject A, an increase in subject B and a decrease in subject C. Fatigue-inertia (F) decreased in all subjects. There was no effect on the confusion-disorientation factor (C) in subject A, a slight decrease in subject B, and a significant increase in subject C. See Table 1 for detailed results.

DISCUSSION

Our study found that 60 minutes of physical activity led to a decrease in depressive symptoms, which is consistent with Morais and colleagues (2019). Tension also decreased significantly after exercise, which is consistent with the findings of Bartholomew and colleagues (2005). However, it is important to note that

hostility significantly increased after the session. In addition, our results showed a positive trend in post-exercise vitality, while a decrease in hostility was found by Nouchi and colleagues (2020).

Table 1. Results at different assessment moments.

POMS	5' before	5' after	30' after	60' after	Variation *(from 5' before to 60' after)*
Tension					
Subject *A*	0	1	3	1	1
Subject *B*	1	1	1	1	1
Subject *C*	1	4	1	0	0
Depression					
Subject *A*	6	0	4	2	-4
Subject *B*	2	0	1	0	-2
Subject *C*	9	1	7	5	-5
Hostility					
Subject *A*	2	0	0	0	-2
Subject *B*	0	0	1	2	2
Subject *C*	1	0	1	3	4
Vitality					
Subject *A*	21	22	17	21	0
Subject *B*	20	21	15	21	1
Subject *C*	17	20	14	15	-2
Fatigue					
Subject *A*	1	0	0	0	-1
Subject *B*	3	0	0	0	-3
Subject *C*	5	4	0	2	-3
Confusion					
Subject *A*	2	0	9	2	0
Subject *B*	2	1	5	1	-1
Subject *C*	2	1	1	9	7

CONCLUSIONS

Overall, this single training session had a positive effect on the emotional well-being of institutionalized elderly and significantly decreased fatigue and depressive symptoms. The study's approach could be integrated into institutional activities to promote the link between physical activity and comprehensive health care.

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The effect of body and muscle composition indices at the beginning of a sports season associated with the risk of injury in futsal players: A pilot study

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ABSTRACT

Futsal is a modality that requires the athlete to perform at a certain level as quickly as possible, causing excessive training after a long break, increasing the risk of contracting various traumas to the musculoskeletal system, increasing the risk of sports injuries, which according to Woods et al., (2002) happens more regularly in the preparatory period of sports seasons, closely associated with low body composition (WC) and muscle capacity (CM) indices of players in this phase of the season. The objective of this study is to verify if the existence of injury in the first 3 months of the sports season in futsal players is related to the low rates of WC and CM in the pre-season evaluation. The sample will be admission, of approximately 70 players, from 5 clubs in the district of Castelo Branco, participating in 4 competitive levels. The InBody, the Chronojump and the isokinetic dynamometer will be used to collect the WC and CM data and, for the existence of an injury, a recording grid created for the purpose. After collecting the data, the normality of the sample will be verified and the multiple linear regression test will be applied to verify the relationship between the dependent variable and the independent variables. We intend that the results alert all professionals involved in training that the initial WC and CM data may be associated with the risk of injury and, naturally, with sports performance.
Keywords: Sports, Injury prevent, Futsal, Body composition, Muscle strength.

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INTRODUCTION

Futsal is characterized by intermittent efforts, of variable duration and random periodicity, which require high-intensity and short-duration efforts from players, which differentiates this modality from the others. It is also a sport that requires a high level of agility, allowing the player to react to the most diverse stimuli quickly and efficiently (Santos, Santos, Ferreira & Costa, 2010; Kurata et al., 2007).

The preventive approach is the most effective way available to sports professionals and physiotherapists to minimize the likelihood of injuries and, consequently, improve performance, a factor of extreme and decisive importance for the life and athletic success of the athlete. of the team (Kurata et al., 2007). It is in this sense that the relevance of our study arises, to know if the WC and CM of the players at the beginning of the sporting seasons is associated with the risk of injury in the first 3 months of the sporting season, as well as to verify the differences between the competitive levels.

MATERIAL AND METHODS

Participants

The study is of the longitudinal type, data collection will be carried out in 5 clubs of three competitive levels (1st National Division, 2nd National Division, 3rd National Division and CB District Championship), consisting of approximately 70 senior male players.

It was considered as an exclusion factor, injured players or in the recovery phase of injury, at the time of the initial assessment.

Measures

The instruments used for data collection will be the Bioimpedance balance (InBody, to assess body composition), ChronoJump (to assess the strength and power of the lower limbs) and the Isokinetic Dynamometer (BIODEX, to assess the strength parameters of the quadriceps and hamstrings).

Procedures

The collection of data for the initial evaluation through the mentioned instruments will take place at the beginning of the sporting season. After this initial collection, each medical department will be given an injury registration grid, which after 3 months will be collected and analysed based on the initial values.

Analysis

For data encoding we will use IBM - SPSS – Statistical Package for the Social Sciences SPSS (v.23.0). In the first analysis, the normality of the sample is verified by applying the Kolmogorov Smirnov test, subsequently resorting to the multiple linear regression test to verify the relationship between the dependent variable (injury) and independent variables (CC and CM).

CONCLUSIONS

We intend that the results obtained serve as a warning for all professionals associated with training and physical preparation, that the initial data of CC and CM may be associated with the risk of injury and naturally with sports performance, being essential at the beginning of the season sports players have good CC and CM indices as well as a different approach on the part of professionals with this type of players.

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Perceived well-being and motives for physical activity: A sex-differentiated approach for young students

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ABSTRACT

With this study we aimed analyse the perception that a group of young Portuguese students had about their physical well-being and adherence to physical activity (PA) in a pandemic context, as well as to study the factors and motivations with influence, based on an analysis by sex. We have counted with 213 participants, (18.0 ± 1.46 years; both sexes). A questionnaire, applied in Google Forms, which allowed collecting data on: body mass index (BMI), weight changes and body image (BI), experiences in PA in childhood, adherence to regular PA practice and motivation factors, in the year of application (2020), period after the 1st confinement (Cnf) by COVID-19. Data were analysed in SPSS (version 28) with descriptive, comparative and correlational statistics. We found that many young people had an increase in weight in the Cnf (2.32 ± 1.39 kg), with higher values for boys. Girls adhere less to PA and sport (p = .006; 19.8% less) and in the Cnf there was a punctual adherence of young people, without control or monitoring, and girls were the ones who more followed PA tutorials (p = .001). PA was perceived as one of the most relevant factors for well-being and health (p = .003). As for the reasons for adherence, the following stand out: 1st "*to feel good*" (80,3%); 2nd "*having practice with accessible exercises*" (74.7%); 3rd "*improving/maintaining repertoire and/or motor skills*" (73.7%). We conclude that asymmetries were observed between boys and girls, regarding physical well-being, adherence to practice and reasons for their involvement.
Keywords: Young students, COVID-19, Well-being, Physical activity adherence, Sex differences.

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INTRODUCTION

Adolescents already tend to seek experiences based on their personal motivations, even if they have an impact on their well-being. In the COVID-19 phase, there tended to be a greater distance between young people and physical and sports practices, due to academic demands and motivational issues. At this stage, they consider Physical Activity as the main preventive and non-pharmacological strategy for the prevention of various diseases (Almeida et al., 2021). Thus, it was our intention to analyse the perception that a group of young students had about their physical well-being and adherence to physical activity (PA) in a pandemic context, as well as to analyse the factors and motivations with influence, based on the analysis of gender differences.

MATERIAL AND METHODS

We conducted a cross-sectional study with a quantitative methodology.

Participants

We have counted 213 participants, young Portuguese students - 60.6% were aged between 17 and 18 years old; 70.4% female and 29.6% male; with an average BMI = 22.1 ± 4.1.

Measures

A questionnaire was applied through *Google Forms* which allowed for collecting data on: body mass index (BMI), weight changes and body image (BI), experiences in Physical Activity in childhood, adherence to regular PA practice and motivation factors.

Procedures

In this online study, participation was voluntary and informed consent was applied.

Analysis

Data were analysed in SPSS (version 28) with descriptive (n and%; x ± SD), comparative (Chi-Square – X^2); and non-parametric [Spearman's Rho (ρ)]. and parametric [Bravais-Pearson (r)] correlational.

RESULTS

Some young people experienced weight gain, the mean value being 2.32 ± 1.39 kg, with a significant difference between sex/gender (X^2, p = .035), with 20% more boys experiencing weight gain. There was also a highly significant difference in the desire to have a distinct weight (X^2, p ≤ .001), with girls being less satisfied. We found a significant positive relationship between weight satisfaction and sex (p = .279 a - p =.001). We also observed significant differences for the difference between perceived and actual BI (boys and girls - X^2, $p \leq p$ = .004) - girls are more adjusted to reality. Still related to (in)satisfaction with their body image, especially with weight - we recorded differences regarding the intention to change weight, with higher values for girls and other items of Body Image - waist, belly, hips, thighs, legs, etc. During the COVID-19 lockdown period there were occasional PA practices by young people, and girls adhere less to PA and sport (p = .006; 19.8% less) followed more expert tutorials (+39%) (X^2, p = .001). After this period, there were differences between boys and girls in the measures adopted in the adherence to physical exercise - with 81.9% of girls saying they had medium/low PA practice and 87.8% of boys high/medium PA practice (ρ = .370 at p = .001).

Table 1 shows that PA was distinctly perceived as one of the most relevant factors for well-being and health.

The most mentioned reasons for adherence to PA practice were: - 1st "*to feel good*" (80.3%);2nd "*to have practice with accessible exercises*" (74.7%); 3rd "*to improve/maintain repertoire and/or motor skills*" (73.7%).

Table 1. Perception of factors associated with well-being - positively and negatively.

Factors in relation (+) to well-being	**Factors in relation (-) to well-being**
1. Body health issues	1. Absence of Movement
2. Balanced Daily Rest Issues	2. Excessive Sedentariness
3. Balanced and Healthy Eating	3. Eating without stopping
4. Regular Physical Activity	4. Alcohol
5. Investing in the time between work routines	5. Regular Medication Smoking

Table 2. Relationship found between sex/gender and motivations for practice PA.

Positive relationships	**Negative relationships**
Competition with self (r = .211 at *p* =.002)	Liking for Rhythmic Activities/ Dance/ Yoga
Striving to the limit (r = .204 at *p* =.003)	(r = .-388 at *p* = .001)
Need to expend energy (r = .153 at *p* =.030)	
Enjoyment of Gym activities (r = .144 at *p* =.041)	

Note. p ≤ .05 - significant difference; p ≤ .001 - highly significant difference.

Table 2 shows that boys and girls show similar motivations for PA and Sport, with some differences: boys refer more to - the need to expend energy, the need to push to the limit, and competed with themselves.

DISCUSSION

In the confinement period, there was a punctual adherence to de PA for young people, those also had an increase in weight that may have contributed to lower self-esteem with their body schema, similar to what was recorded in other studies (Rosa, 2016; Condessa et al., 2022), with differences between boys and girls.

Kumar et al. (2015) emphasize the importance of improving well-being and social behaviour in adolescents, which is evident in our results, especially in boys, who continue to choose practices with physical effort.

CONCLUSIONS

Asymmetries were observed between boys and girls with regard to physical well-being, adherence to practice, and reasons given for this involvement. Girls are still less satisfied with their weight, and their body image, and in the confinement period they sought more PA tutorials.

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Educate through the movement in higher education: A proposal for the improvement of well-being

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ABSTRACT

The need to acquire motor and social literacy was fundamental in the years of fundamental schooling, however, we believe that, given the reality of young higher education students regarding the practice of physical activity (PA), we need to reflect on new strategies to encourage more active involvement in different practices, raising awareness of the relevance of moving activities and their impact on the individual and social well-being of the population. In this study, we first tried to analyse the evolution of non-adherence to PA of a group of students in the 1st year of higher education and to know the factors that influenced their non-practice. It was a transversal study, with quantitative methodology. We resorted to a questionnaire applied at the beginning of a cycle of studies to 573 participants of both sexes, but predominantly girls. We started an evolutionary analysis in 1999 and confirmed this information with post-pandemic data. These data were analysed with descriptive statistics and later we proposed an intervention program.
Keywords: Higher education, Physical activity, Program, Well-being.

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INTRODUCTION

European Social Survey (ESS) considers that Education is vital to change public attitudes and behaviours that tend to increase social inequality in health education, revealing that greater involvement in organized physical practices will benefit young Europeans' well-being. Rainho *et al*. (2017) presented a study on physical and vigorous activity in higher education students, highlighting the importance of the university in encouraging physical practice, simultaneously with the transmission of culture and values to young people who are almost in the transition to adulthood. To combat the numerous barriers to the practice of physical exercise, changes are proposed. Actually, numerous strategies focused on simple changes in their PE and Sports teaching: more recreational practices and adjusted to physical-motor skills following some principles to keep students active, autonomous, altruistic, responsible, and knowledgeable of learning contexts.

MATERIAL AND METHODS

We conducted an experimental and longitudinal study with a quantitative methodology.

Participants
We have counted 573 Portuguese participants, 88% females and 12% males, aged 18 - 20 years old.

Measures
A questionnaire was methodically used in the 1st class of a curricular unit in the area, with the purpose of knowing the experiences and representations of university students in PA, Physical Education (PE), Sport.

Procedures
In this online study, participation was voluntary and informed consent was applied.

Analysis
Data were analysed in SPSS (version 27) with descriptive statistics (n and%).

RESULTS

From the descriptive analysis of the data obtained, we found that of the 501 students inquiry in the years of analysis, at the time of the 1st year of the course, only about 24.4% (estimated total average) said they practiced some PA or Sport. Three main reasons stand out for not adhering to the practice of PA: 1st "*not having time available*" (29.9%); 2nd, "*laziness and lack of interest*" (18.8%) and, finally, the "*lack of facilities close to home*" (13.0%). In the analysis carried out on Well-Being in the PA and Sports, only 67.8% of these students mentioned "*feeling good*", or "*very well*" during the school practices. Those who currently adhere to these Active Life practices do so mainly because they like to exercise (67.2%) and, to a lesser extent, for health reasons (20%). This trend continued in the post-COVID period (n = 72), with 27.8% practicing any PA.

Our project will include some student-oriented objectives (Table 1) and arose because it is known that the current abandonment of this type of activity predicts future abandonment, as inactive young people tend to be inactive adults as well. Thus, we considered it pertinent to think of a program to increase the involvement of students in this type of practice, which contributes to their well-being. that will be developed in a set of activities or teaching and research actions to be proposed, which involve different phases (research; planned; (in)formation; practice intervention- of Ludic, Sports and Expressive activities; evaluation e divulgation). We are committed to a plan that integrates teaching and research and that stands out for offering knowledge in

practices based on "*the benefits of practicing physical activity and sports*". In this sense, we intend to: a) resort to fundamentals from the philosophical, anthropological, sociocultural, health, and educational areas; b) rebuild the design of the PE curriculum - from a critical perspective and use local recreational and recreational practices; c) promote reflection on teaching-learning strategies that lead to daily adherence to movement practices and their mentoring through the use of new technologies; d) take advantage of existing resources (physical and human) in higher schools and in the surrounding community/environment, thus establishing fruitful and sustainable partnerships.

Table 1. Objectives proposed for students with this intervention programs.

Intending that they are able to:
1. Identify behaviours and attitudes related to "*well-being*";
2. Know general foundations for PA - physical fitness, physical exercise, and training;
3. Acquire specific and transversal skills related to PA practices - Recreational, Sports, and Expressive;
4. Mobilize previous skills – exp. lived in physical culture practices – for analysis, systematization, and problem-solving;
5. Rethink the offer of PA practices - adjusted to the community(ies) and the use of natural resources in the region;
6. Acquire skills for developing and supervising intervention programs;
7. Experience research practices - collecting, selecting, and analysing information and confronting policies – (Inter)national;
8. Take advantage of opportunities to move around, in organized and motivating activities, contributing to well-being;
9. Actively participate in the academic community and in volunteer activities.

DISCUSSION

Our research corroborates the values found by Rainho et al. (2017), which showed a low prevalence of vigorous physical practice was evidenced. These results after the COVID-19 pandemic period have changed, which is not more favourable to adherence. To combat the numerous barriers to the practice of physical exercise, changes are proposed, based on authors (Condessa, 2017; Metzler, 2017; Chatoupis, 2018) that present numerous strategies focused on simple PE and Sports teaching changes: more recreational practices and adjusted to physical-motor skills and to introduce new technologies in the teaching and promotion of PA.

CONCLUSIONS

Most students' inquiries had not adhered to some kind of Active Life practices - physical activity or sports, but they like and felt good doing exercise, and the principal motive was not having time available and lack of interest. Current abandonment of this type of activity predicts the future and to contribute to their well-being we proposed an implementation of Ludic, Sports, and Expressive activities outlined in Intervention Programs.

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Description of Portuguese students' health-related behaviors during the COVID-19 confinement

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ABSTRACT

Introduction: Social distancing and confinement measures were key to combating the spread of COVID-19. However, these measures could lead to side effects in other dimensions of health, with radical changes in lifestyle behaviours, namely in physical activity (PA) and eating habits. Objective: The aim of this study was to describe the health-related behaviours of Portuguese students, with regard to PA habits and eating habits before and during confinement due to COVID-19. Methods: 174 students (mean = 21.58; SD = 2.58) residing in Portugal, answered the lifestyle and intention to be physically active questionnaire. Results: Of the 174 respondents, 35.1% did not practice regular PA before the 1st confinement, 22.4% practiced regular PA for less than 6 months, and finally, 42.5% subjects practiced regular PA for more than 6 months. Subjects who practiced PA before the first confinement, for more than 6 months, had better PA habits, better eating habits and higher levels of intention to be physically active. For PA habits, level of intention and eating habits during confinement, between genders, there were no statistically significant differences (p = .131; p = .398; p = .424, respectively) Conclusion: Although there were no statistically significant differences , male students showed better PA habits and more intention to be physically active, while female students showed better eating habits.
Keywords: COVID-19, Physical activity, Eating habits, Intention, Students.

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INTRODUCTION

The main key to preventing the onset of cardiovascular disease is to increase healthy lifestyle behaviours, namely regular PA (Kaminsky et al., 2022). One of the major goals of the WHO by 2030 is to reduce the prevalence of physical inactivity by 15% worldwide (World Health Organization, 2018). The COVID-19 pandemic forced the entire population to be confined to their homes (Legido-Quigley et al., 2020). During this time, drastic negative changes were observed both in the practice of PA and in the consumption of unhealthy foods, alongside this there was a 28.6% increase in sedentary behaviour (Ammar et al., 2020a). The aim of this study was to describe the health-related behaviours of Portuguese students, namely, PA habits before and during confinement due to COVID-19, eating habits during confinement and the subjects' intention to be physically active after mandatory social isolation.

MATERIAL AND METHODS

Participants

An observational, descriptive, cross-sectional study was implemented (Ato et al., 2013; Montero & León, 2007). 174 Portuguese subjects participated in the study, 47 male (12.3%) and 127 female (28.9%) aged between 16 and 24 years (mean = 21.58; SD = 2.58).

Measures and procedures

For data collection, three questionnaires were used: one of sociodemographic characterization with data related to sex, age, residence and regular practice of PA; the Healthy Lifestyle Questionnaire (EVS-III) adapted and validated for the Portuguese population by Batista et al., (2022); and the Physically Active Intention Questionnaire Jiménez et al., (2019).

To forward that the followers and the consent were sent randomly via Google Forms to a network of contacts. Data were collected between April and May 2020.

Analysis

The Statistical Package for Social Sciences (SPSS), version 24.0 for Windows, was used for statistical analysis, with the significance level (p) maintained at 5%.

For the characterization of the sample, descriptive statistics were used. Subsequently, as the normal distribution of data was not verified, we resorted to the U Mann-Whitney and H Krukal-Wallis test for independent samples. Effect size was measured by Cohen's d.

RESULTS AND DISCUSSION

Of the 174 respondents, 35.1% did not practice regular PA before the 1st confinement, 22.4% had practiced for less than 6 months and 42.5% had practiced for more than 6 months. Subjects who practiced PA for more than 6 months showed better PA habits, better eating habits and higher levels of intention to be physically active. In contrast to the findings of the study by Martínez-de-Quel et al. (2021a), this leads us to think that the most active subjects had a smaller impact on their lifestyles during confinement, when compared to non-active subjects. We found statistically significant differences for PA habits, eating habits and intention to be physically active, depending on whether or not you practice regular PA (p = < .001). The effect size, measured using Cohen's d, is small for all variables (Hopkins et al., 2009). On the other hand, there were no statistically

significant differences between genders regarding PA habits, eating habits and intention to be physically active in the future.

CONCLUSIONS

In our study, we found that subjects who practiced PA before the first confinement, for more than 6 months, had better PA habits and higher intention rates. Despite the small effect, we can conjecture that confinement had a significantly smaller impact on these subjects, with regard to healthy lifestyles. On the other hand, although there were no statistical differences, male students showed better PA habits and more intention to be physically active, while female students showed better eating habits.

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Self-reported physical activity of university education students: Comparative study between Portugal, Italy and Spain

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ABSTRACT

The aim of this study was to describe and compare the self-reported physical activity of Portuguese, Italian and Spanish students who attend higher education. Participated in the study 1440 higher education students. Of this total, 424 subjects study in Portugal; 407 study Italy; and 609 study in Spain. The short version of the International Physical Activity Questionnaire (IPAQ) was applied, validated and translated into Italian, Portuguese and Spanish. Using SPSS (v.23.0), descriptive statistics were performed, as well as verification of the normality of data distribution (Kolmogorov-Smirnov) Since all variables have a non-normal distribution, the Kruskal Wallis test was used (Mann-Whitney). We verified that, regarding the variables "*Vigorous PA Days*", "*Moderate PA Days*", "*Sitting Time per day, during the week*" and "*Sitting Time per day, on the weekend*", it is the Italian students who present the mean values more favourable, with significant differences ($p \leq .05$), compared to Spanish and Portuguese students. We conclude that Portuguese, Italian and Spanish university students present moderate levels of physical activity, combined with high amounts of daily sedentary behaviour.

Keywords: Physical activity, Higher education students, Sedentary behaviour.

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INTRODUCTION

University students face a variety of academic, financial and social challenges that can have negative consequences on their physical health, their academic success and their quality of life (Bruffaerts et al.,2018). However, physical activity (PA) can be an important ally in improving students' health. The benefits of PA for health are recognized and consolidated in the scientific literature. PA is an important factor for the prevention and control of cardiovascular diseases (Myers et al., 2019), type 2 diabetes, obesity and certain cancers (McTiernan et al., 2019). Thus, the aim of this study is to describe and compare the self-reported PA of Portuguese, Italian and Spanish students who attend higher education.

MATERIAL AND METHODS

Cross-sectional study, based on the epidemiological study in which factor and effect are observed at the same historical moment, being a type of investigation widely used in this area. To minimize possible errors in the analysis and interpretation of the results obtained, we used the quantitative method, a method that uses statistical techniques to use quantification in data collection and treatment.

Participants

Participated in the study 1440 Portuguese, Italian and Spanish subjects who attend higher education in Portugal, Italy and Spain. Of this total, 424 subjects study at Higher Education Institutions in Portugal (mean age 21.91±5.65); 407 study at Higher Education Institutions in Italy (mean age 22.44 ± 3.43); and 609 study in Higher Education Institutions in Spain (mean age 21.05 ± 4.36).

Measures

The short version of the International Physical Activity Questionnaire (IPAQ) was applied, validated and translated into Italian, Portuguese and Spanish. This instrument makes it possible to standardize measures related to health and the assessment of PA behaviours in the population, in different countries and in different sociocultural contexts (Teixeira, Marques, Lopes, Sardinha, & Mota, 2019).

Procedures

Formal and institutional contact was made with higher education institutions, presenting the objectives of the study and requesting authorization. Before carrying out the data collection, all subjects were presented with the objectives of the study, as well as all the procedures to be followed. An anamnesis form and an informed consent form were sent, respecting and preserving the ethical principles, international norms and standards related to the Declaration of Helsinki.

Analysis

Data analysis was performed using SPSS (v.23.0). Descriptive statistics were performed. To verify the normality of data distribution, the Kolmogorov-Smirnov test was used. After the procedures described, and verification of the assumptions for using the tests, since all variables have a non-normal distribution, the Kruskal Wallis test (Mann-Whitney) was used for the inferential analysis. For these tests, the significance level was set to $p \leq .05$.

RESULTS

We verified that, regarding the variables "*Days of Vigorous PA*" and "*Days of Moderate PA*", Italian students have the highest mean values, with significant differences ($p < .01$), compared to Portuguese and Spanish

students. In turn, in the second variable, Portuguese students have higher mean values, with significant differences (p = .01), compared to Spanish students.

Regarding the variables "*Walking days*" and "*Walking time*", Spanish students have the highest mean values, with significant differences (p < .01), compared to Portuguese and Italian students. In turn, Italian students have higher mean values, with significant differences (p < .01), compared to Portuguese students.

Finally, for the variables "*Time Sitting per day, during the week*" and "*Time Sitting per day, at the weekend*", it is the Italian students who present the lowest mean values (more favourable), with significant differences (p < .01; p = .03), compared to Spanish and Portuguese students. In turn, Portuguese students have lower mean values, with significant differences (p < .01), compared to Spanish students, for these two variables.

DISCUSSION

Both PA behaviours and sedentary behaviours can be described by a high number of activities, carried out in multiple contexts, with different determining factors, and with different health outcomes. In this sense, the factors that determine the levels of physical activity of university students are very diverse. Lack of time and adverse weather conditions are identified as barriers. On the other hand, health awareness, body weight control and stress management are mentioned as motivating factors (Goldstein et al., 2017). In addition, past sports habits can determine PA levels (Towne et al., 2017).

This study provides information, allowing the planning of general lines of interventions aimed at reducing sedentary behaviour and promoting PA in university environments. Interventions aimed at implementing healthy lifestyles appear to be effective in higher education institutions (Plotnikoff et al., 2015). In this domain, individual interventions have shown positive effects on the health behaviours of university students (Dietz et al., 2020).

CONCLUSIONS

The results of our study showed that Portuguese, Italian and Spanish university students have moderate levels of physical activity, combined with high amounts of daily sedentary behaviour. Future lines of investigation should identify the barriers and facilitators of physical activity, as well as the determinants of sedentary behaviour in university students.

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The impact of objectively-measured physical activity and sedentary behaviour in cardiovascular risk and health-related quality of life in adults: A systematic review protocol

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ABSTRACT

Physical activity has been associated with better health outcome, like low risk of many diseases and low mortality, while sedentary behaviour has been considered a risk factor to health. The aim of this systematic review is to analyse the association between physical activity and sedentary behaviour (objectively measured) with cardiovascular risk and health-related quality of life (HRQoL) in adults without previous cardiovascular disease (CVD). Additionally, we intend to analyse the impact of the intensity of the physical activity in this association. This systematic review will follow the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (Page et al., 2021). The search will be carried in three electronic databases (Web of Science, SCOPUS and PubMed) in order to find studies with an observational design, that investigated the association between physical activity and/or sedentary behaviour (objectively measured) and cardiovascular risk and/or HRQoL in adults without history of cardiovascular disease. For quality assessment we will use The National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart Lung & Institute, 2019). This review will clarify the impact of physical activity and sedentary behaviour in the cardiovascular risk and HRQoL of adults, especially the impact of physical activity intensity. The results of this review will influence the promotion of behavioural change in population.

Keywords: Quality of life, Accelerometery, Cardiovascular risk factors, Sitting time, Adults.

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INTRODUCTION

CVD are the most fatal non-communicable diseases globally (Visseren et al., 2021). In order to prevent these diseases and minimize the related mortality, it is necessary to identify the risk factors of them and promote its reduction in the population. The most well-known risk factors are hypercholesterolemia, hypertension, smoking habits, diabetes mellitus, high body mass index, physical inactivity, and sedentary behaviour (Visseren et al., 2021). Some of risk factors mentioned above (i.e., hypertension, hypercholesterolemia, diabetes mellitus, high body mass index and sedentary behaviours) are also associated to low levels of HRQoL (Salinas-Rodríguez et al., 2022). Increase physical activity and reduce sedentary behaviour is highly recommended for all but specially for people with high cardiovascular risk since sedentary time are associated with greater risk for several major chronic diseases and mortality (Visseren et al., 2021). At the same time, people who follow physical activity recommendations have high levels of HRQoL in the physical and mental domains according to various authors. On the other hand, individuals who spend more daily hours in sedentary behaviours have lower levels of HRQoL(Salinas-Rodríguez et al., 2022). The association between physical activity with cardiovascular risk and HRQoL has been studied for some authors but non-systematic review has explored the impact of physical activity and sedentary behaviour (objectively evaluated) in cardiovascular risk and in the HRQoL in adults without previous CVD. Additionally, is unclear the impact of the intensity of the physical activity (objectively evaluated) in the association between physical activity and cardiovascular risk and HRQoL in adults. The aim of this systematic review is to analyse the association between physical activity and sedentary behaviour (objectively measured) with cardiovascular risk and HRQoL in adults without previous CVD. At the same time, we intend to analyse the impact of the intensity of the physical activity in this association.

MATERIAL AND METHODS

This systematic review will follow the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines(Page et al., 2021). The protocol of this systematic review was registered in the PROSPERO International Prospective Register of Systematic Reviews with the registration number: CRD42023401025. The search will be carried out in the following databases: Web of Science, PubMed and SCOPUS. The literature search will be performed according to the PICO strategy(Methley et al., 2014), and will include a combination of free-text and the Key Medical Subject Heading (MeSH terms). Eligible studies should respect the following criteria created with the PICO (Population: Adults, without history of cardiovascular disease; Intervention: Objectively measured physical activity and/or sedentary behaviour assessment; Outcome: Cardiovascular risk and HRQoL) to be included: a) Studies that investigated the association between physical activity and/or sedentary behaviour and cardiovascular risk and/or HRQoL in adults; b) studies that evaluated cardiovascular risk objectively with SCORE2 or other validated scale/algorithm that present the result in a score/percentage; c) studies that evaluated HRQoL with WHOQOL- BREF or other validated questionnaire; d) studies that evaluated physical activity and sedentary behaviours objectively; e) studies that include individuals without previous CVD; f) studies in which the minimum age of participants exceeds 18 years and the maximum age of participants does not exceed 65 years; g) epidemiological studies of cross-sectional, observational, cohort and population-based designs; h) Peer-reviewed studies published in English, Spanish or Portuguese.

Data from search will be imported into Endnote X9 (Thomson Reuters EndNote X9), and all duplicates will be removed. The process of the selection will be performed in phases by two independents reviewers. Initial, the studies will be selected based on the titles and abstracts. After this, the studies selected will be reviewed in their entirety taking into account the specific eligibility criteria. In case of a disagreement over the inclusion

of articles, these will be resolved through mediation by a third reviewer. The extraction of data from the selected studies as well as the extraction of the characteristics of these studies will be performed independently by the two reviewers involved in the selection of the studies.

To evaluate the quality and risk of bias of the studies, will be used The National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies(National Heart Lung & Institute, 2019). This checklist includes 14 items and each one will be classified as "*yes*" (Y), "*no*" (N), "*not applicable*" (NA), "*not reported*" (NR) or "*cannot determine*" (CD). Based on number of items classified with "*yes*" and the total of items applicable for each study will be calculated a total score and a percentage. Based on this percentage, the studies will be classified according to quality rating: Poor < 50%, Fair 50–75% and Good >75%.

RESULTS

The initial search in the database identifies a total of 5819 potentially eligible studies. The selection of the studies will be done in accordance with phases described above in order to identify the studies that will be included in the systematic review.

DISCUSSION

This systematic review will be the first, to our knowledge to explore the impact of physical activity and sedentary behaviour (objectively evaluated) in cardiovascular risk and in the HRQoL in adults without previous CVD. Additionally, we pretend to clarify the impact of the intensity of the physical activity (objectively evaluated) in the association between physical activity and cardiovascular risk and HRQoL in adults. The results of this systematic review will influence the promotion of behavioural change in population and contribute to improve the physical activity prescription.

CONCLUSIONS

This systematic review protocol is in line with Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (Page et al., 2021). This protocol is essential for the correct elaboration of the systematic review.

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Differences in neuromuscular load in basketball according to player's sex

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ABSTRACT

Understanding and effectively managing the neuromuscular load in basketball empowers players to elevate their performance, mitigate the risk of injuries, and extend the longevity of their playing careers. The objective of the present study was to analyse the differences that may occur on neuromuscular load according to the player's sex in a basketball game. Using an ex post facto design, 17 professional male and female players were analysed during an official game. Inertial devices were used to measure the external and internal load of each player. A Student's t-test was used to analyse the dissimilarities. Significant differences were found, mainly with higher values within the female players. By conducting comprehensive studies in this field, coaches and sports scientists can gain valuable insights into the specific physiological and biomechanical responses of basketball players during training and competition. This knowledge can inform the development of evidence-based training strategies that optimize player performance.

Keywords: Basketball, Sex differences, External load, Neuromuscular load, Competition.

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INTRODUCTION

Basketball's demanding schedule and intermittent high-intensity nature require athletes to perform offensive and defensive actions within a limited time. The neuromuscular load, which places stress on nerves and muscles during the game, plays a crucial role in impacting performance and well-being. An integral factor in enabling actions such as jumping and shooting, this neuromuscular load is shaped by dynamic manoeuvres, the forces of landing, alterations in direction, and repetitive movements (Petway et al., 2020). Proper conditioning and recovery strategies are vital to mitigate the risk of injuries and overuse. Coaches should focus on tailored strength and conditioning programs, technique refinement, rest periods, and monitoring strategies to optimize neuromuscular performance and minimize injury risks (Svilar et al., 2018). Understanding and managing neuromuscular load can enhance basketball players' performance and career longevity by aligning training with the demands of competition, particularly for male and female players (Ponce-Bordón et al., 2021). Therefore, the aim of this research was to analyse the differences in the neuromuscular load supported during competition in male and female professional basketball players. This will allow us to know the demands and to be able to adjust training to the demands of the competition.

MATERIAL AND METHODS

Seventeen professional male and female players from ACB and LF Challenge leagues, aged around 26 with an average height of 1.88m, were the participants. The independent variable was player sex, while dependent variables included player load/min (total, horizontal, vertical) and impacts/min categorized by G-force ranges. Data were collected using WIMU ProTM inertial devices with ultra-wideband antennas and Garmin heart rate straps during a league match. Ethical approval was secured, and data was analysed using Jamovi 2.3.28 software. Student's t-test and Mann-Whitney U test assessed parametric and nonparametric variables, respectively. Cohen's d gauged effect sizes.

RESULTS

Table 1. Differences between the averages depending on the player sex.

Variable	Test (St.)	Est.	*p*	Test (E.S.)	E.S.
PLmin	b	28.50	.50	r	.21
PLHmin	b	34.00	.89	d	.10
PLVmin	b	27.50	.44	r	.24
IMPmin	a	-4.73	**<.001**	d	-2.30
IMPmin01	a	-1.85	.08	d	-.90
IMPmin12	a	-5.23	**<.001**	d	-2.54
IMPmin23	b	12.00	**.02**	r	.66
IMPmin34	b	19.00	.11	r	.47
IMPmin45	b	31.00	.67	r	.14
IMPmin56	a	0.19	.85	d	.10
IMPmin67	a	0.92	.37	d	.45
IMPmin78	a	0.75	.47	d	.36
IMPmin89	a	1.30	.21	d	.63
IMPmin+9	a	1.85	.08	d	.90

Note. a: Student's t-test; b: Mann-Withney U test; d: Cohen's d; r: correlation biserial range. St.: Statistic; E.S.: Effect Size.

In Table 1, we present the outcomes of the mean value differences when analysing the variables based on the player sex considering the nature of the data, whether it is parametric or nonparametric.

DISCUSSION

The research aimed to identify differences in neuromuscular load between male and female basketball players during official games. Several significant distinctions were observed. Basketball involves diverse movements that challenge the neuromuscular system, including dynamic actions like jumping and sprinting, which stress muscles and nerves. Actions such as landing and blocking shots also contribute to neuromuscular load. Results indicated noteworthy differences in neuromuscular load indicators between male and female players. Female players exhibited higher impacts per minute and impacts per minute within the 1 to 2 G range, indicating potential significance. In contrast, male players had higher impacts per minute within the 2 to 3 G range. These findings suggest a gender-specific pattern in neuromuscular load distribution. This might be attributed to variations in load distribution and absorption capacity between genders (Gómez-Carmona et al., 2022). Acknowledging these differences is crucial for tailored basketball performance and injury prevention strategies, especially due to the higher impact rates among female players and the distinct impact distribution in males. Further investigation is needed to comprehend the implications of these findings on performance and health.

CONCLUSIONS

Overall, these results shed light on the significance of understanding the differences in neuromuscular load between male and female basketball players. By recognizing and addressing these distinctions, coaches, trainers, and sports scientists can develop tailored training and injury prevention approaches that account for the unique physiological responses and biomechanics in each gender. Moreover, these findings call for additional research to explore the underlying mechanisms driving the observed disparities and investigate potential sex-specific interventions to optimize performance and ensure the well-being of athletes in basketball and other sports contexts. By continually seeking new knowledge and implementing evidence-based practices, the sport can evolve, and players can reach their full potential on and off the court.

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Land evaluation of suitability for the practice of foot orienteering using a spatial multicriteria method. A case study in the central eastern region of continental Portugal

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ABSTRACT

Orienteering is a sport in which the orienteer completes a course of control points in the shortest possible time, aided only by a map and compass, involving the choice of itineraries, through reading and interpreting the map and its relationship with the terrain. The most important factors for selecting areas for orienteering are difficult and challenging terrain that enables good course setting. Finding a suitable area for foot orienteering involves multiple criteria. The main features that provide the athlete greater opportunities for testing navigation skills are, among others, a detailed representation of the terrain, containing rich landforms, and its cover, since foot orienteering is a sport organized in forests or natural areas. Based on these principles, this study aims to assess the suitability of the Central Eastern Region of Continental Portugal for the practice of Foot Orienteering. The suitable areas and their constraints were identified based on integrating a set of criteria using multicriteria spatial analysis tools in a GIS environment. For this purpose, the following descriptors were integrated: land cover, slope, slope variation, Topographic Position Index (TPI), and aspect variation. The criteria were classified into four levels of suitability, calculated by applying the Hierarchical Analytical Process. Based on the results obtained by the proposed methodology, we concluded that 52.5% of the study area presents high suitability for foot orienteering at a competitive level. That is a notable potential resource for the advancement of the sport, and for further refinement of the presented methodology based on additional data and criteria.

Keywords: Land cover, Multicriteria analysis, Foot orienteering, Suitability, Terrain modelling.

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INTRODUCTION

Orienteering maps are detailed maps specially designed with the intention of supporting the competitor in the navigation, allowing them to locate the control points in the terrain and to decide which is the ideal route (Aires et al., 2011). The usual way to determine if a terrain is suitable for orienteering is through field control by an expert (Darken & Banker, 1998). The factors considered are steepness, the density of vegetation, run ability, and the frequency of changes in the terrain (Tutić et al., 2018, Petrovic, 2009). A pre-selection of suitable terrains for orienteering can reduce the time and costs involved in the process. Tutić et al. (2018) proposed a spatial multiple-criteria decision-making approach to determine areas suitable for Foot Orienteering in Croatia and Slovenia. The authors used criteria like terrain slope, slope variation, aspect, aspect variation, and land cover. Another criterion widely used in studies of terrain characterization is the Topographic Position Index (TPI), which detects distinct slope positions and landforms (Fabian, 2004). The present study aims to analyse the land suitability for the practice of Foot Orienteering in the Central Eastern part of Continental Portugal (NUTS: Médio Tejo, Alto Alentejo, and Beira Baixa). For that purpose, a multicriteria spatial analysis tool - the Analytical Hierarchical Process (AHP) in a GIS environment was used, integrating different biophysical factors.

MATERIAL AND METHODS

Data collection and processing

The datasets used in the study were EU-DEM for the terrain model and COS 2018 for the Land Use Land Cover (LULC) information. A spatial database was created in ArcGIS 10.8 software. From EU-DEM, the layers slope, slope variation, aspect variation, and TPI were calculated using 3D analysis tools. All layers were classified into four levels of suitability for Foot Orienteering.

Analysis

The Analytic Hierarchy Process (AHP) was performed by combining all weighted spatial layers (Saaty, 1987). The AHP process was completed by validating the consistency of the pairwise comparison.

RESULTS

The maps resulting from the spatial analysis and geoprocessing in order to perform the AHP, as well as the range of values obtained, are: Land Use Land Cover (9 classes), Slope (0 to 62.01%), Slope Variation (-53.21 to 394.89), Topographic Position Index - TPI (-189.81- to 111.50) and Aspect Variation (-314.55 to 323.24). The criteria values from terrains with existing orienteering maps used for high-level competitions with values of the spatial neighbourhood between the 5th and 95th percentile of the distribution are the following: Slope (0 to 33.96%), Slope Variation (-7.44 to 22.75), TPI (-19.59- to 57.75) and Aspect Variation (-233.47 to 205.23). For LULC, the land cover data in the COS 2018 dataset is on a nominal scale (distinct land cover classes), and the analysis was performed using local operators. The values of the criteria obtained for the areas with orienteering maps were considered in the presented classification. As a result of the application of the AHP, the mapping of the overall suitability of terrain for Orienteering events was obtained, with 7367.19 km^2, corresponding to 52.5% of the territory, having high potential for the practice of Foot Orienteering. The municipalities with the greatest potential for the practice of Foot Orienteering and, consequently are Ponte de Sôr (2.77 ± 0.50), Gavião (2.69 ± 0.51), and Abrantes (2.68 ± 0.55), with 38.2% of the total municipalities having a suitability level above 2.5 on a scale of up to 3. The value of the consistency ratio (RC) obtained was 0.03. Assuming, therefore, the existence of a good consistency in the pairwise comparison of the matrix.

DISCUSSION

The hypothesis that there are new terrains suitable for high-level Orienteering events, and that can be identified through multicriteria spatial analysis, is proven by applying the proposed methodology to the case study. Those conclusions corroborate those obtained by the other known study in which a multicriteria spatial approach was performed to identify areas that meet criteria suitable for Foot Orienteering (Tutić et al., 2018). The innovative aspect of the investigation carried out consists, in addition to being the first of its kind to be carried out in Portugal, in the fact that the TPI was introduced in the analysis. This methodology reduces time and costs in the process of selecting new terrains for Orienteering and helps the ongoing development of the sport with its benefits for participants and society and aims to the filling of the gap in the literature concerning studies in this field.

CONCLUSIONS

Based on the results obtained by the proposed methodology, we can conclude that the studied region has a high potential for the practice of Foot Orienteering in more than half of its territory. This is a remarkable potential resource for the development of this sport. Greater detail in the base information, more specifically in the LULC survey (e.g., the density of shrub cover, the network of rural roads) will allow obtaining additional criteria regarding run ability by the athletes, an important factor in determining suitability for Foot Orienteering. There are also other factors that can influence the final choice of new land to map, namely the restrictions in land access, frequency of changes in use, and existing risks.

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Load differences in basketball according to the final outcome

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ABSTRACT

Basketball is a sport that involves five players per team in order to score more points than the opponent. The objective of the present study is to analyse the differences that may occur according to the outcome in a women's basketball game. Using an ex post facto design, 19 professional female players were analysed during an official game. Inertial devices were used to measure the external and internal load of each player. A Student's t-test was used to analyse the dissimilarities. Significant differences were found, with higher values within the winner. A greater individualization of training is recommended, modulating the intensity and the volume. More research should be done in professional women's basketball.
Keywords: Women, Load monitoring, Training, Competition, Match outcome.

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INTRODUCTION

To optimise performance in basketball, the differences between training and competition should be kept to a minimum (Reina et al., 2019). To do this, it is necessary to analyse what happens in competition to represent it in training. Due to the existing problem in finding articles that analyse the physical load resulting from competition in women's basketball, the main objective of this research is to find the differences in the physical demands (internal and external load) resulting from an official women's game depending on the final outcome.

MATERIAL AND METHODS

Participants

The participants of this research were 19 professional female players belonging to two teams of the LF Challenge league, during the 2021/22 season.

Measures

The independent variable of the study was the final outcome of the match. The dependent variables extracted for the analysis referred to distance, accelerations, heart rate, speed, impacts, jumps and player load.

Procedures

Data were collected in a match in which both teams were monitored simultaneously. An informed consent was signed by all involved. The research was conducted following the criteria of the Declaration of Helsinki (2013) and was approved by the Bioethics Committee of the University of Extremadura (206/2022).

Analysis

Statistical analysis was performed with the Jamovi 2.3.28 tool (The Jamovi Project, v.2.3, 2022). Criterion assumption tests were performed, grouping the variables into parametric and nonparametric. A Student's t-test and a Mann-Withney U-test were performed.

RESULTS

Table 1. Differences between the averages depending on the final outcome of the match.

Variable type	Variable	*n*	$\bar{X} \pm SD$	Test (St.)	Est.	*p*	Test *(E.S.)*	*E.S.*	*pwr*
OIL	Max HR	65	181.00 ± 13.00	b	520.00	.92	r	0.02	.06
	% Max HR	65	84.80 ± 6.53	b	401.00	.10	r	0.24	.25
EOKL	Distance	65	75.00 ± 9.40	a	-0.20	.84	d	-0.05	.07
	Explosive Dist.	65	13.20 ± 2.94	a	2.22	**.03**	d	0.55	.71
	Max Acceleration	65	5.61 ± 1.30	b	325.00	**.01**	r	0.39	.46
	Max Deceleration	65	-5.87 ± 1.46	b	454.00	.33	r	0.14	.14
	High Intensity Acc. Dist.	65	6.61 ± 3.32	b	310.00	**.01**	r	0.41	.50
	High Intensity Dec. Dist.	65	6.64 ± 2.99	b	435.00	.23	r	0.18	.28
	Sprint	65	1.74 ± 1.55	b	353.00	**.02**	r	0.33	.37
	High Speed Running	65	4.34 ± 2.79	a	2.86	**.01**	d	0.70	.87
	Max Speed	65	21.40 ± 3.68	b	323.00	**.01**	r	0.39	.46
NEOL	Impacts	65	151.00 ± 44.60	b	404.00	.11	r	0.24	.25
	High Intensity Impacts	65	0.57 ± 0.47	b	497.00	.68	r	0.06	.08
	Player Load	65	1.06 ± 0.37	b	414.00	.14	r	0.22	.22
	Dist. High Metabolic Load	65	14.60 ± 4.37	a	2.67	**.01**	d	0.66	.84

OIL: Objective Internal Load; EOKL: External Objective Kinematic Load; NEOL: Neuromuscular External Objective Load. a: Student's t-test; b: Mann-Withney U test; d: Cohen's d; r: correlation biserial range. St.: Statistic; E.S.: Effect Size; pwr: Power.

Table 1 shows the results of the differences in the mean values when comparing the variables according to the final outcome.

DISCUSSION

The results of the tests to find differences according to the outcome show significant differences in seven of the fifteen variables analysed. These variables correspond to external kinematic load, except for high metabolic load distance. Of these variables, high-speed running and high metabolic load distance presented a high effect size and a power greater than .80. It should be noted that all the variables with significant differences correspond to variables that represent high or maximum intensity, with higher values obtained by the players of the winning team. These results point out the importance of high-intensity training in professional women's basketball, because players must be able to tolerate high rates of speed and acceleration in competition, and develop high power values (Aschendorf et al., 2019).

CONCLUSIONS

The main objective of this work was to find out the differences in the physical demands in a female official match depending on the final result. There are differences in the intensity of the winning teams versus the losers (in favour of the winners). Coaches and physical trainers should train in all sessions with high intensity, seeking to maintain high speeds, accelerations, and power in the tasks.

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Boxing injuries in Portugal

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ABSTRACT

Boxing has been popular among athletes and spectators for centuries, as well as the injuries that come with it. The aim of this study was to quantify the injuries incidence (II) over the past 3 years and to detect common injury patterns and risk factors among boxing performers (BP). It was produced a 66-item questionnaire shared by BP. Statistical analysis was performed using IBM SPSS software version 29.0. The significance level was 5%. Data is presented with average ± standard deviation for quantitative variables and as frequency and percentage for qualitative variables. Normality was verified using the Kolmogorov-Smirnov test. A three-step hierarchical linear regression was performed. After selection we obtained 583 answers (76.0 % male; 29.15 ± 10.99 age; 173.65 ± 13.29 cm height; 74.42 ± 14.83 kg weight). There were 146 B (21.4%) one injury, 21 (3.6%) two injuries. We found an injuries incidence of 0.53 injuries per 1000 training hours per year. The highest number of injuries was during sparring (34.3%) and the most frequent was inflammation (28.1%). The following risk factors were significant: athletes' height ($p \leq .001$), competition ($p \leq .047$), and strength training ($p \leq .036$). In our study, we concluded that the lesions incidence was low, compared to previous studies and it supports the literature regarding the decrease of II, namely in amateur boxing.

Keywords: Boxing, Sport injuries, Fights, Sparring.

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INTRODUCTION

Boxing has been popular among spectators and performers for many centuries, as have the injuries that come with it. It is considered a dangerous sport, causing serious head injuries and trauma. Loosemore and coworkers (2015) conducted a prospective study in amateur boxing over 5 years, where they concluded that significantly more injuries affected the hand region, however, injuries occurred more in training than in competition. In a similar study in the United States, boxing was found to be responsible for many annual emergency room visits, with under-20s and males being more susceptible to injuries. The most frequently injured anatomical regions were the hands, wrists and shoulders (Lemme et al, 2018). Based on the previous literature it is observed that there is a high rate of injuries in boxers (B), with bigger injuries appearing in the head, hands, elbows and shoulders. There is no conclusive evidence in scientific literature on the risk factors associated with the development of professional or amateur boxers. Although some studies provide knowledge on the occurrence of injury in boxing, they lack information on the mechanism of injury, the specific techniques or phase of training or competition that led to injury occurrence. Additionally, the current literature also lacks information on post-injury and its return to boxing practice. In the present study, the aim is to quantify the 3-year incidence of boxing-related injuries, and how to detect common injury patterns and risk factors among boxers. We also analysed the effectiveness of measures taken by athletes to prevent injuries and to identify behavioural adaptations after the injury.

METHODS

The study was only for individuals who practiced boxing. The survey of the occurring injuries during Boxer practice was developed through a 66-item final questionnaire. The online survey was open for 30 days between the months of June and July 2023 A total of 604 answers were obtained, after selection 23 were excluded (6 did not show interest in participating; 13 lived outside Portugal; 2 gave up after question no. 16), leaving 583 valid answers, mostly male 443 (76.0%), female 139 (23.8%) and miscellaneous 1 (0.2%). With an average and standard deviation in age 29.15 ± 10.99, height (cm) 173.65 ± 13.29 and weight (kg) 74.42 ± 14.83. The analysis data is presented as average ± standard deviation (SD) for quantitative variables, and as absolute frequency and percentage for qualitative variables. Normality of the dependent variable was verified using the Kolmogorov-Smirnov test. A three-stage hierarchical linear regression was performed, with the incidence of injury as the dependent variable. Statistical analysis was performed using IBM SPSS software, version 29.0. The adopted significance level was 5%.

RESULTS

This sample consists mostly of male individuals (76.0%), who have never competed (70.5%); the most common is that they already practiced Boxing between one and three years (23.3%), spent between three and five hours per week training (33.6%), and those who competed in Amateur Boxing (27.1%). Most injuries occurred during sparring (34.3%). The most common techniques where these injuries appear are in hook execution (20.5%) e and when striking (32.1%). Of the 583 observed individuals 146 (25.0%) had one injury, 21 (3.6%) had two injuries and none had three injuries in the past three years. The most frequent injury was Inflammation (28.1%) and the region was the shoulder (17.8%). We registered an injury incidence of 0.53 injuries per 1000 hours of training per year. Regarding the risk factors, the participant factor revealed that height is a determinant for II ($p \leq .001$), taller B are susceptible to fewer injuries. The average height of those with one injury was 175.49 cm while those with two injuries was 173.43 cm. It was found significance in the frequency of competition ($p \leq .047$), the higher the frequency of competition, the lower the incidence of injury. In preventive measures to avoid injuries, strength training showed significance ($p \leq .036$). After injuries, B

present some behavioural changes, with the doing more stretching the one that presents the highest frequency (27.4%).

DISCUSSION

Our study compared to similar ones is based on a larger sample size (583 B) than in identical studies (Loosemore et al, 2015; Siewe et al, 2015). Author Lemme and colleagues (2018) report that after the changes in the rules developed by boxing organizations in 2013 injury rates were lower, as in the systematic review and meta-analysis by Mao and colleagues (2023) who concluded that injuries incidence remains high in professional boxing, but in amateur boxing it has reduced in the last 10 years. In our study, we recorded a lower II than in studies by Alvevras et al (2022) and Siewe et al (2015). Most injuries occurred during sparring. Height is a risk determinant for a B, it was found that taller B tend to be less injured. The average height of those with one injury was 175.49 cm while those with two injuries was 173.43 cm. Some studies contradict our results, that in Kickboxing and Muay Thai athletes, the taller ones tend to be more injured. In terms of frequency of competition, we obtained different outcomes to that shown in the literature, our data revealed, with a significance, that B who competed more often had fewer injuries, establishing controversy with the study by Siewe and colleagues (2015) who reported that boxers who do more than 3 fights per year suffer more injuries. However, our study corroborates the study by Loosemore et al (2015) where they reported that injuries occurred more in training than in competition. Regarding the preventive measures adopted to avoid injuries, strength training was significant, but those who use this type of training were subjected to a greater number of injuries than those who do not. Collected data goes against the existing literature, indicating that stronger athletes produce tasks with superior performance. Greater muscle strength allows the individual to enhance and reduce the risk of injury. Although, there are intrinsic and extrinsic factors that can influence or enhance an injury, which were not evaluated in this study, however, we can assume that there may not exist a direct connection here with the results of our study, in which strength training causes more injuries.

CONCLUSIONS

Data confirms descriptions in the literature regarding the decreasing incidence of boxing injuries, especially in amateur boxing. This study had important implications for boxing literature concerning injuries, common injury patterns and risk factors, as well as preventive factors and behavioural changes. Future research is advised in order to contribute to boxing's development regarding sports injuries.

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Characterization of external and internal load metrics during the preparation for a male international elite rink hockey championship

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ABSTRACT

It is important to manage the training process and ensure positive adaptation according to competitive demands to improve players' performance in a team sport such as rink hockey. This research aimed to investigate the training load through external (EL) and internal load (IL) dynamics during preparation for a top-level national team during the 2021 Rink Hockey European Championship. A non-experimental descriptive method was developed. A two-way mixed design ANOVA was utilized to compare EL and IL across microcycles during training sessions: In general, results revealed significantly higher values between training match day -3 (TMD-3) to TMD-1 for Player Load (PL) ($p \leq .05$) distance covered (DT) and high-speed skating (HSS) ($p \leq .001$). Significant differences were observed on s_RPE on TMD when compared to TMD-3, -2, and -1. In conclusion, different EL and IL dynamics were observed during the preparation weeks; however, s_RPE did not present a "*U*" wave tendency from TMD-3 until TMD. Such results highlight the need to understand each sport's competitive dynamics and use the most appropriate metrics to monitor the preparation process.

Keywords: Indoor team sports, Physical performance, Load monitoring, Local position system, Fatigue.

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INTRODUCTION

Tracking athlete training and competition load is crucial in team sports like rink hockey. It helps assess adaptation and balance stress and recovery. External load measures work accomplished by players, while internal load represents physiological stress. EL can be categorized into three types: kinematics, mechanical, and metabolic.(Impellizzeri et al., 2019). Rink hockey is a team sport with four field players and one goalkeeper. Games have two periods of 25 minutes each. This sport involves intense and varied actions with incomplete recovery periods. It is also characterized by high-intensity actions such as accelerations, decelerations, sprints, and changes of direction (Fernández et al., 2021). The availability of tracking technology allows for a better knowledge of games and player needs in indoor sports like rink hockey. Therefore, the goal of this study was to better understand the dynamics of external and internal load over the two weeks of preparation of an elite team for a European Championship.

MATERIAL AND METHODS

Participants

Nine male rink hockey players aged 29.89 ± 3.41 years, height 175.7 ± 4.21 cm, and body mass 80.03 ± 8.33 kg participated in the study.

Procedures

A non-experimental descriptive method was used to characterize the training sessions and training matches during the two (2) preparation weeks (TW-2 - two training weeks preceding the competition and TW-1 – one week before the competition). The in-preparation weeks included three training sessions followed by one training match (TMD-3, TMD-2, TMD-1) and 2 training matches (TMD). Also, training sessions were grouped according to the days distancing the training matches during the TW-2 and the TW-1 (e.g., TMD-3; TMD-2; TMD-1 and TMD).

Measures

EL variables calculated with WIMU PROTM's local positioning system.: distance travelled (DT; m); medium speed skating, (MSS (12.1-18 km/h); /m); high speed skating (HSS (18.1-30 km/h); /m); number of high impacts (Himpt (8-100 G); n); number of high intensity accelerations (ACC (3-10 m/s²); n); number of high intensity decelerations (DEC [-3 -10]m/s²); n); and Player Load (PL;au). Player RPE was measured using a Borg scale 30 minutes after each training and game to capture overall effort.(Impellizzeri et al., 2019). The overall TL was described by the session-RPE. Descriptive statistics were calculated.

Analysis

Data normality was tested by the Shapiro-Wilk test. EL and IL across weeks and training days were compared using ANOVA with Bonferroni pairwise comparisons.

RESULTS

The analysis of training weeks revealed a general decrease in all the variables from TMD-3 to TMD-1. Significant differences ($p \leq .05$) were also observed between TMD-3 and TMD-2 in comparison with TMD-1 for PL. Further, significant differences ($p \leq .05$) were observed between TMD-3 and TMD-1 for DT and HSS.

The comparison between training matches (TMD) and training sessions (TMD-3 to TMD-1) during the weeks TW-2 and TW-1 revealed that the total duration of the session (DS) and all EL and IL variables of TMD were significantly ($p \leq .05$) higher than in TMD-3, TMD-2, and TMD-1.

The TW-2 revealed higher significant values ($p \leq .05$) in IL metrics RPE and s-RPE and in EL metric (DT) in comparison with the TW-1. In opposition, TW-1 revealed higher significant values ($p \leq .05$) in EL metric ACC in comparison with the TW-2. No other differences were observed in EL variables between TW-2 and TW-1.

DISCUSSION

During the training weeks, the management of training load was developed with reference to the TMD, both in TW-2 and TW-1 with a wavy dynamic. While TW-2 was characterized by high levels of RPE, s-RPE and DT, TW-1 was characterized by high levels of ACC. An attempt of a tapering process was promoted in the TW-1. Results revealed that DT, PL and HSS were higher in TMD-3 in comparison with TMD-2 and TMD-1. As observed in other sports, this decrease of kinematics (DT and HSS) and mechanical (PL) metrics before the TMD suggests a tapering strategy in which EL metrics tend to decrease as match day approaches. Regarding the load dynamics, Fernández et al. (2021) have reported an inverted "*U-Shape*" with higher EL and IL values on MD-3 and MD-2 during each microcycle. However, these results characterize a regular training week before a match day during a national rink hockey championship. In this sense, and regardless of the tapering strategy, our results characterize a different load dynamic than previously reported. We, therefore, believe that this may be related to the different structures of each championship and strategy used to improve athletes' physiological adaptation as suggested by Tarragó et al., 2019. Although in our study TMD-3 present higher values when compared to TMD-2 and TMD-1, they were nevertheless lower when compared to TMD values. We believe that the lack of information regarding match demands in rink hockey may contribute to such differences. We did not observe significant differences in EL metrics between TW-2 and TW-1. The higher values of RPE and s-RPE observed in TW-2 when compared to TW-1, may have been influenced by the DS and not so much by EL variations. Training volume has a greater impact on IL metrics than intensity at this stage. There were no significant differences between kinematic and mechanical metrics in TW-2 and TW-1, except for ACC. Tapering was attempted by decreasing DS.

CONCLUSIONS

Different load dynamics were observed in this study throughout the training of an elite male rink hockey team for an international championship, which is consistent with tapering strategies. Training sessions do not translate a normal *"U"* wave in s_RPE and EL measures. This data may provide an intriguing perspective on training load (TL) tracking. Monitoring the training load should also entail measuring the competition demands and the relationship between subjective measures and sports-specific performance in order to establish a preferred training load model.

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Correlation between squat jump and agility tests in soccer and futsal players

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ABSTRACT

Futsal, with its tactical dynamism and agility, demands motor mastery and quick thinking. Soccer, on expansive fields, requires endurance and precise strategy. Physical condition is a crucial foundation in both, optimizing performance and preventing injuries. Both modalities exemplify the symbiosis between body and mind in the sporting context. Agility ability is associated with jumping, resulting in improved time in agility drills with increased jumping in players. Squat Jump (SJ) training was shown to improve physical ability in soccer players in pre-season. The purpose of this study was to verify the correlation between SJ (Jump Height (JH), Flight Time (FT), Power (P), Initial Speed (IS)) and the agility tests (T Test, Three Cone Test and Reactive Agility Test) in young soccer and futsal players. Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg). The subject performed the "*Squat Jump*" (SJ) from a contact mat using the Chronojump system, followed by three agility tests, T-Test, Three-Cone Test and Reactive Agility Test. The results show that there is a more significant correlation between explosive power and agility in futsal players than in soccer players. Taking this into consideration coaches should continue to work on strength through jumping which will help with their agility.
Keywords: Agility, Jumping, Significant, Futsal, Soccer.

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INTRODUCTION

Given the intermittent nature of soccer and the wide range of intensities that characterise it, soccer players should focus their training on developing explosive strength, speed, anaerobic endurance and aerobic endurance. The reduced size of the futsal field will cause a constant pressure from the opposite players, so the players are found under constant markings and in 1v1 situations. Squat Jump training was shown to improve physical ability in soccer players in pre-season (Loturco et al., 2016). Agility training has long been a component of any soccer training programme but has not been well researched scientifically. The purpose of this study was to verify the correlation between squat jump and agility in young soccer and futsal players. The existing literature points to the existence of a negative correlation between squat jump and agility.

MATERIAL AND METHODS

Participants

Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) volunteered to participate in this study. All subjects signed an informed consent form.

Measures

This study was a cross-sectional analysis, whereby subjects performed the "*Squat Jump*" (SJ) from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain), followed by three agility tests, T-Test, Three-Cone Test and Reactive Agility Test.

Procedures

After arriving facilities, ratters gave participants standardized instructions about the tests procedures. All participants before the test, performed a short warm-up run of 5 minutes. Each participant performed 3 trials of the SJ with 1 minute of rest between each trial. Finally, participants performed three agility tests in different days, each performed 3 trails for each agility test with 2 minutes of rest between each trial.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using the Shapiro-Wilk test. Spearman's rank or Pearson's coefficient (r) were used to verify correlations between JH, FT, P and IS and the strength of the correlation was classified by the Guidelines of Mukaka (2012).

RESULTS

Table 1. Correlation between variables in soccer players under analysis, significance level (p) and correlation coefficient (r).

Soccer		Jump Height (cm)	Flight Time (s)	Power (Watts)	Initial Speed (m/s)
T Test (s)	*r*	-0.068 [a]	-0.061 [a]	-0.608 [b]	0.004 [a]
	p	.701	.731	<.001*	.981
Three cone test (s)	*r*	-0.150 [a]	-0.108 [a]	-0.443 [b]	-0.070 [a]
	p	.398	.543	.009*	.692
Relative Agility Test (s)	*r*	-0.167 [b]	-0.191 [b]	-0.537 [b]	-0.128 [b]
	p	.344	.279	.001*	.471

*Note. *p ≤ .05; [a] Spearman's correlation; [b] Pearson's correlation; r – Correlation coefficient; p – significance level; s – seconds; cm – centimetres; m/s – minutes per second.*

In Table 1 there was only found significant correlation between power and the agility tests and a positive relationship between IS and the T test in soccer players. All the other variables have a negative little to moderate correlation strength.

While in Table 2 was found a significant correlation between all variables and shows a negative relationship between all variables with a correlation strength in low, moderate and high levels in futsal players.

Table 2. Correlation between variables in futsal players under analysis, significance level (p) and correlation coefficient (r).

Futsal		**Jump Height (cm)**	**Flight Time (s)**	**Power (Watts)**	**Initial Speed (m/s)**
T Test (s)	*r*	-0.653 [a]	-0.650 [a]	-0.727 [a]	-0.657 [a]
	p	.001*	.001*	<.001*	.001*
Three cone test (s)	*r*	-0.463 [b]	-0.471 [b]	-0.667 [b]	-0.442 [b]
	p	.026*	.023*	.001*	.035*
Relative Agility Test (s)	*r*	-0.428 [a]	-0.422 [a]	-0.712 [a]	-0.443 [a]
	p	.042*	.045*	<.001*	.034*

*Note. *p ≤ .05; [a] Spearman's correlation; [b] Pearson's correlation; r – Correlation coefficient; p – significance level; s – seconds; cm – centimetres; m/s – minutes per second*

DISCUSSION

Regarding the agility tests, in soccer players, all variables displayed little correlations, except for Power, which showed a moderate correlation, consistently being more significant. In the context of futsal, all variables were significant, with correlations predominantly being moderate and one high between P and the T Test. Negative correlations suggest that an increase in agility may be related to better jumping performance in specific circumstances. In the study by Milanović et., al 2011 they conclude that agility is a very important component in both soccer and futsal and that athletes perform similarly when it comes to this ability. Therefore, it is observed that muscle power assessments are related to performance in agility tests, due to their relevance in change of direction actions, as they are short and fast actions (Brugheli et., al 2008).

Other studies revealed that elite futsal players tend to have a higher percentage of body fat and lower muscular power in their legs. This negatively affects the height of their jumps and their performance in running, which can result in competitive disadvantages. Despite jumps being less frequent in futsal, leg strength remains crucial for optimal performance in both sports.

CONCLUSIONS

The results show that there is a more significant correlation in futsal players than in soccer players. This makes sense, because as stated in the introduction, the reduced space of the futsal field means that there is a constant marking of opposing players and 1x1 situations, situations where agility is used a lot. Compared to soccer where the field is much larger and there are fewer such situations. Also mentioned in the introduction, existing literature points to a negative correlation between squat jump and agility and this can also be seen in this study. Taking this into consideration coaches should continue to work on strength through jumping which will help with their agility.

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Correlation between the countermovement jump and agility tests in soccer and futsal players

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ABSTRACT

Futsal, with its tactical dynamism and agility, demands motor mastery and quick thinking. Soccer, on expansive fields, requires endurance and precise strategy. Physical condition is a crucial foundation in both, optimizing performance and preventing injuries. Both modalities exemplify the symbiosis between body and mind in the sporting context. Agility ability is associated with jumping, resulting in improved time in agility drills with increased jumping in players. The countermovement jump (CMJ) is used to measure the explosive power of the lower limbs in an individual. The purpose of this study was to verify the correlation between CMJ (Jump Height (JH), Flight Time (FT), Power (P), Initial Speed (IS)) and the agility tests (T Test, Three Cone Test and Reactive Agility Test) in young soccer and futsal players. Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg). The subject performed the "*Countermovement jump*" (CMJ) from a contact mat using the Chronojump system, followed by three agility tests, T-Test, Three-Cone Test and Reactive Agility Test. The results show that there is a more significant correlation between explosive power and agility in futsal players than in soccer players. Taking this into consideration coaches should continue to work on strength through jumping which will help with their agility.
Keywords: Futsal, Soccer, Agility, Jumping.

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INTRODUCTION

Futsal, demands physical, technical, and tactical skills. Quick transitions and unpredictability characterize futsal. Studies emphasize the importance of distance covered, sprints, decelerations, and metabolic power (Sekulic et al., 2021). In futsal, combining anaerobic capacity, agility, speed, and strength is crucial. Given the intermittent nature of soccer and the wide range of intensities that characterise it, footballers should focus their training on developing explosive strength, speed, anaerobic endurance and aerobic endurance. Countermovement jump training was shown to significant improvement in strength and power performance during in-season resistance training program in futsal players (Marques et al., 2022). Agility training has long been a component of any soccer training programme but has not been well researched scientifically. A soccer player changes direction every 2-4 seconds and makes 1,200-1,400 changes of direction during a game. The purpose of this study was to verify the correlation between countermovement jump and agility in young soccer and futsal players. The existing literature points to the existence of a negative correlation between countermovement jump and agility.

MATERIAL AND METHODS

Participants

Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) volunteered to participate in this study. All subjects signed an informed consent form.

Measures

This study was a cross-sectional analysis, whereby subjects performed the CMJ from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain), followed by three agility tests, T-Test, Three-Cone Test and Reactive Agility Test.

Procedures

After arriving facilities, ratters gave participants standardized instructions about the tests procedures. All participants before the test, performed a short warm-up run of 5 minutes. Each participant performed 3 trials of the CMJ with 1 minute of rest between each trial. Finally, participants performed three agility tests in different days, each performed 3 trails for each agility test with 2 minutes of rest between each trial.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using the Shapiro-Wilk test. Spearman's rank or Pearson's coefficient (r) were used to verify correlations between JH, FT, P and IS and he strength of the correlation.

RESULTS

In Table 1 the correlations were generally moderate, highlighting the complexity of this relationship in soccer players. Agility had an influence on power.

In Table 2 the correlations vary between little, moderate, and high, with the direction and intensity of the relationships specific to each agility test of futsal players. The significance implies that the relationships did not occur by chance.

Table 1. Correlation between variables in soccer players under analysis, significance level (p) and correlation coefficient (r).

Soccer		Jump Height (cm)	Flight Time (s)	Power (Watts)	Initial Speed (m/s)
T Test (s)	*r*	-0.138[a]	-0.111[a]	-0.601[a]	-0.102[a]
	p	.435	.533	<.001*	.564
Three cone test (s)	*r*	-0.099[a]	-0.056[a]	-0.414[a]	-0.045[a]
	p	.576	.754	.015*	.802
Relative Agility Test (s)	*r*	-0.213[b]	-0.182[b]	-0.583[b]	-0.212[a]
	p	.227	.302	<.001*	.229

*Note. *p ≤ .05; [a] Spearman's correlation; [b] Pearson's correlation; r – Correlation coefficient; p – significance level; s – seconds; cm – centimetres; m/s – minutes per second.*

Table 2. Correlation between variables in futsal players under analysis, significance level and correlation coefficient.

Futsal		Jump Height (cm)	Flight Time (s)	Power (Watts)	Initial Speed (m/s)
T Test (s)	*r*	-0.706[a]	-0.645[a]	-0.784[a]	-0.650[a]
	p	<.001*	.001*	<.001*	.001*
Three cone test (s)	*r*	0.058[b]	0.075[b]	-0.811[a]	-0.635[a]
	p	.743	.675	<.001*	.001*
Relative Agility Test (s)	*r*	-0.441[a]	-0.363[a]	-0.780[a]	-0.379[a]
	p	.035*	.089	<.001*	.074

*Note. *p ≤ .05; [a] Spearman's correlation; [b] Pearson's correlation; r – Correlation coefficient; p – significance level; s – seconds; cm – centimetres; m/s – minutes per second.*

DISCUSSION

This study investigated the correlation between agility tests and CMJ variables in soccer and futsal players. In soccer, agility tests exhibited varied correlations with jump-related variables. Regarding the agility tests, all variables displayed little correlations, except for Power, which showed a moderate correlation, consistently being more significant. In the context of futsal, all variables were significant, except for Jump Height and Flight Time, with correlations predominantly being moderate. While negative correlations suggest that an increase in agility may be related to better jumping performance in specific circumstances. Milanović et al. (2011) concluded that agility is a very important component in both soccer and futsal and that athletes perform similarly when it comes to this ability. Therefore, it is observed that muscle power assessments are related to performance in agility tests, due to their relevance in change of direction actions, as they are short and fast actions (Brugheli et al., 2008). Leg strength is vital for jumping and running in futsal athletes, involving repeated sprints. Despite fewer jumps than football, leg power is crucial due to intense, rapid movements inherent to futsal.

CONCLUSIONS

Futsal players show stronger correlations due to sport's agility emphasis, quick changes, and reactions. Playing style differences contribute. Coaches enhance agility via jump-focused strength training.

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Comparison between the countermovement jump in soccer and futsal players

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ABSTRACT

Futsal, with its tactical dynamism and agility, demands motor mastery and quick thinking. Soccer, on expansive fields, requires endurance and precise strategy. Physical condition is a crucial foundation in both, optimizing performance and preventing injuries. Both modalities exemplify the symbiosis between body and mind in the sporting context. The countermovement jump (CMJ) is used to measure the explosive power of the lower limbs in an individual. The purpose of this study was to analyse the differences in the CMJ outcomes (Jump Height (JH), Flight Time (FT), Power (P), Initial Speed) between young soccer and futsal players. Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) took part of this study. The participant performed the CMJ from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain). Mann-Whitney and T-Test for Independent samples were used to verify differences between groups. We found that futsal players demonstrate notably higher power than soccer players ($p < .05$; 640.85 ± 238.25 vs 566.62 ± 166.23 watts, respectively), while other jump-related variables remain similar.

Keywords: Futsal, Soccer, CMJ, Power, Motor skills.

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INTRODUCTION

Futsal, demands physical, technical, and tactical skills. Quick transitions and unpredictability characterize futsal. Studies emphasize the importance of distance covered, sprints, decelerations, and metabolic power (Sekulic et al., 2021). In futsal, combining anaerobic capacity, agility, speed, and strength is crucial (Barbero-Álvarez et al., 2008). Given the intermittent nature of soccer and the wide range of intensities that characterise it, footballers should focus their training on developing explosive strength, speed, anaerobic endurance, and aerobic endurance. The Countermovement Jump (CMJ) is widely used to evaluate the muscular explosive power of lower limbs in many sports. The main objective of this study was to establish a comparison between CMJ performance in soccer and futsal players. We hypothesised that futsal players will demonstrate superior results compared to soccer players due to the distinct physical and technical demands of this sport.

MATERIAL AND METHODS

Participants

Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) volunteered to participate in this study. All subjects signed an informed consent form.

Measures

This study was a cross-sectional analysis, whereby subjects performed the CMJ from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain).

Procedures

After arriving facilities, ratters gave participants standardized instructions about the test procedures. All participants before the test, performed a short warm-up run of 5 minutes. Each participant performed 3 trials of the CMJ with 1 minute of rest between each trial.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using Shapiro-Wilk test. Mann-Whitney and T-Test for independent samples were used to verify differences between groups. An effect size (Cohen d) analysis was used to determine the magnitude of the effect, and the following cut-off values were considered: 0–0.2, trivial; 0.21–0.6, small; 0.61–1.2, moderate; 1.21–2.0, big; >2.0, very big (Hopkins et al., 2009).

RESULTS

Table 1. Comparison between CMJ in soccer and futsal players under analysis.

Variables	Groups	N	M ± SD	Sig	p.	η^2	d	90% CI
Jump Height (cm)	Soccer	34	23.69 ± 5.47	0.101	.698[b]	---	0.338 (Small)	- 0.109 - 0.785
	Futsal	23	25.54 ± 5.47	0.600				
Flight Time (s)	Soccer	34	0.44 ± 0.5	0.315	.545[b]	---	0.026 (Trivial)	- 0.418 - 0.47
	Futsal	23	0.45 ± 0.04	0.624				
Power (Watts)	Soccer	34	566.62 ± 166.23	0.330	.345[a]	0.016	0.252 (Small)	---
	Futsal	23	640.85 ± 238.25	0.005				
Initial Speed (m/s)	Soccer	34	2.14 ± 0.24	0.279	.164[a]	0.034	0.375 (Small)	---
	Futsal	23	2.22 ± 0.23	0.661				

*Note. *p < .05; [a] T test for independent samples; [b] Mann-Whitney; η^2 – Eta squared; d – effect size; CI = Confidence interval.*

Futsal players showed significantly greater power than soccer counterparts, due to distinct sport demands favouring explosive movements and directional shifts, enhancing muscular power development.

DISCUSSION

This study investigated the differences in CMJ between soccer and futsal players. We observed that futsal players exhibit significantly higher power compared to soccer players, with no notable differences in jump height, flight time, and initial speed. The significant power disparity can be attributed to the distinct physical and technical demands of each sport. Leg strength is vital for jumping and running in futsal athletes, involving repeated sprints. Despite fewer jumps than in soccer, leg power in futsal players is crucial due to the intense, and rapid movements inherent to this sport. Contradictory results were obtained by Gorostiaga (2009), that observed that elite futsal players tend to have a higher percentage of body fat and lower muscular power in their legs. The authors reported that lower muscular power negatively affects the height of their jumps and their performance in running, which can result in competitive disadvantages. Effective strategies to improve strength and power performance in both futsal and soccer players are needed to obtain better competitive advantages. A recent study (Marques et al., 2022) showed that an in-season resistance training regimen significantly improved strength and power performance (evaluated by CMJ) in elite futsal players.

CONCLUSIONS

Our results suggested that futsal emphasizes rapid, explosive movements and frequent changes of direction, fostering greater muscular power development compared to soccer.

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Comparision of squat jump between soccer and futsal players

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ABSTRACT

Futsal, with its tactical dynamism and agility, demands motor mastery and quick thinking. Soccer, on expansive fields, requires endurance and precise strategy. Physical condition is a crucial foundation in both, optimizing performance and preventing injuries. Both modalities exemplify the symbiosis between body and mind in the sporting context. Squat Jump (SJ) training was shown to improve physical ability in soccer players in pre-season. The purpose of this study was to analyse the differences in the SJ outcomes (Jump Height (JH), Flight Time (FT), Power (P), Initial Speed) between young soccer and futsal players. Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) took part of this study. The participant performed the SJ from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain). Mann-Whitney and T-Test for Independent samples were used to verify differences between groups. We found that soccer players demonstrate higher power than futsal players, and the futsal player higher jump height than the soccer group, while other jump-related variables remain similar.

Keywords: Futsal, Soccer, CMJ, Ability, Motor Skills.

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INTRODUCTION

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MATERIAL AND METHODS

Participants

Fifty-seven young people (soccer: n = 34; age = 14.09 ± 2.68 years old, height = 1.63 ± 13.91 m, body mass = 55.33 ± 14.67 kg; futsal: n = 23; age = 14.13 ± 2.69 years old, height = 1.66 ± 13.18 m, body mass = 56.76 ± 15.79 kg) volunteered to participate in this study. All subjects signed an informed consent form.

Measures

This study was a cross-sectional analysis, whereby subjects performed the "*Squat Jump*" (SJ) from a contact mat using the Chronojump system (Chronojump-Boscosystem, Spain), followed by three agility tests, T-Test, Three-Cone Test and Reactive Agility Test.

Procedures

After arriving facilities, ratters gave participants standardized instructions about the tests procedures. All participants before the test, performed a short warm-up run of 5 minutes. Each participant performed 3 trials of the SJ with 1 minute of rest between each trial.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using the Shapiro-Wilk test. Mann-Whitney and T-Test for Independent samples were used to verify differences between groups. Finally, an effect size (Cohen d) analysis was used to determine the magnitude of effect, and the following cut-off values were considered: 0–0.2, trivial; 0.21–0.6, small; 0.61–1.2, moderate; 1.21–2.0, big; >2.0, very big (Hopkins et al., 2009).

RESULTS

Table 1. Descriptive statistics (Mean ± SD), differences between groups (p), and effect size (η^2, d, IC90%).

	Groups	Mean ± SD	*p*	η^2	*d*	CI90%
Jump Height (cm)	Soccer	22.83 ± 5.14	.838 [a]	---	0.493	0.043 - 0.944
	Futsal	25.31 ± 4.85				
Flight Time (s)	Soccer	0.43 ± 0.04	.832 [a]	---	0.5	0.049 - 0.951
	Futsal	0.45 ± 0.04				
Power (Watts)	Soccer	638.51 ± 444.56	.672 [b]	0.003	0.112	---
	Futsal	607.64 ± 177.43				
Initial Speed (m/s)	Soccer	2.12 ± 0.20	.618 [a]	---	0.064	-0.38 - 0.508
	Futsal	2.21 ± 2.21				

*Note. *p ≤ .05; [a] T test for independent samples; [b] Mann-Whitney; η^2– Eta squared; d – effect size; CI – Confidence Interval; s – seconds; cm – centimetres; m/s – minutes per second.*

Futsal players showed more jump height than soccer counterparts, on the other hand soccer players had more power than futsal player. The other two variables had similar results in both groups.

DISCUSSION

This study investigated the differences in SJ between soccer and futsal players. We observed that futsal players exhibit more jump height compared to soccer players, and soccer players more power than the futsal group with no notable differences in flight time and initial speed. The power difference can be attributed to the distinct physical and technical demands of each sport. Leg strength is vital for jumping and running in soccer athletes, involving more resistance because of the longer field and game. Gorostiaga (2009) observed that elite futsal players tend to have a higher percentage of body fat and lower muscular power in their legs. The authors reported that lower muscular power negatively affects the height of their jumps and their performance in running, which can result in competitive disadvantages. Effective strategies to improve strength and power performance in both futsal and soccer players are needed to obtain better competitive advantages. A recent study (Marques et al., 2022) showed that an in-season resistance training regimen significantly improved strength and power performance in elite futsal players.

CONCLUSION

The results show that futsal players jump higher than football players, which doesn't make sense as football players usually jump higher and more often during a game than futsal players. As with the power variable, where football players have a better average, the game of futsal emphasizes rapid, explosive movements and frequent changes of direction, thus contradicting these results.

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Analysis of the finalists of Qatar Major Premier Padel 2023

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ABSTRACT

The aim of this study was to analyse the characteristics of finishing smashes, through the validated OASP instrument, according to their effectiveness in men's professional padel. For this purpose, 880 finishing smashes corresponding to matches of the Premier Padel Major tournament played in Qatar during the 2023 season were analysed, performing a descriptive and inferential analysis. The results indicate that 73.18 % of the finishing smashes are winners, while only 26.82 % of the finishing smashes are errors. In addition, the winning final smashes are made from the areas near the net (zones 3 (CSR = 4.9) and 4 (CSR = 5.3)) and to a lesser extent from the middle areas of the court (zones 2 (CSR = 2.6) and 5 (RTC = 2.6)) and are usually flat (CSR = 8.4), parallel (CSR = 5.4) and finishing X3 (CSR = 6.2) or X4 (CSR = 5.0). While the finishing smashes that end in error are usually made from the back court (zones 1 (CSR = 8.9) and 6 (CSR = 6.7)) and are usually cut (CSR = 11.9), crossed (CSR = 5.4) and that end in own court (stay in the net; CSR = 3.9) or opposite court (the ball hits on the glass or the fence directly; CSR = 3.5). Thus, padel players should be aware of these results in order to perform effective smashes in real competition situations to promote success in the match.

Keywords: Racket sports, Game analysis, Performance, Game actions, Aerial shots.

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INTRODUCTION

The smash is an offensive stroke, without bounce, which is executed over the player's head (Sánchez-Alcaraz et al., 2020), being the most characteristic and effective finishing shot in men´s and women´s padel (Escudero-Tena et al., 2022). However, no study has been found that analyses the characteristics of finishing smashes in professional padel. Therefore, the aim of this study was to analyse the characteristics of the finalist smashes, through the validated OASP instrument, according to their effectiveness.

MATERIAL AND METHODS

Sample

A total of 880 final smashes recorded from matches corresponding to the Premier Padel Major tournament played in Qatar during the 2023 season were analysed.

Study variables

Variables from the OASP instrument (Escudero-Tena et al., 2023) were used: player, laterality, hitting zone, type of smash, direction of the smash, efficiency of the smash and end of the smash.

Process

The parties were identified for observation, data collection and analysis. The OASP instrument was used for this recording and data collection process using the specialized LINCE software. At the end of the process, an intra-observer reliability analysis was performed (0.92 → almost perfect).

Statistical analysis

A descriptive analysis was performed and was followed by an inferential analysis by performing contingency tables and including the Chi-square test ($\chi 2$). The strength of association between variables (Cramer's V coefficient (Vc)), posterior Z-tests adjusting for p values < .05 according to Bonferroni and corrected typed residuals (CSR) were calculated. The significance level was set at $p < .05$.

RESULTS

The effectiveness is associated with the hitting zone ($\chi^2 = 163.197$; df = 5; $p < .001$, Vc = 0.431), type of smash ($\chi^2 = 145.011$; df = 2; $p < .001$, Vc = 0.406), direction ($\chi^2 = 28.869$; df = 1; $p < .001$, Vc = 0.181) and end ($\chi^2 = 72.699$; df = 3; $p < .001$, Vc = 0.287). Table 1 shows the differences between winning and error smashes.

DISCUSSION

Depending on the hitting zone, winners are usually smashes from the areas close to the net and middle areas of the court. Sánchez-Alcaraz et al. (2020) indicate that the effectiveness of the smash decreases when players move away from the net. In addition, Sánchez-Alcaraz et al. (2022), observed that women perform more than 70% of their powerful smashes to end the point in positions close to the net (between 0 and 4 meters), while men perform almost 65% of their powerful smashes in intermediate positions of the court (between 4 and 8 meters away from the net). This could be due to anatomical and strength differences between men´s and women´s players. Thus, while the objective of the pair of players in the backcourt zone is to fight to get the net position, that of the players in the net zone is to fight to keep it (Courel-Ibáñez et al., 2017). On the other hand, players usually finish their smashes successfully when they are flat or topspin,

parallel and when the ball leaves the court by three or four meters, while they usually finish with error when they are slice (trays), crossed and where the ball is in their own court (the ball does not pass the net) or in the opponent's court (the ball hits directly on the fence or glass). Therefore, padel players should treat the tray as a continuity smash, so as not to lose the net, and flat smashes as finishing shots.

Table 1. Analysis of finishing smashes in professional padel. Differences according to the effectiveness of the smash

		Winning shot				**Error**				
		n	%	CSR		n	%	CSR		*p*
Total		644	73.18			236	26.82			
Player	Right	287	44.6a	0.1		104	44.1a	-0.1		.895
	Left	357	55.4a	-0.1		132	55.9a	0.1		
Laterality	Right-handed	518	80.4a	-0.4		193	81.8a	0.4		.654
	Left-handed	126	19.6a	0.4		43	18.2a	-0.4		
Hitting zone	1	64	9.9a	-8.9		83	35.2b	8.9	*	<.001
	2	205	31.8a	2.6	*	54	22.9b	-2.6		
	3	92	14.3a	4.9	*	6	2.5b	-4.9		
	4	81	12.6a	5.3	*	2	0.8b	-5.3		
	5	163	25.3a	2.6	*	40	16.9b	-2.6		
	6	39	6.1a	-6.7		51	21.6b	6.7	*	
Type	Flat	485	75.3a	8.4	*	107	45.3b	-8.4		<.001
	Topspin	119	18.5a	0.8		38	16.1a	-0.8		
	Slice	40	6.2a	-11.9		91	38.6b	11.9	*	
Direction	Parallel	398	61.8a	5.4	*	98	41.5b	-5.4		<.001
	Cross	246	38.2a	-5.4		138	58.5b	5.4	*	
End	X3	100	15.5a	6.2	*	1	0.4b	-6.2		<.001
	X4	89	13.8a	5.0	*	5	2.1b	-5.0		
	Own court	284	44.1a	-3.9		139	58.9b	3.9	*	
	Opposite court	171	26.6a	-3.5		91	38.6b	3.5	*	

*Note. N: number; %: percentage; CSR: corrected standardized residuals; *: CSR > 1.96.*

CONCLUSIONS

Players who play Premier Padel play more winners than errors, decreasing their efficiency as they move away from the net. In addition, the most effective smashes are flat, parallel and where the ball leaves the court by three or four meters. While the least effective smashes are those that are slice, crossed and where the ball remains in one's own court or in the opponent's court.

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Proposal for improvement through the global analysis of movement in the area of physical education in the primary education stage following the study of the influence of the educational system in spanish society

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ABSTRACT

Spanish educational legislation has undergone numerous changes in recent decades that affect the field of Physical Education. However, there is no exact parallel between these changes and the theories underpinning the evolution of Physical Education from a historical point of view. Nor is there a theoretical basis in the legislative changes that justifies the change of view on the subject announced in the laws. This situation motivated the completion of the Final Degree Project summarised in this document, after finishing the studies of the Degree in Primary Education with mention in Physical Education at the Faculty of Education of Palencia (University of Valladolid). In this work, research was carried out on the learning and experiences of the Spanish population in the subject of Physical Education in order to contrast a series of hypotheses on the effectiveness and quality of legislative changes at a social level. With the results obtained in this research, a proposal was developed to improve the area of Physical Education in the educational legislation of Primary Education by means of the Global Movement Analysis (GMA), a methodology created by the teaching staff of the Faculty of Education of Palencia (University of Valladolid).

Keywords: Physical education, Primary education, Spanish educational legislation, Global movement analysis (GMA).

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INTRODUCTION

From the common space existing between the historical evolution of Physical Education as a science and the Spanish educational legislation of Primary Education relating to this same subject, a series of irregularities emerge that raise different questions about the efficiency and quality of the Spanish educational system. In the deepening of these questions, the hypotheses to be studied in the research presented here arise and which are developed in greater detail in the Final Degree Project by Rodríguez (2023):

- Legislative changes have not led to progress in the quality of education.
- Society does not have a clear idea of what Physical Education is and what it consists of.
- There is no quantitative difference between motor learning and transversal and attitudinal content.

Prior to the development of the sections that form the backbone of this article, it is necessary to highlight the influence of the training received as a student of the curriculum of the mention in Physical Education of the Faculty of Education of Palencia, which gives the whole research a critical perspective on the past and current panorama of Physical Education. This educational context and these approaches can be explored in greater depth in chapter 7 of the book by Martínez and Gómez (2009).

MATERIAL AND METHODS

Participants

A total of 384 persons voluntarily participated in the questionnaire: 61.2% female, 38% male and 0.8% prefer to remain anonymous. The most important characteristic of the participants is age, determining the educational law that governed their primary education. The age distribution is between 9 and 86 years old.

Measures

For the study of the hypotheses, the following questionnaire was created, asking about society's perception of Physical Education and different pedagogical aspects of this subject: https://forms.gle/58miKjuTYJHeGrou5. The questionnaire was disseminated in order to reach as many people as possible in order to achieve the greatest possible representativeness of Spanish society in terms of age.

Analysis

From each of the responses, different graphs were generated to provide an easy-to-understand visual representation for the analysis of the results. In all the graphs, a large dispersion of ages can be seen, which is far removed from the different pedagogical tendencies that the laws attempt to establish. In other words, there is no clear link between the approaches of the educational laws and the generations of people corresponding to these laws.

RESULTS

The results validate the three hypotheses presented at the beginning, revealing a series of deficiencies in the Spanish education system. What is evident is the lack of a link between what the law stipulates and what is transmitted in the teaching-learning process in the classroom. This is a rupture in the link between the first, second and third levels of curricular specification which transmits to society a lack of importance and knowledge of the subject of Physical Education.

DISCUSSION

Following the results obtained, a proposal for improving the law of Primary Education in the area of Physical Education is put forward. This improvement is based on structuring the law around the Global Movement Analysis (GMA), a methodology that emerged in 1995 at the University School of Education in Palencia (University of Valladolid). It is a tool that makes it easier for teachers to structure resources around the analysis of motor skills "*from a global and open perspective*" (Abardía and Medina, 1997, p. 128). GMA provides a committed and coherent structure and development with the student body, ranging from the theoretical foundations required by law to the practical issues needed in the classroom. It helps to achieve equal opportunities for students in their knowledge and motor development, making Physical Education provide education with its own transcendental knowledge from which to contribute to the development of the rest of the subjects and on which to rely for its development. For further information on this methodology, we recommend reading the following references: Abardía and Medina (1997); Abardía (2007); and Abardía et al. (2019).

CONCLUSIONS

Physical Education in the Spanish education system should be based on the compulsory nature of the union and collaboration between the theoretical foundations and the practice of educational centres. That is to say, connecting the three levels of curricular concretion from a clear legislative approach that can be put into practice in the classroom. This connection can only be made through the creation of laws based on the contributions of physical education specialists. Without them, it is not possible to guarantee a good foundation and structuring of physical education that is adapted to the social reality of schools. Furthermore, the need for a critical teaching movement should be raised which, through involvement and debate, carries out research and makes contributions to these legislative documents in order to achieve progress in Physical Education as a subject which contributes quality and importance to the development of Primary Education pupils.

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Assessment tools for functional ankle instability. What they evaluate!

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ABSTRACT

Functional Ankle Instability (FAI) is a subject of extensive research, both in sports and other fields. In that context, the aim of this revision was to analyse profoundly the six most cited self-report survey tools. Peer-reviewed articles published before November 2022 were searched to identify the six most cited FAI assessment questionnaires: Lower Extremity Functional Scale (LEFS), Foot and Ankle Ability Measure (FAAM), Foot Function Index (FFI), Foot and Ankle Outcome Score (FAOS), Olerud and Molander Ankle Score (OMAS) and Cumberland Ankle Instability Tool (CAIT). In addition, bibliometric data was calculated, including the weighted average impact factor, and other indicators such as references per year were also considered to analyse the relevance of each questionnaire. Bibliometric analyses suggested that the FAOS occupies the first place and the FFI occupies the sixth place in the weighted average of impact factors of their original publications. Consideration of psychometric strengths/limitations of each questionnaire and the conceptualization of instability in the context of specific research questions should guide investigators in selecting the most appropriate instrument to estimate functional instability in sport. The weighted average impact factor of each questionnaire also presents itself as a relevant metric to be considered. With these considerations, guidance for investigators is provided.
Keywords: Ankle, Functional instability, Questionnaire.

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INTRODUCTION

Ankle instability (AI) may be considered functional, mechanical or chronic. Functional Ankle instability (FAI) is defined as an inability in proprioception, in neuromuscular control, postural control and strength. Meanwhile, mechanical ankle instability (MAI) is defined as excessive anterior movement of the talocrural joint. Chronic Ankle instability (CAI) is a condition of mechanical and functional instability that manifests in frequent ankle sprain mechanisms over a minimum period of 1 year after the initial sprain (Hiller et al., 2006). Studies indicate that FAI is related to CAI, which is one of the main intrinsic risk factors for developing ankle sprains (Martin et al., 2005). Nowadays, we are faced with a diverse panoply of self-report questionnaires, designed to identify individuals with FAI. Thus, the purpose of this study is to evaluate the 6 most frequently used self-report evaluation to identify FAI, using bibliometric methods that elaborate the assessment, exploring the relevant literature in the field.

METHODS

There were four databases researched (Web of Science, Scopus, PubMed and SportDiscus), to identify the most used self-report survey method in the identification of FAI until November 2022. The research was conducted with the following terms: "*ankle*", "*ankle joint*", "*ankle injury*", "*functional instability*", "*sport*", "*exercise*", "*training*", "*survey*", "*questionnaire*", "*instrument*", "*measure*", "*scale*", "*subjective evaluation*", "*assess*", "*tool*", "*self-report*", "*validation studies*", "*psychometr*", "*valid*" and "*internal consistency*". In the same sense, the research strategy was as follows: (ankle OR ankle joint OR ankle injury OR functional instability) AND (sport* or exercise* OR training) AND (survey OR questionnaire* OR instrument* OR measur* OR scale OR "*subjective evaluation*" OR assess* OR tool OR "*self-report**") AND ("*validation studies*" OR psychometr* OR valid* OR "*internal consistency*") (Flores et al., 2013).

RESULTS

The six most frequently mentioned FAI assessment questionnaires were selected for analysis: Lower Extremity Functional Scale (LEFS; Binkley et al., 1999), Foot and Ankle Ability Measure (FAAM; Martin et al., 2005), Foot Function Index (FFI; Budiman-Mak et al., 1991), Foot and Ankle Outcome Score (FAOS; Roos et al., 2001), Olerud and Molander Ankle Score (OMAS; Olerud et al., 1984) and Cumberland Ankle Instability Tool (CAIT; Hiller et al., 2006). The weighted average impact factor for the original publication of each questionnaire was calculated as follows: i) the number of articles (citations) in each journal was multiplied by the journal's 2021 impact factor; ii) this value for all journals was summed and then divided by the total number of articles (citations). Although the bibliometric data (Table 1) indicate that LEFS is the most cited questionnaire under analysis, the weighted average impact factor of the journals responsible for these citations is 3.59. FAOS (4.70) and OMAS (4.42) have the highest weighted average impact factors.

DISCUSSION

Our results show that while the LEFS is a specific tool that applies to a wide range of lower limb orthopaedic conditions, the FAAM, FFI, FAOS, OMAS and CAIT are questionnaires designed to assess lower leg, ankle and foot functional capacity (Binkley et al., 1999; Martin et al 2005; Buddiman et al., 1991; Roos et al., 2001; Olerud et al., 1984; Hiller et al., 2006). Some questionnaires, such as the LEFS and FAAM, have a comprehensive approach to assessing a wide range of daily activities. The FFI and FAOS focus on symptoms and activity implications. The OMAS assesses function based on specific symptom categories. The CAIT addresses the subjective perception of ankle instability in various activities. Bibliometric data can also be

useful to indicate the impact of using a specific questionnaire. Contrary to some critical reviews, which highlight the CAIT and the AII to determine FAI status, which indicate that the Identification of Functional Ankle Instability (IdFAI) is the most appropriate questionnaire for this field. In the present review, the bibliometric analysis revealed that, although the LEFS is the most widely mentioned questionnaire in the literature, it is the FAOS that tops the list in terms of overall impact, evaluated by means of the weighted average impact factor, which suggests that it is considered the questionnaire with the greatest impact in the context of FAI in sport. Meanwhile, the FFI is ranked sixth.

Table 1. Bibliometric data of the six highly cited measures self-report surveys in sport.

Measure	Original Authors	Citations	Citations /Year	FI-Original Journal	Sources Whit FI		
					Journals	Articles	Average Weighted FI
LEFS	Binkley et al., (1999)	989	43	3.679 – Physical Therapy	310	858	3.59
FAAM	Martin et al 2005	575	33.8	3.569 – Foot & Ankle International	137	508	3.13
FFI	Buddiman et al., (1991)	554	17.3	7.407 – Journal of Clinical Epidemiology	161	483	3.12
FAOS	Roos et al., (2001)	445	21.2	3.569 – Foot & Ankle International	111	391	4.70
OMAS	Olerud et al., (1984)	391	10.3	2.928 – Archives of Orthopaedic and Trauma Surgery	86	325	4.42
CAIT	Hiller et al., (2006)	335	19.7	4.06 – Archives of Physical Medicine and Rehabilitation	109	322	3.14

Note: Data achieved through "Cited Reference Search" from Web of Science (Core Collection); IF: Impact Factor. LEFS - Lower Extremity Functional Scale; FAAM - Foot and Ankle Ability Measure; FFI - Foot Function Index; FAOS - Foot and Ankle Outcome Score; OMAS - Olerud and Molander Ankle Score; CAIT - Cumberland Ankle Instability Tool.

CONCLUSIONS

The evaluated questionnaires have different characteristics and are useful for different populations with FAI in sports. However, FAOS stands out with the highest weighted impact factor, indicating its relevance and recognition in the scientific literature. The use of these methods can significantly contribute to the accurate and objective analysis of FAI in athletes and sportspersons.

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Association of serum adipokines levels with fat mass, lipid and glycemic profiles in middle-aged sedentary adults

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ABSTRACT

This study aimed to investigate the circulating levels of adiponectin and leptin levels and their association with fat mass, and lipid and glycaemic profiles in sedentary middle-aged adults without diabetes. Forty middle-aged sedentary adults (82.5% women; 53.4 ± 7.18 years old; BMI: 27.4 ± 3.9 kg/m^2) took part in this study. Anthropometric measures including body mass, stature, waist circumference, and body mass index (BMI) were measured. Fat mass was determined by bioimpedance. Fasting blood samples were collected to determine adipokines and lipid and glycaemic profile outcomes. Pearson and Spearman's correlations were used to determine the associations between variables. Our results suggested that leptin is positively associated with BMI, waist circumference, fat mass, glucose, HbA1c (%), and total cholesterol. Regarding adiponectin levels, we found a negative association with BMI and triglycerides and a positive association with HDL-C levels. No significant associations were observed between adiponectin and glycaemic profile outcomes. Adiponectin/leptin ratio showed to be associated negatively with BMI, waist circumference, fat mass, fasting glucose, and triglycerides. This study has important clinical and public health implications supporting the importance of adopting a healthy lifestyle to maintain satisfactory levels of leptin and adiponectin, and consequently, a normal glycaemic and lipid profile.

Keywords: Adiponectin, Leptin, T2DM, Glucose metabolism, Lipid metabolism.

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INTRODUCTION

Adiponectin is the most abundant hormone secreted by adipose tissue and appears to have important anti-inflammatory properties (Li et al., 2022). The levels of adiponectin are decreased in cardiovascular diseases and several metabolic disorders, such as obesity, insulin resistance (IR), type 2 diabetes (T2DM), and inflammatory states (Saltevo et al., 2008). Leptin is also another hormone secreted by adipose tissue with several activities including regulation of endocrine function, reproduction, and immunity (Al-Hamodi et al., 2014). Despite its role in regulating body weight, evidence reports an association between high circulating leptin levels and obesity which probably can reflect a state of leptin resistance, with impaired leptin signalling and action (Al-Hamodi et al., 2014). This state could promote disorders of glucose and lipid metabolism. However, the influence of adiponectin and leptin levels on glycaemic and lipid profiles in 'healthy' adults remains unclear. We aimed to investigate the circulating levels of adiponectin and leptin levels and their association with fat mass, and lipid and glycaemic profiles in sedentary middle-aged adults without diabetes.

MATERIAL AND METHODS

Participants

Forty middle-aged sedentary adults (53.4 ± 7.18 years old; BMI: 27.4 ± 3.9 kg/m^2) participated in this study after signing written consent. Participants were recruited from different companies and were eligible if they were between 40 and 64 years old; if they have sedentary occupations; if they took no regular exercise; and if they were free of metabolic disease, cardiovascular disease, or other serious illnesses. We determined the sample size necessary for association analysis using the G∗Power software (version 3.1.9.2, Germany). For a moderate correlation of 0.50, a sample size of 37 participants achieves 95% power to detect significant associations between variables (α-level of 5%). The protocol of this study was approved by the Ethical Committee for Health of the FCDEF - UC (reference: CE/FCDEF-UC/00512019).

Measures

Body weight (SECA 761, Germany) and stature (Seca Bodymeter 208, Germany) were assessed to calculate body mass index (BMI). Waist circumference was assessed using a flexible tape measure (Hoechstmass-Rollfix, Germany), and total fat mass using a tetrapolar bioimpedance (Inbody 270, USA). Fasting blood samples were drawn after an overnight fast to determine adipokines and lipid and glycaemic profile outcomes.

Procedures

BMI was calculated according to the formula: BMI = (weight/height^2). Fasting glucose, total cholesterol, HDL-C, LDL-C, and triglycerides were determined using standard enzymatic assays (Atellica ® CH, Analyzer, Siemens Healthineers, USA). HbA1c was determined by the Ion-Exchange method (Tosoh G8 HPLC Analyzer, Tosoh Bioscience, Inc., CA). Serum adiponectin and leptin levels were analysed using an enzyme-linked immunosorbent assay (Crystal Chem, High-Performance Assays, USA). The Adiponectin/Leptin ratio was determined using the following formula: (adiponectin (µg/mL)/leptin (ng/mL). Blood collections were performed by a registered nurse. All the procedures were performed according to the manufacturer's protocol.

Analysis

Data are presented as mean ± standard deviation. Data normality was analysed using histograms and Shapiro-Wilk test. Pearson and Spearman's correlations were used to determine the associations between variables under analysis. The strength of the correlation was classified as little (r = 0.30), low (r = 0.50), moderate (r = 0.70), high (r = 0.90) and very high (r = 1.00). Analyses were performed using IBM SPSS Statistics (SPSS Inc., Chicago, IL, USA, version 28.0). Significance level was set at $p \leq .05$.

RESULTS

Bivariate correlation analysis showed leptin to be positively associated with BMI (r = 0.574, $p < .001$ [moderate]), waist circumference (r = 0.556, $p = .001$ [moderate]), fat mass (r = 0.714, $p < .0001$ [high]), fasting glucose (r = 0.451, $p = .003$ [low]), HbA1c (%) (r = 0.325, $p = .041$ [low]), and total cholesterol (r = 0.324, $p = .041$ [low]). Adiponectin levels were positively associated with HDL-C levels (r = 0.520, $p = .001$ [moderate]) and negatively associated with BMI (r = -0.332, $p = .036$ [low]) and triglycerides (r = -0.421, $p = .007$ [low]). No significant associations were observed between adiponectin and fasting glucose or HbA1c % ($p > .05$). Lastly, adiponectin/leptin ratio showed to be negatively associated with BMI (r = -0.684, $p < .0001$ [moderate]), waist circumference (r = -0.650, $p < .0001$ [moderate]), fat mass (r = -0.728, $p < .0001$ [moderate]), fasting glucose (r = -0.444, $p = .004$ [low]), and triglycerides (r = -0.523, $p = .001$ [moderate]).

DISCUSSION

Our results suggested that leptin is positively associated with BMI, waist circumference, fat mass, glucose, HbA1c (%), and total cholesterol. Other study also found a positive association between leptin and BMI, waist circumference, triglycerides, glucose, and insulin resistance in obese and T2DM individuals (Al-Hamodi et a., 2014). In relation to adiponectin levels, we found a negative association with BMI and triglycerides and a positive association with HDL-C levels; however, no significant associations were observed between adiponectin with glycaemic profile outcomes. On the contrary, Hong et al. (2023) found that adiponectin quartiles were negatively associated with HbA1c levels in individuals with complex metabolic status.

CONCLUSIONS

This data confirms previous descriptions of leptin related to body composition and glycaemic and lipid metabolism. In relation to adiponectin, more studies are needed to explore the association with glycaemic profile in sedentary but 'healthy' adults. This study has important public health implications supporting the importance of adopting a healthy lifestyle to maintain satisfactory levels of leptin and adiponectin, which, as we have seen, play an important role in the regulation of glucose and lipid metabolism.

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Normal range glycated hemoglobin A1c is associated with reduced pulmonary function in middle-aged adults

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ABSTRACT

Glycated haemoglobin (HbA1c) has been related to impaired lung function in the diabetic population. Few studies have analysed the association between lung function and HbA1c in the non-diabetic population. We investigated whether HbA1c below the diagnostic threshold is associated with lung function parameters. Forty non-diabetic adults took part in this study. Fasting blood samples were drawn to determine the HbA1c level. Lung function was assessed by spirometry using the Spiropalm 6MWT (Cosmed, Italy) Spirometer. One-way ANOVA was performed to detect significant differences between the groups according to their HbA1c level (%). Pearson and Spearman's correlations were used to determine the associations between variables. Participants were divided into 3 groups according to HbA1c level as follows: Group 1 (n = 18), ≥ 5.0 to ≤ 5.5%; Group II (n = 10), >5.5 and ≤ 5.7%; and Group III (n = 12), >5.7 and ≤ 6.2%.Group I had the higher FVC (108.33 ± 13.81% pred.), FEV1 (108.11 ± 14.92% pred.), PFE (7.63 ± 2.25 L/s) and the lowest FEV1/FVC ratio (80.03 ± 5.52%) compared to other groups; however, there were no significant differences between groups. Bivariate correlation analysis showed that HbA1c was negatively related to FVC (L) (r = -0.465, *p* = .002 [low]), FVC% prev. (r = -0.377, *p* = .016 [low]), and FEV1 (L) (r = -0.375, *p* = .017 [low]) but not to PFE and FEV1/FVC (*p* > .05). Our results suggest that HbA1c (%) level is associated with lower FVC and FEV1 in middle-aged adults, which may be a potential predictor of poor lung function.

Keywords: Lung function, Spirometry, Glycaemic profile, Diabetes, Sedentary behaviour.

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INTRODUCTION

Impaired lung function reflects airflow limitation in diseases such as asthma and chronic obstructive lung disease (Nerpin et al., 2018) and has also been pointed out as a marker for increased morbidity and mortality in other diseases such as cardiovascular diseases and diabetes (Zhang et al., 2020). Studies have shown that higher glycemia levels are related to poor lung function in patients with full-grown diabetes mellitus (Pereira et al., 2013). Although the mechanisms underlying this association remains to be established, some studies pointed out the chronic low-grade inflammation and the microangiopathy of the pulmonary vascular network as potential mechanisms (Klein et al., 2010). However, it is not clear how HbA1c levels in the non-diabetic states begin to affect lung function. This association remains important because of potential epidemiological and clinical implications. Therefore, this study aimed to investigate whether HbA1c level is related to lung function in generally healthy middle-aged individuals.

MATERIAL AND METHODS

Participants

A total of 40 middle-aged sedentary adults participated in this study after signing written consent. The mean age of the participants was 53.4 ± 7.18 years old, and the BMI was 27.4 ± 3.96 kg/m^2. Participants were physically inactive, have sedentary occupations, and were free of metabolic disease, cardiovascular disease, or other serious illnesses. A power analysis, calculated using the G∗Power software (version 3.1.9.2, University of Kiel, Germany), showed that a sample size of 37 was required to detect a moderate correlation of 0.50 (Power 1-β = 0.95, α-level = 5%). The study protocol was approved by the Ethical Committee for Health of the FCDEF - UC (reference: CE/FCDEF-UC/00512019).

Measures

Fasting blood samples were drawn after an overnight fast to determine HbA1c levels. Lung function was assessed by spirometry using the Spiropalm 6MWT (Cosmed, Italy) Spirometer.

Procedures

HbA1c was measured by the Ion-Exchange method (Tosoh G8 HPLC Analyzer, Tosoh Bioscience, Inc., CA), according to the manufacturer's protocol. Participants performed a maximal inspiratory and expiratory manoeuvre to achieve the Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1), FEV1/FVC ratio, and Peak Expiratory Flow (PEF). Predicted FEV1 (FEV1% pred) and FVC (FVC% pred) were calculated based on age, sex, ethnicity, and stature according to the Global Lung Function Initiative guidelines. The lung function assessment was performed by a specialized technician.

Analysis

Data are presented as mean ± standard deviation for continuous variables. Data normality was analysed using the Shapiro-Wilk test. One-way ANOVA was performed to detect significant differences between the groups according to their HbA1c level (%). Non-normally distributed variables were logarithmically transformed. Pearson and Spearman's correlations were used to determine the associations between variables under analysis. The strength of the correlation was classified as little (r = 0.30), low (r = 0.50), moderate (r = 0.70), high (r = 0.90), and very high (r = 1.00). Analyses were performed using IBM SPSS Statistics (SPSS Inc., Chicago, IL, USA, version 28.0). The significance level was set at $p \leq .05$.

RESULTS

All participants presented fasting glucose and HbA1c values within normal ranges (< 110 mg/dL and < 6.5%, receptively). The 40 participants were divided into 3 groups according to HbA1c (%) as follows: Group 1 (n = 18), ≥ 5.0 to ≤ 5.5%; Group II (n = 10), > 5.5 and ≤ 5.7%; and Group III (n = 12), > 5.7 and ≤ 6.2%.Group I had the higher FVC (108.33 ± 13.81% pred.), FEV1 (108.11 ± 14.92% pred.), PFE (7.63 ± 2.25 L/s), and the lowest FEV1/FVC ratio (80.03 ± 5.52%) compared to other groups; however, there were no significant differences between groups. Bivariate regression analysis showed that HbA1c (%) was negatively related to FVC (L) (r = -0.465, *p* = .002 [low]), FVC% prev. (r = -0.377, *p* = .016 [low]), and FEV1 (L) (r = -0.375, *p* = .017 [low]) but not to PFE and FEV1/FVC (*p* > .05).

DISCUSSION

HbA1c was associated with reduced lung function parameters (i.e., FVC and FEV1) in middle-aged sedentary workers without diabetes. These results are concerning and could suggest that small increments of glycaemic levels, even those below the cutoff for diabetes mellitus, may be compounded by reduced lung volumes and airway flow restriction (Oh et al., 2015). The underlying mechanisms that can explain this association remain to be established, however, there is some evidence that pointed out the chronic low-grade inflammation and the microangiopathy of the pulmonary vascular network as potential mechanisms (Klein et al., 2010). Oh et al. (2015) also found an inverse association between HbA1c levels and FVC and FEV1 and concluded that HbA1c might be a reliable predictor of poor lung function, especially the restrictive pattern in a sample of Koreans adults aged ≥ 40 years. There are limitations in this study that should be addressed. First, the cross-sectional study design does not allow for causal conclusions to be drawn. Second, we did not adjust our analysis considering possible confounding factors such as age, BMI, and smoking level. Future population-based studies are needed to clarify the causal relationship between the variables under analysis and to identify the mechanisms involved in this association and the clinical implications.

CONCLUSIONS

In generally healthy middle-aged adults, we found that HbA1c (%) levels could be associated with decrements of FVC and FEV1, being a potential predictor of poor lung function.

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Effects of a combined training program on pain, stiffness, fatigue and well-being in women with fibromyalgia

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ABSTRACT

Fibromyalgia is a rheumatic disease characterized by chronic widespread muscle pain and its treatment is carried out through pharmacological interventions. Physical exercise and the adoption of a healthy lifestyle influence the reduction of the symptoms of the disease. The main objective of this study was to analyse the effects of a combined training program on health and functional capacity in female individuals diagnosed with Fibromyalgia. It was a quasi-experimental study with a duration of 8 months with a sample of six participants between 43 and 58 years old, who did not practice any type of physical exercise program. The following instruments were used in baseline and post intervention: Fibromyalgia Impact Questionnaire (FIQ), Short Form Health Survey Questionnaire (SF-36v2) and functional physical fitness tests (30-second chair stand, arm curl, sit and reach, 8-ft up-and-go, back scratch and 2-minute step test. Wilcoxon non-parametric test (intra-group comparison) was used, with a significance level of $p < .05$ to compare baseline and post intervention effects. Significant improvements were observed: in 2-minute step test ($p = .21$); physical function; physical performance; physical pain and general health, the mental component, vitality; social function of the SF-36v2 (all, $p < .05$). Moreover, FIQ showed a significant reduction in all scales at the end of the program compared to the baseline ($p < .05$). Combined training program can reduce the impact of fibromyalgia while improving health and aerobic performance.

Keywords: Combined exercise program, Fibromyalgia, Functional capacity, Health.

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INTRODUCTION

Fibromyalgia is characterized by painful muscle complaints associated with pain, muscle stiffness, sleep disturbances, anxiety, and depression, decreased functional capacity and cognitive problems (Atan & Karavelioğlu, 2020). The medical prescription for these patients includes pharmacological treatments for sleep disorders and chronic intensive pain. Considering that this population alone is already more sedentary due to its constant immobilization associated with chronic pain, one of the main methods used to improve quality of life is physical exercise (Sousa et al., 2023). Physical exercise promotes several physical and psychological benefits and a recent systematic review showed that combined training was the most effective for this population to reduce the symptoms of the disease with a duration between 60 and 90 min, three times a week with a light to moderate intensity (Sousa et al., 2023).

Therefore, the aim of this study was to analyse the effects of a combined training program on health and functional capacity in female individuals diagnosed with Fibromyalgia.

MATERIAL AND METHODS

Participants

The study included six female participants aged between 43 and 58 years old. The following inclusion criteria were assigned: i) fibromyalgia diagnosed; ii) female between 30 and 60 years old; iii) having no other associated pathologies (e.g., diabetes, cardiovascular diseases, respiratory diseases); iv) no regular participation in supervised physical exercise sessions. A written informed consent of all participants and the approval from the Ethics Committee of the Polytechnic Institute of Santarem, Santarem, Portugal were obtained.

Measures

The Fibromyalgia Impact Questionnaire - Portuguese version (FIQ-P) by Lapa Rosado et al., (2006) and the Short Form Health Survey Questionnaire (SF-36v2) - Portuguese version 2 by Ferreira et al. (2012) were used while the physical fitness tests of Fullerton Functional Physical Fitness were applied (Riklli & Jones, 1999): i) 30-sec chair stand; ii) arm curl; iii) Sit and reach; iv) 8-foot up and go test; v) back scratch; vi) 2-minute step test.

Procedures

The program was carried out twice a week, lasting 60 minutes. The intervention always started with aerobic exercise (20 to 30 minutes), then 1 set of 15-20 repetitions of strength training (consisting of 6 exercises for the major muscle groups) and, finally, stretching exercises for tender points, (10 to 30 seconds), according to the recommendations of the ACSM (2018).

Analysis

Data processing and statistical analysis were performed using SPSS software version 21.0 (Armonk, NY: IBM Corp). Descriptive statistics were used by mean and standard deviation (SD) to characterize the sample. The Wilcoxon test was used for the comparative analysis between each evaluation moment (baseline-Final), with a significance level of $p < .05$.

RESULTS

Table 1 presents the results of the SF-36v2 and FIQ-P.

Table 1. Comparative analysis of the questionnaires.

SF-36v2 Dimensions	Mean	SD	Mean	SD	*p*-value	FIQ-P scale	Mean	SD	Mean	SD	*p*-value
Physical Function	39.167	25.965	87.500	16.650	.027*	Physical Disability	2.140	0.680	0.420	0.200	.042*
Physical Performance	37.500	26.220	73.958	12.130	.027*	Feeling good	7.150	2.710	1.670	0.580	.027*
Physical Pain	27.833	18.777	69.333	11.076	.028*	Absentees from work	4.290	3.500	1.430	0.900	.063*
General Health	43.667	19.562	66.667	18.779	.027*	Work performance	7.830	2.320	2.830	0.750	.027*
Vitality	45.833	12.290	85.417	12.290	.027*	Pain	7.330	2.340	2.830	0.980	.028*
Social Function	45.833	18.819	89.583	9.410	.027*	Fatigue	8.330	1.750	2.670	0.820	.027*
Emotional Performance	61.111	31.914	84.722	13.351	.072	Rest	7.500	2.430	2.830	0.750	.027*
Mental Health	70.000	8.367	85.000	22.583	.014*	Stiffness	7.330	2.660	3.000	1.100	.026*
Physical Component	37.042	20.510	74.360	11.990	.028*	Anxiety	7.170	3.310	2.670	1.210	.046*
Mental Component	55.694	9.959	86.181	9.009	.028*	Depression	7.000	2.830	2.500	1.050	.046*
						TOTAL FIQ	2.140	0.680	0.420	0.200	.028*

*Note. SD: Standard Deviation; *: p < .05.*

Regarding the Physical Fitness Tests only the 2-minute step test improved (p = .21) while no significant changes were observed in the remaining tests.

DISCUSSION

The present study showed improvements in the majority of the variables of both questionnaires which seems to be in line with a previous study that showed a clinical impact of a combined exercise program in the same measures (Sañudo et al., 2011). The Rikli & Jones Test Battery (1999) was used because it is relatively easy and safe to perform and require minimal resources of materials and space. This may explain the non-significant results in most of the tests, although the 2-min step test improved from baseline to the final assessment. Future studies may use different physical tests.

CONCLUSIONS

Combined training can reduce the impact of fibromyalgia while improving health and aerobic performance.

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Do teaching model, and out-of-school practice time influence tactical knowledge in school soccer?

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ABSTRACT

This quasi-experimental study determined the influence of the teaching model, and out-of-school soccer practice time on the tactical knowledge of primary school students. It included 41 fifth-grade students (M = 10.41, SD = 0.50 years), from a Spanish public school. They were distributed into two groups according to the teaching model: fifth grade A learned soccer by the Tactical Games Approach, and fight grade B learned soccer by the Direct Instruction model. The "*total tactical knowledge*" of the students was measured using the Soccer Tactical Knowledge Test, after the application of the two learning situations (11 sessions each). The interaction Teaching model * Out-of-school soccer practice time and intergroup differences were calculated using a General Linear Model and Tukey's Post Hoc test, respectively. There were no differences in tactical knowledge according to the teaching model. There were differences in tactical knowledge according to the out-of-school soccer practice time, in favour of the students who played soccer "*a lot*" versus those who played soccer "*never, ever and enough*". Post Hoc comparisons (interaction) indicated differences, in favour of students who learned by the traditional model and played soccer "*a lot*" versus those who learned by the Tactical Games Approach and played soccer "*never, ever, and enough*". Students who learned by the Direct Instruction model had played more soccer. More soccer experience implied greater tactical knowledge.

Keywords: Physical education, Tactical games approach, Direct instruction, Sport experience.

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INTRODUCTION

Players make in-game decisions based on their prior knowledge, and the capacity to process new information (Ashford et al., 2021). Tactical knowledge (declarative "*to know what, and why to do it*"; and procedural "*to know how and when to do it*"), together with the instructional model and sport experience, can help players/students in their decision-making, especially at formative ages (Serra-Olivares & García-López, 2016). In this regard, within the compressive teaching of invasion sports, the Tactical Games Approach (TGA), by its characteristics (Mitchell et al., 2013), encourages decision-making through tactical problem solving. The Direct Instruction (DI model), by its characteristics (Metzler, 2011), limits decision-making because players/students execute learning tasks according to instructions given to them. In physical education, it has been shown that teaching soccer using TGA model improves the tactical knowledge of primary school students on this sport; likewise, soccer experience influences the teaching models (García-Ceberino, Gamero, et al., 2020). Therefore, teachers should be aware of the influence of instruction, and sport experience on tactical knowledge. This study aimed to determine the influence of teaching model, and out-of-school soccer practice time on the tactical knowledge of primary school students.

MATERIAL AND METHODS

Participants

A total of 41 fifth-grade students (M = 10.41, SD = 0.50 years old; 23 boys and 18 girls), from a public primary school in south-western Spain, participated in this study. They were distributed into two groups according to the teaching model: fifth grade A learned soccer by the TGA model (n = 20), and fifth grade B learned soccer by the DI model (n = 21). The selection of the groups to learn by one or the other model was random, without knowing their experience.

Measures

The Soccer Tactical Knowledge Test, STKT (Serra-Olivares & García-López, 2016), made it possible to determine the "*total tactical knowledge*" of the students. It was calculated from the percentage correct answers in the declarative and procedural knowledge items. The practice time was asked using a Likert scale from 1 to 5, where 1 = Never and 5 = A lot. The STKT focuses on the principles of action for the attack.

Procedures

Figure 1 shows the study procedure. Both learning situations (tactical and traditional) were similar in objectives, content, and game phases; and different in the teaching model (own characteristics) (García-Ceberino et al., 2019). These had excellent content validity and internal consistency according to 13 experts (García-Ceberino, Antúnez, et al., 2020).

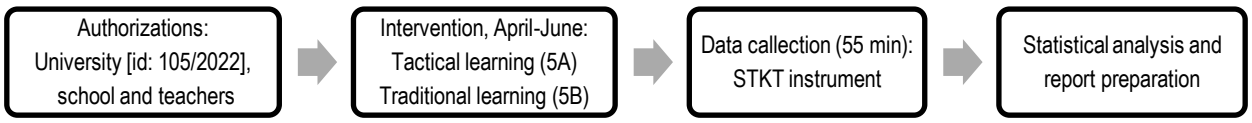

Figure 1. Study procedure. Note: The Soccer Tactical Knowledge Test.

Analysis

First, outliers were transformed by averaging. Then, the Shapiro-Wilk and Levene tests indicated the use of parametric tests (p > .05). The interaction Teaching model * Out-of-school soccer practice time and intergroup differences were calculated using a Univariate General Linear Model (ANOVA) and Tukey Post Hoc test,

respectively. The effect size was calculated using Eta-Squared and Cohen's. Jamovi software, version 2.3, was used for statistical analyses.

RESULTS AND DISCUSSION

There were no differences in tactical knowledge according to the teaching model. Despite our results, comprehensive models favour decision-making (Ashford et al., 2021). Proof of this is the implementation of models with an educational nature (e.g., Sport Education model) in the out-of-school soccer (Núñez et al., 2020). On the other hand, there were differences (with a large effect) in tactical knowledge according to the time spent in out-of-school soccer practice, in favour of the students who played soccer "*a lot*" versus those who played soccer "*never, ever, and enough*". In Spanish primary school, García-Ceberino, Gamero, et al. (2020) indicated that students with more experience in soccer reported higher levels of declarative and procedural knowledge; thus, tactical knowledge was acquired through sports practice, differentiating expert students from novices. In addition, Post Hoc comparisons (interaction) indicated differences with a large effect, in favour of students who learned by the DI model and played soccer "*a lot*" versus those who learned by the TGA model and played "*never, ever, and enough*". Finally, within the traditional model, there were differences with a large effect, in favour of students who played soccer "*a lot*" versus those who played soccer "*never*". García-Ceberino, Gamero, et al. (2020) reported a significant influence of soccer experience on the study of teaching models.

Table 1. Interaction Teaching model * Out-of-school soccer practice time and intergroup differences.

	ANOVA			Post Hoc comparison			
Variable	***F***	***p-value***	h^2	**Comparisons**	***t***	p_{tukey}	***d***
Teaching model	3.401	.08	.05	TGA – DI	- 1.840	.08	- 0.58
Out-of-school soccer practice time	6.727	< .001***	.42	Never – A lot	- 3.746	.01*	- 1.17
				Ever – A lot	- 4.455	< .001***	- 1.39
				Enough – A lot	- 3.351	.02*	- 1.05
Teaching model * Out-of-school soccer practice time	0.494	.74	.03	TGA Never – DI A lot	- 4.562	< .01**	- 1.43
				TGA Ever – DI A lot	- 3.892	.02*	- 1.22
				TGA Enough – DI A lot	- 3.873	.02*	- 1. 21
				DI Never – DI A lot	- 4.689	< .01**	- 1.47

*Note: With the exception of the teaching model, only comparisons with significant differences appear. *p < .05; **p < .01; ***p < .001.*

The main study limitation was the size of the sample selected, so that the results should be interpreted with caution.

CONCLUSIONS

Teachers must take into account the heterogeneity of physical education classes when planning the teaching of soccer. As demonstrated in this study, the out-of-school soccer practice time (experience) influences the tactical knowledge of primary school students. More experience in soccer implies greater tactical knowledge.

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Understanding physical activity of patients followed in psychiatry/psychology consultation

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ABSTRACT

Aim: Characterise the levels of PA of 189 patients (44.77 ± 15.07 years) followed in a mental health clinic. Participants self-reported sociodemographic data and data regarding PA. Results: 51.3% reported practicing no PA. The sub-sample of participants who reported practising at least one hour of PA per week, on average, people reported practising PA 3.18 times and 3.39 hours per week. When compared sex assigned at birth differences in the amount of PA, men reported superior levels of PA practice. It is of utmost importance to understand the PA levels practised by patients when seeking psychiatry and psychology. Searching for the context of the overall health and well-being of the individuals served, as well as the assessment of the patient's physical health and lifestyle, is crucial to creating better treatment protocols. The results of the present study emphasize the importance of working with multidisciplinary teams in mental health, specifically with exercise physiologists.

Keywords: Exercise, Mental health, Psychopathology, Physical activity.

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INTRODUCTION

Physical activity (PA) has benefits for physical and mental health, reducing psychopathology and promoting psychological well-being (Stubbs et al., 2017). The WHO guidelines (2020) recommend the practice of at least 150-300 minutes of moderate-intensity aerobic PA per week. However, most people fail to meet these recommendations, a gap particularly notorious in the psychiatric population (De Mello et al., 2013). Thus, understanding the levels of PA practised by patients seeking psychiatry and/or psychology consultation can be highly relevant to the context of the overall health and well-being of the individuals, which can have important implications for preventing and treating various psychological conditions. This paper aims to characterise the levels of PA of patients followed in a mental health clinic.

MATERIAL AND METHODS

Participants

The sample comprised 189 respondents (44.77 ± 15.07 years), ranging from 18 to 83 years. Regarding sex assigned at birth, 68.3% were born female. Most of the sample identified with White/Caucasian ethnicity (89.9%). The overall sample average BMI (kg/m^2) was 24.73 ± 5.03. Respondents were fully informed regarding: nature of the study, procedures for data recording and voluntary nature of their participation. They could withdraw from the study with no implications for treatment. Subjects provided their consent before the survey's completion, and anonymity was guaranteed.

Measures, procedures, and analysis

Participants answered sociodemographic data. BMI ($weight/height^2$) was automatically calculated. They self-reported data regarding PA by answering the following questions: Times a week practicing PA; The total number of hours of PA practiced per week.

This study was conducted in a mental health clinic in the metropolitan area of Lisbon between February and July 2023. This work is included in Psymap, an ongoing research project in the referred clinic. Procedures followed standards for research and were performed according to the Declaration of Helsinki.

Data analysis was performed using the SPSS (IBM version 28.0). Descriptive statistics were computed. Counts (and proportions), means, standard deviations (SD), and chi-square were computed to describe categorical and continuous variables for the total sample.

RESULTS

97 participants (51.3%) of participants reported less than one hour weekly of PA. The remaining 48.7% reported at least one hour per week of PA. Regarding the sub-sample of participants who reported practising at least one hour of PA per week, on average, people reported practising PA 3.18 times and 3.39 hours per week. Only 22.2% reported working out 3 or more hours per week. Figures 1 and 2 summarise the frequencies of PA (workouts per week and hours per week). When comparing the practice of PA (at least 1h per week) between genders, significant differences were found.

A chi-square test indicated that subjects who identified as male were more likely to be physically active than those who identified as female χ^2 (1, n = 89) = 4.55, p = .03

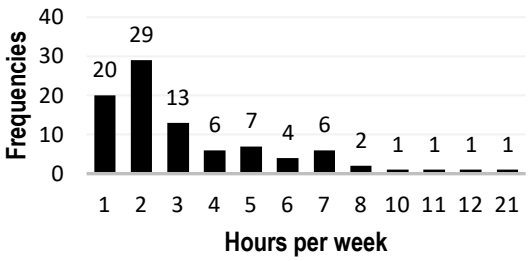

Figure 1 and 2. Summary of frequencies of PA: workouts per week and hours per week.

DISCUSSION

This study aimed to characterize the levels of PA of outpatients attending a mental health clinic. Most of our sample reported practicing no regular PA. This result aligns with most studies that continuously report high levels of sedentary lifestyles worldwide (Guthold et al., 2020). In our sub-sample of physically active subjects, participants spent on average 3.39 hours per week practicing PA. However, in the overall sample, only 22.22% reported working out 3 or more hours per week, and the majority 51,3% do not practice PA at all. Considering the vast literature reinforcing the importance and benefits of PA and exercise on people's physical and mental health and even in cases where PA is not directly related to the patient's principal complaint, PA may be used as co-adjuvants (Stubbs et al., 2017) and may play key roles in the overall treatment strategy. The results of our study are in line with the majority of literature in this field, suggesting that the majority of people not practicing PA are usually mainly composed of women and that men typically present higher levels of PA (Guthold et al., 2020). This result might be related to gender roles, in which women adopt the role of caregiver along with the professional role, having less time for themselves, including the availability to practice PA (Galvin et al., 2022). It is essential to promote psycho-education interventions about the importance and benefits of PA. Exploring the principal barriers and the possible motives for the practice of PA and exercise, as well as helping the individual implement and plan goals, will help maximize the probability of achievement. Working with multidisciplinary teams in mental health contexts, specifically with exercise physiologists, is crucial. The current study presents the following limitations: a cross-sectional study with self-reported data (objective measures are crucial to monitor the levels of PA practiced). However, this study presents strengths by addressing a meaningful issue (the relationship between PA and mental health in patients being treated in a mental health clinic). Although we previously addressed this as a limitation the truth is that a cross-sectional survey also has benefits by allowing capturing an overview of patients' PA levels at the time, they were engaging with mental health services. The study had a reasonable number of participants, allowing for a comparative analysis of sex differences. It is our hope that integrated conferences in this area and publications of this kind will have implications for mental health policy, highlighting the need to incorporate approaches that promote PA as part of the treatments offered in mental health clinics.

CONCLUSIONS

This data provided information that allows mental health professionals to adapt and improve their services.

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Asymmetry in handgrip strength in children in the 2nd and 4th years of schooling

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ABSTRACT

The aim of this study is to assess handgrip strength and manual asymmetry in children attending the 2nd and 4th grades of primary school. In general, genetic and non-genetic factors have been proposed to explain manual preference in humans (Papadatou-Pastou et al, 2020). On the other hand, evidence from various studies shows that lateral asymmetries vary throughout development, with a somewhat predictable phasing, but with some inconsistencies yet to be explained. Gender, the subject's neurological state and the type of society in which they live are factors that seem to interfere with the development of manual preference and the consequent manual asymmetry. It can therefore be said that asymmetry is the result of biological, social and cultural factors characteristic of a given geographical area and its historical and cultural context. Thirty children attending the 2nd and 4th years of primary school (18 girls and 12 boys) were assessed for this study. Fifteen are in the second year and another fifteen are in the fourth year.

Keywords: Asymmetry, Grip strength, Children.

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INTRODUCTION

The aim of this study is to analyse hand asymmetry in children attending the 2nd and 4th years of primary school in terms of handgrip strength.

Hand muscle strength is an objective index of the functional integrity of the upper limbs and is often used to monitor motor function (Häger-Ross, C., & Rösblad, B. 2002).

According to the literature, male children are expected to have greater handgrip strength, and this tendency is even more evident the older the child gets (Rodrigues et al., 2010). The same authors also add that genetic and non-genetic factors have been proposed to explain hand preference in humans.

In general, genetic and non-genetic factors have been proposed to explain hand preference in humans (Papadatou-Pastou et al, 2020).

Thus, two research questions arose: are there significant differences in force production between boys and girls; are there significant differences in the asymmetries of force production of the two hands of children in the 2nd and 4th grades. Following on from the above, this study aims to analyse asymmetries in handgrip strength in children attending the 2nd and 4th years of primary school.

MATERIAL AND METHODS

Participants

Thirty children attending the second and fourth years of the First Cycle of Basic Education (1ºCEB), aged between 7 and 10, took part in the study. Eighteen were girls and twelve were boys, fifteen were in the second year and another fifteen in the fourth year.

Instruments

The following assessment instruments were used: a sociodemographic questionnaire; a Jamar® hydraulic dynamometer was used for the grip strength test, where three measurements were taken in accordance with the recommendations of the American Society of Hand Therapists and the American Society for Surgery of the Hand; a SECA® stadiometer and a body mass monitor (TANITA model BC45-MA, Tokyo, Japan) were used to assess height.

Procedure

Initially, the participants had to fill in a sociodemographic questionnaire and then underwent physical, anthropometric and body assessments.

Data analysis

The statistical analysis involved descriptive statistics and inferential statistics. Student's t-test for independent samples and Student's t-test for paired samples were used. The normality of distribution was analysed with the Shapiro-Wilk test and the homogeneity of variances with the Levene test. The significance level for rejecting the null hypothesis was set at $\alpha \leq .05$.

RESULTS

Table 1 shows that both groups (boys and girls) gained in strength production from the 2nd to the 4th year of school.

Table 1. Comparison of hand grip strength by school year and gender.

	2nd year		4th year		
	M	**SD**	**M**	**SD**	**Sig.**
Female					
Preferential hand	11.0	1.8	15.9	2.4	.001***
Non-preferred hand	11.4	2.0	15.6	2.6	.001***
Male					
Preferential hand	11.2	3.4	18.6	2.7	.002**
Non-preferred hand	11.9	3.7	17.0	2.4	.016*

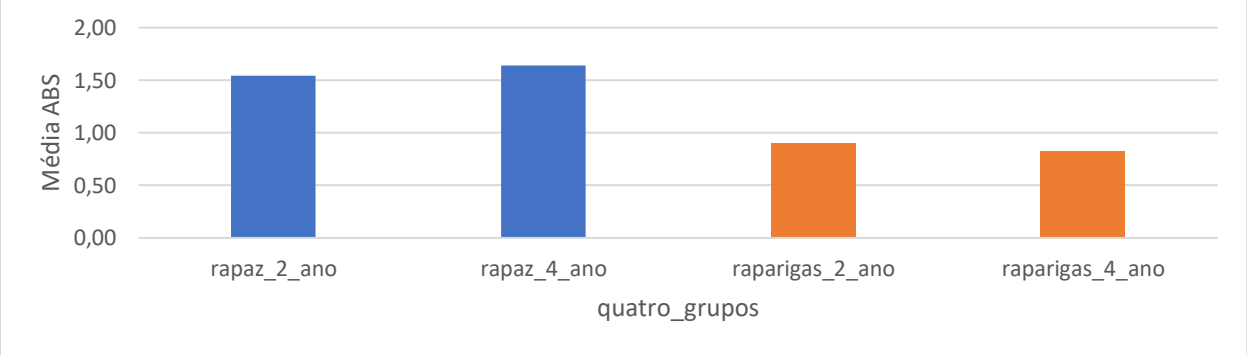

Figure 1 shows that the asymmetry in the production of handgrip strength is greater in boys than in girls.

DISCUSSION

The aim of this study was to analyse manual asymmetry in children attending the 2nd and 4th years of primary school in terms of handgrip strength. According to the literature, male children can be expected to have greater handgrip strength, and this tendency is even more evident the older the child is (Rodrigues et al, 2010). This was borne out by the results we obtained, namely confirming the existence of statistically significant differences in 4th grade boys in the production of handgrip strength between the preferred and non-preferred hand. This situation was not seen in the group of boys in the 2nd year of schooling, which could be explained by the fact that at these younger ages the set of motor experiences and culture may not be sufficiently differentiating in their effects on the hegemony of one of the differentiated sides.

With regard to girls, there were no statistically significant differences in force production between the preferred and non-preferred hands in both years of schooling.

As far as asymmetry is concerned, boys were found to be more asymmetrical than girls, regardless of age and year of schooling.

CONCLUSIONS

Analysing the results, it can be concluded that boys are more asymmetrical than girls when it comes to producing strength in each hand; however, this asymmetry does not seem to increase with age.

Both boys and girls increased their handgrip strength from the 2nd to the 4th year of school. The only group where there was a statistically significant difference in force production between the preferred and non-preferred hand with age was in 4th grade boys. Girls in 4th grade showed higher values in the preferred hand, although there was no statistically significant difference.

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Importance of an Intervention for the development of strength and impulse of the lower limbs in acrobatic gymnastics

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ABSTRACT

The objective of this study was to verify if there were differences in terms of the development of strength and impulsion of the lower limbs in athletes practicing Acrobatic Gymnastics. In this study participated 12 athletes aged between 10 and 15 years (12.50 ± 0.97) all female, divided into two groups, an Experimental Group (N = 5, 12.40 ± 0.92) and a control group (N = 7, 12.57 ± 0.36). To assess the strength of the lower limbs, the Chronojump software was used and to verify the body composition, the "*Inbody*" Bioimpedance scale was used. Athletes in the experimental group performed 20 specific training sessions for different types of strength over approximately 3 months. The Shapiro-Wilk test was applied to verify normality and the Wilcoxon test was used (to assess intra-group differences). The main results obtained refer that both groups evolved, however it was the experimental group (subject to complementary training) that obtained better results and greater evolution, with statistically significant differences.
Keywords: Strength, Impulse, Acrobatic gymnastics, Intervention.

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INTRODUCTION

In the physical preparation of gymnasts, in the first place, physical capacity is worked on flexibility and, in a later phase, much emphasis is placed on strength work (Publio, 1988).

According to the literature, muscle power ankle, knee and hip is required. For the technique to be effective, it must be executed both very quickly and with a represents the product of muscle strength and speed of action, each of which is influenced by intrinsic muscle properties.

Jastrjembskaia and Titov (1999), points out that gymnasts should start Explosive Strength training from 7 and 8 years old. And the greatest emphasis on this physical capacity is given from 11 and 13 years old. The same authors, the relative strength, which represents the force exerted in relation to the weight of the gymnast, reaches its maximum level at 13 and 14 years of age and stabilizes at a maximum at 17 years of age. And they also reveal that there are three periods: between 9 and 11 years old; 13 and 14 years old; 16 and 18 years, in which gymnasts can accelerate the development of Absolute Strength.

With regard to Resistance Strength, according to Jastrjembskaia and Titov (1999), the intensive increase in muscular resistance was observed in girls aged 9 to 12 years and the maximum increase in isometric strength resistance is observed among girls aged 13 and 16 years, when they reach the stage of sexual maturity.

One of the methods that have been used as discriminators of muscle power are the vertical jumps developed by Bosco (1999), among these jumps the Countermovement Jump (CMJ) stands out, which measures muscle power with the contribution of CAE and the Squat Jump (SJ), which basically reflects the athlete's neural recruitment capacity.

Thus, the objective of this study was to verify whether, with complementary training sessions, there were differences in the development of strength and impulsion, comparing the experimental group (subject to complementary training sessions of strength and impulsion of the lower limbs) with the control group (which was not subject to any complementary training session).

MATERIAL AND METHODS

Participants

In this study participated 12 athletes aged between 10 and 15 years (12.50 ± 0.97) all female, divided into two groups, an Experimental Group (N = 5, 12.40 ± 0.92) and a Control Group (N = 7, 12.57 ± 0.36).

The experimental group underwent complementary training 3 times a week lasting 1 hour of strength and impulsion in the lower limbs.

Measures

The instruments used to collect information on the motor capacity, strength and body composition of the children under study were the Bioimpedance scale (Weight, Height, Body Mass Index, Percentage of Fat Mass and Percentage of Lean Mass), and the Chronojump (jumping platform to analyse only the SJ jump (Squat Jump)). The function of Chronojump was to measure several parameters of jumps, and what we analysed in this study was the Height of Jumps variable.

Analysis

For data coding, we resorted to IBM - SPSS – Statistical Package for the Social Sciences SPSS (v.23.0). In the first analysis, the normality of the sample was verified by applying the Shapiro-Wilk test. As we obtained a non-normal distribution (sig. < .05) for all variables under study, we resorted to the Wilcoxon test to assess differences and intra-group evolution. A descriptive analysis of data based on means and standard deviation was also used.

RESULTS

Regarding the weight variable, we can see that the control group increased their weight and consequently their BMI, while the experimental group decreased their weight but also increased their BMI value. On the other hand, there was an increase in both groups of lean mass and a decrease in fat mass.

Regarding the vertical jump (SJ) both groups evolved from the 1st to the 2nd evolution, however it was in the experimental group that there was the greatest evolution and with statistically significant differences (22.68 ± 2.17 vs 24.02 ± 1.99, p = .041).

DISCUSSION AND CONCLUSIONS

The observed results allow us to verify that most of the children who had these sessions (experimental group) presented, on average, better results after the sessions (2nd evaluation). Despite the few studies that investigate the importance and influence of training sessions oriented towards the specificity of strength as an improvement in performance in acrobatic gymnastics, our results are in line with most investigations, referring that the more specific training sessions for this greater motor capacity is sports performance.

These results corroborate the studies of: Murad (2009) who carried out a study of explosive strength of IM with gymnasts aged between 11 and 13 years and found that gymnasts who were not very flexible could not achieve the jump form during the flight and as a consequence, they obtained an insufficient elevation in the jumps. Like Petry (2008) the jumps evaluated in our study, according to Lebre and Araújo (2006) are considered easy to perform and do not require a marked amplitude of the hip joint to be performed correctly, we believe that the values achieved would depend on the power of the IM muscles.

The main conclusions of this study are that, in fact, the sessions carried out to the athletes of the experimental group had an effect on their evolution of the capacity of strength and impulsion of the lower limbs, since this one showed greater evolution when compared to the control group. Thus, concluding that complementary training sessions to stimulate the strength of the lower limbs led to improvements in the performance of the athletes.

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The importance of an intervention for the development of flexibility in 7- and 15-year-old children

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ABSTRACT

The objective of this study was to verify whether the application of additional sessions of flexibility training improves this capacity in athletes who practice acrobatic gymnastics. The study included 28 children (10.57 ± 2.5 years), aged between 7 and 15 years of both genders (F, N = 24, 11.00 ± 0.5 years; M, N = 4, 8.00 ± 0.4 years), divided into two groups, experimental group (N = 14, 8.43 ± 1.01) and control group (N = 14, 12.71 ± 1.51). The athletes in the experimental group performed 20 specific training sessions for different types of flexibility over approximately 3 months. The Shapiro-Wilk test was applied to verify normality and the Wilcoxon test (to assess intra-group differences) was used. After analysing the results, we found that although there were not many statistically significant differences, on average the experimental group presented better results after the intervention in the various variables evaluated, whereas the control group presented, on average, and in some of the study variables, little or no evolution. These results agree with the study by (Publio, 1988) who carried out an investigation evaluating the flexibility of Olympic gymnasts through training, where they obtained significant results in gymnasts with an average age of ten years.
Keywords: Flexibility, Childrens, Acrobatic gymnastics, Intervention.

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INTRODUCTION

The fundamentals of acrobatic gymnastics go through balance, strength, coordination and flexibility, it can be performed in groups, pairs, trios. It is a modality that covers different age groups, as well as having a lot of variety in body composition, in this way, bases and defensive midfielders are distinguished by their motor development. In general, gymnasts have impeccable flexibility, however, some tend to have difficulties in achieving good results due to poor joint mobility.

The methodology used to run the specific intervention sessions was to start normal training with all the athletes together in the usual way, when they started training flexibility all together, the stipulated athletes already knew that they would have one more flexibility training session to follow and the remaining athletes continued with their normal training. The type of exercises performed went according to the needs of the athletes, that is, the interventions were based on joint exercises and exercises that were similar to those of the Flexitest, as well as exercises in which parts of the body were worked with less range of motion. movement and that did not deviate from the normality of the gymnasts' usual training sessions.

The objective of this study was to verify whether the application of additional sessions of flexibility training improves this capacity in athletes who practice acrobatic gymnastics.

MATERIAL AND METHODS

Participants

In this longitudinal study to 28 gymnasts (10.57 ± 2.5 years) of both genders (F, N = 24, 11.00 ± 0.5 years; M, N = 4, 8.00 years) ± 0.4 years). Participants were divided into two groups (for convenience): experimental group (N = 14, 8.43 ± 1.01) and control group (N = 14, 12.71 ± 1.51). The sessions for the experimental group were based on flexibility and motor capacity, during 20 sessions, distributed twice a week with a duration of 20 minutes each.

Measures

The main evaluation instrument for collecting information regarding the flexibility of the chosen participants was the Flexitest (Araújo, C. 1986), this allows us to classify the degree of flexibility in which the athletes are, which is divided into 6 levels depending on your score: <20 level of flexibility, very small (ankylosis); 21-30 small flexibility level; 31-40 flexibility level, medium small; 41-50 flexibility level, positive medium; flexibility level, great; > 60 flexibility level, very large (Hyper Mobility). The flexitest is made up of 20 different exercises in which athletes can obtain a classification from 0 to 4. The Flexitest consists of evaluating the maximum passive mobility of 20 joint movements of the whole body, eight of the movements are performed in the lower limbs, three in the throne and finally, nine in the upper limbs (Araújo, 2002).

Analysis

For data coding, we resorted to IBM - SPSS – Statistical Package for the Social Sciences SPSS (v.23.0). In the first analysis, the normality of the sample was verified by applying the Shapiro-Wilk test. As we obtained a non-normal distribution (sig. < .05) for all variables under study, we resorted to the Wilcoxon test to assess differences and intra-group evolution. A descriptive analysis of data based on means and standard deviation was also used.

RESULTS

Regarding the weight variable, we can see that the control group and the experimental group have higher values in the 2nd evaluation, and the control group was the one that presented the most evolution compared to the experimental group, however, in addition to the descriptive differences that exist in the experimental group, we can also verify statistically significant differences (p = .022). That said, to better understand this evolution from the 1st evaluation to the 2nd evaluation, it may be due to the fact that the athletes practice physical activity 3 times a week with 5 hours a week and therefore the weight gain can be justified with the increase in mass muscle.

We verified in the variables Flexitest 1, 5 and 20 that the experimental group obtained significant values of p, being the values (p = .002); (p = .014) and (p = .008), as well as obtained significant results of p in the variables PGC, MG AND MME, being the values: (p = .000); (p = .031) and (p = .000). All other Flexitest variables in this intervention group did not have significant values.

In the control group, there are not even significant differences in any of the Flexitest variables, and we can see that in variables 4, 5, 9, 10, 14, 15, 16 and 20 there was regression of the results from the 1st evaluation to the 2nd evaluation. However, in the variables BMI, PGC, MG and MME we verified significant values in p, being the values: (p = .000); (p = .021); (p = .001) and (p = .000).

We can say that the observed results allow us to verify that the majority of the children who had these sessions (experimental group) presented, on average, better results after the sessions (2nd evaluation), whereas the group that did not have this type of sessions, on average, did not show improvements, that is, there was practically no evolution compared to the 1st evaluation.

DISCUSSION

In the present study, 28 children were evaluated, using the Flexitest (to assess flexibility capacity) and Inbody (to assess body composition), verify that most of the children who had these sessions (experimental group) presented, on average, better results after the sessions (2nd evaluation), whereas the group that did not have this type of sessions , on average, did not show improvement, that is, there was practically no evolution compared to the 1st evaluation.

Our results also corroborate, with those of Fernandes (2016) who refer that the stimulation of flexibility in gymnasts, assumes a relevant role, allowing improvements in the development and consequently in their performance of the athlete both at a technical level as static.

Thus, it becomes increasingly important for clubs to give due importance to stimulation and complementary flexibility training, because according to Neto (2009) lately, children have very busy schedules, as well as the constraints of lack of space and mobility. existing in the life of cities, towns and villages, the lack of risk and adventure and an unhealthy diet, progressively becoming obese, sedentary and motor illiterate, with very serious consequences in the short term for public health.

For this reason, we conclude that additional/complementary sessions of stimulation in the flexibility motor capacity, causes the improvement of this capacity when compared to athletes who only attend the training of their classes.

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Teacher-student contact as a pedagogical tool in the physical-motor expression classroom and in the aquatic environment in a Portuguese school

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ABSTRACT

Contact is defined as a human need and its use in the educational field is justified against the moral panic that predominates in society. This article deepens into the reality of the use of contact as a pedagogical tool in relationships between the specialist in Physical Education and the student. Its objective is to analyse situations of intergenerational contact in the Physical-Motor Expression classroom and the aquatic environment at a school in Castelo Branco, Portugal. It was based on the bodily experience of a teacher who carried out her internship with 150 students in an Erasmus mobility. A professional from the school was involved as well. A qualitative method of research is adopted in order to detect the different pedagogical functions of touch, through the Teaching Body Journal and a semi-structured interview with a professional. We verified that the teacher-student contact has great value in the teaching and acquisition of body techniques, in emotional regulation and in auxiliary tasks. We conclude that contact can occur in multiple ways in the classroom and if it is used properly, its pedagogical value is high.
Keywords: Contact, Physical-motor Expression, Swimming, Body experience, Teaching body journal.

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INTRODUCTION

A school is a place for interaction and for building personal relationships (Echavarría, 2003), where the bodies of the students and the teachers play a key role. Physical contact is a way of human interaction (Varea et al., 2018) and its use is necessary to achieve the maximum potential of the student, therefore "*it could be considered a basic human right*" (Caldeborg, 2022, p. 73). Nevertheless, in our society there has been an existing taboo when it comes to relating the bodies and the touch in the educational field (Carey y Heather, 2008). Currently, there are numerous discourses of child protection and even no-contact policies that lead the Physical Education specialist to remain alert and implement certain self-regulation processes (Öhman, 2017). Therefore, the objective of this research is to critically analyse the use of contact as a pedagogical tool in the relationships established between the Physical Education specialist and the students both in the Physical-Motor Expression classroom and in the swimming pool.

MATERIAL AND METHODS

Participants

The person who collects the data is a 21-year-old woman of Spanish nationality, who is taking the Practicum course in Portugal thanks to an Erasmus scholarship. The research counts also with the participation of a professional from the centre, a specialist in Physical-Motor Expression and swimming, of Portuguese nationality and with 23 years of experience. During the study, different pedagogical situations experienced in the Physical-Motor Expression and swimming classes were considered, with a total of 150 students between 6 months and 10 years old, divided into different preschool and first cycle classes of Basic Education.

Measures

This study was carried out from the reflection of the internship lived by a teacher in practice in an Erasmus mobility. A Teaching Body Journal was prepared, a "*pedagogical and research instrument*" (González and Martínez, 2018, p. 190) based on an autobiographical-narrative approach where experience criteria prevail. This instrument guides towards the development of a critical pedagogical practice and in its execution the phases proposed by González and Martínez (2018) were followed: description of bodily situations, classification and first analysis, and final reflection. Furthermore, a semi-structured interview with a specialist was conducted in order to find out his perspective on the contact and, in this way, situate the teaching practice herself and understand what was discovered in the descriptions of the Teaching Body Journal.

Procedures

During the Physical-Motor Expression and swimming classes, a process of direct observation was carried out, and significant primary data was collected for the elaboration of potential descriptions for the Teaching Body Journal. After the description phase and a literature review, an interview with a specialist was planned and arranged. In the beginning, the reasons, objectives and confidentiality of the information exchanges were explained. Direct communication between the interlocutors and the transmission of various information occurred in the development phase. At the end of the interview, a recapitulation of important data was conducted and conclusions were drawn. In parallel, the phase of classification and analysis of the corporal reports was carried out and, finally, a global reflection was accomplished.

Analysis

The body descriptions prepared in the Teaching Body Journal were subjected to an exhaustive analysis. The main themes were extracted, different titles were assigned and a categorization of the different bodily experiences narrated was executed. Subsequently, the body dimension of the teacher in this area, and the

influence of her body and contact in relationships with the students were analysed. Likewise, the different data provided by the interviewee were interpreted and compared with his own experience.

RESULTS

The dataset from which the category system arose contains a total of 32 descriptions. Three groups referring to the different uses of contact between the teacher and the students in the classroom were created. It is verified that physical contact is used with the aim of teaching and working on a specific body technique in the relationships between the specialist and the students. In the second category, its use stands out as a key tool in the emotional field, for the establishment of affective and positive relationships. The last group refers to contact as a means of help in auxiliary tasks, related to the attention and care of the well-being of the students. In this domain, the value of contact in the assimilation of bodily practices is verified. It is proved that this promotes certain bodily sensations in the bodies involved in the interactions, and its prohibition would entail numerous difficulties in this area. Likewise, the teacher is responsible for adapting the different types of contact to the proposed objectives, and the possibilities of suspicion vary depending on their gender.

DISCUSSION

In the practice of Physical Education and swimming there are many functions that the sense of touch encompasses. This study suggests that the age of the students is a factor of influence when establishing contact in the classroom. The conditions of women and trainee teachers reduce possible suspicions derived from the reluctance that exists in contemporary school spaces about the risks that bodily contact with schoolchildren may entail within the idea of moral panic. Defining a didactic contract and setting appropriate limits can help prevent problems. This research allows us to identify different uses of contact in teacher-student interactions and assess its real benefits in the classroom. The use of contact seems to generate various benefits in the area of Physical Education and places the body of individuals in the foreground, an important factor taking into account that "*the fact that we are corporeal beings is not something anecdotal or marginal, but rather constitutes us as people*" (Martínez, 2013, p. 161).

CONCLUSIONS

The results of our study showed that teacher-student contact can occur in multiple ways in the Physical-Motor Expression and swimming classroom, and if it is used properly, its pedagogical value is high. Future lines of research should explore the influence of the teacher's gender in the use of pedagogical touch, and the bodily perceptions of students in situations of intergenerational contact.

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Effects of the order of execution of endurance training and resistance on the development of physical condition in secondary school students

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ABSTRACT

The objective of this study is to assess the effect of the order of execution of endurance and resistance training on the development of the physical condition in secondary school students during Physical Education classes. Thirty-one individuals were randomly divided into three groups, group 1 (EG1, n = 12) performed resistance training followed by endurance training, group 2 (EG2, n = 11) endurance training followed by resistance training and group 3 was the control group (CG, n = 8). The training program was performed during physical education classes, twice a week during ten weeks. To evaluate the effects of training, each participant underwent two assessments, in which a test shuttle run, the release of 3kg and 5kg medicine balls, countermovement jump, and 20m sprint were applied. The results of this study revealed that only the groups subject to the workout plan showed significant improvements in performance, with a significance level of $p > .01$, whereas the CG showed no improvement. In terms of training purposes, EG1 and EG2 showed significant percentage gains in performance, whereas the CG showed no percentage performance improvements. With this study we can conclude that regardless of the order of application of exercises, nineteen minutes of endurance and resistance training applied twice a week at the beginning of the physical condition classes is sufficient to contribute significantly to improving the physical condition of students.
Keywords: Endurance training, Resistance training, Physical condition, Student.

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INTRODUCTION

The school assumes a preponderant role in the physical activity of students, being Physical Education of extreme importance for the practice of physical activity, and for an active lifestyle of young people, with Physical Education programs considered as the main intervention weapon in the fight against sedentary lifestyle (Hoehner et al., 2008). Simultaneous resistance and endurance training has received considerable attention in the literature (Gravelle & Blessing, 2000). However, few studies have demonstrated whether strength training should precede or follow resistance training when both are performed in the same training session (Gravelle & Blessing, 2000). Therefore, the objective of our work is to verify the effect of the order of execution of resistance and endurance training on the development of the students' physical condition, with the purpose of verifying how we can be more effective in training the physical condition of students during Physical Education classes.

MATERIAL AND METHODS

Participants

For this study, thirty-one young men were recruited. The participants were randomly distributed into three groups: two intervention groups, group 1 (EG1, n = 12, 16.50 ± 0.67 years, 63.74 ± 12.64 kg, 171.92 ± 5.63 cm) which performed a strength training program followed by resistance; group 2 (EG2, n = 11, 16.27 ± 0.47 years, 64.78 ± 10.91 kg, 174.64 ± 6.56 cm) a resistance program followed by strength exercise and a control group (CG, n = 8, 18.22 ± 0.67 years, 66.81 ± 8.72 kg , 176.78 ± 7.33 cm) which had no training program.

Procedures

Table 1. Training program design.

Exercises	**Session 1**	**Session 2**	**Session 3**	**Session 4**	**Session 5**
3 kg Medicine Ball Throw	2x8	2x8	2x8	4x8	6x8
5 kg Medicine Ball Throw	2x8	2x8	2x8	4x8	6x8
CMJ (S x R)	1x5	1x5	1x5	3x5	3x5
Sprint (S x R)	4x20m	4x20m	3x20m	3x20m	3x20m
20-m shuttle Run (MAV)	75%	75%	75%	75%	75%
Exercises	**Session 6**	**Session 7**	**Session 8**	**Session 8**	**Session 10**
3 kg Medicine Ball Throw	3x5	2x5	2x5	1x5	1x5
5 kg Medicine Ball Throw	3x5	2x5	2x5	1x5	1x5
CMJ (S x R)	4x5	4x5	2x5	2x4	2x4
Sprint (S x R)	4x30m	4x30m	3x40m	2x30m	2x30m
20-m shuttle Run (MAV)	75%	75%	75%	75%	75%

Note. CMJ = Countermovement vertical jump; S x R = sets x repetitions; MAV = maximum individual aerobic velocity.

Training intensity and volume were established according to the guidelines of the American College of Sports Medicine. The application of the exercises was based on the study by Faigenbaum et al. (2007). Before starting each training session, the participants began with a warm-up of about 10 minutes (for both intervention groups), 5 minutes of constant running, and the remaining 5 minutes with muscle activation exercises. After warming up, the participants underwent the training protocol established for each intervention group for approximately 20 minutes (table 1). All participants were assessed before (pre-test) and after (post-test) the intervention. The battery of tests was performed in two sessions, separated by an interval of 48 hours. In the first session, the order of battery tests was as follows: (1) 20 m sprint time, (2) 3 and 5 kg medicine ball throw distance, (3) countermovement jump height (CMJ). In the second session, the shuttle

run test was performed. One week before the initial performance tests, two familiarization sessions were held to teach correct test execution and minimize technical errors.

Analysis

For the description of the test results, the traditional calculations of central tendency will be used: means and standard deviations. Considering that the sample groups were small in number (<30) and that they did not follow a normal distribution, we used the non-parametric Friedman test for the analysis of the comparison of the training effects in each of the groups (intra- group). To verify whether there were significant differences between the three groups at each of the evaluation moments, we resorted to the Kruskal-Wallis non-parametric test (inter-group effect). To check in which groups these differences were more noticeable (comparison of training effects between two groups), we resorted to the non-parametric Mann-Whitney test. A significance level for rejecting the null hypothesis of $p \leq .05$ was assumed.

RESULTS

Performing out an intra-group analysis, we could observe that only the groups subject to the training plan (EG1 and EG2) showed significant improvements ($p < .01$) in their performance in all tests performed. On the other hand, performing an intergroup analysis, we could observe that there are significant differences between the CG and the EG1 ($p < .05$) in all analysed variables and between the CG and the EG2 ($p < .01$) in the CMJ, 20m sprint and Shuttle Run. Regarding the training effects produced in both groups, we could observe that there were significant percentage improvements between 3.75 - 12.74% in EG1 and 1.79 - 20.81% in EG2, from pre to post-test in the variables studied.

DISCUSSION

The objective of this study is to assess the effect of the order of execution of endurance and resistance training on the development of the physical condition in secondary school students during Physical Education classes. The most relevant data from our study suggest that 20 minutes of resistance and endurance training in a school context (at the beginning of Physical Education classes) provide greater gains in the students' physical condition, regardless of the order of application. According to Faigenbaum (2004) children and young people of both sexes show substantial improvements in muscle strength, in response to different training protocols (strength training programs) when these are properly prescribed and supervised. When we compare the percentage effects of training between the experimental groups and the control group, it can be seen that in our study both EG1 and EG2 obtained significant improvements in the various parameters evaluated when compared with the CG. The results found in the present study also indicated that a reduced period of resistance training, i.e., that ten weeks seems to be enough to bring about significant gains in the students' physical condition. The result of our study is in line with the results obtained in the experimental study carried out by Cunha (1996), with students of the 7th year of schooling, in which the author evaluated the effects of a resistance training program in a period of ten weeks, and each training session consisted of 20 minutes, integrated in Physical Education classes.

CONCLUSIONS

Through the results obtained in the present study, we can conclude that regardless of the order in which the exercises are applied, 20 minutes of strength and resistance training applied twice a week at the beginning of Physical Education classes seem to be enough to contribute significantly to the improvement of the physical condition of the students.

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Validation of a program for teaching an alternative invasion team sport

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ABSTRACT

The validation of programmes based on pedagogical models is essential to ensure the effectiveness of the tasks. The aim of the research was to validate a didactic programme using the Game-Centred Model for the teaching of an alternative invasion team sport called "*the Rosquilla*". The sample consisted of nine expert judges who participated in the validation process. Content validity was achieved by calculating Aiken's V coefficient, using the algebraic equation modified by Penfield and Giacobbi. Internal consistency was obtained through Cronbach's α coefficient. Eleven tasks were eliminated from the intervention programme for not exceeding the exact critical value (V ≥ .73). Therefore, 49 tasks were included in the programme. The value obtained for internal consistency was excellent (α = .99). The programming is established as valid, reliable and suitable for learning "*the Rosquilla*". It can be used for the implementation of alternative sports, to determine the effects produced in the students and to favour the teaching work in Physical Education.
Keywords: Pedagogical models, Alternative invasion team sport, Expert judge, Aiken's V, Physical education, Pedagogical innovation.

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INTRODUCTION

Alternative sports (AS) are a philosophy of physical-sports practices with a recreational purpose that can be adapted to any space and context (Calle et al., 2020).

The empirical basis of the studies supports the quality of the teaching through a relevant validation that ensures the effectiveness of the programmes. In the literature, there are no learning situations designed for the teaching of AS that guarantee the appropriateness of the tasks through different pedagogical models. Therefore, the aim of this study was to validate a programme based on the Game-Centred or Comprehensive Model (GCM) for an alternative invasion team sport called "*the Rosquilla*", to allow its subsequent implementation and analysis of the effects produced.

MATERIAL AND METHODS

Participants

The expert judgement method was used for the validation process (Escobar-Pérez & Cuervo-Martínez, 2008). The group of experts had to meet the criteria predetermined by the researchers. The sample of subjects consisted of 9 expert judges.

Measures

Two variables were used, content validity and internal consistency. For the calculation of content validity, the evaluation of expert judges (Escobar-Pérez & Cuervo-Martínez, 2008) was used, using a Likert scale ranging from 1 to 10. The internal consistency of the tasks was calculated through Cronbach's α coefficient (Cronbach, 1990). An intervention programme based on the Game-Centred Model (GCM) was designed for the alternative invasion sport "*the Rosquilla*" for 1st and 2nd year of Obligatory Secondary Education (OSE). The programme consisted of 60 tasks distributed in twelve sessions.

Procedures

The expert judges' evaluations were collected. Subsequently, content validity was calculated. Finally, the intervention programme was defined. The study was conducted in accordance with the Declaration of Helsinki, with the approval of the Bioethics and Biosafety Committee of the University of Extremadura (159/2022), and with the consent of the participants.

Analysis

Content validity was computed using Aiken's V coefficient (Aiken, 1985), using the algebraic equation modified by Penfield and Giacobbi (2004). The critical value defined task acceptability calculated using the central limit theorem for large samples ($m > 25$). The 95% confidence level was set for the exact critical value, a value of .73 was reached. The 99% confidence level was set for the cut-off point for task modification with a score of .82.

RESULTS AND DISCUSSION

Figure 1 shows the Aiken V values obtained that were below the critical value of .73 (eliminated tasks), values between .73 and .82 (modified tasks), and values above .82 (accepted tasks).

Eleven tasks were deleted. Therefore, the final number of tasks is 49. Extensive modifications were made to adjust the organisation of the tasks to the number of students, available physical space and proposed

objectives. The expert panel is used with a set of 9 expert judges, higher than the minimum set, as the minimum number of experts required is five to provide reliability (Lynn,1986). The inclusion criteria are very demanding, guaranteeing the excellence and effectiveness of the didactic programme. A high level of demand is defined for the acceptance or elimination of a task. This technique is used in several research studies (González-Espinosa et al., 2017). However, no validations of alternative team sports programmes according to a pedagogical model have been found. The internal consistency using Cronbach's α coefficient (Cronbach, 1990) obtained a value of .997. The literature establishes as acceptable a value close to .70 (Nunnally, 1978), values above .90 are considered excellent results (George & Mallery, 2003). Therefore, the programme designed is excellent, which implies that it is adequate and well-constructed. This validation is of great importance because of its valuable practical implications and the paucity of studies on the subject. It is a valid and reliable programme in the educational context that certifies the sequencing of a series of tasks to achieve the didactic objectives. This programme makes it possible to analyse the learning acquired by the students after its implementation.

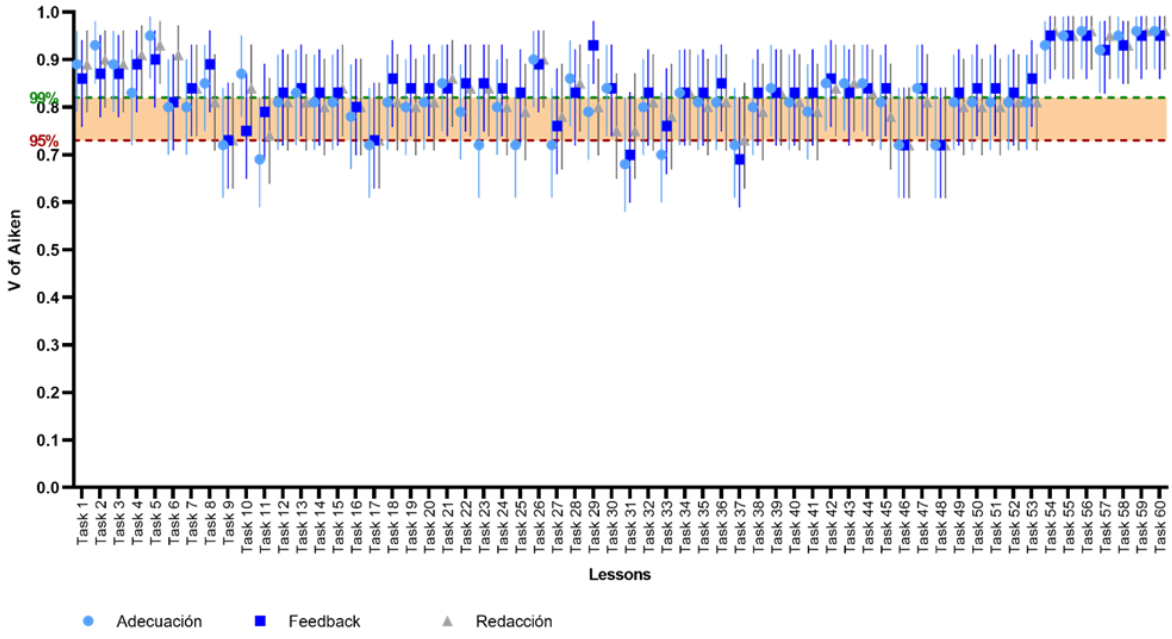

Figure 1. Aiken V-values and Confidence Intervals of the tasks.

CONCLUSIONS

The tasks that make up the intervention programme obtain optimal levels of internal consistency and validity. Therefore, it is considered valid and reliable for the teaching of the alternative sport of invasion, "*the Rosquilla*". This validated programme provides a suitable instrument to be implemented by teachers, guaranteeing a quality educational process. It also makes it possible to analyse the level of learning achieved by the students after its implementation. Determining the effects and benefits of the programme favours the work of Physical Education teachers.

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The good game as content of a lesson in the aquatic environment

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ABSTRACT

The aim of this project consists in creating a new way of structuring Education School Physics lessons, based on a logical whatever pedagogical-didactic, instead of anatomical - physiological way. This plan has been put into practice with students of 4th grade from Padres Redentoristas Social Center, located in Castelo Branco (Portugal) in swimming classes. With this purpose we designed an intervention plan in the water, which consists in four games encouraging them to do it by the good way. As a result, we analyse the results obtained in the planning, intervention and the subsequent hypothetical development of a good game that was carried out. Since due to a series of factors, both personal and external, I have not been able to meet the expectations that I had originally established in my planning.
Keywords: Game good, Education school physics, Pool, Intervention, Security, Relationships.

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INTRODUCTION

In the field of Physical Education, the body of the students is not taken into account because the lessons are not taught according to the rhythm of the body at those certain hours, which causes it to become a time to vent (García Monge, 2005). For this reason, teachers should try to propose methodologies that motivate students, respecting personal needs and promoting balanced social development among peers (Saldias Lizama et. al., 2019). The application of the "*good game*" content adapts to the characteristics of a group, to their interests and needs of students and teachers, causing a balance in relationships, developing the game without risk or conflict or injury, in a safe space when agreeing to the rules jointly (García Monge, 2011). The game has a significant effect on the progress of learning processes, and significantly helps the development of these skills, especially in the aquatic environment (Mármol, 2019). Continuing with this, the offer of swimming practice in educational centres is necessary and important because it complements the total training of the student, using water as an added resource in Physical Education within the school environment (Gosálvez y Joven, 1997). Since children spend most of their time in the water playing, either alone or under supervision, it is therefore essential that they are aware of the dangers that exist, and also, in order that the relationships between the children students are balanced for optimal play.

MATERIAL AND METHODS

Cross-sectional study, based on the epidemiological study in which factor and effect are observed at the same historical moment, being a type of research widely used in this area. To minimize possible errors in the analysis and interpretation of the results obtained, we use the quantitative method, a method that uses statistical techniques to use quantification in data collection and treatment.

Participants

We worked with a 4th year sample. The course was divided into two classes, group A had 17 students, and group B 18, with a total of 35 students. The participants were 9 or 10 years old. However, in each lesson they did not fully attend the classes, as some could not attend certain days for different reasons.

Measures

The lessons were planned according to five aspects influenced by the context: Little time in class to carry out the development of my intervention; Not knowing how much time I will really have to put the game into practice; Venting games, which serve to get tired, but which in turn do not pose many problems due to the time and lack of control of the class; One game per day; The teacher has a schedule that varies as he considers and the needs of the class.

Procedures

A didactic unit with four mini-lessons was planned, using good game content, mainly thematic nuclei of relationships and security. Each one consisted of a different game known to the students every day, lasting approximately ten minutes in the warm-up part of the lesson. Subsequent to the planning, the lessons were developed with the guidelines, pauses and questions to reflect on.

Analysis

Because each class is different, as well as the individuals that form it, in each group there were different answers, proposals and problems that led to different questions or rules in each game. For this reason and due to the lack of time to be able to fully develop the good game, I made a hypothesis of how the good game would continue in each class.

RESULTS

As the some began to understand the good game, they became involved, participated more and reflected on their actions. However, the participation was low and the answers usually came from the same subjects, except in the last game. Also, it was possible to observe an improvement in the classroom environment during the games. At the beginning, there were several arguments and aggressions, but compared to the last class, camaraderie was fostered and the students were more aware of their actions and did not attack or argue as before. The second game could not be played in group B due to various factors such as lack of time and lack of time control in the group A locker room. In addition, there were games like the third in group A, which had less time than normal.

DISCUSSION

To explore in depth in relation to the planning and the results obtained, six topics have been selected to analyse. In the first topic, the timing of the proposal is addressed, highlighting challenges such as the planning of games in alternate weeks and the interference of unexpected events in the programming, as well as the delays or changes that affected the teaching process. Therefore, more continuous planning is important. In the second theme, he focuses on the beginning of the proposal, highlighting that the introduction of the "*good game*" was not ideal due to the lack of familiarity of the students with the concept and their initial resistance. As the classes progressed, an increase in student interest and engagement is observed, suggesting that a more careful introduction might have been beneficial in establishing a solid foundation from the outset. In addition, the choice of games in the third topic is explored, explaining how he selected specific games based on safety and relationship themes, and how time constraints and the aquatic environment influenced these choices. In the fourth theme, the challenges of the space in the pool are discussed and how poor soundproofing affected communication and interaction with students. The fifth topic focuses on the author's communication during the intervention, detailing efforts to speak in Portuguese and how this affected her tone of voice and clarity when giving instructions and explanations. Finally, in the sixth topic, it is explored how moments of reflection were implemented to build the "*good game*" with the students and how this evolved throughout the classes.

CONCLUSIONS

Choosing good game content as teaching-learning content is an ideal way of treating release games, since it seeks to adapt the games to the characteristics, needs and interests of the students and the teacher. However, as long as the fundamental conditions to fully develop the good game are met, enough time to fully develop the good game, not as in the intervention that has been carried out.

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Exploring school PE beliefs and their impact on professional identity in future physical education teachers

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ABSTRACT

Physical Education (PE) teachers have prior experiences and backgrounds that influence their pedagogical practice. Students, far from being a 'blank slate,' demonstrate how their previous socialization period, subjectivities, and identities shape a particular culture of PE teaching. This present study aims to understand and delve into the preconceptions held by future Physical Education teachers that influence their practice and pedagogical intentions. The study included 23 second-year students pursuing a degree in education with a specialization in Physical Education, following a qualitative design. Data collection tools consisted of a questionnaire, a life history, and a semi-structured individual interview. The findings reveal that participants approach the profession from different professional perspectives: a sports-oriented perspective, a health-oriented perspective, a pedagogical perspective, and a perspective focused on critical pedagogy and social change within the context of PE.

Keywords: Teacher education, Physical education, Student teachers, Career choice motives, Professional identity.

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INTRODUCTION

Several studies indicate that prior experiences as students influence the attitudes, beliefs, and practices of future teachers (González Calvo, Barbero González, Bores Calle, & Martínez Álvarez, 2014; Korthagen, 2009; Virta, Hökkä, Eteläpelto, & Rasku-Puttonen, 2019). Thus, it is common for students entering initial teacher education programs to bring deeply rooted conceptions about teaching and learning, of which they are sometimes not even aware (Feiman-Nemser, 2001). In this regard, Fernández-Balboa (1998) and González-Calvo and Fernández-Balboa (2018) argue that in education, the personal and the pedagogical cannot be separated, and what happens in one area profoundly affects the other. As educators in the field of Physical Education, our own identities are strongly aligned with socially critical and just approaches to teaching and learning. In our particular case, we are deeply committed to exploring and promoting pedagogical practices that work towards inclusivity, support learning, and foster positive physical identities regardless of gender, ability, socioeconomic status, or any other factor. The construction of one's own pedagogical identity is positively influenced by (auto)biographical narratives, especially from a critical perspective, as these narratives help theorize the concept of professional identity (Clandinin, 1992; Connelly & Clandinin, 1999; Fletcher & Temertzoglou, 2010) to the point of being considered "*important constituents in the formation of the teacher's professional identity*" (Beijaard, Meijer, & Verloop, 2004, p. 109). Therefore, it could be argued that researching lived teaching experience from a (auto)biographical and critical perspective in any aspect related to the educational profession constitutes both an example of human science for an action-sensitive pedagogy (van Manen, 1997) and a dual process of embodied learning (Stolz, 2015) and pedagogical praxis (Fernández-Balboa, 1998). Research on motives for choosing a teaching career, specifically focused on PE teaching, is underdeveloped from a Spanish perspective. To the best of our knowledge, no study explores this topic in-depth from a qualitative perspective. In this study, we aim to provide an opportunity for future PE teachers to write, speak, and delve into their motives and perceptions regarding the subject and the teaching profession, thereby capturing their thoughts and obtaining rich, contextualized, and nuanced findings (Spry, 2001). Therefore, the study's objective is to identify the perceptions of future PE teachers midway through their university studies regarding education in general and PE in particular, with the intention of making them aware of these perceptions so that they can transform and enrich them.

MATERIAL AND METHODS

The participants involved in this research comprised 23 pre-service PE teachers, consisting of 14 females and 9 males, aged between 20 and 27 years at the time of data collection. These individuals were pursuing their second year of undergraduate studies at a Spanish university, specializing in the field of Physical Education. At the time of the study, all participants were enrolled in the course titled "*School Physical Education*," which is offered during the second year of their degree program. The course was attended by a total of 44 students, among whom the 23 participants were selected based on their decision to continue their studies in the specialization of Physical Education in subsequent academic years. This research adopted a narrative, reflective, and autobiographical approach to delve into the personal and pedagogical worlds of the participants (González-Calvo & Arias-Carballal, 2017; González-Calvo & Fernández-Balboa, 2018). This approach places the subject at the forefront, valuing their own voice as a tool for investigation and interpretation. Thus, the participants, through a profound and extended process of introspective reflection, could confront their own experiences actively and derive diverse meanings from them.

RESULTS

The data analysis reveals different main themes related to the development of teachers' professional identity and their effects on future pedagogical practice. The analysis considers specific factors of professional identity that can be categorized into four different levels: (a) sports identity and its influence on the development of professional identity; (b) health identity and its influence on the development of professional identity; and (c) pedagogical identity and its influence on the development of professional identity.

DISCUSSION AND CONCLUSIONS

Conceptions about teaching influence teaching performance, so it seems appropriate to study how they impact teacher education and the quality of education they provide (e.g. González-Calvo, 2020; González-Calvo & Arias-Carballal, 2017). Therefore, it is essential that, as responsible individuals for future teacher training programs, we take into account the prior knowledge and beliefs our students bring with them, as new ideas and approaches must compete with the tacit and implicit beliefs and theories they have developed throughout their experiences as students in the educational system. In line with our approach in this study, we understand that those who can offer the most accurate insight into the current state of Physical Education are the future teachers who are entrusted to teach it. They have experienced it from within as students and will transform and/or reproduce their past experiences with the subject. Our work advocates for understanding these prior experiences as a starting point for making changes and improvements in initial teacher training (Casey & Fletcher, 2012; González Calvo et al., 2014).

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Sociocultural animation and the interaction of playing with football: The importance of multidisciplinary in child

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ABSTRACT

This article aims to show the pedagogical and social perspective of the interaction between Socio-Cultural Animation and the play associated with football. The possibility of associating play with football enables a more balanced growth at a physical, emotional, and social level. In this dimension, socio-cultural animation is relevant due to its multiplicity of interventions, in the context of promoting the social relationship and physical-motor development and the cooperative games, in the process of educational construction in the football context, helping in the child's growth, training the norms and rules, supervising and establishing social relationships, for the reinforcement of physical-motor skills and behavioural parameterization. This study tried to present the value that the action of Sociocultural Animation has in the importance of the play associated with the football context.

Keywords: Play, Football, Socialization, Socio-emotional, Childhood.

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INTRODUCTION

Pais (1992) considers that there are three main ideas in playing: 1) action (the unfolding of play), 2) freedom (unstructured activity), and 3) pleasure (the satisfaction that the child gets from it). He also considers that play develops according to needs, interests and curiosity. By playing, the child will easily make countless discoveries, learn rules, customs and values; in other words, they discover the world around them. Playing plays an equally important role in the child's socialization, allowing children to learn to share, cooperate, communicate, and relate, developing the notion of respect for oneself and others, as well as self-esteem (Silva, et al, 2021; Sarmento, 2005). According to Ferland (2006), play represents the child's development in relation to knowing how to do and knowing how to be, i.e., it develops skills and attitudes that will be useful in various situations in daily life. Also, for Gomes (2010, p. 45), "*More than a tool, playing is an essential condition for the child's development*". By playing, the child develops attention, memory, imitation, explores and reflects on the reality and culture of the world where he/she is inserted Childhood and adolescence are periods marked by a high motor, physical and cognitive adaptation of child development. In these phases of development, several neuro-cognitive and motor consolidations occur, thus marking more remarkable plasticity in the development of children (Silva et al., 2021). According to Hillman et al. (2014), football assumes a fundamental role, presenting an ability to change the neuro structural and functional formation of children and adolescents due to its tactical and technical demands with great action at the level of psychological, perceptive-cognitive and motor capacities.

MATERIAL AND METHODS

The parents of the child athletes of Desportivo de Castelo Branco were asked to answer a brief questionnaire to obtain their understanding and perceptions about the importance that an activity like football, as a game can have on the quality of the child's interaction with their world, and specifically, in the way they play. The questionnaire was elaborated for the present study.

Participants

A total of 28 parents collaborated in this study. The majority was female (60.7%, n = 17). The parents are mainly between 30 and 50 years old and have a university degree (57.1%, n = 16).

Measures

Brief questionnaire to obtain their understanding and perceptions about the importance that an activity like football, as a game can have on the quality of the child's interaction with their world, and specifically, in the way they play.

Procedures

The questionnaire was administered between September and December 2021, with the participation of parents of children who integrated Desportivo de Castelo Branco as inclusion criteria. The questionnaire was composed of (1) socio-professional; (2) a questionnaire on Family Perceptions (Global Appreciation of the Project Playing with Football); Practices and perceptions of the activities (Project Playing with Football); Global Assessment (Professional performance, Ensuring quality in the future of training).

Analysis

SPSS was used in order to carry out the descriptive analyses of the sample and the questionnaire. The percentages of responses given to the items in the questionnaire were verified. The sociodemographic characteristics of the population sample were also analysed.

RESULTS

With regard to the parents' characterization of their overall assessment of the Playing with Football project, we found that most parents gave positive answers to all items. Most parents answered that the project is very good (N = 20), that football is in fact very important for learning (N = 17) and to increase students' motivation (N = 15), and they agree that soccer activities can improve physical, motor and educational conditions (N = 18). Parents also consider football to be a good learning tool (N = 20) and that it promotes children's socio-emotional skills (N = 20). Parents rated the project developed (Playing Football Project) as very good (N = 20), referring that their children had very good results (N = 20). They consider that the project developed very favourably (N = 15).

DISCUSSION

Preparing children for the physical-motor knowledge associated with football and the formal, relational, and social knowledge. This is because, at the moment of playing/training, they learn to play, dominate the ball, and concentrate and control the movements to achieve the goal. The children also learn how to relate as a group, respect, solidarity, self-control, self-confidence, group spirit, union, participation, responsibility, humility and appreciation of the other and control of the rules. Thus, the present study intended to analyse how the research project of Desportivo de Castelo Branco, for the small children's age group (under 7s), promotes the context of football practice and understanding of the importance of associating the practice of football with the context of childhood play. It is generally agreed that socializing and educating are related to "*playing*"; thus, it is essential to associate the educational and behavioural aspects with the play component. The added value that "*play*" brings to child development is undeniable. By mediating children's games and play, it enhances playful learning, facilitates learning, and stimulates the approach to the educational context in the practice of football.

CONCLUSIONS

We have demonstrated that the Desportivo de Castelo Branco investigation project for the small children's age group (under 7s) contributes to a more harmonious development of the children in the context of the promotion of the social relationship and physical-motor development. The cooperative games help in the process of educational construction in the football context and the child's growth, training the norms and rules, supervising and establishing social relationships, for the reinforcement of the physical-motor skills as of behavioural parameterization.

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What do students pay attention in physical education classes?

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ABSTRACT

The focused attention arises as a fundamental condition to the learning process, since the greater the power to keep the focus on a certain object or task, the better the chance of success. We intend to know the aspects to which the students pay attention during the different moments of the Physical Education class. The sample consisted of 156 students from the 3rd Cycle of Basic Education, of both genders (84 female and 72 male). We applied the questionnaire ATEST-EF (Petrica, 2010; Santos et al., 2019), in which the students signalized what they were thinking of at certain moments of the Physical Education classes. The final results indicate that there are no significant differences in terms of statistics, because after the application of the test of "*Qui-Quadrado*" to associate the variable "*Attention*" and the variable "*Signal*", we can verify the value of (p = .373). From the analysis performed, we can infer that in relation to students' attention profile study, there are no statistically significant differences.

Keywords: Physical Education, Moments in class, Student's thought, Attention.

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INTRODUCTION

Learning any motor skill requires selecting information that may be contained in the environment and/or provided by the teacher or coach. In order for this information to be retained, for later interpretation and possible storage in long-term memory, the attention process, and especially focused attention, emerges as a fundamental condition for learning, because the greater the power to maintain focus on a given object or task, the greater the chances of success.

In addition to the different types of attention applied to different sports, we have studied this phenomenon in children in their transition to puberty, between 10 and 15 years old (particularly in the teaching and learning process during physical education classes (Santos, Petrica & Maia, 2019).

MATERIAL AND METHODS

Participants

156 students from a school in the Sertã council, central Portugal, aged between 12 and 16 years old ($\bar{x}$ = 14.7 ± 1.3) 84 females (53.8%) and 72 males (46%). They all attend the 3rd Cycle (7th, 8th or 9th year), and were assessed during the Physical Education classes

Measures

To assess students' attention in Physical Education classes, the Atest-EF Questionnaire validated by Petrica, (2010), Santos, Petrica and Maia (2019) was used. It is a single question questionnaire with 16 response items, subdivided into six variables with the respective levels: (5) attention to task; (4) attention to behaviour; (3) attention to information; (2) affective attention; (1) off-task attention and (0) attention on other things.

Procedures

We intended that the students' attention would be registered in questionnaires distributed and explained to the students at the beginning of the class, and at a previously known sound signal, they would register their option from a range of possible answers to the question. What were you thinking the moment you heard the signal?

RESULTS

When comparing the moments of the class, significant differences were only observed in the students' attention when approaching sports, in the first (p = .035) and fourth (p = .019) moments of the class, as well as in the general profile of attention (p = .008), with significantly higher values when approaching collective modalities. Only a small magnitude of the effect (d = 0.219) was observed at the level of the general attention profile.

Table 1. General attention profile of students in physical education class.

	Individuals	SD	Collective	SD	Sig.	d-Cohen effect-size (95%-CI)
1st Moment	3.76	1.25	3.96	1.17	.035*	0.165(-0.151-0.482)
2nd Moment	4.07	1.30	4.17	0.99	.30	0.087(-0.229-0.403
3rd Moment	4.12	1.19	4.18	1.11	.58	0.052(-0.264-0.368)
4th Moment	3.57	1.39	3.85	1.55	.019*	0.19(-0.126-0.507)
General attention profile	3.88	0.74	4.04	0.72	.008**	0.219 (-0.098-0.536)

DISCUSSION

The objective was to characterize the attentional focus and the attentional profile of the students during the physical education class. This study confirmed that the focus of attention is mainly centred on attention to the task and attention to information (internal focus), with these data in line with the studies by Petrica (2010), which found profiles of attention similar to those of our study. Other investigations also sought to find strategies to enhance orientation whose effect was to focus the subject on the effects of movement (internal attentional focus), noting that this orientation was beneficial for learning, studies such as those carried out in golf by Brocken, Kal and Van der Kamp (2016) and in the javelin throw by Tse and Ginneken (2017).

CONCLUSIONS

We conclude that students' attention during physical education class is mostly focused on the task and with less attention focused on things outside the class.

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The level of physical activity of primary school students

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ABSTRACT

Extracurricular Activities of Physical Motor Expression are the starting point for students physical, social, and cognitive development. Therefor understanding the characteristics of Physical Motor Expression classes of AEC`s (Extracurricular Activities) according to the levels of physical activity, the context of the classes and the teacher's behaviour are important elements to help teacher to organize their work. For that we used SOFIT an instrument based on direct observation, developed, and validated for the evaluation of Physical Education classes. Data was analysed using descriptive statistics. We found that the time students were standing 34% of time, and very active 18.3%. Girls demonstrated that they are more active for longer than boys. The largest proportion of class time was on practicing skills (44.6%) and games (29.4%). In class teacher spent 29.7% on observing situations. The data suggest that students spend in class the same time in motor activities and stopped, and the teacher spends his time in several didactic situations.
Keywords: Physical activity levels, Extracurricular activities, Physical motor expression, Sofit.

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INTRODUCTION

School age is the best period for developing physical improvement and adopting an active lifestyle (Bracco et.al, 2003). It is in physical education classes that a child relates to the group and through their movements, gestures and actions where they demonstrate their difficulties, desires, actions, thoughts and personality (Santana, 2012). According to the WHO (2015), physical activity is a fundamental determinant of energy balance and weight control, reducing the risk of numerous diseases such as diabetes, cardiovascular diseases, hypertension and some forms of cancer. The objective of this was to analyse the characteristics of Physical Motor Expression classes of AEC`s (Extracurricular Activities).

MATERIAL AND METHODS

Participants

Participated in this study 1st, 2nd and 3rd year classes of elementary School, 12 classes were evaluated, 4 classes per school level. Each class had an average of 20 students (minimum 17 and maximum 23) aged between 6 and 9 years old. Materials used was computer, a specific form, a summary sheet of observed data and word and Excel program.

Measures

SOFIT (System for Observing Fitness Instruction Time) from Mckenzie & Sallis (1991), is an observational system that obtain data on student activity levels, the lesson context in which they occur, and how teachers interact regarding promoting physical activity and fitness during physical education class, and sports practices.

Procedures

12 classes were evaluated, 4 classes per school level, in each class evaluated, 5 students were randomly selected, but we will only have 4 target students with the same proportion of boys and girls (2 boys, 2 girls), the 5th student was part of study if one of the other students observed leave class for any reason. Students and teachers were Physical Motor Expression classes, where were observed, recorded, and registered the data on the SOFIT test protocol. A written consent was obtained from parents allowing the participation of their children in the study.

Analysis

These evaluations were carried out in the morning and afternoon, each class lasted 60 minutes, which gives a total of 720 minutes in 12 classes evaluated. Data was analysed using descriptive statistics.

RESULTS

Table 1. Proportion of physical education class time in physical activity categories.

Physical activity	Girls	Boys	All
Lying down	0%	0%	0%
Seated	11,5%	18,6%	15,7%
Standing	35,3%	34%	34%
Walking	34,6%	29,3%	32%
Very active	18,6%	18,1%	18,3%

Table 2. Proportion of physical education class time according to the context of the classes.

Class context	Results
Management	21.8%
Specific knowledge	0.5%
Physical aptitude	3.7%
Skills practice	44.6%
Game	29.4%
Others	0%

Table 3. Proportion of physical education class time according to the teacher's behaviour.

Teacher behaviour	Results
Promotion	4.2%
Demonstration	19.3%
General instructions	24.2%
Management	22.6%
Observation	29.7%
Other tasks	0%

DISCUSSION

We observe that the students do 18.3% of the class with high physical intensity (table 1), so the majority of the class is done with moderate and low intensity in this sense Guedes and Guedes (1997), concluded that students spent 16.3% of the class in moderate activity and 15.8% in high intensity activity in physical education classes that allow them to conclude that the time students spent in moderate and vigorous activities is insufficient to benefit from positive changes in health. Considering the high proportion of time that students spend lying, sitting is 49.7% (table 1), in resting or waiting situations, some investigators consider that to maximize the time in which students remain physically active, the class context must be properly organized, especially with tasks involving motor characteristics (Sallis; Mckenzie, 1997). Within the classes observed (table 2), the majority 44.6% were skills practice, and 29.4% were games, 3.7% of which were for physical fitness, only 0.5% of the theoretical content was covered, for some investigators this content are importance helping individuals in physically activities, since knowledge of the benefits and greater guidance have been associated with greater participation in physical activities (Sallis et al., 2000). Analysing the teacher's behaviour, we consider that most of the time, he was in didactic tasks that allow students to engaged adequately physical education class.

CONCLUSIONS

We conclude that students still can perform Physical Motor Expression classes with more intensity moments, whit more information about specific knowledge and teachers present good class organization to achieve a high participation of all students.

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External and internal load of wheelchair basketball players

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ABSTRACT

Inertial devices (ID) have been used in professional sports to quantify the external and internal load, due to their great functionality in the characterization of players' performance levels. Wheelchair Basketball (WB) is a sport designed for people with disabilities, who have a functional classification (FC), according to their range of movements and trunk stability (1.0 to 4.5 FC). This study aimed to analyse the external and internal load of WB players, according to the players' FC. The results showed that players of FC4.0 present better values in most of the analysed variables. Players of FC1.0 presented the highest maximum values in acceleration and deceleration. Determining the load to which WB players are subjected in simulated competition situations will allow training sessions to be personalized considering the physical demands of the competition. Analysing the external and internal load of the players during training tasks gives the coaching staff a great quantity of information, allowing to personalise the training tasks according to the competition demands, to obtain the best performance of each player, through a progressive training process.
Keywords: Performance, Player load, Functional classification, Training.

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INTRODUCTION

In Wheelchair Basketball (WB), there are few studies that used inertial devices (ID) for the analysis of players' external load (EL) (Hernández-Beltrán et al., 2023). For analysing the players' internal load (IL), heart rate (HR) or the rating of perceived exertion (RPE) scale have been used, and both methods can represent complementary tools to monitor players' IL. WB is a sport discipline intended for people with disabilities. Therefore, players will be attributed a functional classification (FC) depending on trunk control and stability. This will directly influence the performance of the players (Tachibana et al., 2019). The aims of the present study were: a) to identify the physical demands of WB players in 5x5 situations considering the FC; and b) to identify differences in the EL and IL values of WB players according to the FC.

METHODS

Design and sample

This study was classified as a cross-sectional study, since the data collection was carried out at a specific time during the pre-season. For this purpose, all the players of a first-level WB national team were included (n = 12; age = 31.5 ± 8.3 years, height = 167.0 ± 0.25 cm, weight = 68.0 ± 12.6 kg). The analysis sample consisted of all the tasks performed in training sessions simulating competition situations (5x5). A total of 144 cases were identified.

Procedure and instruments

After a familiarization session with the ID and the HR bands, the different training sessions were monitored to extract the information related to the players' EL and IL during the 5x5 tasks. For quantifying the EL, 12 WIMU PRO™ devices (RealTrack Systems, Almeria, Spain) were used ubicated in the interscapular area using an anatomical harness. For IL monitoring, Garmin™ HR bands were used.

Variables and statistical analysis

The independent variable was the FC of each player. The dependent variables were distance/min, explosive distance/min, accelerations/min, decelerations/min, maximum acceleration, maximum deceleration, maximum HR, average HR, % maximum HR, maximum speed, average speed, impacts/min and player load/min. The Kolgomorov-Smirmov test and a descriptive analysis of the sample were performed. Subsequently, the Mann-Whitney U test was carried out to identify the existence of differences between the different FC during the 5x5 tasks. Statistical Package of Social Science software (version 27, 2021; IBM Corp., IBM SPSS Statistics for MAC OS, Armonk, NY, USA) was used.

RESULTS

Table 1 shows the results of the descriptive analysis and the Mann Whitney U test to identify the differences between the different FC.

DISCUSSION

The results highlighted that players in FC4 have the highest values for most of the variables. FC1 players are the athletes with the highest maximum values in acceleration and deceleration. The analysis of the physical demands of the WB players in training and competitions will allow the training staff to personalize the training sessions according to the competition demands. The players with FC 4.0 are the ones with the highest values in the different variables analysed, and they are also the group of players with the greatest difference in

sporting performance compared to the rest of the players. This is because FC4 players have a large range of movements, as well as chair ergonomics and high trunk mobility (Vanlandewijck et al., 2011). To improve performance, techniques aiming to improve propulsion as well as accelerations should be carried out. These techniques improve upper limb function, reducing the incidence of pain as well as the likelihood of injury (Hernández-Beltrán et al., 2022), because the performance of WB players is closely related to muscle strength in the upper limbs, as well as aerobic and anaerobic capacity. This demonstrates how FC players present higher values in the analysed variables due to their greater range of motion of the trunk, and, consequently, the development of better performance during tasks and competitions. One of the limitations of the study is the small sample, due to the fact that working with a WB national team is complex when it comes to scheduling the time for data collection. For future studies, it is recommended to establish different time ranges to perform the experimental procedures, as well as to develop them at different times of the season and compare the performance considering the different moments.

Table 1. Descriptive and Mann Whitney U test results.

Variables	FC1		FC2		FC3		FC4		Mann-Whitney U test	df	*p*	Post-hoc
	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
Distance/min (m)	35.61	15.77	47.29	27.30	40.89	27.15	54.76	20.34	9.38	3	.025	FC1- FC4
Explosive Dist./min (m)	3.53	1.47	6.13	7.50	5.11	5.23	5.51	2.95	4.88	3	.181	
Accelerations/min (count)	27.01	6.59	27.38	7.92	26.99	6.78	29.69	5.17	3.83	3	.280	
Decelerations/min (count)	16.09	8.86	16.76	9.98	14.74	10.93	20.74	9.76	5.31	3	.150	
Max. Acc. (m/s^2)	5.97	1.56	5.43	2.31	5.62	2.04	5.07	1.85	4.95	3	.175	
Max. Dec. (m/s^2)	-5.24	1.62	-5.07	2.31	-5.05	2.05	-4.86	2.15	2.91	3	.405	
Max. HR. (bpm)	150.92	27.42	153.03	31.95	149.61	26.67	172.83	18.21	19.53	3	.000	FC1-FC4, FC2-FC4,FC3-FC4
Avg. HR. (bpm)	124.88	21.71	121.55	25.53	117.86	22.94	138.04	19.10	13.08	3	.004	FC2-FC4, FC3-FC4
Avg. (% of Max.)	69.10	13.31	69.24	13.63	66.13	11.30	73.10	9.76	5.59	3	.133	
Max. Speed (km/h)	16.52	6.45	16.73	7.81	16.80	8.95	16.20	2.91	3.56	3	.312	
Avg. Speed (km/h)	4.00	0.89	4.44	1.41	4.19	1.39	4.70	0.84	7.98	3	.046	FC1-FC4
Total Impacts/min (count)	69.68	42.46	98.04	66.22	87.63	69.49	126.26	54.25	10.80	3	.013	FC1-FC4
Player Load/min (a.u.)	0.41	0.22	0.49	0.30	0.47	0.35	0.71	0.27	14.61	3	.002	FC1-FC4,FC2-FC4,FC3-FC4

Note. Df: degree of freedom; $p < .05$.

CONCLUSIONS

Understanding the EL and IL of the WB players during training and competition is very important. It allows the coaching staff to personalize the training load according to the competitive demands, and to develop a progressive and modular training program of the loads to obtain the best performance from the athletes.

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Does the goal kick influence in sport performance of blind football players?

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ABSTRACT

The present study analyses all in-game goal kicks (n = 424) in 5-a-side football for blind people (Fa5) in the international tournament World Grand Prix 2021, held in Tokyo (Japan). The IOLF5C instrument was used (consisting of fourteen variables to analyse the effectiveness of goal kicking). A descriptive and association study between the independent variables of the analysis (contextual and game actions), and the study variable (result of the kick) was carried out. The results show that Fa5 is a sports modality with a reduced number of technical-tactical actions. The winning team of the tournament is the one that performs the highest number of goal kicking. They start the play in the starting zone, and kick at the goal from the offensive zone. The players performed a fast progression with driving and shooting at goal, without blocking, and, mainly, they hit the ball with the right foot and, mostly with the toe/kick. The result of the kick is conditioned by the team status, initial zone, opposition to the shot, and body zone. It is recommended that coaches should design situations that favour quick ball stealing after effective pressure in offensive zones.
Keywords: Sport performance, Sport, Disability, Blind.

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INTRODUCTION

Football for the blind people (Fa5) is a low-scoring invasion sport with specific particularities and differs from other types of football considering the technical-tactical actions performed by the players, such as the types of progression, blocks, or game tactics (Gamonales et al., 2021). Performance indicators applied in team sports allow the scientific analysis of sporting performance to advance knowledge of the game context, with the aim of improving future results. The performance indicators applied in team sports allow us to understand the logic of the game through technical-tactical factors (Gómez-Ruano, 2017). The main objective of the study was to analyse the effectiveness of goal kicking in Fa5 during World Grand Prix 2021 (WGP 2021), held in Tokyo (Japan).

MATERIAL AND METHODS

Design and sample

The present study fits within the empirical quantitative studies, with the aim of finding out the effectiveness of goal kicks during a Fa5 competition. Therefore, all the goal kicks (n = 424), performed in the Fa5 matches played in the WGP 2021 (n = 12) were analysed.

Procedure and statistical analysis

The IOLF5C instrument (Gamonales et al., 2018) was used to record and analyse the goal kicks during the WGP 2021, and determinate the effectiveness of goal kicks. To do so, the coders followed a training process to confirm that the data were valid and reliable, and consequently could be used for the research. Inter-observer and intra-observer reliability was analysed through the Kappa value (p = .90). Afterward, the observers recoded all goal kicks (n = 424). A descriptive and inferential analysis was performed, using the Chi-square (χ^2), to obtain the relationships between the analysed variables. The Cramer's V value (φC) was used to quantify the level of association in the relationships, as well as the Adjusted Standardise Residual (ASR). Crewson's (2006) proposal was used to analyse the association strength: Small (<0.100), low (0.100-0.299), Moderate (0.300-0.499), and High (>0.500).

RESULTS

Table 1. Relationship between the shooting outcome variable and the independent variables of the study.

Variables	Shooting Outcome							
	χ^2	**gl**	**p**	**FET**	***p***	**φc**	**p**	**Association size**
Stage	8.258	4	0.083	7.597	.091	0.140	.079	---
Team	20.178	16	0.212	20.154	.191	0.109	.212	---
Time	0.988	4	0.912	1.001	.919	0.048	.915	---
Team status	30.651	8	**0.000***	25.297	**.001***	0.190	**.000***	Low
Final outcome	11.090	8	0.197	10.769	.197	0.114	.190	---
Initial zone	26.217	12	**0.010***	25.533	**.008***	0.144	**.008***	Low
Type of advancement	7.056	8	0.531	6.751	.561	0.091	.534	---
Shooting zone	15.363	12	0.222	12.983	.257	0.110	.213	---
Circumstances leading to shot	20.433	12	0.059	19.924	.047	0.127	.047	---
Blocks	9.453	12	0.664	13.870	.398	0.086	.413	---
Opposition to shot	53.312	16	**0.000***	39.063	**.000***	0.177	**.001***	Low
Body zone (for control)	18.034	8	**0.021***	15.660	**.022***	0.146	**.031***	Low
Type of contact/touch	15.652	16	0.477	16.554	.340	0.096	.340	---

*Note. * p < .05.*

Table 1 shows the results of the association between shooting outcome variables and the independent variables of the study.

The descriptive results and ASR of the significant variables of the study show that there is a greater than expected probability that the teams that are winning take shots at goal (ASR = 5.4). Similarly, there is a greater probability than expected that the starting zone for shots at goal will be from the defensive zone (ASR = 2.5). Regarding the opposition to shot, there is a higher-than-expected probability that the shots at goal are without opposition (ASR = 4.1). Finally, considering the body zone, there is a lower than expected probability that the shots at goal are with the right foot.

DISCUSSION

The aim of the research was to analyse the effectiveness of goal kicking in Fa5 during the international tournament WGP 2021, held in Tokyo (Japan) because the documents related to sport performance indicators in Fa5 are scarce (Gamonales et al., 2018). The descriptive results of the present study revealed how players perform goal kicks in Fa5 mostly in the group phase and during the 1st half of the game. Athletes of the winning teams perform a greater number of shots in the offensive zone. They perform a fast progression driving and shooting at goal, without blocking. Additionally, they hit the ball with their right foot, mostly with the toe/forefoot. These characteristics of the modelling of competitive activity allow us to obtain extremely important information regarding the technical-tactical aspects in Fa5. This is a sport with little technical-tactical variety of actions, since field players mainly use sensory-perceptual resources, except for the goalkeeper. The information provided by the performance indicators can help to establish the strategy and tactics of the teams. It is recommended that the Fa5 coaching staffs evaluate the technical-tactical actions of international competitions to understand the playing patterns of the opposition teams. The association between the pitching result variable and the independent contextual variables of team situation, starting zone, and pitching opposition show that they can influence the game success. Regarding the observed performance of the participating teams, there is a significant correlation between the final ranking and the number of shots on goal.

CONCLUSIONS

Fa5 is a low-scoring invasion sport modality, which differs from the other adapted modalities in football due to its respective technical-tactical actions. Regarding the result of the kick, this is conditioned by the different significant studied variables (team situation, starting zone, kick opposition, and body zone).

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Training to win: Analysis of performance indicators in elite football

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ABSTRACT

As the years go by, football teams are able to improve by working with a greater knowledge of information on their own and the opposing team's performance indicators. To do this, they rely on specialised coaching staffs. The aim of this work was to know any performance indicator that affects the result of a match, and therefore the championship, in order to be able to work on it in training, improve it and thus achieve the objectives at the end of the season. For this research, three seasons of the Spanish First Division of men's football were analysed, using the variables location, result and all the performance indicators, comparing all the groups to find out the significant differences. The main findings show that when the team plays at home it should increase the quantity of passes, set pieces and the quantity of shots, if the team plays away it should be an aggressive team, which makes good counterattacks and must improve the quality of the shot because it will have fewer opportunities to shoot.
Keywords: Training, Football, Performance indicators, Sport, Advantage.

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INTRODUCTION

In a sport like football, an infinite number of strategies are created in order to win a match or a championship. There are variables that become important throughout a championship such as the location of the match. During the 2020 pandemic, a natural context with empty stadiums was obtained, and this phenomenon demonstrated the decrease of the home advantage (Fernández-Cortés, García-Ceberino, García-Rubio & Ibáñez, 2023). When the competitive level is lower either because of lower competitions or lower level leagues, location becomes more important in the final result (Caballero, García-Rubio & Ibáñez, 2017). Winning teams take more total shots, shots on goal, crosses and ball possession than teams that end up losing the match in Spanish league matches (Lago-Peñas, Lago-Ballesteros, Dellal & Gómez, 2010). Following the literature review, it is necessary to know any performance indicator that affects the outcome of a match.

MATERIAL AND METHODS

Participants

The data sample consisted of 2280 cases corresponding to the 2018/2019, 2019/2020 and 2020/2021 seasons of La Liga (Spanish First Division of Men's Football). The data were collected from the official La Liga website (https://www.laliga.com/laliga-easports) and https://www.flashscore.es.

Variables

Two independent variables were used in this research: i) Location (home and away) and ii) Result (win, draw and loss) and different dependent variables: i) Possession, ii) Total shots, iii) Shots on goal, iv) Shots away, v) Free kicks, vi) Corner, vii) Offside, viii) Fouls committed, ix) Attacks, x) Dangerous attacks, xi) Total passes and xii) Tackles.

Procedure

Statistical data was collected for 3 seasons. In the first phase, an investigation was carried out to analyse, select the variables that could affect the result and work during the training sessions. Once the selection was made, each variable was recorded and coded. In the second phase, the necessary analyses were carried out to find out the significant differences that existed and a table was drawn up, showing the mean, standard deviation and existing differences between the variables studied.

Data analysis

Firstly, descriptive analyses of the different performance indicators according to location and outcome (Mean and Standard Deviation) were performed. Secondly, the file was segmented by location variable. Thirdly, a one-factor ANOVA was performed with the outcome grouping variable and the performance indicators as dependent variables, applying Tukey's Post Hoc to find out the significance value between groups, and thus find out where the significant differences were found. Data analysis was carried out using the JAMOVI programme.

RESULTS

Table 1 shows the descriptive (mean and standard deviation) and inferential results of the influence of the performance indicators on the location and outcome of the match. Teams that achieved the victory playing at home, obtained higher means in total shots and shots on goal. Losing teams get more shots away and free kicks. Finally, the teams that make more passes are the winners. In addition, significant differences were

found in the visiting teams between the teams that win and those that draw and lose, with the winners obtaining a higher average in total shots, and their average being lower in shots away and attacks. There were differences between the 3 groups in shots on goal, with the winning teams having a higher number of shots on goal. Finally, differences were found between the losing teams and the winning and tied teams in offside and fouls committed.

Table 1. Descriptive and inferential results and differences between groups.

	Win				Tie				Lose					
	Home		Away		Home		Away		Home		Away		Home	Away
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
Total shots	13.2	4.8	10.9	3.94	12.3	5.06	10.1	3.99	12	4.96	9.81	4.23	&*	&*
Shots on goal	5.34	2.46	4.74	2.04	3.85	2.12	3.28	1.69	3.44	2.1	2.88	1.8	&*	&*#
Shots off goal	7.82	3.58	6.13	3.09	8.47	4.02	6.78	3.35	8.58	3.88	6.93	3.46	&*	&*
Free kicks	14.8	4.04	16.1	4.72	16.2	5.23	16.1	4.96	16.3	4.91	15.8	4.54	&*	
Offsides	2.35	1.72	2.16	1.68	2.13	1.76	2.26	1.75	2.18	1.68	1.8	1.64		*#
Fouls committed	13.3	4.07	13.8	4.21	13.8	4.36	13.9	4.33	13.8	4.06	13.1	3.72		*#
Attacks	108	25.6	97.8	22.3	111	25.1	105	23.2	111	27	102	23.1		&*
Total passes	453	147	430	138	426	118	417	127	429	106	410	105	&*	

*Note. & Differences Win-Tie, * Differences Win-Lose, # Differences Tie-Lose.*

DISCUSSION

The aim of this research was to find out any performance indicators that affect the result, and therefore the championship, in order to be able to work on them in training sessions. Differences were found between the local teams that won and the others, obtaining different averages in total shots, shots on goal, shots on target, shots on goal, free kicks and passes. In the Spanish league, it has been concluded that during the pandemic the home advantage of playing in the absence of spectators decreased (Fernández-Cortés, García-Ceberino, García-Rubio, Ibáñez & 2023). The presence of the public is important when planning training sessions, the indicators of shots, free kicks and passes should be the concern of the coaching staff in order to improve results. The winning visiting teams were distinguished by a higher average of total shots and shots on goal. Total shots, shots on goal, crosses and ball possession differentiated the winning teams from the losing teams (Lago-Peñas, Lago-Ballesteros, Dellal & Gómez, 2010). Coaches must judge the quality of the shots and attacks their team is making, because quality is more important than quantity, as well as achieving a proactive defending team.

CONCLUSIONS

Coaches should modify their training and adapt it in anticipation of the known conditions of the next match. Throughout the three seasons it is observed that the quantity of passes is important when playing at home, with no difference when playing away, therefore, visiting teams must be especially careful in losing the ball, because the quality of the pass is more important than the quantity. Home teams should train set pieces because of their importance when playing in their home stadiums, while away teams should be aggressive teams and train counter-attacks, to attack quickly, and to finish in clear situations, because they will have fewer opportunities to score goals.

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Analysis of the predominance of technical actions used in the 2021 European Judo Championship depending on combat time and golden score

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ABSTRACT

The interest of this study perspective, which allows us to interpret competitive action in more detail, is also important to reflect that according to the legal adaptations dictated by the rules of a modality, it makes its study necessary. The objective was to analyse the predominance of technical actions used in the 2021 European Judo Championship based on combat time and golden score. The study sample focused on 400 combats of the European Judo Championship 2021. We used an observation system created for this purpose, according to the classification system proposed by Kodokan. Cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals. The predominance of techniques and their effectiveness presented a similar hierarchy in both the combat and golden score phases. In golden score, women showed a significant association with hip techniques and men with frontal sacrifice techniques. Female athletes proved to be more effective in percentage terms in the golden score phase.

Keywords: Judo, Kodokan, European championship, Combat performance, Competitive performance analysis.

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INTRODUCTION

Judo is an Olympic combat sport divided into male and female weight categories. Each weight category implies marked differences in technical and strategic dimensions, as well as physiological, performance, and body composition between different weight categories competitors (Franchini and Herrera-Valenzuela, 2017). This individual variability can broadly mark the options and predominance of technical actions inherent to its own movements (Sterkowicz, Sacripanti, and Sterkowicz-Przybycien, 2013). It's important and necessary to interpret the competitive action in more detail on the different phase of the combat, and it is also important to reflect that according to the legal adaptations dictated by the rules of a modality (Batista et al, 2022). The objective was to analyse the predominance of effectiveness of technical actions used in the 2021 European Judo Championship based on combat time and golden score.

MATERIAL AND METHODS

Participants

The study sample focused on the European Judo Championship 2021, which had the participation of 359 athletes registered, 210 male athletes, and 149 female athletes, from 45 countries. 400 judo combats were observed, in the different male and female weight categories, with 6716 technical actions in combat being categorized.

Measures

We used an observation system created for this purpose, allowing registration and categorization of each technical action observed in combat, according to the following variables described. Each technique was categorized according to the classification system proposed by Kodokan. Data analysis was performed to identify each technique serving five categorization classes for Nage-Waza, also used by other authors (Boguszewski, 2016).

Procedures

For this research preparation, no ethical issues involved in the analysis and interpretation of the data used were considered, since they were obtained using publicly available and freely accessible International Judo Federation (IJF) online sources and were not generated by any experimentation process.

The athletes' personal identification was not done since the observation was not individualized. The identification of each observed combat was replaced by a code, which guaranteed anonymity and confidentiality.

Analysis

The techniques count distribution frequency was compared using the software IBM SPSS 21.0 software. For this purpose, cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals, taking as reference positive values equal to or greater than 1.96, assuming that the higher the residual, the more significant the trend is (Marôco, 2018).

To determine differences between groups in the frequencies recorded proportions, the Z test was applied, where the significance level was set at $p \leq .05$.

RESULTS

The results expressed in Tables 1 show that the hierarchy of techniques used by male and female athletes are similar, noting that in golden score the second most used group by female athletes became the Koshi Waza group instead of Te Waza. Significant associations were identified in golden score with the use of Ma Sutemi Waza techniques by men and Koshi Waza by women. In Table 2 we observe identical trends in effectiveness in both genders, although female athletes present an effectiveness above 10% in golden score, with a significant association with the Ippon advantage in that same phase.

Table 1. Predominance of technical actions during combat.

	Phase	Ashi Waza	Koshi Waza	Te Waza	Ma Sut Waza	Y Sut Waza	Total
Male	Combat	1810 a	272 b	711 a, b	217b	153c	3163
	%	57.2%	8.6%	22.5%	6.9%	4.8%	100.0%
	Golden Score	193a	43 b	98a, b	40* b	7c	381
	%	50.7%	11.3%	25.7%	10.5%	1.8%	100.0%
	Total	2003	315	809	257	160	3544
	%	56.5%	8.9%	22.8%	7.3%	4.5%	100.0%
	Phase	**Ashi Waza**	**Koshi Waza**	**Te Waza**	**Ma Sut Waza**	**Y Sut Waza**	**Total**
Female	Combat	1816 a	289 b	344 a, b	60 a, b	163 a, b	2672
	%	68.0%	10.8%	12.9%	2.2%	6.10%	100.0%
	Golden Score	206 a	52* b	49 a, b	9 a, b	24 a, b	340
	%	60.6%	15.3%	14.4%	2.6%	7.1%	100.0%
	Total	2022	341	393	69	187	3012
	%	67.1%	11.3%	13.0%	2.3%	6.20%	100.0%

*Note. * (technical group shows a significant residue); a b (technical group differs).*

Table 2. Effectiveness of technical actions during combat.

	Phase	Ippon	Waza-ari	Non Score	Kiken Gachi	Total
Male	Combat	146 a	116 a	2962 a	3a	3227
	%	4.5%	3.6%	91.8%	0.1%	100.0%
	Golden Score	25 a	11a	363 a	0a	399
	%	6.3%	2.8%	91.0%	0.0%	100.0%
	Total	171	127	3325	3	3626
	%	4.7%	3.5%	91.7%	0.1%	100.0%
	Phase	**Ippon**	**Waza-ari**	**Non Score**	**Kiken Gachi**	**Total**
Female	Combat	104 a	78 a, b	2550 b	1 a, b	2733
	%	3.8%	2.9%	93.3%	0.0%	100.0%
	Golden Score	22* a	14 a, b	321 b	0 a, b	357
	%	6.2%	3.9%	89.9%	0.0%	100.0%
	Total	126	92	2871	1	3090
	%	4.1%	3.0%	92.9%	0.0%	100.0%

*Note. * (technical group shows a significant residue); a b (technical group differs).*

DISCUSSION

When we analyse the results, we observe that the predominance and percentage of effectiveness respect an identical trend to that already found by Batista et al. (2022), Boguszewski (2016) or Sterkowicz, Sacripanti, and Sterkowicz-Przybycien (2013). However, it should be noted that, in percentage terms, behavioural

changes are observed in the decision-making of judokas in both genders, from the combat phase to the golden score phase, an aspect also identified by Batista et al. (2022).

CONCLUSIONS

The predominance of techniques and their effectiveness presented a similar hierarchy in both the combat and golden score phases. In golden score, women showed a significant association with hip techniques and men with frontal sacrifice techniques. Female athletes proved to be more effective in percentage terms in the golden score phase.

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Biomechanical analysis of technical actions used in the 2021 European Judo Championship as a function of combat time and golden score

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ABSTRACT

In Judo, each motor action depends greatly on the behavioural and technical variability of each judoka, which largely determines the options and the predominance of biomechanical actions inherent to the movements themselves. It is, therefore, important to understand the biomechanical action trends implemented by judokas in the dynamics of current judo, allowing for more assertive competitive preparation. The objective was to biomechanically analyse the technical actions used in the 2021 European Judo Championships based on combat time and gold score. The study sample focused on 400 combats of the European Judo Championship 2021. We used an observation system created for this purpose, according to the classification system proposed by Sacripanti. Cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals. In both genders and phases of combat, the use of torque techniques predominated over lever techniques, with the hierarchy of technical resources used by judokas being identical. In golden score, women showed a significant association with the use of torso-leg binary techniques. Throughout the fights, women registered differences in the use of groups of techniques..

Keywords: Judo, Biomechanics, Lever techniques, Couple techniques, Competitive performance analysis.

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INTRODUCTION

Judo is a dynamic, intermittent, high-intensity combat sport that requires complex skills and tactical excellence for success (Franchini & Herrera-Valenzuela, 2017). In each combat, judokas have to perform a high number of motor actions of a technical nature, making the physical demand high in each combat and consequently in each competition. Each motor action depends greatly on the behavioural and technical variability of each judoka, which largely marks the options and predominance of biomechanical actions inherent to the movements themselves (Sterkowicz, Sacripanti, & Sterkowicz-Przybycien, 2013; Batista et al, 2022). The objective of this study was to biomechanically analyse the technical actions used in the 2021 European Judo Championships based on combat time and gold score.

MATERIAL AND METHODS

Participants

The study sample focused on the European Judo Championship 2021, which had the participation of 359 athletes registered, 210 male athletes, and 149 female athletes, from 45 countries. 400 judo combats were observed, in the different male and female weight categories, with 6555 technical actions in combat being categorized.

Measures

We used an observation system created for this purpose, allowing registration and categorization of each technical action observed in combat, according to the following variables described. Each technique was categorized according to the classification system proposed by Sacripanti (2012 in Sterkowicz, Sacripanti and Sterkowicz-Przybycien, 2013). The data was analysed to identify each technique according to nine categorisation classes for Tachi-Waza, also used by other authors (Batista et al., 2022; Sterkowicz, Sacripanti and Sterkowicz-Przybycien, 2013).

Procedures

For this research preparation, no ethical issues involved in the analysis and interpretation of the data used were considered, since they were obtained using publicly available and freely accessible International Judo Federation (IJF) online sources and were not generated by any experimentation process. The athletes' personal identification was not done since the observation was not individualized. The identification of each observed combat was replaced by a code, which guaranteed anonymity and confidentiality.

Analysis

The techniques count distribution frequency was compared using the software IBM SPSS 21.0 software. For this purpose, cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals, taking as reference positive values equal to or greater than 1.96, assuming that the higher the residual, the more significant the trend is (Marôco, 2018). To determine differences between groups in the frequencies recorded proportions, the Z test was applied, where the significance level was set at $p \leq .05$.

RESULTS

The results revealed in both genders and both in the combat and golden score phases, a predominance of use of binary techniques (60%) compared to lever techniques (40%), respectively men 55% - 45% and

women 66.5% – 33.5%. The hierarchy recorded in binary techniques was arm-leg techniques, trunk-leg techniques, and arm techniques. In lever techniques the hierarchy was variable arm lever technique, maximum arm, minimum arm, and medium arm. Women showed a significant association with the use of trunk-leg binary techniques in the golden score phase. There were differences in the use of groups of techniques by women as opposed to men where this aspect was not verified.

Table 1. Predominance of binary techniques during combat.

	Phase	Arm Leg	Trunk Leg	Arms	Total
Male	Combat	1324 a	438 a	3a	1765
	%	75.0%	24.8%	0.2%	100.0%
	Golden Score	125 a	51 a	0.0	176
	%	71.0%	29.0%	0,00%	100.0%
	Total	1449	489	3	1941
	%	74.7%	25,20%	0.2%	100.0%
	Phase	**Arm Leg**	**Trunk Leg**	**Arms**	**Total**
Female	Combat	1330 a	455 b	5 a, b	1790
	%	74.3%	25.4%	0.3%	100.0%
	Golden Score	140 a	71* b	1 a, b	212
	%	66.0%	33.5%	0.5%	100.0%
	Total	1470	526	6	2002
	%	73.4%	26.3%	0.3%	100.0%

*Note. *(technical group shows a significant residue); a b (technical group differs).*

Table 2. Predominance of lever techniques during combat.

	Phase	Midlle Arm	Max Arm	Variab Arm	Min Arm	Total
Male	Combat	59a	507a	618a	213a	1397
	%	4.2%	36.30%	44.2%	15.2%	100,00%
	Golden Score	6a	84a	87a	28a	205
	%	2.9%	41.0%	42.4%	13.7%	100,00%
	Total	65	591	705	241	1602
	%	4,10%	36,90%	44,00%	15,00%	100,00%
	Phase	**Midlle Arm**	**Max Arm**	**Variab Arm**	**Min Arm**	**Total**
Female	Combat	31 a, b	308 b	393 a	150 a, b	882
	%	3.5%	34.9%	44.6%	17.0%	100,00%
	Golden Score	2 a, b	33 b	74 a	19 a, b	128
	%	1.60%	25.8%	57.8%	14.8%	100,00%
	Total	33	341	467	169	1010
	%	3.3%	33.8%	46.2%	16.7%	100,00%

*Note. *(technical group shows a significant residue); a b (technical group differs).*

DISCUSSION

Overall, we observed a predominance of use by judokas of torque techniques compared to the use of lever techniques. This evidence contradicts the results observed by Sterkowicz, Sacripanti and Sterkowicz-Przybycien (2013) and Batista et al. (2022) which recorded an opposite reality. When analysed by groups of techniques, the hierarchy of technical actions used in the combats analysed in Tachi-Waza respect the same trend found by Batista et al. (2022), in binary techniques and in lever techniques. However, if we analyse by

gender the work of Batista et al. (2022) the hierarchical trend was not fully fulfilled in the same way as the results of our study, as well as the significant associations found between gender and type of techniques.

CONCLUSIONS

In both genders and phases of combat, the use of torque techniques predominated over lever techniques, with the hierarchy of technical resources used by judokas being identical.

In golden score, women showed a significant association with the use of torso-leg binary techniques. Throughout the fights, women registered differences in the use of groups of techniques.

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Analysis of the frequency and effectiveness of the technical actions used in the 2021 European Judo Championship according to the elapsed time of combat

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ABSTRACT

The interpretation of temporal parameters during competitive practice is always interesting and pertinent, and specifically in judo, which requires high preparation from athletes to be able to control or throw the opponent in a short space of time. The interest of this study perspective, which allows us to interpret competitive action in more detail, is also important to reflect that according to the legal adaptations dictated by the rules of a modality, it makes its study necessary. The objective was to analyse the frequency and effectiveness of technical actions used in the 2021 European Judo Championship depending on the elapsed time of combat. The study sample focused on 400 combats of the European Judo Championship 2021, with 6731 technical actions in combat being categorized. We used an observation system created for this purpose, according to the classification system proposed by Kodokan. Cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals. The number of technical actions tends to decrease over the 1st to 4th minute of combat and consequently also towards the golden score time. The relative percentage of technical actions scored from the 1st to the 4th minute of combat tends to increase, with the Ippon advantage assuming an increasing percentage trend and the Waza-ari advantage a decreasing trend, maintaining this trend in golden score.

Keywords: Judo, Kodokan, European Championship, Combat performance, Competitive performance analysis.

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INTRODUCTION

Judo is an Olympic combat sport divided into male and female weight categories. Each weight category implies marked differences in technical and strategic dimensions (Franchini and Herrera-Valenzuela, 2017). Currently, a judo fight can last from a few seconds to more than 12 minutes, depending on the score obtained by the competitors. However, a high-level judo fight tends to last 3 minutes, with periods of activity of 20 to 30 seconds and 5 to 10 seconds of interruption. It is noted that a significant part of the fights last 3 to 4 minutes (Franchini and Herrera-Valenzuela, 2017). It's important and necessary to interpret the competitive action in more detail on the different phase of the combat time, and it is also important to reflect that according to the legal adaptations dictated by the rules of the sport (Batista et al, 2022). The objective was to analyse the frequency and effectiveness of technical actions used in the 2021 European Judo Championship depending on the elapsed time of combat.

MATERIAL AND METHODS

Participants

The study sample focused on the European Judo Championship 2021, which had the participation of 359 athletes registered, 210 male athletes, and 149 female athletes, from 45 countries. 400 judo combats were observed, in the different male and female weight categories, with 6731 technical actions in combat being categorized.

Measures

We used an observation system created for this purpose, allowing registration and categorization of each technical action observed in combat, according to the following variables described. Each technique was categorized according to the classification system proposed by Kodokan. Data analysis was performed to identify each technique serving five categorization classes for Nage-Waza, also used by other authors (Boguszewski, 2016).

Procedures

For this research preparation, no ethical issues involved in the analysis and interpretation of the data used were considered, since they were obtained using publicly available and freely accessible International Judo Federation (IJF) online sources and were not generated by any experimentation process. The athletes' personal identification was not done since the observation was not individualized. The identification of each observed combat was replaced by a code, which guaranteed anonymity and confidentiality.

Analysis

The techniques count distribution frequency was compared using the software IBM SPSS 21.0 software. For this purpose, cross-frequency tables were produced, where the association degree between variables was analysed using the Chi Square test, where the significance level was set at $p \leq .05$. We complemented the association analysis between variables by calculating the adjusted standardized residuals, taking as reference positive values equal to or greater than 1.96, assuming that the higher the residual, the more significant the trend is (Marôco, 2018).

RESULTS

The results revealed for combat time min = 36'', max = 676.8'', M = 239.4'', DP = 98.4'', which gives an average of 4.25 technical actions per minute. In the data in Table 1, we observed in both sexes that the

number of technical actions tends to decrease throughout the 1st to the 4th minute of combat and consequently also for the golden score time. In turn, the relative percentage of technical actions scored from the 1st to the 4th minute of combat tends to increase, with the Ippon advantages assuming an increasing percentage trend and the Waza-ari advantage a decreasing trend. In the golden score phase, Ippon's advantage is also higher than Waza-ari, a phenomenon registered in both genders, with a higher relative percentage of effectiveness in females. There were also significant associations with the Ippon advantage in the 4th minute and golden score in both genders.

Table 1. Predominance of technical and effectiveness actions during to the elapsed time of combat.

		Total	Male Group / Combat Time				
	Advantage		**1º m**	**2º m**	**3º m**	**4º m**	**GS**
Male	Ippon	176	17	34	48	48*	29*
	%	4.84%	1.9%	3.7%	5.7%	9.0%	6.52%
	Waza-ari	128	29	36	31	17	15
	%	3.52%	3.2%	3.9%	3.7%	3.2%	3.37%
	Non Score	3332	855	848	757	471	401
	%	91.64%	94.9%	92.4%	90.6%	87.7%	90.11%
	Total	3636	901	918	836	536	445
		Total	**Female Group/Combat Time**				
	Advantage		**1º m**	**2º m**	**3º m**	**4º m**	**GS**
Female	Ippon	128	18	30	29	28*	23*
	%	4.14%	2.1%	3.8%	4.7%	6.3%	6.13%
	Waza-ari	92	27	22	16	11	16
	%	2.97%	3.1%	2.8%	2.6%	2.5%	4.27%
	Non Score	2875	821*	736	574	408	336
	%	92.89%	94.7%	93.4%	92.7%	91.3%	89.6%
	Total	3095	866	788	619	447	375

*Note. * (technical group shows a significant residue).*

DISCUSSION

When analysing the results, we observed that the percentages of effectiveness follow a trend identical to that already found by Batista et al. (2022), Boguszewski (2016). The average value of combat time (M = 239.4''), although general for both genders, falls within the average values published by Barreto et al. (2022 in Batista et al., 2022) in their review and meta-analysis (combat time for men's judo in international competitions between 2010 and 2019), where they observed that the average combat time for men's judo decreased after each rule change (2010, 2013, 2017 and 2018). The same authors also recorded significant differences between fights that ended within the regular time and those that required extra time (gold score: 2013 = 3% vs. 2018–2019 = 21%).

CONCLUSIONS

The number of technical actions tends to decrease over the 1st to 4th minute of combat and consequently also towards the golden score time. The relative percentage of technical actions scored from the 1st to the 4th minute of combat tends to increase, with the Ippon advantage assuming an increasing percentage trend and the Waza-ari advantage a decreasing trend, maintaining this trend in golden score.

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Differences in agility performance tests between soccer and futsal players: A comparative study

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ABSTRACT

Agility is characterized by the athlete's capacity to perform rapid whole-body movements with a change of velocity or direction in response to a stimulus. This study aimed to verify the differences in agility performance between young soccer and futsal players. A total of 57 young players (futsal: n = 23; 14.13 ± 2.69 years old [age], 1.66 ± 13.18 m [stature], 56.76 ± 15.79 kg [body mass]; soccer: n = 34; 14.09 ± 2.68 years old [age], 1.63 ± 13.91 m [stature], 55.33 ± 14.67 kg [body mass]) volunteered to participate in this study. The participants performed three different agility tests, namely: 'T-Test' (seconds), 'Three Cone Test' (seconds), and 'Reactive Agility Test' (seconds). The normality of the data was verified by the Shapiro-Wilk Test. The mean and standard deviation were computed as descriptive statistics. T-test Student and Mann-Whitney tests for independent samples were used to verify differences between groups. Our results demonstrated significant differences in the 'Three cone test', with futsal players presenting better time (seconds). No significant differences were observed for 'T-Test' and 'Reactive Agility Test'.
Keywords: Team sports, Agility, Performance.

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INTRODUCTION

Rapid bodily movement with a change in speed or direction in response to a stimulus characterizes agility (Sheppard & Young, 2006). This capacity is recognized as an important factor of efficacy in several tactical duties, and it is a crucial facet of effectiveness in team sports (Paul, Gabbett, & Nassis, 2016). In futsal, a team sport of high-intensity and intermittent activities requiring substantial physical, tactical, and technical efforts, agility appears to be a crucial component of successful play (Naser, Ali, & Macadam, 2017). Similarly, in the soccer game - an intermittent team sport involving frequent transitions in activity patterns, from high-intensity movements and decelerating to low-to-moderate intensity activities (Clemente et al., 2019) – players also need to rapidly change their speed and direction in response to external stimuli (i.e., movement of the ball). Despite their common characteristics, the futsal players experience more fatigue as the game progresses due to the high-intensity nature of the game and the repeated maximal sprint efforts required (Naser et al., 2017). To our knowledge, there is little evidence that compares young futsal and soccer players in agility performance. Therefore, we aimed to analyse the differences in agility performance between young soccer and futsal players. We hypothesized that young futsal players will present better results in the agility tests, compared to soccer players, due to the distinct physical and technical demands of this sport.

MATERIAL AND METHODS

Participants

A total of 57 young players (futsal: n = 23; 14.13 ± 2.69 years old [age], 1.66 ± 13.18 m [stature], 56.76 ± 15.79 kg [body mass]; soccer: n = 34; 14.09 ± 2.68 years old [age], 1.63 ± 13.91 m [stature], 55.33 ± 14.67 kg [body mass]) were recruited to participate in this study. All subjects were informed about the study procedures before signing a written informed consent form. The study procedures were in accordance with the Declaration of Helsinki.

Measures

A cross-sectional design was selected for this study. Participants performed three agility tests, namely: 'Agility T-Test', 'Three-Cone Test' and 'Reactive Agility Test'.

Procedures

Participants received standardized instructions regarding the test procedures once they arrived at the testing sites. A 5-min warm-up of low-to-moderate-intensity was performed before the agility tests. The agility tests were performed on different days, and each test was performed 3 times with 2 minutes of rest between each.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using the Shapiro-Wilk test. Mann-Whitney and T-Student Test for Independent samples were used to verify differences between groups. Finally, an effect size (Cohen d) analysis was used to determine the magnitude of effect, and the following cut-off values were considered: 0–0.2, trivial; 0.21–0.6, small; 0.61–1.2, moderate; 1.21–2.0, big; >2.0, very big (Hopkins et al., 2009). Significance level was set at $p \leq .05$.

RESULTS

Our results showed that futsal players showed better results in the 'Three Cone Test' compared to soccer players ($p = .025$). No significant differences were observed for 'Agility T-Test' and 'Reactive Agility Test'.

Table 1. Descriptive statistics (Mean ± SD) and differences between groups (*p*).

Variables	Groups	N	Min	Max	Mean	SD	*p*	η^2	*d*
Agility T-Test (sec.)	Soccer	34	9.42	16	11.4	1.61	.384	0.013	0.232
	Futsal	23	9.76	13.85	11.63	1.39			
Three cone test (sec.)	Soccer	34	8.19	13.09	9.82	1.14	**.025***	**0.088**	**0.623**
	Futsal	23	7.3	11.18	9.13	1.03			
Reactive Agility Test (sec.)	Soccer	34	1.81	3.1	2.39	0.33	.631	0.004	0.127
	Futsal	23	1.41	9.91	2.74	1.63			

*Note. *p ≤ .05, significant differences between groups.*

DISCUSSION

This study aimed to analyse the differences in agility performance between young soccer and futsal players. We observed that futsal players showed better performance in the 'Three Cone Test' compared to soccer players. However, similar results in the groups were observed in other agility tests. Different results were obtained by Milanović et al. (2011) since the authors did not find significant differences between soccer and futsal players in agility tests. The authors concluded that futsal and soccer players differ in the intensity of exertion during the game but not in motor capacities such as agility. In team sports, agility is a crucial component of performance and is considered capable of distinguishing between higher-skilled individuals and their lesser-skilled counterparts (Paul et al., 2016). Therefore, it seems important to include regular agility training in season planning, both for soccer players and futsal players. According to Paul et al. (2016), training recommendations relevant to the development of agility can involve perceptual and decision-making exercises, with appropriate stimulus and response, and small-sided games and strength training.

CONCLUSION

We observed that futsal players showed better performance in the 'Three Cone Test' compared to soccer players. However, no significant differences were observed in the other agility tests. More research is needed to confirm these results.

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Imagery ability in collective sports: Comparison among soccer and futsal young practitioners

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ABSTRACT

Imagery (IM) is one of the most popular psychological techniques used by athletes and coaches to improve performance at competition level. The aim of the study was to investigate if there were statically significant differences in the use of the imagery modalities of MIQ-3 (kinaesthetic, Visual Internal, Visual External) between futsal and soccer practitioners. Seventeen-three subjects (soccer: n = 24; age = 11.33 ± 0.48 years old; futsal: n = 49; age = 10.08 ± 1.77 years old) volunteered to participate in this study. All the participants had at least two years of regular practice in federated competition. The subjects signed an informed consent form. To assess IM ability, the Portuguese version of MIQ-3 was used. The normality of the data was verified by the Shapiro-Wilk Test. The mean and standard deviation were computed as descriptive statistics. T-test Student and Mann-Whitney tests for independent samples were used to verify differences between groups. Our results demonstrated no significant differences between groups ($p > .5$), values were higher in futsal practitioners in VI, VE and MIQ-3.

Keywords: Imagery, Intervention, Collective sports, Imagery ability.

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INTRODUCTION

Imagery (IM) is one of the most popular psychological techniques used by athletes and coaches to improve performance at competition level (Cumming & Williams, 2013). Futsal's nature (i.e., unlimited substitutions, space and time restriction, and the constant variations in the contexts of play) demands tactical dynamism and agility, motor mastery and quick thinking. Soccer is a sport where two teams compete dynamically in space and time to unfold goal-direction behaviours. To this end, players adjust their positioning and behaviour according to the spatiotemporal information that they perceive, such as the distance and angle between teammates and opponents (Spyrou et al., 2023). One of the main differences between this to sports are the number of players and the space where the game is developed. On the sports environment, imagery, can be considered as a creation or replication of an experience that was generated through information stored in one's memory. Usually this causes physiological and psychological effects on the subject that does the imagery (Morris, Spittle, and Watt, 2005). Based on that, is possible that the nature of the sports gives more emphasis to the development of imagery skills in its different modalities (kinaesthetic (K), Visual Internal (VI), Visual External (VE)). The aim of the study was to investigate if there were statically significant differences in the use of the imagery modalities (K, VI, VE and MIQ-3) between futsal and soccer practitioners.

MATERIAL AND METHODS

Participants

Seventeen-three subjects (soccer: n = 24; age = 11.33 ± 0.48 years old; futsal: n = 49; age = 10.08 ± 1.77 years old) volunteered to participate in this study. All the participants had at least two years of regular practice in federated competition. The subjects signed an informed consent form.

Measures

To assess IM ability, the Portuguese version of MIQ-3 (Duarte-Mendes et al., 2016) was used. The MIQ-3 is a 12 items questionnaire grouped in three subscales to assess the K, VI and VE modalities.

Procedures

The instrument was always applied in similar places and settings for all participants, in a room with the maximum number of five athletes and all subject completed the questionnaire individually, where the right environment was provided. Data were collected anonymously to guarantee its confidentiality, making sure it would not be individually passed on to third parties.

Analysis

Descriptive statistics (mean ± standard deviation) were performed for all variables under analysis. Data normality was tested using the Shapiro-Wilk test. Mann-Whitney and T-Test for Independent samples were used to verify differences between groups. Finally, an effect size (Cohen d) analysis was used.

RESULTS

Although we did not find significant differences between groups, values were higher in futsal practitioners in VI, VE and MIQ-3, as shown in Table 1.

Table 1. Differences between groups of imagery ability.

	Groups	N	Mean ± SD	*p*	η^2	d	CI90%
Kinaesthetic (K)	Soccer	24	22 ± 3.39	.54a	---	0.11	-0.523 - 0.397
	Futsal	49	21.51 ± 4.71				
Visual Internal (VI)	Soccer	24	23.54 ± 3.31	.76b	001	0.09	---
	Futsal	49	23.82 ± 3.42				
Visual External (VE)	Soccer	24	23.58 ± 2.92	.11b	0.04	0.38	---
	Futsal	49	24.55 ± 3.18				
Total MIQ-3 Port (MIQ-3)	Soccer	24	69.13 ± 6.8	.43b	0.01	0.19	---
	Futsal	49	69.88 ± 9.75				

*Note. *p ≤ .05; a T test for independent samples; b Mann-Whitney; η^2– Eta squared; d – effect size; CI – Confidence Interval; s – seconds; cm – centimetres; m/s – minutes per second.*

DISCUSSION

This study analysed if there were statically significant differences in the use of the imagery modalities (kinaesthetic, internal or external visual) between futsal and soccer practitioners. The main findings revealed that there were no differences of imagery ability between futsal and soccer young practitioners, but values were higher in futsal practitioners in VI, VE and MIQ-3. Previous research investigates the imagery ability of different sports showing that were differences in relation with the nature of sports (individual and collective) (Duarte-Mendes et al., 2019). Futsal and soccer are both collective sport and that may be one of the reasons why there are no differences, however the fact that there are fewer players and the smaller field, futsal presents higher values in imagery ability. This study has some limitations, namely the fact that it is a cross-sectional study. Future research should replicate this study in different age groups in different sports and evaluate the application of imagery programs based on imagery ability of the subjects in sports performance. We also suggest relating the imagery ability with different motor skills in other sports modalities, as already has been reported in the literature (Duarte-Mendes et al., 2019). This information is important to highlight the use of imagery questionnaires (Mendes et al., 2016) to evaluate the imagery ability of the subjects when imagery programs are applied to improve sports performance by coaches and support teams in the organization of technical intervention for collective sports.

CONCLUSIONS

Our results showed that were no significant differences between groups and values of imagery were higher in futsal practitioners in VI, VE and MIQ-3. This suggest that futsal practitioners can benefit more from the imagery intervention.

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Analysis of pedagogical behaviors among swimming teachers

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ABSTRACT

The study aimed to analyse and compare behavioural changes in swimming teachers, after retrospective reflection between two swimming teaching sessions. 10 individuals were analysed, characterized by gender, level of experience, coaching graduation and level of students practice. To analyse behaviours, the SOP (teacher observation system) was applied, comparing the moments of Instruction, Feed-back, Organization and Observation. In the statistical comparison, two non-parametric tests were applied: the Wilcoxon test, which allowed comparing the same behaviours between the first and second sessions, and the Mann Whitney test, which allowed comparing the same behaviours between the first and second sessions of each session. It was found that there were significant differences in Instruction and Organization behaviours between the first and second sessions among the swimming teachers analysed.
Keywords: Teaching, Swimming, Behaviours, Pedagogical supervision, Observation.

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INTRODUCTION

At the level of teaching practices, supervised pedagogical practice is intended as a strong training strategy, but it depends on several factors, and where the training and competence of the supervisors and the type of supervision relationships that are established in this process are certainly influential factors (Alarcão and Tavares, 1987). The specific sport of swimming requires specific procedures and interventions for teachers who are dedicated to teaching in swimming, and which are essentially linked to the transition for the aquatic environment, that is, it is necessary to provide these swimming teachers with interventional capabilities specific to this sport, whose technical standards and teaching methodologies are necessary to master and promote a successful teaching (Constantino, 2001).

MATERIAL AND METHODS

The data collection procedure was carried out as follows: The teacher's first session was recorded on video; b) After recording this session, the observed teacher was given a checklist (autoscopic checklist) of the behaviours he exhibited and to which he has responded; c) In a second phase, another session (the second) was recorded and the "*checklist*" was again delivered for a second response; d) teachers' behaviours were collected, recorded and compiled into a grid for later analysis. After the behaviours were recorded, they were analysed according to the Teacher Behaviour Observation System (SOP). To record the observed behaviours, we used the Teacher Behaviour Observation System (SOP), (Pieron, 1986), as its objective is to study the behaviours displayed by teachers, thus reflecting a profile of their most frequent interventions. The system was created by Pierón (1988) and was designed for observation of Physical Education classes, in any case it was used in this case, in swimming teaching sessions as we understand that it is adaptable to this situation. The system was presented without any adaptation and is composed of eight analysis categories: Instruction, Feed-back, Organization, Positive Affectivity, Negative Affectivity, Student Verbal Interventions, Observation and Other Behaviours. Only Instruction, Organization, Feed-back and Observation behaviours were counted for this study.

Participants

The 10 teachers were recruited randomly and analysed in relation to gender (5 male and 5 female), teaching experience (less than 5 years and more than 5 years), level of coaching graduation (level 1 and level 2) and level of students practice (5 teachers at level 1 for water adaptation basics and level 2 for teaching swimming techniques).

Measures

The teachers were subjected to a retrospective reflection, which took place after the first and second swimming teaching sessions, with a view to reflecting on their interventions in those same sessions. For this purpose, an autoscopic checklist was created where teachers marked the behaviours that occurred during the session they had taught. The behaviours that consisted in this checklist were created based on the teaching skills defined by Siedentop (1983).

Procedures

The classes were recorded on video, using a Sony camcorder. Sound recording was carried out using a receiver microphone connected to the camera and the lapel microphone held on the teacher's shirt, with the transmitter attached to the shorts. The camera was supported on a tripod and placed in a closed area to avoid external interference, being located at a level higher than the water (swimming pools), thus allowing

the actions and movements of the observed teacher to be monitored. The technical recording conditions were tested in two experimental sessions, and all recordings were carried out by the same individual.

Analysis

For the differences between the first and second sessions, Wilcoxon non-parametric was applied and for the differences between the first and second sessions of each group, Mann Whitney test was used. After data collection through the Teacher Behaviour Observation System (SOP), the statistical program SPSS (Statistical Package for the Social Sciences) was used for data analysis and the significance level was set at 5%.

RESULTS

In relation to the first behaviour (instruction) we found significant differences, in which the mean values decrease from the first to the second session after the retrospective reflection session. Also regarding the behaviour of the "*organization*", there are significant differences, in which the mean of behaviours decreases from the first to the second session. It can be seen that regarding "*feed-backs*" there are no significant differences, despite the number of behaviours increasing from first to the second session. Regarding "*observation*" behaviours, no significant differences were found, although their mean increased in the second session.

Table 1. Comparison of minimum, maximum, mean, standard deviation and significance values between the 1st and 2nd swimming sessions.

Behaviour	**Min.**	**Max.**	**Mean**	**SD**	***Sig.***
Instruction 1 session	13.27 %	18.43 %	15.21 %	2.18	*.041*
Instruction 2 session	12.31 %	16.28 %	14.23 %	1.24	
Organization 1 session	2.09 %	3.97 %	3.26 %	0.96	*.018*
Organization 2 session	1.01 %	2.99 %	2.16 %	0.71	
Feed-Back 1 session	17.12 %	20.43 %	19.36 %	1.01	*.378*
Feed-Back 2 session	14.87 %	24.46 %	19.93 %	3.05	
Observation 1 session	41.32 %	50.65 %	47.31 %	2.93	*.257*
Observation 2 session	*42.20 %*	*55.34 %*	*49.01 %*	*3.65*	

DISCUSSION

It was also possible to know that regarding gender, teaching experience, coaching graduating and students' level of practice there were no significant differences from the first to the second session.

CONCLUSIONS

According to comparative analyses, there are significant differences regarding the behaviour of the "*Instruction*"; b) There are significant differences regarding the behaviour of the "*Organization*". However, there are no significant differences in the remaining behaviours (feed-backs and observation).

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