

**ACTA UNIVERSITATIS CAROLINAE**  
**KINANTHROPOLOGICA, Vol. 59, 2 – 2023**  
Charles University  
Karolinum Press

AUC Kinanthropologica is licensed under a Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

<http://www.karolinum.cz/journals/kinanthropologica>

© Charles University, 2023

MK ČR E 18584

ISSN 1212-1428 (Print)

ISSN 2336-6052 (Online)

## CONTENTS

### Original Articles

**79** BEDNÁŘ, M.

The constitutive values of fair play

**93** ŘÍHOVÁ, M., JANDOVÁ, T., VĚTROVSKÝ, T., MACHAČOVÁ, K.,  
KRAMPEROVÁ, V., JAKLOVÁ DYTRTOVÁ, J., ŠTEFFL, M.,  
HOLMEROVÁ, I.

Effectiveness of home-based video exercise programmes on physical fitness in older adults – systematic review and meta-analysis

**113** BAGHURST, T., CACHO, F., GRIFFIN, A.

The athletic consul: a new role in sports organizations

**125** MACHOVÁ, K., ZÍTEK, Š., DAŘOVÁ, K., PROCHÁZKOVÁ, R.

Dog walking during the lockdown in the Covid-19 pandemic situation in the Czech Republic: a questionnaire survey



# The constitutive values of fair play

Miloš Bednář

Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic  
bednar@ftvs.cuni.cz

---

## ABSTRACT

Fair play as a phenomenon of sporting life is present even if only in the form of small acts or gestures in most competitions; its absence is present in cases of foul play. The daily press comments its presence or absence every day in, and not only in the sports sections. Both the public and experts discuss acts from so called grey zone (forms of gamesmanship). Deciding unequivocally on the moral quality of a diverse range of actions, attitudes or statements requires clarity about the values underpinning fair play. Our aim is therefore to find the constitutive values of fair play by examining a set of values from the field of sport, relevant offerings from fundamental ethics, using Abraham Maslow's meta-value system and selection from the fundamental values of fair play considered so far. Organizing the selected values into a meaningful system is the final aim. We used a hermeneutic method to interpret the role of values within fair play. We identify five values and five meta-values as constitutive of fair play, the meta-values of goodness, truth, and transcendence as the basis of the entire system. We identify character (of athletes) and ethos (of sports communities) as both initiators of activities within the system and recipients of benefits.

## KEYWORDS

axiology; character; ethos; meta-values; sports ethics

## DOI

10.14712/23366052.2023.5

## INTRODUCTION

Although fair play has emerged as an integral part of modern sport, it often pervades the non-sporting sphere (Business Ethics speaks about fair behaviour, there is talk of “financial fair play” etc.). Logically, it has also become a subject of academic interest – philosophy, sociology, psychology and, of course, especially ethics, since it is most closely related to its moral imperatives, ethical codes, and values.

After the formation of the International Fair Play Committee in 1963, there was also a demand from the practical movement for informed reflection on the issue of fair play. The first articles (in the *Journal of the Philosophy of Sport*) and subsequently

monographs appeared (McIntosh, 1979; Simon, 1985; Gerhardt and Lämmer, 1993; McNamee and Parry, 1998; Loland, 2002; Simon, 2010). The need for underpinning values, principles, codes, and principles is now satisfied by a considerable number of scholarly articles in peer-reviewed journals and educational materials published by fair play organisations and clubs. Yet there has been no single and universally accepted definition of fair play.

Our aim is not to present a synthetic “winning” definition; we will only overlook a selection of influential approaches and observe which values they rely on. This is not a systematic selection and the search for the core values of fair play must aim to a broader context, namely sportive, in the field of fundamental ethics and in Abraham Maslow’s system of meta-values. After a critical evaluation of the conglomerate of values that, according to the International Fair Play Committee, fund fair play, we will present our own proposal of constitutive (meta)values and their hierarchical ordering.

## METHODS

We used a hermeneutic approach to interpret the role of values within fair play. We interpret the key concepts (ethos, character, fairness, value, virtue) of fair play and explained their meaning in general and in the field of sport. Furthermore, we followed the wider context of the issues studied, according to the hermeneutic proposition that “the text without context is only a pretext”. The confrontation of the sets of values related to fair play (from the field of sport, fundamental ethics, and Maslow’s system of meta-values) with the key concepts of fair play revealed both an intersection containing a group of values suitable for our purpose and relevant meta-values. Ten of these were selected as the essentials of fair play. Each of them was described and interpreted. Arguments for this selection were presented.

By examining them, we found (co)relations between them and were able to determine their hierarchy based on the meta-values goodness, truth, and transcendence.

### What is Fair Play?

Being fair means making justice, fairness, selflessness, or honesty part of your personality and being able to empathise with others. Cultivated and developed over a time, it crystallises into the virtue of fairness, which then opens the way to fair behaviour in life’s diverse situations. But playing fair is also about making choices. When we interact with each other in sport, we must consider what is right and what is wrong in the situation.

Fair play is the English name for an ancient ethical device designed to soften the severity of the (co)fighths that took place in different competitions, which the ancient Greeks called *agon*. It was enforced by the development of religious festivals, at the heart of which were the ‘sporting’ games, led by the most famous Olympic ones. The educational concepts of *arête* (both excellence and virtue) and *kalokagathia* (harmony of physical beauty and noble soul) developed this tool. Fortunately, we do not forget any of this, and through medieval chivalric virtues we apply it in modern times. As a figure of speech, it appeared in Shakespeare, but as a notion it is linked to the origins of modern sport in Great Britain (Renson, 2009). Its development and the revival of the Olympic Games in the 19th century saw its rapid worldwide acceptance. It

emerged as an organised ‘fair play movement’ in 1963, spearheaded by the International Fair Play Committee, with other organisations gradually emerging at continental and national levels.

This is just a brief history. It is not our task to describe it in detail, but to analyse how the concept of fair play is founded and on what values it is based. As has already been said, there is no single definition of the concept, nor is there a universally accepted definition of fair play. We present only influential concepts from both the academic and sporting spheres that try to approach the essence of the concept and highlight the relevant aspects:

*“Fair play is a complex concept that comprises and embodies a number of fundamental values that are not only integral to sport but relevant in everyday life.”* (International Fair Play Committee, 2015)

*“Fair play incorporates the concepts of friendship, respect for others and always playing within the right spirit. Fair play is defined as a way of thinking, not just a way of behaving.”* (Council of Europe, 2010)

*“FP breeds opportunities for non-zero-sum benefits of competition.”* (Kretchmar, 2005)

*“Fair play – spirit of sport.”* (Housiaux, 2022)

Responding to the latter “definition”, serving as a new motto for the European Fair Play Movement, where “spirit” seems to us too vague (and having more than one component – see below), we argue for a combination of fair play and ethos:

*“Fair play is the ethos of sport.”*

The term *ethos* originally meant the customs or mores of the ancient Greek polis; in modern times it was adopted by most languages and gradually crystallized into an *ethical core of the behaviour* of diverse communities. This includes sporting ones. *Cum grano salis* we can speak of a “collective conscience”. There is no doubt that in sport, fair play fulfils this role in the form of principles, tenets, codes of ethics, etc., which are moral norms (Anzenbacher, 1992) put into practice by the activities of fair play organisations or clubs (promotion, education, announcement of special prizes, etc.). On the relationship between ethos and the conscience/character of individuals, see below. The connection between ethos and fair play is discussed in detail by philosophers of sport Sigmund Loland and Mike McNamee, who conclude that *ethical ethos* depends on the realisation of the following interpretation of the ideal of fair play: *“If voluntarily engaged in sporting games, keep the ethos of the game if the ethos is just and if it includes a proper appreciation of the internal goods and the attitude to playing to win!”* (Loland and McNamee, 2000, p. 76) We can see that the authors work with a broader concept of ethos and, to define its ethical dimension, they use the adjective *ethical ethos*. We consider this a pleonasm. The inclusion of “playing to win” in the ethos of fair play is problematic – one of the frequently used principles of fair play is: *“I want to succeed in the competition, but not at any cost.”*

We have seen that different approaches are based on different values, or rather a selection of values. Therefore, other values associated with fair play need to be sought in a broader context – those of sport and social sciences. First, however, the question needs to be answered:

## What are values?

There is a range of approaches: experts understand values as universally valid norms of human behaviour, objects of our efforts, special characteristics or qualities, abstract goals, etc. (more in Crossan and Bednář, 2018). The most influential contemporary definition says that values are “desirable trans-situational goals, varying in importance and serving as guiding principles in the life of a person or other social entity” (Kluckhohn, 1951; Schwartz, 1994). We identify with this definition, which is well applicable in the field of sport.

One question is where values are “located”. There are two basic approaches: values form a special independent realm (especially Max Scheler), or they are purely personal entities (especially Jean Paul Sartre). We advocate the compromise position outlined by Gabriel Marcel (1998): values are part of the transcendent realm but manifested only as *incarnated in human reality*. Incarnated in an individual personality, we speak of intrinsic values, or in most cases they can become virtues.

## Wider context of the search for fair play values

Fair play is a process that takes place at both individual and community levels. It is built upon values that are woven into the lives of individuals and communities. In the search for the values that underpin the fair play movement, values in the world of sport and physical activity are a natural background (a). However, as fair play has ethical foundations, it is also necessary to draw on this sphere (b). Finally, we believe that there is also a transcendent direction at play, so we will try to extract something relevant from Maslow’s theory of meta-values (c).

### Ad a)

Here we can draw on Olympism ancient and modern (*arête*, *agon*, *kalokagathia* + “*Citius. Altius. Fortius*”, etc.), the values of the NCAA (National Collegiate Athletic Association), the organization for American college athletes (endurance, resilience, hard work, sportsmanship, etc. – see Brand, 2006) or the work of the American philosopher of sport Scott Kretchmar (1994, 2005), who emphasized health, fun and joy, courage, and conscientiousness. The intrinsic values of sport in fact are also useful in shaping the so-called “spirit of sport”. They are summarised by WADA (World Anti-Doping Agency) in the chapter on the fundamental foundations of its Anti-Doping Code: health – ethics, fair play and honesty – athletes’ rights – excellence in performance – character and education – fun and joy – teamwork – dedication and commitment – respect for rules and laws – respect for self and other participants – courage – community and solidarity. (World Anti-Doping Agency, 2021)

Finally, the values highlighted by the International Fair Play Committee are important to our aim. In 2015, this organisation presented twelve “fundamental” fair play values: fair competition, respect, friendship, team spirit, equality, sport without doping, respect for written and unwritten rules such as integrity, solidarity, tolerance, care, excellence, and joy (International Fair Play Committee, 2015). We do not know how the committee arrived at this set of values, nor what sources it may have relied on. We agree with the choice of respect, equality, solidarity and excellence and they will form a part of our system of *constitutive values* (see below). Yet we have doubts about the other eight values and do not consider them to be constitutive – they are



more results of action of fair play. In the case of *care*, we opt for wider notion of *solidarity*; concerning *sport without doping* we believe that we must include also other negative phenomena (corruption, any type of discrimination, match fixing, different metastases of cheating). We subordinate the fight on this front against foul play to the wider concept of *catharsis*.

Concerning the value of *tolerance*, we have rather controversial opinion and consider it as an ambiguous instrument of interpersonal relations: if it develops into respect for e.g., the otherness of the opponent, then it can become a gateway to an atmosphere of fair play, but if it becomes a comfortable indifference (“letting go”) or even condoning wrongdoing or cheating, it closes the road to fair play. In the latter case, even intolerance is appropriate ...

### **Ad b)**

The individual ethical “organ” that guides our behaviour with morally relevant impact is *conscience*. A complementary concept in the social sphere is *ethos*, regulating the behaviour of diverse communities, starting with the family ethos, and ending with the global ethos, for which Hans Küng coined the term *Welt ethos* (Küng, 1990). The ethos of the communities in whose lines of force the individual finds himself throughout life influences individual consciences. We discussed the possibilities of educating conscience through the ethos of sport in (Bednář, 2011). The fair play movement plays a significant role here through its direct influence and the overall ethical environment.

Relevant for our considerations appear furthermore moral values such as love, courage, honesty, prudence, responsibility, and conscientiousness – incarnated as virtues and conforming our character in an optimal case. As an “ancillary” value we dare to assign resilience, transcending the status of a purely moral value, cementing character by building a strong will. Without it, we can hardly imagine courageous behaviour and the ability to resist temptation, which opens the path to success and closes the slope leading to unfair play.

### **Ad c)**

The fair play movement also has the potential to influence our self-actualization forming the top of Abraham Maslow’s famous pyramid of needs. They are *deficient needs* (physiological, safety, love, self-respect) in it (Maslow, 1954). Yet at the top of a pyramid are *being needs* aiming to *being values*, or *meta-values* (Maslow, 1964). They have power to saturate our need of self-actualization. He names seventeen of them, such as truth – goodness – transcendence – justice – perfection – order – wholeness – playfulness, etc.

## **RESULTS**

### **Values of fair play according to own analyses**

A certain criticality of the International Fair Play Committee choice of values calls for a replication. The above presentation of sets of values from the sphere of sport and the fair play movement in the form of an unstructured conglomerate is also a challenge. The answer is the actual selection of relevant values and the search for hierarchies

and (co)relations between them. We will try to look for values *constitutive* for fair play; they are intertwined with the fundamental values of sport (see above), but at the same time they go beyond them, extending the first part of the definition of values (“trans-situational goals”) also to “trans-sport” goals, and can thus – if they are “addressed” by the subjects of the fair play movement – fulfil their second mandate, namely to become “guiding principles in people’s lives”. The transcendence of fair play into the non-sporting sphere is accepted. We will not go into an analysis of this aspect of fair play, but simply note the ‘evidence’ of common language in the form of expressions such as ‘financial fair play’ or ‘fair play in life’.

So, we will limit ourselves to sports fair play. The first question is: Who is driving the fair play movement? Who generates acts of fair play, or more technically: Which entity generates them? Who bases sporting competition on the values of fair play?

The answer is offered by the long-standing experience of the fair play movement (not only the organised one of the last 60 years): above all, it is the athletes who have managed to exceed their ambitions even in the heat of competition, who have stepped out of the zone of result expectations of the environment, who have managed to “switch” during a sports competition into the mode of a crisis manager to deal with a critical situation, threatening e.g. the health or life of other competitors, etc. These individuals deserve to be awarded (even if they may not get the fair play award) and undoubtedly, as a secondary way, they increase their credit – both sporting and human. So many awards for the act. As we know, athletes are also recognised for ‘a lifetime of fair play’. In these cases, we are certainly not only evaluating the number of fair play acts, but also the overall way of thinking (see one of the definitions of fair play), attitudes and dissemination of fair play values and principles (not only) in the sphere of sport. The specific trigger of these positives is the *character* of the athlete with a core of conscience. Other components of character are incarnated values (especially ethical and aesthetic), self-concept and important dispositions such as attitudes and interests, etc. Positive psychology considers the following six virtues to be the cornerstones of a so-called “good character”: wisdom, courage, love, justice, temperance, and spirituality (Peterson et al., 2007).

Practice shows that even a person with an immature conscience, or who has a biography of unfair acts, or the absence of fair acts in situations that required it, can choose a fair solution. Psychologically, we can justify his “stepping out of his shadow” with a range of motives from epiphany based on a deep experience of the situation, to “reforming the sinner”, to hypocritical image enhancement.

Often entire collectives are rewarded for acts of fair play. This is where the overall moral climate of a sporting community or sporting sector comes into play, often based on a set of values (see above for examples), tradition and nowadays also on codes of ethics and/or fair play principles. At the core of this set of ethical factors is *ethos*. Olympism has a distinct ethos, but remarkable ethos’s shape sporting events, e.g., in combat sports, rugby, etc.

The question we have asked in this article then is: Which are the most important values of fair play (those that constitute and structure the phenomenon)?

Sporting events that add something positive to the competitive level and thus deserve the label fair play have a moral/ethical dimension and inscribe themselves in the character of athletes and community ethos. In the former case, it is part of self-actual-

isation, which we understand as a lifelong task; in the case of ethos, it has a transformative potential and sometimes plays a cathartic role.

So much so, the reasoning behind why we headfirst to the overarching sphere of meta-values, which plays an important motivational role in the self-actualization process of individuals and, analogously, has the power to influence the ethos of sporting collective subjects.

Comparing the myriad of acts of fair play recorded in ancient Olympism and modern sport with the above overview of meta-values, the following three meta-values are the intersection and appropriate foundation of the entire construct of fair play:

GOODNESS – TRUTH – TRANSCENDENCE

Another relevant meta-value is justice, which we subordinate to meta-value “goodness”, and excellence, subordinated to the meta-value “transcendence”. By analysing these meta-values and the conglomerate of values from the field of sport and fair play, the following five values emerged as a complementary and necessary part of the fair play system: equality – solidarity – respect – health – catharsis.

### Ad Goodness

This ultimate concept of ethics is preserved in the famous *kalokagathia*, the heritage of ancient Olympism and “gymnastics”. *Agathon*, the Greek word for goodness, was what the Greeks wanted to develop in the souls of Olympians and ordinary citizens alike. After a historical phase of the predominance of abstract considerations of goodness and evil, we are now returning to more practical considerations of how to live well, and a variety of life models with an orientation towards freedom, well-being, etc. are offered by philosophers and psychologists. From this point of view, we understand the goodness as the horizon of human positive activities (individual and universal).

The quoted Scott Kretchmar seems to have been inspired by this trend and in his chef-d’oeuvre links value-oriented physical activities with the “*good life*”. It is not surprising that the *active lifestyle* is at the heart of such a life. (Kretchmar, 2005, p. 205–252) Lukáš Mareš, a Czech philosopher of sport, tries to find the constitutive properties of “*good sport*”. (Mareš, 2023)

### Ad Truth

As we have seen, this (meta)value did not appear in the above value summaries. It only appears in the WADA serving as a kind of summary statement of how the “spirit of sport is expressed in how we play true”. They add: “*Doping is fundamentally contrary to the spirit of sport.*” (World Anti-Doping Agency, 2021). Czech theologian Jiří Skoblík makes this aspect of doping even more acute, saying that it “*degrades man into an extremely powerful machine by lying about his possibilities*” (Skoblík, 1997, p. 197).

Of course, every sporting deception is also a lie. Lies about a person’s capabilities, however, also logically raise the question of what the truth about a person’s capabilities is. The answer, based on records and extraordinary performances, is not clear-cut and the search for answers would exceed the scope of this paper. What we can state unequivocally, however, is that fair play contributes significantly to the truthfulness of sportsmanship. It is hard to imagine acts of fair play based on lies. On the contrary, acts of fair play are also motivated by a desire not to lie, e.g., by correction the score sheets to one’s disadvantage.

### **Ad Transcendence**

If we strive for personal or social development, the next steps must aim at more distant horizons; here we have a “menu” of meta-values, having transcendent attributes. Transcendence was originally a religious term which, in a simplification, can be thought of as a journey from the human to the divine. Gradually, however, it has been parcelled out in terms of “what” we want to transcend and/or “where” we direct the transcendence. The religious component is “hidden” in the beliefs of individuals, and Couber-tin’s idea of a kind of “religion of athletes” (*religio athletae*) has not taken hold, but in a way, it has been transformed into a postmodern spirituality that has found its place in the field of sport in recent decades.

### **Ad Health**

Enhancing health, cultivating, and maintaining it is one of the main motives for playing sport. Without taking care of the health of the competitors, we cannot talk about good sport, which should be embedded in a good life model and thus aim at the meta-value “goodness”. The risk is to undermine integrity - physical, psychological, and moral. The fair play movement formulates the principle: “I want to succeed in the competition, but not at the cost of endangering my own or my opponent’s health.” Endangering one’s own health is also on the agenda in situations of exaggerated aspirations, failure to estimate the level of risk or pressure on the result from coaches, or the management of clubs or national teams.

The fair play movement should also monitor more closely and condemn cases of violations of psychological and moral integrity by those competitors who are often in the “grey zone” of gamesmanship (unfair behaviour during competition that still “fits” the letter of the rules, but not their “spirit” – see Howe, 2004) to disrupt the personal zone, the psyche, or the concentration of the opponent. Cyberbullying is also a new unfair phenomenon threatening mental health, as well as other negative phenomena associated with the expansion of social networking.

### **Ad Justice**

The idea of justice has been with humankind since time immemorial and, when it has been fulfilled, has functioned as a social cement and a path to the good life of individuals and communities, in a higher sense, a path to the goodness. Aristotle gave a firm theoretical foundation to this idea, and the Roman law referred to justice as the basis of the entire system.

Justice today is mainly understood – and in favourable social conditions implemented – as distributive (fair distribution of benefits and burdens), retributive (appropriate punishments and rewards), procedural (deciding equal cases equally and unequal cases differently) and last but not least as fairness (!) The fact that sporting themes can be found in all these forms shows how intertwined sport is today with society at large and how the understanding of sport as a separate entity capable of self-regulation has long since fallen away.

Sporting *rules* have been created based on justice since the beginning of modern sport. Adherence to the rules was and is supposed to guarantee fair results of competitions. However, this is not always the case in sporting practice. Moreover, rules cannot capture all situations in a turbulent sport. The awareness of injustice then persists in

the minds of athletes, spectators, and other stakeholders, spoiling the atmosphere and affecting the future competition. This is where the fair play movement should become more involved through targeted publicity, influence the necessary shift towards fairer solutions to controversial situations – present and future.

### **Ad Equality**

There is another principle of justice, which is based on the idea of equality and is implemented in practice as equality before the law requiring equal treatment of all. John Rawls considers certain social and economic inequalities (effectively accepted by communities) to be just, if they benefit the least advantaged members of society and are open to others on the condition of equal opportunity (Rawls, 1971).

Equality of opportunity is also a major theme in contemporary sport. Specific activities aim at eliminating or at least minimizing inequalities: those created naturally or by historical development (physical parameters, age, gender, social and economic inequalities at the level of the individual and communities, including states, etc.), as well as discriminatory ones, created by malicious intent and sometimes ignorance on the part of other sports actors. It should be noted that anti-discrimination clauses are now part of advanced legal systems and most codes of ethics, including those in the field of sport.

While the creation of a level playing field for all competitors is mainly the task of the organisers before the start of the competition, fairness plays a role in situations where *vis maior* intervenes during the competition (change in natural conditions not equally affecting all competitors; injury or technical failure of a competitor, etc.) and the organisers fail to find a solution to compensate for the inequality/inequity created.

We believe that achieving equality in the outlined levels of sporting competition is a certain ideal rarely achievable in practice. Nevertheless, important actors should strive to realise it as far as possible.

### **Ad Solidarity**

It builds on the value of equality and seeks to counterbalance the inequalities (handicaps) that arise through acts of solidarity based on fairness: both long-term and those that arise, often unexpectedly, during the competition. An act of solidarity can be an act of charity or a small act of help to a “rival in need”. In general, solidarity is mostly directed towards disadvantaged members of sporting communities, or towards disadvantaged communities or those affected by natural disasters, etc. Solidarity funds are set up by Olympic Committees or sports federations to support former athletes etc.

It is common for a wave of solidarity to arise across the sporting world when an athlete has a serious personal problem, even if it arises in his or her life outside of sport. This does not have to be limited to well-known athletes – social networks now also make it possible to draw attention to the cases of ‘unknown’ athletes. It does not have to be just material support; often solidarity expressed verbally can mean more.

### **Ad Respect**

Respect is a more powerful tool of interpersonal communication than tolerance and requires a higher degree of empathy, understanding and the ability to find the good in another person, deserving of appreciation and, to the highest degree, respect. In

this way, we help the other to satisfy the need for respect or esteem and thus to gain self-esteem (cf. the 4th layer of Maslow's pyramid of needs). Of course, we have the same need, and here the problem of the lack of reciprocity from the other may arise.

We therefore believe that the fair play movement cannot demand *unconditional* respect, but that competition in the spirit of fair play can only take place based on *mutual* respect. Respect can hardly be demanded for unfair opponents, unfair referees, or misbehaving fans. It is hard to have respect for organisers who do not show respect for the needs of competitors, for example by building dangerous courses in pursuit of their own ambitions. Such actors make competitions – unfortunately – impossible to run in the spirit of fair play. Nevertheless, a higher level of fair play represents the ability of more morally mature individuals to show respect to such actors *at the start* of a new competition. Without prejudice, without generosity, without the burden of resentment – dilemma of a proper reaction must solve the other side ...

Mutual respect also creates mutual responsibility of all actors in sport competitions, an atmosphere of fair play and the credibility of sport competition. Good example is Rugby where “respect for one's rival is the norm, and the ‘third half’ is a time of dignity and largesse. This is when the two teams and the referee come together to show mutual appreciation for a game well played.” (Andreu-Cabrera, 2010)

Within the value system, respect clearly points towards the (meta)value of goodness.

### **Ad Catharsis**

The purifying effect of the phenomenon called catharsis (katharsis in Greek for both purification and cleansing) was discovered by Plato and in another form by Aristotle. “*There are the purification /katharsis/ of living bodies ... effected by medicine and gymnastics ... and of badness and ignorance in souls ... effected by rectification and education.*” (Plato, Sophist, 1989) Aristotle speaks of purification from negative emotions or purification of those with the potential to harmonize the emotional and moral side of man (Aristotle, 1921, 1924). Compassion and enthusiasm are agents in this case.

While the power of cathartic action has been highlighted especially in the field of art and therapy, today's sport is not left behind and all the mentioned aspects of catharsis can be found thanks to its action (Bednář, 2017). Note that catharsis operates at the level of individuals and communities. Especially emotional, ethical, and educational aspects are a matter of interest for us. Sport is an arena of strong emotions, for all actors. Their regulation is a permanent challenge. One of the principles of the fair play movement exhorts athletes to “Control your emotions!” The fight against negative phenomena purifies sport in its ethical dimension, so that it can become “the truth about human potential”. All educational projects of the fair play movement or Olympic education, etc., aim at truth by cleansing ignorance and transgressions, or directly refuting lies. That is why we find the value of catharsis on the way to the meta-value “truth”.

### **Ad Excellence**

This value forms one of the foundations of ancient Olympism under the ancient Greek name of *arête*. It represented the best that an Olympian could perform during the Games: the realization of his potential in the physical, mental, spiritual, and moral components (in the last *arête* is a virtue). The link with transcendence is straightfor-

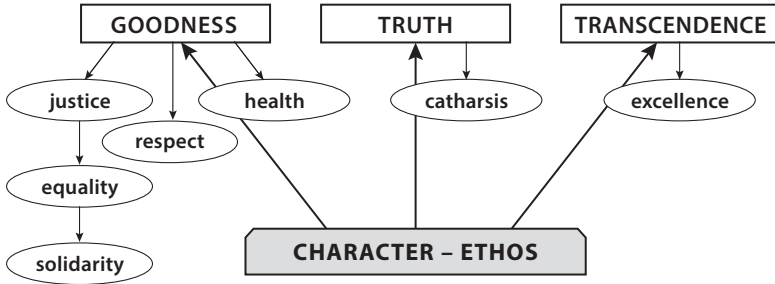


Figure 1 Overview of interrelationships between character and/or ethos and 10 constitutive values

ward here in the expected connection with the divine element based on the belief in the appearance of divine power.

The connection with another building block of Olympism, *kalokagathia*, made it impossible to understand excellence as merely the performance of the maximum measurable feat. There was also an ethical and aesthetic dimension at play. It was therefore not just a question of ‘how much’ but also ‘how’. These tribal values of ancient Olympism were continued by the founder of modern Olympism, Pierre de Coubertin (1863–1937). Although their importance gradually waned during the founder’s lifetime, they retain their place today despite the hypertrophy of the performance orientation. The aesthetic component plays an important part of the performance evaluation in sports like figure skating, gymnastics, or artistic swimming; moreover, it is a kind of surplus value in other sports as well, fulfilling the full meaning of the concept of excellence.

### DISCUSSION

We consider the above ten values to be constitutive, i.e., building and structuring the whole fair play system. We see our proposal as open to criticism and further additions or restructuring. When the fair play acts and the overall atmosphere of fairness work optimally, the fair play movement generates other values. International Fair Play Committee named *friendship, care, tolerance, team spirit, and joy* (see above). Let us add *beauty*, which, in the optimal case of harmony with the moral and performance dimension of a successful performance, completes the experience of sporting performance (NB: *fair* in Old English meant beautiful). A special value position has *education*, which introduces the history of the fair play movement and highlights extraordinary acts or personalities with lifelong fair attitudes, The Code of Sports Ethics (The Council of Europe, 2010) is finalized like this: “*To succeed in promoting and developing sport and involvement in sport, respect and education are crucial to the concept of sports ethics.*” Educational action through fair play can thus motivate people to reflect on their own attitudes or to engage in certain activities.

In addition to the direct impact of the movement’s activities, there is also an indirect one at play, where strong sports personalities (‘true champions’) influence other sports people, especially children and young people, through their behaviour and attitudes. It is accepted that character – as opposed to temperament – is the result of

formation and learning. Fair play here has considerable scope to influence the integrity of athletes. It is also accepted, that sport has the power to build character. However, studies from (Doty, 2006; Gerdy, 2000; Sage, 1998 etc.) show a different reality. If there are doubts concerning the role of sport in building character, there is no doubt that fair play does it. In the optimal case, the incarnation of fair play values is the fruit of the valorisation not only of character but also of the ethos of community sporting entities, which enhances, among other things, their credibility and social status. It seems that the spread of the Olympic motto “Citius. Altius. Fortius” to “Communiter” (Together) in 2021 intended to emphasise this aspect.

## CONCLUSION

We consider fairness to be essential, even self-preserving, for the functioning and long-term sustainability of sporting competitions. We can observe that building blocks of fair play are experienced and learnt both on and off the field. The values of fair play thus help to fulfil the second main goal of sport (alongside the performance one), so that we could perhaps talk about *double goal competing* (analogous to the now promoted *double goal coaching*), where there is a transcendence of sporting framework to the universal level and personal and community development. In this way, a prerequisite is created to increase the credibility of the whole sport sector, which is undoubtedly important for all participants. However, this requires a constant effort: on a practical level, the adoption of a *values-driven leadership* style into sports organisations and clubs, which should be supplied by a theoretical community with values-based principles and fair play principles as a basis for implementation in practice, with an expected amplification effect enabling to engage as many athletes as possible in “good” sports. We will try to contribute to this task by elaborating our proposed fair play value structure into principles and concrete principles of athlete behaviour and attitudes based on them in the next article.

## ACKNOWLEDGEMENTS

Author acknowledges the financial support from by the Cooperatio, Sport sciences social branch development programme at the Charles University in Prague.

## REFERENCES

- Andreu-Cabrera, E. (2010). Olympic values: The end does not justify the means. *Journal of Human Sport and Exercise*, 5(1), 15–23. <https://doi.org/10.4100/jhse>.
- Anzenbacher, A. (1992). *Einführung in die Ethik*. Düsseldorf: Patmos Verlag.
- Aristotle (1921). *Politics*. Oxford: Clarendon Press.
- Aristotle (1924). *Poetics*. Oxford: Clarendon Press.
- Bednář, M. (2011). Education with Conscience: “Conscientia mille testes”. In: J. Dovalil et al. (Eds.), *Fair Play Education in Schools: A Shared Responsibility. The 16th European Fair Play Congress* (pp. 114–118). Czech Olympic Committee.
- Bednář, M. (2017). Catharsis in the biodromal perspective and with focus on sports and outdoor activities. *Journal of Outdoor Activities*, 11, 9–14.
- Brand, M. (2006). The Role and Value of Intercollegiate Athletics in Universities. *Journal of the Philosophy of Sport*, 33, 9–20. <https://doi.org/10.1080/00948705.2006.9714687>.



- Council of Europe (2010). *The Code of Sports Ethics: Fair play – the winning way*. <https://rm.coe.int/16804cf400>.
- Crossan, W., & Bednár, M. (2018). A critical evaluation of the development and use of values in coaching. *Acta Universitatis Carolinae Kianthropologica*, 54(2), 96–117. <https://doi.org/10.14712/23366052.2018.8>.
- Doty, J. (2006). Sports build character?! *Journal of College and Character*, 7(3), 1–9. <https://doi.org/10.2202/1940-1639.1529>.
- Gerdy, J. R. (2000). *Sports in School: The Future of an Institution*. Teachers College Press.
- Gillmeister, H. (1993). Not Cricket und Fair Play: Betrachtungen zum Englischen Sportgedanken. In: V. Gerhardt & M. Lämmer (Eds.), *Fairness und Fair Play* (pp. 127–137). Sankt Augustin: Academia.
- Housiaux, P. (2022). *President's Message: Fair Play – Spirit of Sport*. [www.fairplayeur.com/efpm/presidents-message/](http://www.fairplayeur.com/efpm/presidents-message/).
- Howe, L. A. (2004). Gamesmanship. *Journal of the Philosophy of Sport*, 31(2), 212–225. <https://doi.org/10.1080/00948705.2004.9714661>.
- International Fair Play Committee (2015). *What is Fair Play?* [www.fairplayinternational.org/what-is-fair-play](http://www.fairplayinternational.org/what-is-fair-play).
- Kluckhohn, C. (1951). Values and value-orientations in the theory of action: An exploration in definition and classification. In: T. Parsons, & E. Shils (Eds.), *Toward a General Theory of Action* (pp. 388–433). Cambridge: Harvard University Press.
- Kretchmar, S. R. (1994). *Practical Philosophy of Sport*. Champaign, IL: Human Kinetics.
- Kretchmar, S. R. (2005). *Practical Philosophy of Sport and Physical Activity*. Champaign, IL: Human Kinetics.
- Küng, H. (1990). *Projekt Welt ethos*. München: Piper Verlag.
- Loland, S. (2002). *Fair play in sport: a modern norm system*. London: Routledge.
- Loland, S., & McNamee, M. (2000). Fair Play and the Ethos of Sports: An Eclectic Philosophical Framework. *Journal of the Philosophy of Sport*, 27(1), 63–80. <https://doi.org/10.1080/00948705.2000.9714590>.
- Marcel, G. (1998). *Homo viator: Prologomènes à une métaphysique de l'espérance*. Association Présence de Gabriel Marcel.
- Mareš, L. (2023). 'Good Sport': Different Dimensions and Their Constitutive Properties From the Ontological and Moral Point of View. *Physical Culture and Sport. Studies and Research*, 99(1), 27–42. <https://doi.org/10.2478/pccsr-2023-0011>.
- Maslow, A. (1954). *Motivation and Personality*. New York, NY: Harper & Row Publishers.
- Maslow, A. (1964). *Religions, Values, and Peak-Experiences*. Columbus Ohio: Ohio State University Press.
- Maslow, A. (1971). *The Farther Reaches of Human Nature*. New York: Viking Press.
- McIntosh, P. (1979). *Fair play: ethics in sport and education*. London: Heinemann.
- McNamee, M. J., & Parry, S. J. (Eds.) (1998). *Ethics and sport*. New York: E & FN Spon.
- Peterson, C. et al. (2007). Strengths of character, orientations to happiness, and life satisfaction. *Journal of Positive Psychology*, 2(3), 149–156. <http://dx.doi.org/10.1080/17439760701228938>.
- Plato (1989). *The collective dialogues*. E. Hamilton, & H. Cairns (Eds.). Princeton, NJ: Princeton University Press.
- Rawls, J. (1971). *A Theory of Justice*. Cambridge: Harvard University Press, Belknap Press.
- Renson, R. (2009). Fair Play: Its Origins and Meanings in Sport. *Kinesiology*, 41(1), 5–18. <https://hrcak.srce.hr/file/60493>.
- Sage, G. (1998). Does sport affect character development in athletes? *Journal of Physical Education, Recreation & Dance*, 69(1), 15–18. <https://doi.org/10.1080/07303084.1998.10605041>.

- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50(4), 19–45. <http://dx.doi.org/10.1111/j.1540-4560.1994.tb01196.x>.
- Simon, R. L. (1985). *Fair Play: Sports, Values, and Society*. Boulder, CO: Westview Press.
- Simon, R. L. (2010). *Fair Play: The Ethics of Sport*. Boulder, CO: Westview Press.
- Skoblík, J. (1997). *Přehled křesťanské etiky* (Overview of Christian Ethics). Praha: Karolinum.
- Thompson, J. (2003). *The Double-Goal Coach*. HarperCollins.
- World Anti-Doping Agency (2021, January 1). *World Anti-Doping Code*. [https://www.wada-ama.org/sites/default/files/resources/files/2021\\_wada\\_code.pdf](https://www.wada-ama.org/sites/default/files/resources/files/2021_wada_code.pdf).

# Effectiveness of home-based video exercise programmes on physical fitness in older adults – systematic review and meta-analysis

Marcela Říhova<sup>1</sup>, Tereza Jandová<sup>2</sup>, Tomáš Větrovský<sup>2</sup>,  
Kateřina Macháčová<sup>1</sup>, Veronika Kramperová<sup>2</sup>, Jana Jaklová Dytrtová<sup>2</sup>,  
Michal Štefl<sup>2,\*</sup>, Iva Holmerová<sup>3</sup>

<sup>1</sup> Longevity Studies, Faculty of Humanities, Charles University, Prague, Czech Republic

<sup>2</sup> Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

<sup>3</sup> Centre of Expertise in Longevity and Long-term Care, Faculty of Humanities, Charles University, Prague, Czech Republic

\* Corresponding author: [steffl@ftvs.cuni.cz](mailto:steffl@ftvs.cuni.cz)

---

## ABSTRACT

*Background:* Home-based video exercise programmes might be a suitable alternative to traditional physical activity in older adults to preserve muscle health. The aim of this systematic review and meta-analysis was to examine the effects of home-based video exercise programmes on physical fitness in older adults.

*Methods:* A systematic review and robust variance estimation meta-analysis with meta-regression were carried out according to the recommendations and criteria outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.

*Results:* Thirteen studies involving 1,056 participants were included. Meta-analysis showed statistically significant positive changes in balance ( $p = 0.023$ ), upper extremity strength ( $p = 0.049$ ), and strength overall ( $p = 0.042$ ), there was also statistically significant positive effect based on all the 28 outcomes in eight studies, including 696 participants ( $p = 0.008$ ).

*Conclusion:* The present systematic review and meta-analysis indicate that home-based video exercise programmes positively affect essential components of physical fitness, such as balance and strength, to prevent falls in older adults. Promoting home-based video exercise in clinical practice and ideally supporting it through supervision is vital to effectively combat the age-related physical decline, especially for those in home isolation.

## KEYWORDS

aging; DVD; physical performance; muscle strength; balance

## DOI

10.14712/23366052.2023.6

## BACKGROUND

It is widely known that the global population is getting older, which carries profound medical and socio-economic consequences (UN DESA, 2020). Older age is associated with the accumulation of health complications where cardiovascular diseases, cancer and musculoskeletal (MSK) diseases are the main contributors to the disease burden in this population (Prince et al., 2015). Notably, the latter should be of primary importance as MSK diseases can severely impact an individual's quality of life (QoL) and functional independence, an individual's ability to perform activities of daily living (ADLs) such as personal hygiene, dressing or eating (Mlinac et al., 2016). For instance, the most recent Eurostat statistics on disability have shown that nearly 50% of people aged 65 and over struggle with at least one personal care or household activity (EUROSTAT, 2022). Therefore, worldwide consensus has been reached supporting any method that may prevent a physical decline in the functional independence of older people.

The importance of physical activity (PA) in older age has been propagated long time (Eckstrom et al., 2020). PA in older age is essential for health not only because it preserves and increases muscle mass and strength – parameters of sarcopenia that decline with age (Morley et al., 2016), but PA also improves endurance, immunity, and cardiovascular function (Yoo et al., 2018; Paffenbarger et al., 2001). Therefore, age-related health complications in the older population are largely preventable by applying different exercise training practices, which often leads to improved functional capacity and QoL (Laurin et al., 2019; Hunter et al., 2004; Christie, 2011). Current PA guidelines for older adults recommend at least 150–300 minutes of moderate-intensity aerobic physical activity, or at least 75–150 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity throughout the week along with two or more days a week of muscle-strengthening activities, involving major muscle groups to develop and maintain cardiorespiratory, musculoskeletal, and neuromotor fitness (WHO, 2010; Garber et al., 2011). However, meeting these PA guidelines was nearly difficult during the new coronavirus disease 2019 (COVID-19) global pandemic (Meyer et al., 2020), where quarantine and social distancing, especially emphasised in older adults, had been the first-line measures to prevent the highly contagious virus from spreading further (Wilder-Smith et al., 2020). While these attempts to suppress human-to-human transmission may have been highly justifiable, prolonged homestay, specifically in the elderly population, has already proved to have many adverse effects on the individual's health (Mlinac et al., 2016; Kirwan et al., 2020; Brooke et al., 2020).

For this reason, specific home-based PA recommendations and guidelines (Joy, 2020; WHO, 2020) have been recently established to increase PA rates during restricted periods, as exercise at home was the only possibility to stay active during the pandemic. However, these recommendations do not specify the type and dosage of exercise, especially for the older population, to achieve favourable health effects. Recent systematic review and meta-analysis has examined the experimental evidence of the effects of home-based exercise programmes (home-based interventions comprised of single-mode or multimodal training focused only on strength and/or balance) on physical fitness (muscle strength, endurance, power and balance) in healthy

older adults and has found small effects in all the measured parameters for the older population group (Chaabene et al., 2021). Considering that most included studies had limited visual or intervention support by the research staff, individuals may have found it challenging to commit to exercising at home. Therefore, home-based video exercise programmes might result in greater improvements in physical fitness. This systematic review with meta-analysis aimed to examine the effects of home-based video exercise programmes on physical fitness in older adults, as there is currently limited knowledge on this specific topic.

## **METHODS**

This systematic review and meta-analysis were carried out per the recommendations and criteria outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021), and the review protocol has been registered in the international prospective register of systematic reviews (PROSPERO: CRD42022381761).

### **Criteria for considering studies for this review**

Studies focused on home video-based exercise in older adults > 65 years written in English and published in peer-reviewed journals were considered.

### **Types of studies**

Single group trials (SGT) and either randomised controlled trials (RCT) or non-randomised controlled trials (NRCT) with either exercise or non-exercise control groups were considered for the systematic review part, and RCTs and NRCTs with non-exercise control groups were considered for the meta-analysis.

### **Types of participants**

Medically stable older adults (Greig et al., 1994) aged  $\geq 65$  years, either females or males or both, were considered for this study.

### **Types of interventions**

All studies focusing on home video-based exercise programs related to physical performance were considered.

### **Types of outcome measures**

Physical performance was measured by physical performance battery – Physiological Profile Assessment (PPA) (Lord et al., 2003), Short Performance Physical Battery (SPPB) (Guralnik et al., 1994), muscle strength tests – handgrip, biceps strength, leg extensor power, chair stand, balance tests – Balance Outcome Measure for Elder Rehabilitation (BOOMER) (Haines et al., 2007), Berg Balance Scale (Berg et al., 1992).

### **Search methods for identification of studies**

Appropriate papers were identified by searching three electronic databases: PubMed, Scopus, and Web of Science. The same stream of keywords was used in all the databases:

(((((home) OR (home-based)) AND (exercise)) AND (((video) OR (DVD)) OR (YouTube))) AND (“older adults” OR (elderly))) NOT (game)

### **Data collection and analysis**

All the potential papers were first downloaded using a reference manager, and then all duplicates were deleted. If the papers seemed suitable from a brief screening of the abstracts, three independent reviewers examined the full text in detail. Additionally, other possible papers were identified through the reference lists of papers and reviews gained by the database search.

### **Data extraction and management**

We collected the following data for both the exercise groups and control groups: mean differences (after – before) and either standard deviation (SD) or 95% confidence interval (CI); if the mean differences were not available, we collected baseline and follow up means and either SD or 95% CI.

### **Assessment of risk of bias in included studies**

A modified version of the Cochrane risk of bias tool (RoB 2) for randomised (Sterne et al., 2019) and risk of bias in non-randomised studies-of interventions (ROBINS-I) for non-randomised comparative studies was used to assess the methodological quality of the included studies (Sterne et al., 2016).

### **Statistical analysis**

All analyses were performed using an R environment for statistical computing (version 4.2.2). The effect sizes for individual outcomes were calculated as standardised mean differences (Hedges'  $g$ ) (Hedges, 1981) between the intervention and control groups using the metafor (Viechtbauer, 2016) package (version 3.4). The effect sizes were pooled using a random-effects meta-regression with robust variance estimation using robumeta (Fisher et al., 2015) package (version 2.0). Robust variance estimation allows for the inclusion of multiple dependent outcomes from the same study and does not require weights or distributional assumptions (Hedges et al., 2010; Tipton, 2015). The analyses were performed for individual domains (aerobic capacity, balance, strength, physical performance) and for all domains combined and visualised using forest plots. For all analyses, we computed pooled effect size, its standard error, 95% confidence intervals and statistical significance (set at  $p < 0.05$ ), percentage of variance due to between-study heterogeneity ( $I^2$ ), and the absolute value of true heterogeneity ( $\text{Tau}^2$ ). The values of  $I^2 > 25\%$ ,  $> 50\%$ , and  $> 75\%$  indicate, respectively, low, moderate, and high heterogeneity (Higgins et al., 2003). Sensitivity analyses were conducted by assessing the effects of influential cases on the results. The influential cases were diagnosed using a combination of several methods (externally standardised residuals, difference in fits values, Cook's distances, covariance ratios, leave-one-out estimates of the amount of heterogeneity, leave-one-out values of the test statistics for heterogeneity, hat values, and weights) as implemented in the 'influence' function within the metafor package (Viechtbauer et al., 2010). Potential publication bias was explored using a funnel plot and Egger's regression test (Sterne et al., 2005).

## RESULTS

### Description of studies

The yield of the search process is summarised in Figure 1. Thirteen studies involving 1,056 participants were included in this systematic review. Nine studies were randomised control trials (RCT), two were single group trials (SGT), and one was non-randomised control trials (NRCT). However, two RCTs did not include any non-exercising group. Nearly all the participants were considered healthy older adults living independently. Out of all the studies, only one study included pre-frail older adults, and another one included older adults with mobility impairment. Except for two studies that included females only, the rest included females and males. The majority of studies used telephone-supported DVD-based exercise interventions, and the duration of interventions ranged between two and six months. The basic description of the included studies is presented in Table 1.

### Risk of bias in included studies

The randomised studies showed an acceptable risk of bias, according to RoB 2. Nevertheless, only a study by (Hong et al., 2017) was at low risk of bias. In (Baez et al., 2017), all the variables statistically differed between groups in baseline measurements, and Hong (Hong et al., 2018) as well as (Vestergaard et al., 2008) showed unclear baseline data; therefore, it was impossible to mark randomisation process with the low risk. Participants' dropout was the major problem in this analysis. More than 10%

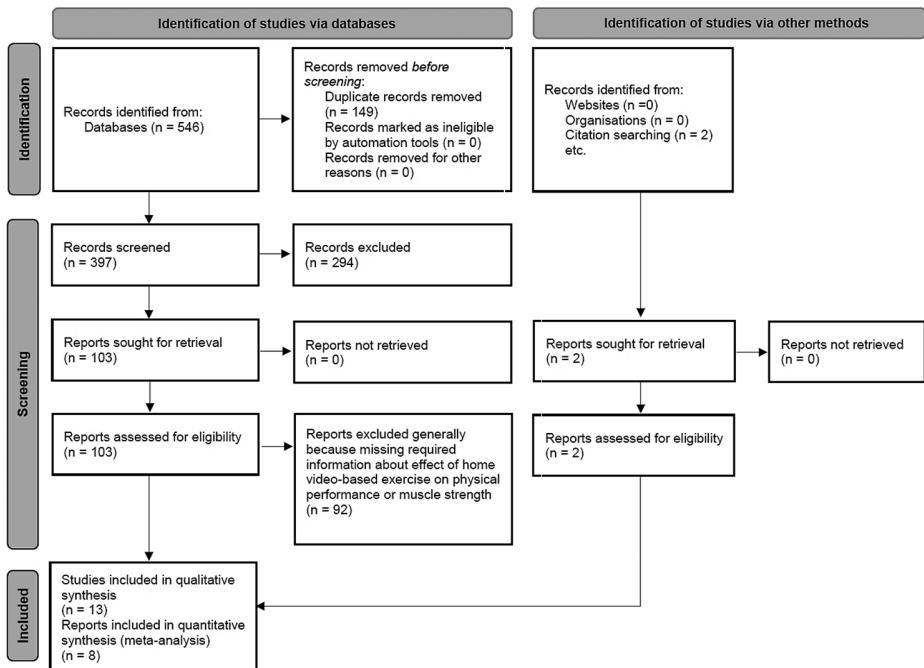


Figure 1

**Table 1** Basic description of the included studies

| Study              | Year | Country     | Design | Sample description                                  | Sample size | Sex | Mean age (SD) of the experimental group | Format                                   | Telephone-supported | Length of the intervention |
|--------------------|------|-------------|--------|---|-------------|-----|---|--|---------------------|----------------------------|
| Baez et al.        | 2017 | Italy       | RCT    | Older adults  | 37          | T   | 70.3 (4.5)                              | Tablet-based application                 | –                   | 2 months                   |
| Davis et al.       | 2016 | Canada      | NRCT   | Older adults  | 61          | T   | 79.6 (4.5)                              | DVD                                      | Yes                 | 6 months                   |
| Geraedts et al.    | 2021 | Netherlands | SGT    | Pre-frail older adults                              | 21          | T   | 81.3 (4.7)                              | Tablet, web-based application            | Yes                 | 3 months                   |
| Haines et al.      | 2009 | Australia   | RCT    | Older adults with mobility impairment               | 68          | T   | 80.9 (8.9)                              | DVD                                      | Yes                 | 2 months                   |
| Hong et al.        | 2018 | South Korea | RCT    | Elderly women with a high risk of falling           | 34          | F   | 78.1 (5.7)                              | Tablet, supervised telepresence          | –                   | 3 months                   |
| Hong et al.        | 2017 | South Korea | RCT    | Members of the Senior Citizen Centre                | 23          | T   | 82.2 (5.6)                              | Tablet PC, supervised telepresence       | –                   | 3 months                   |
| McAuley et al.     | 2013 | US          | RCT    | Low-active older adults                             | 307         | T   | 70.6 (0.4)                              | DVD                                      | Yes                 | 6 months                   |
| Roberts et al.     | 2017 | US          | RCT    | Low-active older adults                             | 153         | T   | 70.0 (5.0)                              | DVD                                      | Yes                 | 6 months                   |
| Vestergaard et al. | 2008 | Denmark     | RCT    | Community – dwelling frail women                    | 61          | F   | 81.0 (3.3)                              | Video tape                               | Yes                 | 5 months                   |
| Vikberg et al.     | 2022 | Sweden      | SGT    | Community – dwelling elderly at risk of sarcopenia  | 34          | T   | 71.1 (0.3)                              | Pre-recorded video accessed via homepage | –                   | 2.5 months                 |
| Wu et al.          | 2010 | US          | RCT*   | Community – dwelling elderly with a risk of falling | 94          | T   | 76.1 (7.9)                              | DVD                                      | Yes                 | 4 months                   |
| Wu and Keyes       | 2006 | US          | SGT    | Independent living elderly                          | 17          | T   | 81.0 (8.0)                              | Video-conference                         | –                   | 4 months                   |
| Yamada et al.      | 2011 | Japan       | RCT    | Community – dwelling older adults                   | 146         | T   | 83.0 (6.7)                              | DVD                                      | –                   | 6 months                   |

Note: RCT = randomized control trial; NRCT = non-randomized control trial; SGT = single group trial; SD = standard deviation



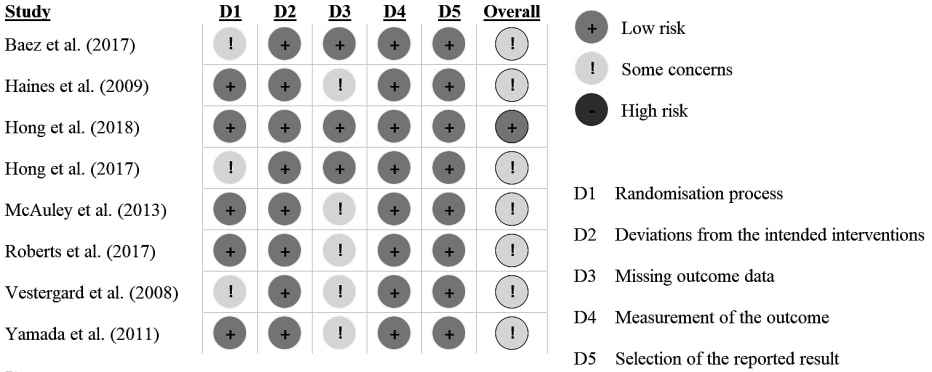


Figure 2

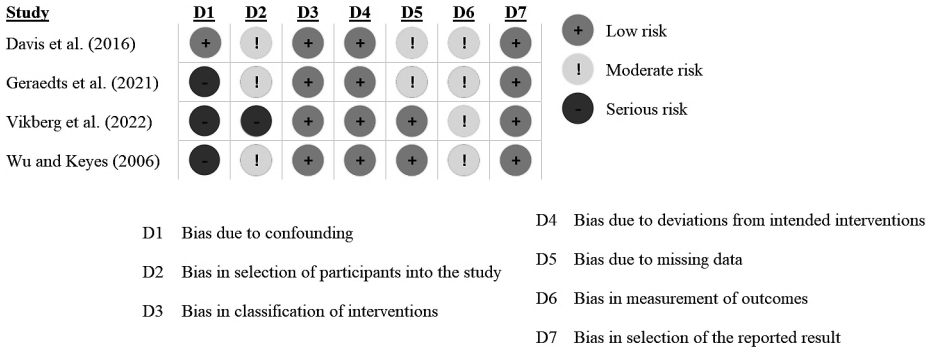


Figure 3

of participants dropped out in five out of eight studies (Figure 2). Non-randomised studies were of medium quality, according to ROBINS-I. In fact, only (Davis et al., 2016) was NRCT, but the control group had a different location from the intervention group. There was the same problem with the considerable dropout rate. The other three studies were SGS; therefore, they did not meet all criteria from ROBINS-I (Figure 3).

**Systematic review**

Fourteen intervention groups were included in the systematic review. Four studies used the Otago Exercise Programme (NCOA, 2023), two FlexToBa (McAuley et al., 2012), and two DVD Tai Chi programs. Several methods were used to measure physical performance and muscle strength (Table 2). Statistically significant improvements were recorded 23 times out of 40 within-group analyses. Participants mainly improved their lower extremities strength assessed by several modifications of the chair stand test (7x improvements). There were also 3x improvements in overall performance assessed by the Short Performance Physical Battery (SPPB) and 4x upper extremities strength (2x 30-sec arm curl, 1x handgrip strength and 1x biceps strength). Between

**Table 2** The detail description of the studies included in this systematic review

| Study                    | Intervention description                              | Outcome                                    | Within-group effect sig. | Between-groups effect sig. |
|--------------------------|---|--|--------------------------|----------------------------|
| Baez et al. (2017)       | Otago Exercise Programme                              | 30-sec chair stand (Jones et al. 1999)     | ↑                        | — <sup>a</sup>             |
|                          |   | TUG (Podsiadlo and Richardson, 1991)       | ↑                        | — <sup>a</sup>             |
| Davis et al. (2016)      | Otago Exercise Programme                              | PPA (Lord et al., 2003)                    | —                        | —                          |
|                          |   | SPPB (Guralnik et al., 1994)               | —                        | —                          |
| Geraedts et al. (2021)   | Otago Exercise programme                              | STS (Zijlstra et al., 2010)                | —                        | N/A                        |
|                          |   | TUG (Podsiadlo and Richardson, 1991)       | ↑                        | N/A                        |
|                          |   | Chair-Rise test (Zhang et al., 2014)       | ↑                        | N/A                        |
| Haines et al. (2009)     | Kitchen Table Exercise Program                        | BOOMER (Haines et al., 2007)               | —                        | —                          |
|                          |   | 2-min walk test (Stewart et al., 1990)     | —                        | —                          |
| Hong et al. (2018)       | Telepresence Exercise Program                         | 2-min step test (Rikli and Jones, 2013)    | —                        | —                          |
|                          |   | 30-sec arm curl                            | —                        | —                          |
|                          |   | 30-sec chair stand (Guralnik et al., 1994) | ↑                        | ↑                          |
|                          |   | 8-foot up-and-go                           | —                        | —                          |
|                          |   | Berg Balance Scale (Berg et al., 1992)     | ↑                        | ↑                          |
| Hong et al. (2017)       | Telepresence Exercise Program                         | 2-min step test (Rikli and Jones, 2013)    | ↑                        | —                          |
|                          |   | 30-sec arm curl                            | —                        | —                          |
|                          |   | 30-sec chair stand (Guralnik et al., 1994) | ↑                        | ↑                          |
|                          |   | 8-foot up-and-go                           | —                        | —                          |
| McAuley et al. (2013)    | FlexToBa  | SPPB (Guralnik et al., 1994)               | ↑                        | ↑                          |
|                          |   | 30-sec arm curl                            | ↑                        | ↑                          |
| Roberts et al. (2017)    | FlexToBa  | SPPB (Guralnik et al., 1994)               | ↑                        | ↑                          |
|                          |   | 30-sec arm curl                            | ↑                        | ↑                          |
| Vestergard et al. (2008) | Video tape exercise including booklet describing them | Handgrip                                   | ↑                        | —                          |
|                          |   | Biceps strength                            | ↑                        | —                          |
|                          |   | Leg extensor power                         | —                        | —                          |
|                          |   | Chair stand                                | ↑                        | —                          |
|                          |   | Walking speed                              | ↑                        | —                          |
|                          |   | Semi balance                               | —                        | —                          |
|                          |   | PPT (Reuben and Siu, 1990)                 | ↑                        | —                          |
| Vikberg et al. (2022)    | Online resistance training                            | SPPB (Guralnik et al., 1994)               | ↑                        | N/A                        |
| Wu et al. (2010)         | DVD Tai-Chi program                                   | TUG (Podsiadlo and Richardson, 1991)       | —                        | N/A                        |
|                          |   | SLS (Wu, 2002)                             | —                        | N/A                        |
| Wu and Keyes (2006)      | DVD Tai-Chi program                                   | TUG (Podsiadlo and Richardson, 1991)       | ↑                        | N/A                        |
|                          |   | SLS (Wu, 2002)                             | ↑                        | N/A                        |
| Yamada et al. (2011)     | DVD training  | DT walking time (Yamada et al., 2011)      | —                        | —                          |
|                          |   | ST walking time (Lopopolo et al., 2006)    | ↑                        | ↑                          |
|                          |   | TUG (Podsiadlo and Richardson, 1991)       | —                        | —                          |
|                          |   | 30-sec chair stand (Guralnik et al., 1994) | —                        | —                          |

Note: ↑ = increased levels; ↓ = decreased levels; N/A not applicable; <sup>a</sup>Individual home-based training program vs. online group exercising  
 TUG = Timed Up & Go test; PPA = Physiological Profile Assessment; Short Performance Physical Battery; BOOMER = Balance Outcome Measure for Elder Rehabilitation; PPT = Physical Performance Test; ST walking time = 10-m walking under the single-task condition; DT walking time = 10-m walking under the dual-task condition

study comparisons, 8× were statistically significant improvements (2× 30-sec chair stand, 2× 30-sec arm curl, 2× SPPB, 1× Berg Balance Scale, and 1× 10-m walking under the dual-task condition (DT walking time). The results of the studies included in this systematic review are shown in Table 2.

**Meta-Analysis**

**Effects of interventions**

Meta-analysis showed statistically significant positive changes in balance (ES = 0.517 [95% CI: 0.144 to 0.891], p = 0.023, Figure 4), upper extremity strength (ES = 0.388 [95% CI: 0.002 to 0.775], p = 0.049, Figure 5), and strength overall (ES = 0.442 [95% CI: 0.023 to 0.862], p = 0.042, Figure 6). There was no heterogeneity detected in balance (I<sup>2</sup> = 0%, Tau<sup>2</sup> = 0). The heterogeneity of the results was moderate for the upper extremity strength (I<sup>2</sup> = 43%, Tau<sup>2</sup> = 0.038) and high for the strength overall (I<sup>2</sup> = 70%, Tau<sup>2</sup> = 0.114). Meta-analysis for physical performance tests yielded positive but non-significant effects (ES = 0.422 [95% CI: -0.093 to 0.938], I<sup>2</sup> = 57%, Tau<sup>2</sup> = 0.05, p = 0.078, Figure 7). The highest but non-significant effect with considerable heterogeneity (I<sup>2</sup> = 84%, Tau<sup>2</sup> = 0.583) was estimated in lower extremity strength (ES = 0.875 [95% CI: -0.662 to 2.412], p = 0.166, Figure 8). On the other hand, the smallest effect with no heterogeneity (I<sup>2</sup> = 0%, Tau<sup>2</sup> = 0) was estimated in aerobic capacity (ES = 0.279 [95% CI: -0.577 to 1.135], p = 0.284, Figure 9). The overall effect based on 28 outcomes in eight studies, including 696 participants, was statistically significant (ES = 0.361 [95% CI: 0.132 to 0.590], p = 0.008, Figure 10). Heterogeneity was moderate for the overall effect (I<sup>2</sup> = 58%, Tau<sup>2</sup> = 0.076). The sensitivity analysis did not identify any influential cases. The visual inspection of the funnel plot complemented Egger’s regression test for funnel plot asymmetry (p = 0.211) and indicated that publication bias was unlikely to have influenced the results significantly.

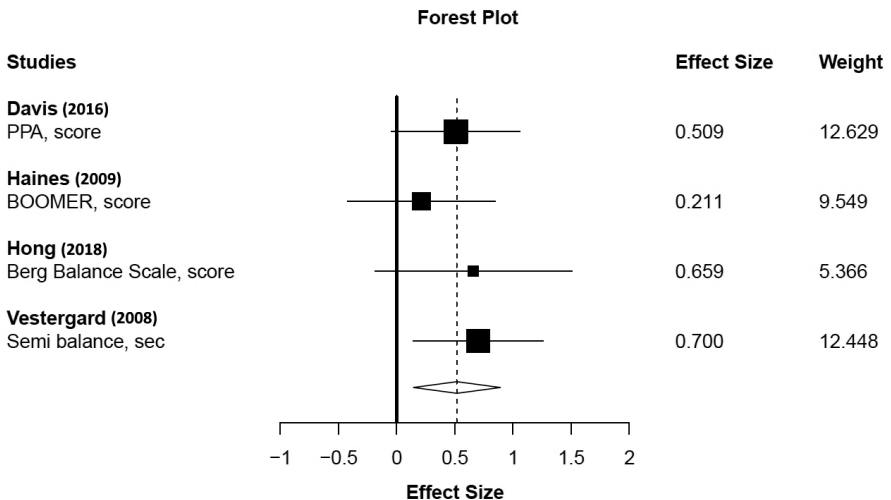


Figure 4

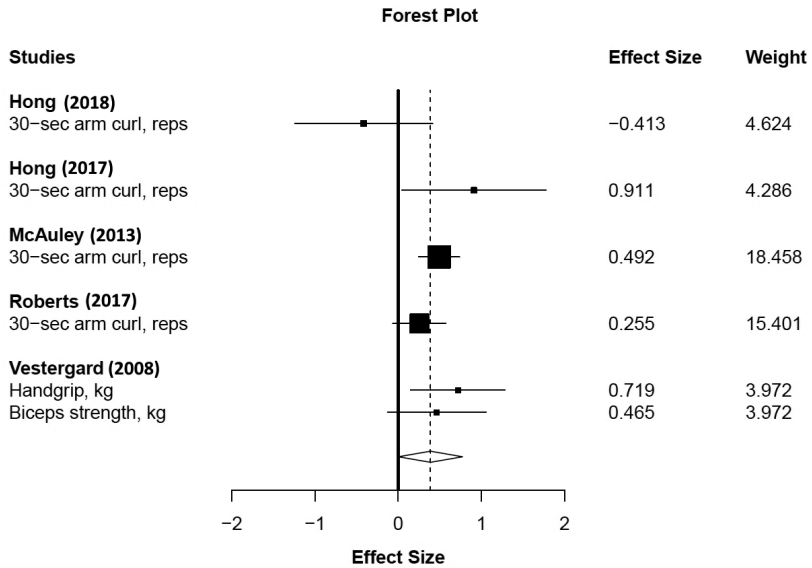


Figure 5

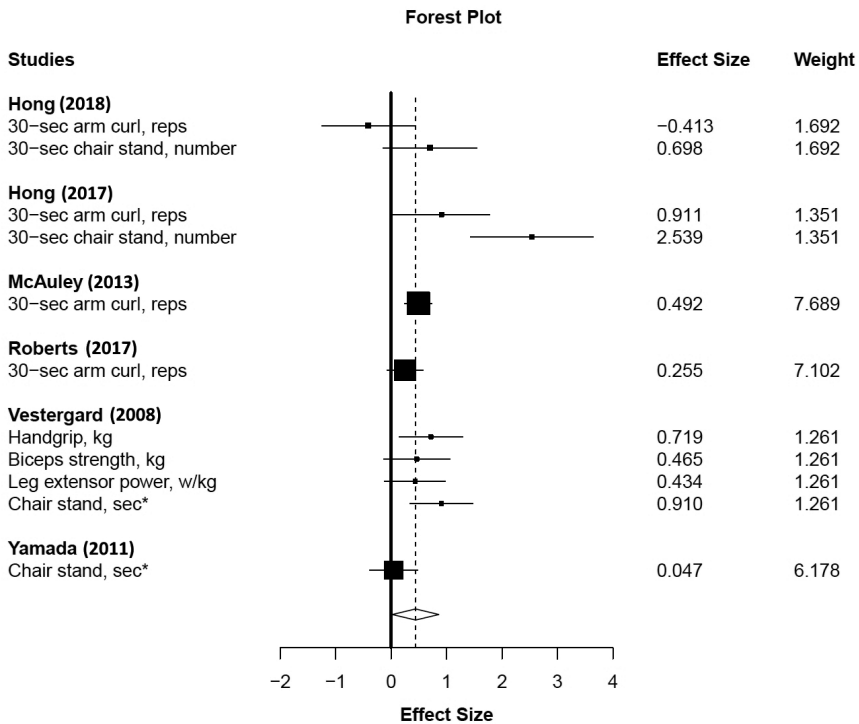


Figure 6

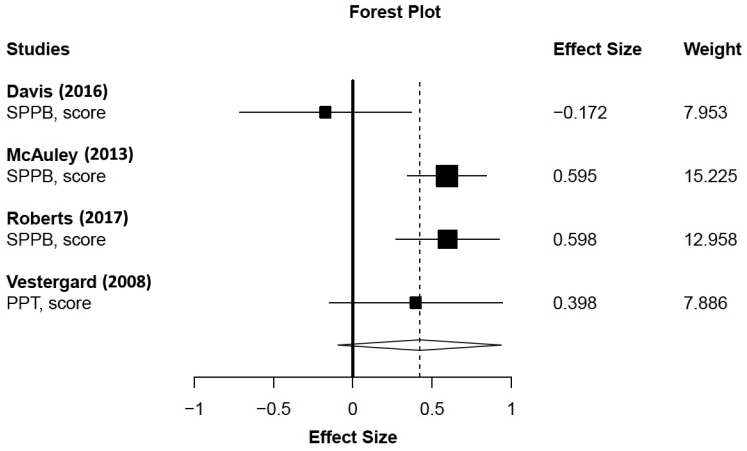


Figure 7

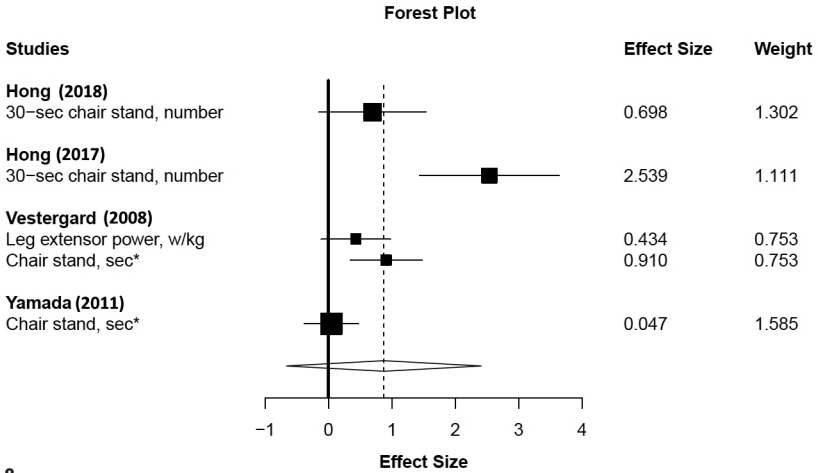


Figure 8

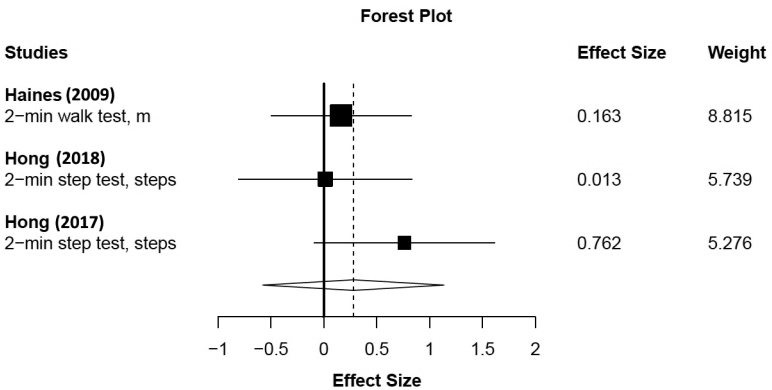


Figure 9

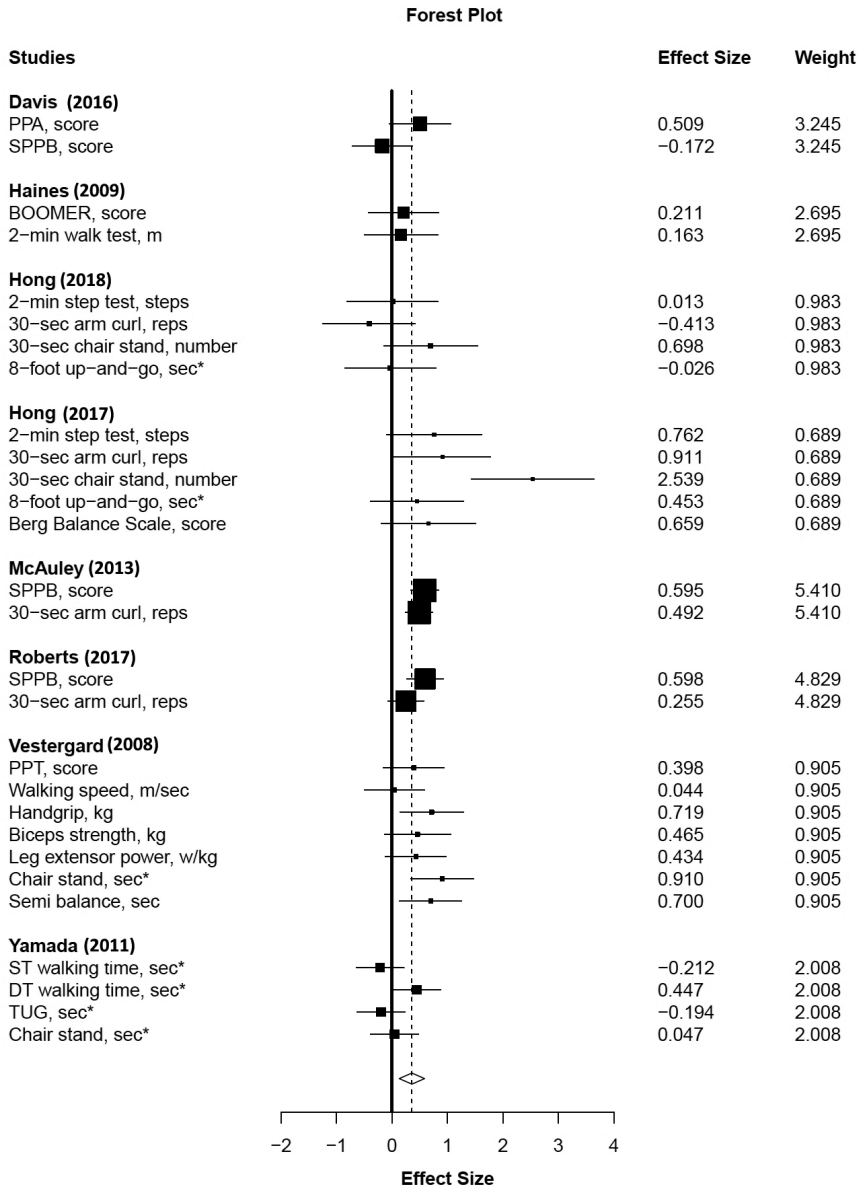


Figure 10

## DISCUSSION

The results of this present study indicate that home-based video exercise programmes have moderate effects on important components of physical fitness, such as balance and muscle strength, in medically stable older adults. This study did not find statistically significant effects on physical performance per se. These results could be, therefore,

used to promote home-based video exercise programmes in clinical practice, especially in times of home isolation, to community-dwelling older individuals as a preventative exercise for people at increased risk of falls due to frailty and/or sarcopenia.

The major public health concern nowadays is the age-related loss of muscle mass and strength, termed sarcopenia, because it is associated with many adverse outcomes, including frailty, decreased mobility and increased likelihood of falls (Gadelha et al., 2018; Bauer et al., 2008). Extensive evidence suggests that physical inactivity or decreased levels of PA are the primary cause of sarcopenia and other non-communicable diseases (Cunningham et al., 2020; Bell et al., 2016). In fact, reduced levels of PA are common in ageing (Suryadinata et al., 2020; Westerterp, 2018), but social isolation brought about by the COVID-19 pandemic has affected it even more (Oliveira et al., 2022). Nevertheless, a study by (McPhee et al., 2016) has shown that active older people can reduce the risk of such diseases, and, in addition, they also experience much improved functional capacity and better QoL. PA is a low-cost lifestyle behaviour that has consistently been associated with physical and mental health improvements in the older adult population (Awick et al., 2017).

For these reasons highlighted above, it was essential to investigate current evidence of the effects of home-based exercise on physical fitness in the older population. The first systematic review with meta-analysis on this topic published in 2021 aggregated data from 17 randomised controlled trials and found beneficial effects, although small in magnitude, of home-based exercise programmes on various components of physical fitness, including muscle strength, endurance, power, and balance in healthy older adults, irrespective of sex (Chaabene et al., 2021). Our study included 13 home-based video exercise programmes and found moderate effects on physical fitness parameters, specifically on balance and muscle strength. One of the reasons for the overall moderate effect found in our study might be the mode of the exercise programmes. The Otago Exercise Programme (NCOA, 2023), FlexToBa (McAuley et al., 2012), and Tai-Chi are of low intensity and focus mainly on improving balance and strength parameters. This explains our results regarding the non-significant effect of such programmes on physical performance, specifically on aerobic capacity, as central and peripheral adaptations that increase  $\text{VO}_2$  max, also known as maximal oxygen uptake or exercise capacity, are typical after endurance training (Kohrt et al., 1991) also demonstrated that home-based single-mode strength training had moderate effects on muscle strength and balance, while multimodal training produced no statistically significant effects on these parameters, which aligns with our results too. Moreover, the moderate effect found in this study may also suggest either better compliance and/or movement skill competency during the execution of exercise according to pre-recorded video demonstrations at home. However, this needs to be investigated in future studies.

The beneficial effects of different types of exercise to countermeasure muscle wasting with age are already well-documented. For example, it is well established that resistance training is of benefit to older adults by stimulating hypertrophy and increases in muscle strength (Hunter et al., 2004; Christie, 2011), while endurance training is widely recognised for its protective effects against various age-associated chronic conditions, such as diabetes or insulin resistance, that are thought to impair muscle function (Lurin et al., 2019; Lanza et al., 2008). This study's results demonstrate that

home-based video exercise programmes might be potent in mitigating age-related declines in physical fitness parameters such as balance and muscle strength, which may prevent the risk of falls in older adults (Thomas et al., 2019). In fact, research indicates that age-associated postural control impairment is related more to strength declines, especially in the lower limbs, than age-associated changes in sensorial integration (Andrade et al., 2017). Thus, promoting and disseminating such exercise protocols may also serve as a preventative measure in age-related sarcopenia, which has been questioned due to disuse physiology (Narici et al., 2010). However, it must be pointed out that regarding home-based exercise, non-adherence might be the biggest culprit in success. Compared to PA done outside or at the gym with or without an instructor, individuals may find it more challenging to commit to exercising at home. For example, non-adherence to home exercise in rehabilitation, where the success of specific medical interventions depends largely on patient adherence to prescribed rehabilitation regimes, including specific exercises to do unsupervised at home to aid recovery, is as high as 50% (Argent et al., 2018). Nevertheless, a recent study by Schwartz et al. (Schwartz et al., 2021) demonstrated that PA protocol delivered live via a video-conferencing platform to older cohorts was very effective in adherence rates, which were as high as 90%, and 97% of participants indicated that they would participate in such a program in the future.

There are limitations in our systematic review and meta-analysis that must be considered. Among them is the relatively small number of included studies with a different type of exercise along with large heterogeneity (except for the balance where we detected zero heterogeneity), which could undermine the accuracy of the study comparisons. Furthermore, we must consider that different characteristics vary among the studies and do not allow a direct comparison of the retrieved results. For example, the majority of studies used different assessment tools for the evaluation of fitness parameters. Most studies also did not assess the physical and training status, which may have led to a biased conclusion.

### **Quality of the evidence**

This review and meta-analysis included 13 studies which used RCT, NRCT and SGT designs. The risk for bias and quality of reporting data was assessed as acceptable for RCT, and NRCT was of medium quality. All included studies assessed effects on the completers only, which may result in an overstatement of the effects due to the high dropout rate.

### **Potential biases in the review process**

This systematic review and meta-analysis are limited to published research; therefore, our review may be biased due to the possible threat of publication and reporting bias.

### **Agreements and disagreements with other studies or reviews**

This present study confirms and extends previous findings (Chaabene et al., 2021) by demonstrating that home-based exercise positively affects components of physical fitness in older adults. The overall medium effect with moderate heterogeneity found in our study suggests that home-based video exercise programmes seem more potent in improving components of physical fitness, such as strength and balance, in older adults.



## CONCLUSIONS

The results of the present systematic review and meta-analysis indicate that home-based video exercise programmes positively affect essential components of physical fitness, such as balance and strength, to prevent falls in older adults. Therefore, any positive change in physical fitness parameters measured in this study can only serve as evidence for the benefits of home-based PA in the older population. Thus, promoting it in clinical practice and ideally supporting it through supervision is vital to effectively combat the age-related physical decline, especially for those who end up in home isolation. On the other hand, the main focus in research on home-based (video) exercise should be placed now on improving adherence and investigating preferences and motivational forces of (older) people to keep up with home-based exercise modality.

## ACKNOWLEDGEMENTS

Authors highly acknowledge the financial support from the Grant of the Ministry of Health of the Czech Republic [grant number NU22-09-00447] and the grant of Charles University - Cooperatio.

## REFERENCES

- Andrade, H. B., Costa, S. M., Piropo, U. S., Schettino, L., Casotti, C. A., & Pereira, R. (2017). Lower limb strength, but not sensorial integration, explains the age-associated postural control impairment. *Muscles, Ligaments and Tendons Journal*, 7(4), 598–602. <https://doi.org/10.11138/mltj/2017.7.4.598>.
- Argent, R., Daly, A., & Caulfield, B. (2018). Patient involvement with home-based exercise programs: can connected health interventions influence adherence? *JMIR mHealth and uHealth*, 6(3), e47. <https://doi.org/10.2196/mhealth.8518>.
- Awick, E. A., Ehlers, D., Fanning, J., Phillips, S. M., Wójcicki, T., Mackenzie, M., Motl, R., & McAuley, E. (2017). Effects of a home-based DVD-delivered physical activity program on self-esteem in older adults: results from a randomized controlled trial. *Psychosomatic Medicine*, 79(1), 71–80. <https://doi.org/10.1097/PSY.0000000000000358>.
- Baez, M., Khaghani Far, I., Ibarra, F., Ferron, M., Didino, D., & Casati, F. (2017). Effects of online group exercises for older adults on physical, psychological and social wellbeing: a randomized pilot trial. *PeerJ*, 5(5), e3150. <https://doi.org/10.7717/peerj.3150>.
- Bauer, J. M., & Sieber, C. C. (2008). Sarcopenia and frailty: a clinician's controversial point of view. *Experimental Gerontology*, 43(7), 674–678. <https://doi.org/10.1016/j.exger.2008.03.007>.
- Bell, K. E., von Allmen, M. T., Devries, M. C., & Phillips, S. M. (2016). Muscle disuse as a pivotal problem in sarcopenia-related muscle loss and dysfunction. *The Journal of Frailty & Aging*, 5(1), 33–41. <https://doi.org/10.14283/jfa.2016.78>.
- Berg, K. O., Wooddauphinee, S. L., & Williams, J. I. (1992). Measuring balance in the elderly – validation of an instrument. *Canadian Journal of Public Health*, 83(Suppl 2), S7–S11.
- Brooke, J., & Jackson, D. (2020). Older people and COVID-19: Isolation, risk and ageism. *Journal of Clinical Nursing*, 29(13–14), 2044–2046. <https://doi.org/10.1111/jocn.15274>.
- Chaabene, H., Prieske, O., Herz, M., Moran, J., Höhne, J., Kliegl, R., Ramirez-Campillo, R., Beh, D. G., Hortobágyi, T., & Granacher, U. (2021). Home-based exercise programmes improve physical fitness of healthy older adults: A PRISMA-compliant systematic review and meta-analysis with relevance for COVID-19. *Ageing Research Reviews*, 67, 101265. <https://doi.org/10.1016/j.arr.2021.101265>.

- Christie, J. (2011). Progressive resistance strength training for improving physical function in older adults. *International Journal of Older People Nursing*, 6(3), 244–246. <https://doi.org/10.1111/j.1748-3743.2011.00291.x>.
- Cunningham, C., O’Sullivan, R., Caserotti, P., & Tully, M. A. (2020). Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. *Scandinavian Journal of Medicine & Science in Sports*, 30(5), 816–827. <https://doi.org/10.1111/sms.13616>.
- Davis, J. C., Hsu, C. L., Cheung, W., Brasher, P. M. A., Li, L. C., Khan, K. M., Sykes, J., Skeleton, D. A., & Amborse, T. L. (2016). Can the Otago falls prevention program be delivered by video? A feasibility study. *BMJ Open Sport & Exercise Medicine*, 2(1), e000059. <https://doi.org/10.1136/bmjsem-2015-000059>.
- Eckstrom, E., Neukam, S., Kalin, L., & Wright, J. (2020). Physical activity and healthy aging. *Clinics in Geriatric Medicine*, 36(4), 671–683. <https://doi.org/10.1016/j.cger.2020.06.009>.
- Eurostat Statistics Explained (2022). *Disability statistics - elderly needs for help or assistance*. Available from: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Disability\\_statistics\\_-\\_elderly\\_needs\\_for\\_help\\_or\\_assistance#Difficulties\\_in\\_personal\\_care\\_or\\_household\\_activities](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Disability_statistics_-_elderly_needs_for_help_or_assistance#Difficulties_in_personal_care_or_household_activities).
- Fisher, Z., & Tipton, E. (2015). Robumeta: An R-package for robust variance estimation in meta-analysis. Available from: <https://cran.r-project.org/web/packages/robumeta/vignettes/robumetaVignette.pdf>.
- Gadelha, A. B., Neri, S. G. R., Oliveira, R. J., Bottaro, M., David, A. C., Vainshelboim, B., & Lim, R. M. (2018). Severity of sarcopenia is associated with postural balance and risk of falls in community-dwelling older women. *Experimental Aging Research*, 44(3), 258–269. <https://doi.org/10.1080/0361073X.2018.1449591>.
- Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B., Lamonte, M., Lee, I. M., Nieman, D. Ch., & Swain, D. P. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Medicine & Science in Sports & Exercise*, 43(7), 1334–1359. <https://doi.org/10.1249/MSS.0b013e318213fefb>.
- Geraedts, H. A. E., Dijkstra, H., Zhang, W., Ibarra, F., Khaghani Far, I., Zijlstra W., & Stevens, M. (2021). Effectiveness of an individually tailored home-based exercise programme for pre-frail older adults, driven by a tablet application and mobility monitoring: a pilot study. *European Review of Aging and Physical Activity*, 18(1), 10. <https://doi.org/10.1186/s11556-021-00264-y>.
- Greig, C. A., Young, A., Skelton, D. A., Pippet, E., Butler, F. M., & Mahmud, S. M. (1994). Exercise studies with elderly volunteers. *Age and Ageing*, 23(3), 185–189. <https://doi.org/10.1093/ageing/23.3.185>.
- Guralnik, J. M., Simonsick, E. M., Ferrucci, L., Berkamn, L. F., Blazer, D. G., Scherr, P. A., & Wallace, R. B. (1994). A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. *The Journals of Gerontology*, 49(2), M85–94. <https://doi.org/10.1093/geronj/49.2.m85>.
- Haines, T., Kuys, S. S., Morrison, G., Clarke, J., Bew, P., & McPhail, S. (2007). Development and validation of the balance outcome measure for elder rehabilitation. *Archives of Physical Medicine and Rehabilitation*, 88(12), 1614–1621. <https://doi.org/10.1016/j.apmr.2007.09.012>.
- Haines, T. P., Russell, T., Brauer, S. G., Erwin, S., Lane, P., Urry, S., Jasiewicz, J., & Condie, P. (2009). Effectiveness of a video-based exercise programme to reduce falls and improve health-related quality of life among older adults discharged from hospital: a pilot randomized controlled trial. *Clinical Rehabilitation*, 23(11), 973–985. <https://doi.org/10.1177/0269215509338998>.

- Hedges, L. V. (1981). Distribution theory for glass's estimator of effect size and related estimators. *Journal of Educational Statistics*, 6(2), 107–128. <https://doi.org/10.2307/1164588>.
- Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research Synthesis Methods*, 1(1), 39–65. <https://doi.org/10.1002/jrsm.5>.
- Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *The British Medical Journal*, 327(7414), 557–560. <https://doi.org/10.1136/bmj.327.7414.557>.
- Hong, J., Kim, J., Kim, S. W., & Kong, H. J. (2017). Effects of home-based tele-exercise on sarcopenia among community-dwelling elderly adults: Body composition and functional fitness. *Experimental Gerontology*, 87, 33–39. <https://doi.org/10.1016/j.exger.2016.11.002>.
- Hong, J., Kong, H. J., & Yoon, H. J. (2018). Web-based telepresence exercise program for community-dwelling elderly women with a high risk of falling: randomized controlled trial. *JMIR mHealth and uHealth*, 6(5), e132. <https://doi.org/10.2196/mhealth.9563>.
- Hunter, G. R., McCarthy, J. P., & Bamman, M. M. (2004). Effects of resistance training on older adults. *Sports Medicine*, 34(5), 329–348. <https://doi.org/10.2165/00007256-200434050-00005>.
- Jones, C. J., Rikli, R. E., & Beam, W. C. (1999). A 30-s chair-stand test as a measure of lower body strength in community-residing older adults. *Research Quarterly for Exercise and Sport*, 70(2), 113–119. <https://doi.org/10.1080/02701367.1999.10608028>.
- Joy, L. (2020). Staying active during COVID-19. In: *American College of Sports Medicine*. Available from: <https://www.exerciseismedicine.org/staying-active-during-covid-19/>.
- Kirwan, R., McCullough, D., Butler, T., Perez de Heredia, F., Davies, I. G., & Stewart, C. (2020). Sarcopenia during COVID-19 lockdown restrictions: long-term health effects of short-term muscle loss. *GeroScience*, 42(6), 1547–1578. <https://doi.org/10.1007/s11357-020-00272-3>.
- Kohrt, W. M., Malley, M. T., Coggan, A. R., Spina, R. J., Ogawa, T., Ehsani, A. A., Bourey, R. E., Martin, W. H., & Holloszy, J. O. (1991). Effects of gender, age, and fitness level on response of  $\text{VO}_2\text{max}$  to training in 60–71 yr olds. *Journal Applied Physiology*, 71(5), 2004–2011. <https://doi.org/10.1152/jappl.1991.71.5.2004>.
- Lanza, I. R., Short, D. K., Short, K. R., Raghavakimal, S., Basu, R., Joyner, M. J., McConnell, J. P., & Nair, K. S. (2008). Endurance exercise as a countermeasure for aging. *Diabetes*, 57(11), 2933–2942. <https://doi.org/10.2337/db08-0349>.
- Laurin, J. L., Reid, J. J., Lawrence, M. M., & Miller, B. F. (2019). Long-term aerobic exercise preserves muscle mass and function with age. *Current Research in Insect Science*, 10, 70–74. <https://doi.org/10.1016/j.cophys.2019.04.019>.
- Lord, S. R., Menz, H. B., & Tiedemann, A. (2003). A physiological profile approach to falls risk assessment and prevention. *Physical Therapy*, 83(3), 237–252.
- Lopopolo, R. B., Greco, M., Sullivan, D., Craik, R. L., & Mangione, K. K. (2006). Effect of therapeutic exercise on gait speed in community-dwelling elderly people: a meta-analysis. *Physical Therapy*, 86(4), 520–540. <https://doi.org/10.1093/ptj/86.4.520>.
- McAuley, E., Wójcicki, T. R., White, S. M., Mailey, E. L., Szabo, A. N., Goethe, N., Olson, E. A., Mullen, S. P., Fanning, J., Motl, R. W., Rosengren, K., & Estabrooks, P. (2012). Physical activity, function, and quality of life: Design and methods of the FlexToBa™ trial. *Contemporary Clinical Trials*, 33(1), 228–236. <https://doi.org/10.1016/j.cct.2011.10.002>.
- McAuley, E., Wójcicki, T. R., Gothe, N. P., Mailey, E. L., Szabo, A. N., Fanning, J., Olson, E. A., Phillips, S. M., Motl, R. W., & Mullen, S. P. (2013). Effects of a DVD-delivered exercise intervention on physical function in older adults. *The Journals of Gerontology series A Biological Sciences and Medical Sciences*, 68(9), 1076–1082. <https://doi.org/10.1093/gerona/glt014>.

- McPhee, J. S., French, D. P., Jackson, D., Nazroo, J., Pendleton, N., & Degens, H. (2016). Physical activity in older age: perspectives for healthy ageing and frailty. *Biogerontology*, 17(3), 567–580. <https://doi.org/10.1007/s10522-016-9641-0>.
- Meyer, J., McDowell, C., Lansing, J., Brower, C., Smith, L., Tully, M., & Herring, M. (2020). Changes in physical activity and sedentary behavior in response to COVID-19 and their associations with mental health in 3052 US adults. *International Journal of Environmental Research and Public Health*, 17(18), 6469. <https://doi.org/10.3390/ijerph17186469>.
- Mlinac, M. E., & Feng, M. C. (2016). Assessment of activities of daily living, self-care, and independence. *Archives of Clinical Neuropsychology*, 31(6), 506–516. <https://doi.org/10.1093/arclin/acw049>.
- Morley, J. E. (2016). Frailty and sarcopenia: the new geriatric giants. *Revista de Investigación Clínica*, 68(2), 59–67.
- Narici, M. V., & Maffulli, N. (2010). Sarcopenia: characteristics, mechanisms and functional significance. *British Medical Bulletin*, 95, 139–159. <https://doi.org/10.1093/bmb/ldq008>.
- National Council on Aging (2023). *Evidence-Based Program: Otago Exercise Program*. Available from: <https://www.ncoa.org/article/evidence-based-program-otago-exercise-program>.
- Oliveira, M. R., Sudati, I. P., Konzen, V. M., de Campos, A. C., Wibelinger, L. M., Correa, C., Miguel, F. M., Silva, R. N., & Borghi-Silva, A. (2022). Covid-19 and the impact on the physical activity level of elderly people. *Experimental Gerontology*, 59, 111675. <https://doi.org/10.1016/j.exger.2021.111675>.
- Paffenbarger, R. S. Jr., Blair, S. N., & Lee, I. M. (2001). A history of physical activity, cardiovascular health and longevity: the scientific contributions of Jeremy N Morris, DSc, DPH, FRCP. *International Journal of Epidemiology*, 30(5), 1184–1192. <https://doi.org/10.1093/ije/30.5.1184>.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lali, M. M., Li, T., Lordor, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., Stewart, L. A., Thomas, J., Tricco, A. C., Welch, V. A., Whitig, P., & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *The British Medical Journal*, 372, n71. <https://doi.org/10.1136/bmj.n71>.
- Podsiadlo, D., & Richardson, S. (1991). The timed “Up & Go”: a test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society*, 39(2), 142–148. <https://doi.org/10.1111/j.1532-5415.1991.tb01616.x>.
- Prince, M. J., Wu, F., Guo, Y., Robledo, L. M. G., O'Donnell, M., Sullivan, R., & Yusuf, S. (2015). The burden of disease in older people and implications for health policy and practice. *Lancet*, 385(9967), 549–562. [https://doi.org/10.1016/S0140-6736\(14\)61347-7](https://doi.org/10.1016/S0140-6736(14)61347-7).
- Reuben, D. B., & Siu, A. L. (1990). An objective measure of physical function of elderly outpatients. The Physical Performance Test. *Journal of the American Geriatrics Society*, 38(10), 1105–1112. <https://doi.org/10.1111/j.1532-5415.1990.tb01373.x>.
- Rikli, R. E., & Jones, C. J. (1999). *Senior fitness test manual*. Champaign, IL: Human Kinetics.
- Roberts, S., Awick, E., Fanning, J. T., Ehlers, D., Motl, R. W., & McAuley, E. (2017). Long-term maintenance of physical function in older adults following a DVD-delivered exercise intervention. *Journal of Aging and Physical Activity*, 25(1), 27–31. <https://doi.org/10.1123/japa.2015-0284>.
- Schwartz, H., Har-Nir, I., Wenhoda, T., & Halperin, I. (2021). Staying physically active during the COVID-19 quarantine: exploring the feasibility of live, online, group training sessions among older adults. *Translational Behavioral Medicine*, 11(2), 314–322. <https://doi.org/10.1093/tbm/ibaa141>.
- Sterne, J. A. C., Savovic, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., Cates, Ch. J., Cheng, H. Y., Corbett, M. S., Eldridge, S. M., Emberson, J. R., Hernán, M. A.,

- Hopewell, S., Hrobjartsson, A., Junqueira, D. R., Jüni, P., Kirkham, J. J., Lasserson, T., Li, T., McAleenan, A., Reeves, B. C., Shepperd, S., Shrier, I., Stewart, L. A., Tilling, K., White, I. R., Whiting, P. F., & Higgins, J. P. T. (2019). RoB 2: a revised tool for assessing risk of bias in randomised trials. *The British Medical Journal*, *366*, l4898. <https://doi.org/10.1136/bmj.l4898>.
- Sterne, J. A., Hernán, M. A., Reeves, B. C., Berkman, N. D., Meera, V., Henry, D., Altman, D. G., Ansari, M. T., Boutron, I., Carpenter, J. R., Chan, A., Churchill, R., Deeks, J. J., Hróbjartsson, A., Kirkham, J., Jüni, P., Loke, Y. K., Pigott, T. D., Ramsay, C. R., Regidor, D., Rothstein, H. R., Sandhu, L., Santaguida, P. L., Schünemann, H. J., Shea, B., Shrier, I., Tugwell, P., Turner, L., Valentine, J. C., Waddington, H., Waters, E., Wells, G. A., Whiting, P. F., & Higgins, J. P. T. (2016). ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *The British Medical Journal*, *355*, i4919. <https://doi.org/10.1136/bmj.i4919>.
- Sterne, J. A. C., & Egger, M. (2006). Regression methods to detect publication and other bias in meta-analysis. In: *Publication bias in meta-analysis: prevention assessment and adjustments* (pp. 99–110). John Wiley & Sons, Inc. <https://doi.org/10.1002/0470870168.ch6>.
- Stewart, D. A., Burns, J. M. A., Dunn, S. G., & Roberts, M. A. (1990). The two-minute walking test: a sensitive index of mobility in the rehabilitation of elderly patients. *Clinical Rehabilitation*, *4*(4), 273–276. <https://doi.org/10.1177/02692155900040040>.
- Suryadinata, R. V., Wirjatmadi, B., Adriani, M., & Lorensia, A. (2020). Effect of age and weight on physical activity. *Journal of Public Health*, *9*(2), 1840. <https://doi.org/10.4081/jphr.2020.1840>.
- Tipton, E. (2015). Small sample adjustments for robust variance estimation with meta-regression. *Psychological Methods*, *20*(3), 375–393. <https://doi.org/10.1037/met0000011>.
- Thomas, E., Battaglia, G., Patti, A., Brusa, J., Leonardi, V., Palma, A., & Bellafiore, M. (2019). Physical activity programs for balance and fall prevention in elderly: A systematic review. *Medicine*, *98*(27), e16218. <https://doi.org/10.1097/MD.00000000000016218>.
- United Nations, Department of Economic and Social Affairs, Population Division (2020). *World Population Ageing 2019*.
- Vestergaard, S., Kronborg, C., & Puggaard, L. (2008). Home-based video exercise intervention for community-dwelling frail older women: a randomized controlled trial. *Aging Clinical and Experimental Research*, *20*(5), 479–486. <https://doi.org/10.1007/BF03325155>.
- Viechtbauer, W. (2016). Conducting Meta-Analyses in R with the metafor Package. *Journal of Statistical Software*, *36*(3), 1–48. <https://doi.org/10.18637/jss.v036.i03>.
- Viechtbauer, W., & Cheung, M. W. (2010). Outlier and influence diagnostics for meta-analysis. *Research Synthesis Methods*, *1*(2), 112–125. <https://doi.org/10.1002/jrsm.11>.
- Vikberg, S., Björk, S., Nordström, A., Nordström, P., & Hult, A. (2022). Feasibility of an online delivered, home-based resistance training program for older adults – a mixed methods approach. *Frontiers in Psychology*, *13*, 869573. <https://doi.org/10.3389/fpsyg.2022.869573>.
- Westerterp, K. R. (2018). Changes in physical activity over the lifespan: impact on body composition and sarcopenic obesity. *Obesity Reviews*, *19*(1), 8–13. <https://doi.org/10.1111/obr.12781>.
- Wilder-Smith, A., & Freedman, D. O. (2020). Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of Travel Medicine*, *27*(2), taaa020. <https://doi.org/10.1093/jtm/taaa020>.
- World Health Organization. (2020). *Stay physically active during self-quarantine*. Available from: [https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/publications-and-technical-guidance/noncommunicable-diseases/stay-physically-active-during-self-quarantine?fbclid=IwAR2RQYVYBnmpDCMjBwqmoz0hZxzmit\\_9yKzXu6ZjHGNYwRTEzWOUQefU8V0](https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/publications-and-technical-guidance/noncommunicable-diseases/stay-physically-active-during-self-quarantine?fbclid=IwAR2RQYVYBnmpDCMjBwqmoz0hZxzmit_9yKzXu6ZjHGNYwRTEzWOUQefU8V0).

- World Health Organization (2010). *Global recommendations on physical activity for health*. Geneva.
- Wu, G., Keyes, L., Callas, P., Ren, X., & Bookchin, B. (2010). Comparison of telecommunication, community, and home-based Tai Chi exercise programs on compliance and effectiveness in elders at risk for falls. *Archives of Physical Medicine and Rehabilitation*, *91*(6), 849–856. <https://doi.org/10.1016/j.apmr.2010.01.024>.
- Wu, G., & Keyes, L. M. (2006). Group tele-exercise for improving balance in elders. *Telemedicine Journal and e-Health*, *12*(5), 561–570. <https://doi.org/10.1089/tmj.2006.12.561>.
- Wu, G. (2002). Evaluation of the effectiveness of Tai Chi for improving balance and preventing falls in the older population. *Journal of the American Geriatrics Society*, *50*(4), 746–754. <https://doi.org/10.1046/j.1532-5415.2002.50173.x>.
- Yamada, M., Aoyama, T., Hikita, Y., Takamura, M., Tanaka, Y., Kajiwara, Y., Nagai, K., Uemura, K., Mori, S., & Tanaka, N. (2011). Effects of a DVD-based seated dual-task stepping exercise on the fall risk factors among community-dwelling elderly adults. *Telemedicine Journal and e-Health*, *17*(10), 768–772. <https://doi.org/10.1089/tmj.2011.0054>.
- Yamada, M., Aoyama, T., Tanaka, B., Nagai, K., & Ichihashi, N. (2011). Seated stepping exercise in a dual-task condition improves ambulatory function with a secondary task: a randomized controlled trial. *Aging Clinical and Experimental Research*, *23*(5–6), 386–392. <https://doi.org/10.1007/BF03337763>.
- Yoo, S. Z., No, M. H., Heo, J. W., Park, D. H., Kang, J. H., Kim, S. H., & Hyo, B. K. (2018). Role of exercise in age-related sarcopenia. *Journal of Exercise Rehabilitation*, *14*(4), 551–558. <https://doi.org/10.12965/jer.1836268.134>.
- Zijlstra, W., Bisseling, R. W., Schlumbohm, S., & Baldus, H. (2010). A body-fixed-sensor-based analysis of power during sit-to-stand movements. *Gait Posture*, *31*(2), 272–278. <https://doi.org/10.1016/j.gaitpost.2009.11.003>.
- Zhang, W., Regterschot, G. R., Schaabova, H., Baldus, H., & Zijlstra, W. (2014). Test-retest reliability of a pendant-worn sensor device in measuring chair rise performance in older persons. *Sensors (Basel)*, *14*(5), 8705–8717. <https://doi.org/10.3390/s140508705>.

# The athletic consul: a new role in sports organizations

Timothy Baghurst<sup>1,\*</sup>, Frances Cacho<sup>2</sup>, Adrian Griffin<sup>3</sup>

<sup>1</sup> Florida State University, USA

<sup>2</sup> United States Military

<sup>3</sup> Milwaukee Bucks, Milwaukee, WI, USA

\* Corresponding author: timothybaghurst@gmail.com

---

## ABSTRACT

Sports organizations are complex. In addition to the actual coaching of athletes, many utilize a myriad of different administrative and sport science departments or areas of expertise to aid in the achievement of success. Examples include sports administration, nutrition, strength and conditioning, sport psychology, counseling, athletic training, to name a few. Consequently, there are many voices within the organization, and communication and effectiveness may be affected by silos, fear of voicing opinions, or other challenges that come from the stresses and rigors of athletic competition. Anecdotally, we have noticed the often-informal introduction of an individual into some sports organizations and teams to help support the overall organization and its personnel. This individual does not necessarily have decision-making powers, but serves as a conduit of information, a supporter, and an advisor to all parties. To date, a specific title for this position has not been formally recognized, nor have its roles or responsibilities been defined. Therefore, the purpose of this conceptual article is to propose a name for this position, which we have termed Athletic Consul (AC). Further, we outline why such a position is valuable, its fit within an athletic program, the roles and responsibilities of the position, and why it is necessary for such this position be formalized.

## KEYWORDS

coach; athlete; ombudsman; sport psychology; counseling; athletics; sport management

## DOI

10.14712/23366052.2023.7

## INTRODUCTION

Sports is a massive industry. How massive is unclear, but it is estimated that over 50 million youth participate in sports in the United States alone (Baghurst & Benham, 2020). This excludes the millions of collegiate, adult, and masters-level participants. Not surprisingly, coaches are in high demand. The United States Bureau of Labor Sta-

tistics (2021) reported almost 300,000 jobs in coaching and scouting (excluding the hundreds of thousands of coaches who work part-time, volunteer, or work in areas not typically identified within the coaching profession) and predicted a “much faster than average” increase in the profession at a 12% growth over the next ten years. Trends are similar in the United Kingdom where the number of sport coaches, instructors, and officials has risen approximately 13% to 89,000 since 2021 (Statista, 2023).

The rise in sports popularity, followed by an increasing demand for coaches, highlights the many opportunities for employment in sports. For example, we unofficially surveyed coaches at a variety of club, high school, collegiate, and professional teams to identify what resources they used. Included were examples such as: athletic trainers, medical professionals, strength and conditioning coaches, sport psychologists, counselors, sports nutritionists, biomechanists, exercise scientists, data analysts, media professionals, academic support specialists, managers, agents, and owners.

Admittedly, most volunteer or small program coaches will lack many of the aforementioned resources and will be expected to know and handle many of these team functions, which creates its own challenges. However, regardless the level of competition or the personnel resources (un)available, coaches have many roles and responsibilities, including serving as a substitute parent, disciplinarian, tactician, academic tutor, mentor, and friend to their athletes (Davis, 2005). In addition, coaches may be expected to work with a variety of individuals not directly working for the sports organization or team, such as parents, boosters/fundraisers, sponsors, and reporters (Lyst, 2019).

Working with a vast array of individuals and groups within and external to the team can place enormous pressure on a coach, especially within the context of an outcome-oriented environment: coaches are expected to win (Pearson et al., 2020). While the expectation of a youth coach may be to develop athlete skills, create a fun environment, and foster lifelong activity (Wilson Jr., 2019), which we advocate at all levels, most coaches are evaluated on winning and losing, which is a very public evaluation of their job performance (Pearson et al., 2020). Athlete performance is often the judge of success, which depends on how well the athletes have been prepared. How well they have been prepared depends not only on the coach, but on the effectiveness of those supporting the coach and athletes.

With the many roles and responsibilities now placed on coaches, particularly in larger athletic programs that include staff across multiple areas of expertise, communication lines can become challenged, silos of expertise may develop, and an overall breakdown in desired culture may occur (Cruickshank & Collins, 2012; Zakrajsek et al., 2007). Stewart (2014) reported that in 409 US Division I collegiate athletic programs, 88% reported they believed silos to exist within their program. To help address this from occurring, within this conceptual article we propose the creation of a new position in sport programs, which we term the Athletic Consul (AC).

### **Origin of the term “consul”**

The term “consul” has multiple definitions, but early use of the term extends to the Roman republic where it was used to describe an elected chief magistrate (Merriam-Webster, n.d.). Being elected was considered a great honor and consuls had significant power. For example, in 494 BC, Rome was in trouble. The underclass plebians,



the workforce of Rome, cried out for reform, but its patricians and the ruling senate refused to listen to the complaints. So, the plebeians left, leaving Rome without the workers needed to sustain it. The senate, recognizing the plight they were now in, requested Agrippa Menenius Lanatus, a former consul, to negotiate on their behalf (Guerber, 1896).

Menenius was a popular figure with the plebians and known for his eloquence. He recognized the need to speak to them in a form they would understand, so he told them a fable about the parts of the body. Specifically, some of the body parts were unhappy with the stomach because it did little work, so the body decided to stop feeding it. Initially, the body parts were pleased with this decision, but it was not long before they began to fatigue and realize their need for the stomach.

Of course, Menenius was suggesting that the patricians were the stomach, the plebians the other “working” body parts, and they needed to work together for the common good (Guerber, 1896). Through concessions and negotiations Menenius made with the patricians, the plebians returned to Rome, and Menenius remained a popular figure with both groups throughout his life. Interestingly, scholars debate whether he was a plebian or patrician (Livy, 1971), but the former consul has been recognized in history for his ability to work with both groups to the betterment of all.

### **Similarities to the athletic consul in other vocations**

Although the AC would be a new position in sports organizations, there are examples within other vocations. For example, some recent job postings in the sports field include the title of Sports Performance Director, or something similar, whereby the individual has the responsibilities of overseeing performance departments such as strength and conditioning, sports nutrition, and athletic training. However, these positions focus primarily on administrative duties that may include responsibilities such as hiring, evaluating, and firing staff rather than providing support for all departments (SportsNet, n.d.). The role of the AC in other professional settings, such as business, might be seen in a human resources employee or high-performance consultant; someone outside the departments who is specifically tasked with facilitating department cohesion to achieve the mission of the company.

Rodrigue and Trudel (2019) suggested high performance coaches could benefit from a “Personal Learning Coach” or “PLC” to help them over their coaching journey. High performance coaches can be isolated following their coach education and training certification, and a PLC could facilitate new knowledge and reflection. However, while the processes within this framework are valuable, they are focused on coaches only, and more specifically those working in high performance. Therefore, the scope of the PLC is limited.

An ombudsman may also be suited to this type of role. A non-gender specific title, an ombudsman serves as an independent, objective investigator when there are complaints between parties. The individual evaluates whether the complaint has merit and makes recommendations how the problem can be resolved (Fowlie, 2017). Fowlie provides a variety of situations where an ombudsman can be of assistance within sports, but separates them by role (e.g., sport integrity ombudsman, club specific ombudsman, athlete ombudsman). Although the ombudsman may have some roles and responsibilities that are like those of the proposed AC, dispute resolution is the

central role of such a position, and the AC's roles and responsibilities should be much wider in range.

Some researchers have described how applied sport psychology professionals (ASPP) have assumed the role of AC or have been trained to assume a responsibility to support the sport science and management staff (Arnold et al., 2019). ASPPs are trained in managing areas such as stress, emotions, role clarity and conflict, communication, and cohesion; therefore, they are expected to be the resident resource for managing these issues among the support staff in addition to the athletes (Arnold et al., 2019). However, there is support for the idea that taking on these responsibilities could be overloading ASPPs and that there may be a need for an additional person to assume some of these responsibilities (Arnold et al., 2019; Fletcher et al., 2011; Fletcher & Arnold, 2011).

As the practice of applied sport psychology has grown, there have been instances where ASPPs have been tasked with expanding their practice to address the communication of the coaching and support staff (Arnold et al., 2019). For example, circumstances where the primary presenting concerns have been coach-athlete relationships, managing support staff stressors, or return from injury have been where many ASPPs find themselves in these roles (Arnold et al., 2019; Friesen & Orlick, 2011). Supporting staff cohesion has been another situation where an ASPP might be tasked with being the liaison bridging the gap between athletes and staff (Arnold et al., 2019).

Another situation that typically puts ASPPs in this role is during their rapport-building phase. Part of being a competent ASPP involves the ability to not only build relationships with the athletes but also the coaches and support staff (Friesen & Orlick, 2011). ASPPs have suggested that part of their role is to be a trusting friend/confidant to athletes as a "jack-of-all-trades" and holding respectful and appreciative relationships with coaches and other sport science staff as a means of maintaining a holistic practice (Friesen & Orlick, 2011). This is required to gain access, learn about the environment, and build trust when working with a new program (Friesen & Orlick, 2011). However, this often leaves ASPPs managing dual provisions of service and roles within an organization that can increase emotional stress around their job.

While the scope of training in sport psychology is expanding to include practices of industrial, occupational, and organizational psychology, the role of an ASPP does not necessarily include the roles and responsibilities of an AC. Rather, the focus of the field is in emphasizing the facilitation of performance excellence in the athletes (Aoyagi et al., 2012). However, the transferability of some of the skills ASPPs teach has put these practitioners in the position of filling these roles at times (Fletcher & Arnold, 2011). It has been suggested that specialized training in performance, organizational, or occupational psychology might be a better suited professional to fill this role as the position of an ASPP within a sport organization managing both services can leave them prone to experience the division of the silos and ethical dilemmas in the workplace (Aoyagi et al., 2012; Fletcher et al., 2011; Fletcher & Arnold, 2011). In fact, previous researchers have advocated that due to the emotional stress and overloading of responsibilities, there should be another professional to manage relationships among the silos (Fletcher et al., 2011; Fletcher & Arnold, 2011).

### **Proposed function of the AC**

The responsibilities for the AC will be situation specific. For example, an individual working within a collegiate program may need to understand and work with National Collegiate Athletic Association (NCAA) rules and regulations. Conversely, working within professional sports may require interaction with a team owner or executive director. Therefore, while we outline some areas for engagement, these could be considered conceptual suggestions rather than required.

Above all, the AC should act as a liaison between players, coaches, management, and other entities as needed. This may help address issues in role conflict, whereby an individual or group perceive themselves to have multiple roles that produce differing demands that are perceived to be unachievable (Bigby, 2021). The AC may be able to decipher when role conflict might arise or when expectations are perceived to be unrealistic.

The AC may be able to facilitate by holding office hours for groups or being available for appointments on an individual basis. They may also be a conduit for the sharing of information, such as the roles and responsibilities of each individual/group, but this must be rooted in trust. Athletes should not view this person as a coach, nor should the coach view them as “front office,” or they may be hesitant to share important information. All must trust that the AC will only share information that is given consent to share. The administrative and coaching staff must trust they are only sharing what is absolutely necessary to maintain the rapport between the players.

An example of information sharing could consist of a personal family situation that a player is experiencing. First, the AC should seek permission from the athlete to share sensitive information and allow the athletes to decide how much detail could be shared. To the player ... “Do you mind if I sharing this with (coach/management)?” To coaches and management ... “He’s not playing well because he’s dealing with a personal issue. I can’t go into detail about it, but I would suggest going easy on him today.”

Second, the AC should provide or facilitate educational and scientific support to the staff and team. Although each silo will be knowledgeable in their area of expertise (e.g., strength and conditioning, nutrition), the AC could provide holistic training to support the entire team. Examples might include communication skills, leadership training, inviting guest speakers on specific topics, and so on. Part of acting as the liaison or providing educational support, the AC could be responsible for coordinating regular meetings or workshops that educate the silos on how their individual works combine to holistically impact the athlete’s performance/outcomes as a way to build value and appreciation for the other silos and minimize competition between silos. Although larger organizations may have a system in place to provide this content, many do not, and the AC could fill this gap.

Third, with valuable knowledge, the AC should serve as an advocate for the program. An individual with exceptional communication skills could support the program by interacting with boosters, donors, sponsors, and even the media, which may be an unwanted or overly taxing responsibility often assigned to coaches.

Fourth, and perhaps more at the professional level than others, the AC should facilitate communication and relationships between the athlete and the organization. Professional athletes may have agents or other staff, for example, who may encourage

athlete obligations and commitments that may conflict with team obligations. They may wish to take on roles that are traditionally housed within the team. This may potentially be a source of contention (Shropshire et al., 2016). So, if the agent is solely advocating for the athlete and their business, and the team's public relations is advocating for what is best for the team, the AC may be able to serve as the middle-ground facilitator. It is important to stress that the AC must not be pressured to share information that a player has specifically asked not to share. If the coaches and management cannot accept that there will be specific information that they cannot have access to, it will strain the relationship of all parties involved.

A very public example of this conflict occurred in 2018, when multi-Super Bowl winner Tom Brady's trainer Alex Guerrero came into conflict with New England Patriot's head coach Bill Belichick. For example, there were disagreements about the access Guerrero was given within the facility, who he worked with, and what authority he had compared to the team's medical staff. The dispute was reportedly one of the factors that influenced Tom Brady to leave the team with which he had built his legacy (Camenker, 2021).

Last, and while not necessarily a stated job requirement but perhaps more of a desired disposition, the AC should be an encourager and positive role model to the program. An encourager is someone who builds up and exhorts, taking time to learn about and understand others with the goal of adding to their self-worth and goals (Durkee, 2018). Being an encouragement, having a positive outlook, and demonstrating a commitment in the program is paramount to the success of the AC. Durkee (2018) proposed that for an encouraging action (i.e., delivery of the encouragement) to be effective, it is dependent on the discovery phase (i.e., need or reason to encourage) combined with the magic gratitude (i.e., the right word/verbiage/action to use) and the right timing (i.e., when the encouragement should be delivered). Thus, within the framework of the AC, examples might be developing awards or honors that recognize positive efforts of those within the program and supporting/cheering players/staff at practices and competition. Durkee (2018) suggested that even offering someone a piece of gum at the right time can serve as a way to provide encouragement.

### **Qualifications of the AC**

Although someone such as an ASPP might be qualified to work with sports performance topics, they may not be qualified or comfortable supporting individuals within the organization outside of this realm. Further, given the intimate nature of what an ASPP does, there may be a lack of trust. For example, would a player be comfortable discussing personal situations with an individual who typically reports to the coach or athletic director? Therefore, we propose the qualifications of the AC stem from three potential areas, each with their own advantages and drawbacks.

### **Former player**

Former players offer an immediate credibility with current players and the organization. This is particularly true if the former player competed for and was successful with that team (Note: if relationships as a recent former player are important, the AC may need to be replaced every few years). Players are more likely to open up and listen

to the advice of someone who has “been in their shoes” and understands what they might be going through. In a recent interview, former Duke women’s basketball coach Joanne McCallie stated that hiring former players to her staff was more effective than someone else unfamiliar with her system and program (FSU COACH, 2021).

Although a former player might benefit some, the coach must be willing to work with this individual, who may not understand or appreciate the intricacies of the coaching profession. Therefore, it would be important that the incoming AC be supported by the coach, and that the coach is willing to allow the former player to be a valued member of the support staff. Without this open communication and trust, it is unlikely the former player would be as effective bridging the gap between players and coach.

### **Former coach**

Just as a former player might have a deeper connection with current players, a former coach may have the same effect with a current coach. Former coaches are likely to have a deeper knowledge of the coaching challenges and stressors experienced by the coach, which are many (Pearson et al., 2020). Further, they may also be better able to work with the many ancillary support groups that exist, such as athletic trainers and strength and conditioning coaches.

It should be noted that there is an inherent danger associated with a former coach acting as an AC. Former coaches may not wish to remain “former,” and could seek an opportunity to return to a coaching position. Therefore, any former coach hired to this position must be considered retired without personal ambition to resurrect their former career.

### **Sports academic**

Although this may seem an unusual option at first, an individual with scientific training in coaching and/or sports performance may be more suited to this position than a former coach or athlete. Although former coaches and athletes bring value from their past experiences within the sport, they also bring additional challenges as already outlined. An individual external to the sports organization and without deep personal connections to the coaching staff, players, or organization may provide a more neutral perspective and more easily cross boundaries between silos. Further, they may have a more broad-based knowledge to contribute beyond those of a former coach and player, who are more likely to rely on their own personal experiences as opposed to scientific best-practices or current research.

Yet, there is also a risk in hiring an academic. Academics may be “academic” in nature, providing theoretical ideas and knowledge that may not apply effectively to the sports setting needing assistance. Further, some academics may not be actively engaged in the sports arena, and a lack of experience within the sport as a player, coach, or support staff may limit their understanding of the real-life situations occurring. Therefore, if considering an academic within this role, it may be important to ascertain their own sporting history. For example, have they played or coached sports? At what level? Do they have experiences that will translate into the “real world?”

**Summary of qualifications**

As noted, whether a former player, coach, sports academic, or someone else, there are advantages or drawbacks to each. Ideally, if a player or coach, it is important they have received additional training and knowledge beyond the scope of their own personal experiences. If a sport academic, it is important they have gained knowledge and experiences beyond those acquired in certifications and research. Recent playing/coaching experiences, even if not within the sport in question would amplify any “book knowledge” being shared. Therefore, ideally the individual should have playing/coaching experiences with additional knowledge and training that would support the organization and its members.

While qualifications may be debated, it is important that the individual also possess soft skills, which are being recognized as an increasingly important component of the workplace (Kyllonen, 2013). Examples include relationship building, communication, and leadership development as important skills that an AC should possess. As a slightly facetious example, we have provided a job description for the position from the time of Menenius, which is presented in Table 1.

**Table 1** Example Job Description for the Athletic Consul Position

|  |  |
|--|--|
| <b>Name</b>                                  | Chariot Racing Athletic Consul   |
| <b>Type</b>                                  | Part-Time  |
| <b>Posted</b>                                | February 2, 503 BC   |
| <b>Category</b>                              | Athletics  |
| <b>Location</b>                              | Military College of the Roman Empire, Rome   |
| <b>Description</b>                           | The Military College of the Roman Empire is seeking a dynamic and enthusiastic individual to support the College’s chariot racing program. Historically successful, the program has grown substantially, and has expanded its support programs to remain the very best across the empire. The Athletic Consul will help facilitate the operation of these different programs, while supporting athletes and coaching staff with best practices and current scientific knowledge. The individual will serve as a liaison between the team, coaches, and athletic administration, serving as an advocate of the program to external entities.                          |
| <b>Required Qualifications</b>               | <ul style="list-style-type: none"> <li>• Either a sport scientist (training in chariot racing preferred), a former chariot racer, or a chariot racing coach. It is preferred the candidate has racing and coaching experience with evidence of having acquired additional training in sport sciences.</li> </ul>   |
| <b>Essential Duties and Responsibilities</b> | <ul style="list-style-type: none"> <li>• Support and assist all aspects of the Military College of the Roman Empire’s chariot racing program.</li> <li>• Act as a liaison between players, coaches, athletic administration, and other entities.</li> <li>• Provide or facilitate educational and scientific support to the staff and team.</li> <li>• Serve as an advocate for the athletic program to external entities.</li> <li>• Facilitate communication and relationships between the athlete and the team, coaches, and College.</li> <li>• Perform all duties and maintain all standards in accordance with the College’s rules and regulations.</li> </ul> |

---

|  |   |
|--|---|
| <b>Desired Knowledge, Skills and Abilities</b> | <ul style="list-style-type: none"> <li>• Extensive knowledge of chariot racing</li> <li>• Knowledge chariot racing at the collegiate level.</li> <li>• High level verbal and written communication skills.</li> <li>• Fluency in Latin required, other languages a plus.</li> <li>• Mentoring skills.</li> <li>• Ability to teach and educate in an individual and group setting.</li> <li>• Serve as a positive role model.</li> <li>• Maintain confidentiality.</li> <li>• Fundraise and advocate for the program.</li> </ul> |
| <b>Requirements</b>                            | <ul style="list-style-type: none"> <li>• Chariot racing license and insurability with the College's insurance carrier. Individuals hired for this position may be required to operate a chariot. A chariot driving history (CDH) will be conducted in addition to a background check.</li> <li>• Current First-aid and CPR certification.</li> </ul>  |

---

Former player, former coach, and sports academic are the three backgrounds we suggest an AC should be derived from. However, it should be recognized that each background will determine what focus an AC might have on the program. Therefore, ideally, athletic programs should consider hiring an AC with playing and coaching experience who has also acquired professional training that would enable them to integrate all areas of expertise.

## CONCLUSION

This article is conceptual in nature and the idea of an AC within a sports organization and team is a new one. Although there are examples within sports to suggest that similar roles and titles exist, they are limited to one area of a sports team, such as supporting the coach but not the athlete. Although Menenius serves as an example of an individual who brought groups together, the AC can do this and more. In addition to resolving problems, we assert that an AC can support an athletic program through other areas, such as education, fundraising, and mentorship. Therefore, we propose that those within sports administrations consider the formal addition of this role, adhering to similar roles and responsibilities as outlined. Doing so will serve to support all parties in an unbiased and positive manner.

## REFERENCES

- Arnold, R., Collington, S., Manley, H., Rees, S., Soanes, J., & Williams, M. (2019). "The Team Behind the Team": Exploring the organizational stressor experiences of sport science and management staff in elite sport. *Journal of Applied Sport Psychology*, 31(1), 7–26. <https://doi.org/10.1080/10413200.2017.1407836>.
- Aoyagi, M. W., Portenga, S. T., Poczwardowski, A., Cohen, A. B., & Statler, T. (2012). Reflections and directions: The profession of sport psychology past, present, and future. *Professional Psychology: Research and Practice*, 43(1), 32. <https://doi.org/10.1037/a0025676>.
- Baghurst, T., & Benham, R. H. (2020). Quality sport coaching in action: The application of the National Standards for Sport Coaches in the interscholastic sport context, *Strategies*, 33, 21–27. <https://doi.org/10.1080/08924562.2020.1812340>.

- Bigby, J. (2021). Mind over matter or matter over mind: How potential role conflict affects the psychological well-being of college student-athletes. [Thesis, Georgia State University]. [https://scholarworks.gsu.edu/sociology\\_theses/95](https://scholarworks.gsu.edu/sociology_theses/95).
- Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Coaches and Scouts. Retrieved March 19, 2021, from <https://www.bls.gov/ooh/entertainment-and-sports/coaches-and-scouts.htm>.
- Camenker, J. (2021, October 3). *The TB12 drama, explained: Inside Bill Belichick's feud with Tom Brader trainer Alex Guerrero*. <https://www.sportingnews.com/us/nfl/news/bill-belichick-tom-brady-trainer-alex-guerrero-tb12/arj5nxml4hss1smit98d8854b>.
- Cruickshank, A., & Collins, D. (2012). Culture change in elite sport performance teams: Examining and advancing effectiveness in the new era. *Journal of Applied Sport Psychology*, 24(3), 338–355. <https://doi.org/10.1080/10413200.2011.650819>.
- Davis, P. G. (2005). Performance appraisal for coaches. Paper presented at the ICCE Coaching Conference Hong Kong, China.
- Durkee, P. (2018). *How to be a champion encourager*. Independent.
- Fletcher, D., & Arnold, R. (2011). A qualitative study of performance leadership and management in elite sport. *Journal of Applied Sport Psychology*, 23(2), 223–242. <https://doi.org/10.1080/10413200.2011.559184>.
- Fletcher, D., Rumbold, J. L., Tester, R., & Coombes, M. S. (2011). Sport psychologists' experiences of organizational stressors. *The Sport Psychologist*, 25(3), 363–381. <https://doi.org/10.1123/tsp.25.3.363>.
- Fowle, F. (2017). Prospects for a Sports Ombudsman in Canada. *Laws*, 6(1), 5. <https://doi.org/10.3390/laws6010005>.
- Friesen, A., & Orlick, T. (2011). Holistic sport psychology: Investigating the roles, operating standards, and intervention goals and strategies of holistic consultants. *Journal of Excellence*, 14(1), 18–42.
- FSU COACH (2021, March 1). *Interview with Joanne P. McCallie, former head coach, women's basketball, Duke University*. <https://www.youtube.com/watch?v=Vi-oohue0Qo>.
- Guerber, H. A. (1896). The story of the Romans. Pantianos Classics.
- Kyllonen, P. (2013). Soft skills for the workplace. *Change*, 45(6), 16–23. <https://doi.org/10.1080/00091383.2013.841516>.
- Livy (1971). *The early history of Rome*. Books I–V of the history of Rome from its foundation. Penguin Classics.
- Lyst, R. (2019). Coaching collegiate sports. In: T. Baghurst (Ed.), *Coaching for Sports Performance* (pp. 417–441). Routledge. <https://doi.org/10.4324/9780429299360-15>.
- Merriam-Webster (n.d.). *Consul*. <https://www.merriam-webster.com/dictionary/consul>.
- Pearson, R., Baghurst, T., & Mwavita, M. (2020). Stress and burnout experienced by intercollegiate swimming head coaches. *International Sport Coaching Journal*, 8, 72–78. <https://doi.org/10.1123/iscj.2019-0030>.
- Rodrigue, F., & Trudel, P. (2019). A “Personal Learning Coach” for high-performance coaches. In: B. Callary and B. Gearity (Eds.), *Coach education and development in sport* (pp. 140–153). Routledge. <https://doi.org/10.4324/9780429351037-12>.
- Shropshire, K. L., Davis, T., & Duru, N. J. (2016). *The business of sports agents*. University of Pennsylvania Press.
- SportsNet (n.d.). *Inside the Toronto Blue Jays' high performance department*. <https://www.sportsnet.ca/baseball/mlb/big-read-inside-toronto-blue-jays-high-performance-department/> (visited June 29, 2021).
- Statista (2023, November 13). *Estimated number of sport coaches, instructors and officials in the United Kingdom from 4th quarter 2021 to 2nd quarter 2023*. <https://www.statista.com/statistics/319316/number-of-sports-coaches-instructors-and-officials-in-the-uk/>.



Stewart, R. H. (2014). *Organizational silos within NCAA Division I athletic departments*. ProQuest Dissertations Publishing.

Wilson Jr., C. H. (2019). Coaching youth sports. In: T. Baghurst (Ed.), *Coaching for Sports Performance* (pp. 443–475). Routledge. <https://doi.org/10.4324/9780429299360-14>.

Zakrajsek, R. A., Abildso, C. G., Hurst, J. R., & Watson, J. C. (2007). The relationships among coaches' and athletes' perceptions of coaching staff cohesion, team cohesion, and performance. *The Online Journal of Sport Psychology*, 9(3), 1–14.



# Dog walking during the lockdown in the Covid-19 pandemic situation in the Czech Republic: a questionnaire survey

Kristýna Machová<sup>1</sup>, Štěpán Zítek<sup>1,\*</sup>, Klára Daňová<sup>2</sup>, Radka Procházková<sup>3</sup>

<sup>1</sup> Department of Ethology and Companion Animal Science, Faculty of Agrobiolgy, Food and Natural Resources, Czech University of Life Sciences, Prague, Czech Republic

<sup>2</sup> Department of Adapted Physical Education and Sports Medicine, Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

<sup>3</sup> Department of Statistics, Faculty of Economics and Management, Czech University of Life Sciences, Prague, Czech Republic

\* Corresponding author: ziteks@af.czu.cz

---

## ABSTRACT

This study aimed to compare the frequency, duration, and location of dog walking during and before the first Covid-19 lockdown (LD) and possible variable factors. The research team interviewed 504 adult Czech dog owners using an online questionnaire regarding their dog walking activity. During the LD in April 2020, the frequency of dog walking was significantly lower, and a single walk duration was significantly higher than before ( $p < 0.001$ ). The preference for locations also changed during the LD. Dog walking was considered beneficial for physical activity (PA) and daily rhythm. Factors related to dog walking frequency during the LD were age ( $p = 0.016$ ) and the length of working/studying hours ( $p < 0.001$ ). These factors were significant before and during the LD: the number of children ( $p < 0.001$ ), the number of household members ( $p = 0.044$ ), and the type of housing ( $p = 0.006$ ). This study brings a broad amount of data on current trends and changes in dog walking during the unprecedented lockdown, which might contribute to the organisation of public health or research methodology in future relatable situations.

## KEYWORDS

companion animal; physical activity; lockdown; public health; leisure

## DOI

10.14712/23366052.2023.8

## INTRODUCTION

The Covid-19 epidemiological situation caused many effects, such as unusual sadness, fear, frustration, helplessness, loneliness, and nervousness because of spatial distanc-

ing, self-isolation, quarantine, social and economic discord, and misinformation (Sakib et al., 2020; Shah et al., 2020). For many, the Covid-19 situation has represented tremendous psychological pressure, disturbance (Li et al., 2020; Wang et al., 2020), and mental distress (Khan et al., 2022).

Another change in this unfavourable epidemiological situation was the closure of workplaces and schools. People had to learn to work from home and still be helpful to the children in their education. This change was unprecedented, and home-schooling has significantly stressed families worldwide. As of 9 April 2020, families were educating 1.57 billion children without previous experience of protracted home-schooling (O'Sullivan et al., 2020).

Decreased overall physical and mental well-being while working from home was associated with changes in physical exercise, food intake, communication with co-workers, children at home, distractions while working, adjusted work hours, workstation set-up, and satisfaction with workspace indoor environmental factors (Xiao et al., 2021). On the other hand, a Swedish study has reported a positive outcome of working from home – increasing sleep time, which is beneficial. Interestingly, sedentary, standing, and moving behaviours did not change markedly when working from home compared to working at the office (Hallman et al., 2021).

Children, partners, and non-human family members engage in the daily routine. Some respondents reported obstacles like interruptions of video conferencing by the barking of dogs, unexpected snuggling of a cat and its interest in the computer monitor, or other distractions while working from home for various reasons (Delanoëije, 2020). On the one hand, contemporary literature aims at possible problems connected with pet ownership, e.g., the postponement of animal owners' testing caused by the anxiety of the animal staying alone (Applebaum, Adams et al., 2020) or an inability to provide the animal with sufficient movement, stimuli, social ties, and material stuff (Applebaum, Tomlinson et al., 2020). On the other, articles have been published describing that the presence of a pet and touching it may assist in promoting health and well-being when human contact is limited (Young et al., 2020). As Shoosmith et al., (2021) have reported, companion animals constitute a reliable source of support, providing unconditional love, affection, and companionship. Companion animals were frequently perceived as being able to enhance mood, reduce stress, and help participants to cope generally with the Covid-19 lockdown phase. The constant source of companionship appeared to ameliorate feelings of loneliness – particularly for those living alone or those who lived with workers who frequently worked outside of the home (Shoosmith et al., 2021).

In the same study, many participants commented that animal ownership encouraged and promoted physical activity (PA). Animals appeared to enhance mobility, increase exercise participation and promote contact with nature, especially for owners of dogs and horses. However, their study did not prove this phenomenon numerically or even statistically (Shoosmith et al., 2021).

Many previous studies have shown a positive influence of dog ownership on human PA and the extent of movement through dog walking (Coleman et al., 2008; Cutt et al., 2008; Ham & Epping, 2006; Hoerster et al., 2011). Numerous studies have proven that PA improves physical (Powell et al., 2011) and mental health (White et al., 2017). When all sports centres were closed, and sports could only be performed individually,

the increase in the length and frequency of walking seemed to be a good option for regular and much-needed physical activity. Furthermore, this could also be important for maintaining mental balance for many people.

Moreover, at the time of the lockdown (LD) and related restrictions, it was recommended that people go out in nature, and walking pets was one of the few activities allowed. Therefore, this study aimed to map whether the time spent walking dogs, the frequency of this activity, and the location of dog walks changed compared to the time before Covid-19. It was assumed that factors such as compulsory working from home, changes in working hours, and the number of people living in the household would increase the frequency and duration of dog walking time and influence the location of dog walking.

## **MATERIALS AND METHODS**

### **Participants**

There were 504 adults enrolled in this study. All the participants were dog owners. The study was conducted 29–36 days after starting the first LD declaration in the Czech Republic in the spring of 2020. The sample consisted of 448 women and 56 men. All the respondents were Czech, spending the lockdown (LD) in the Czech Republic.

The inclusion criteria included dog ownership, ability and willingness to complete the required online questionnaire, and permission to share required data through online informed consent. Demographic data of the whole group ( $N = 504$ ) are presented in Table 1.

At the time of the lockdown, almost half of the respondents stated that they worked or studied from home, 22.8% of respondents went to work or school as before the lockdown, and 11% worked alternately from home and their office (place of work). During the LD, 40% of respondents reported working 1–4 hours a day, 31.3% working 4–8 hours a day, 22.8% working 8–12 hours a day, and 5.6% stated that they worked more than 12 hours a day. 48.8% of respondents stated they worked less during the lockdown than before, while 15% of respondents claimed that they, conversely, worked more during the lockdown than before, and for 36% of respondents, the length of work hours did not change.

6% of respondents stated that their dog was in the age of a puppy (2–4 months), 17.9% of respondents had a junior dog (4 months to 1 year), 60.7% of respondents had an adult dog (1–7 years), and 16.1% owned a senior dog (> 7 years). 79.8% considered their dogs completely obedient, 12.7% did canine sports, and 7.5% found their dogs disobedient. 30.2% of respondents cared for the dog personally, whereas the remaining 70% shared care with other household members. This situation did not change.

### **General procedures**

Data were collected during one week in April 2020 in the Czech Republic. The questionnaire design was based on study hypotheses, which were formulated in such a way that allowed testing their validity through information gathered through the questionnaire. Before conducting the study, a pilot questionnaire was created to attest to the intelligibility and comprehensibility of the questionnaire (40 respondents were included in the pilot study). Based on the findings of the pilot questionnaire survey, partial

**Table 1** Summary of the demographic data obtained in the questionnaire

| Demographic category                      |                                      | n   | %     |
|---|--------------------------------------|-----|-------|
| Gender                                    | Male                                 | 56  | 11.11 |
|   | Female                               | 448 | 88.88 |
| Age category                              | 20–29 years                          | 264 | 52.38 |
|   | 30–44 years                          | 150 | 29.76 |
|   | 45–60 years                          | 264 | 52.38 |
| Size of a place of residence (population) | Village                              | 171 | 34.00 |
|   | Town (less than 1000 inhabitants)    | 10  | 2.00  |
|   | Town (1000–29000 inhabitants)        | 131 | 26.60 |
|   | Town (30 000–100 000 inhabitants)    | 50  | 10.00 |
| Residence type                            | City (more than 100 000 inhabitants) | 133 | 26.40 |
|   | Apartment                            | 224 | 44.40 |
| Household composition                     | Family house                         | 280 | 55.50 |
|   | Living with spouse and children      | 252 | 50.00 |
|   | Living with parents                  | 176 | 35.00 |
|   | Living alone                         | 57  | 11.30 |
| Number of children                        | Other (with roommates, siblings)     | 161 | 3.20  |
|   | None                                 | 341 | 67.70 |
|   | One                                  | 67  | 13.30 |
|   | Two                                  | 126 | 25.00 |
|   | Three                                | 16  | 3.20  |
| Number of people in a shared household    | Four                                 | 3   | 0.60  |
|   | One person                           | 185 | 36.70 |
|   | Two people                           | 111 | 22.00 |
|   | Three people                         | 91  | 18.00 |
|   | Four people                          | 31  | 6.20  |
| Employment type                           | Five people                          | 35  | 6.90  |
|   | Full-time contract                   | 307 | 61.00 |
|   | Part-time contract                   | 71  | 14.00 |
|   | Students without employment          | 85  | 16.80 |
|   | Unemployed or retired                | 23  | 4.50  |

adjustments to questions and answers were made. Participants signed informed consent (data anonymity, consent to use, process, and store the data). The questionnaire was filled in and distributed via social networks due to restrictions on social contact. Unfortunately, this fact affected the age structure of the respondents. The time provid-

ed for completing the questionnaire was 10 minutes, so the respondents had enough time to review all questions. Incomplete questionnaires were not sent for evaluation.

At the beginning of the online questionnaire, the study was presented, and information was provided that by continuing to fill in the questionnaire, informed consent was provided for the use of the obtained data for a scientific publication. The data set is securely stored in a locked box at the Czech University of Life Sciences. The testing procedures described herein were carried out according to the ethical standards of the Ethical Committee of Lincoln University, UK, and the Declaration of Helsinki, as the latest amendment. The study was approved by the Institutional Review Board of the Czech University of Life Sciences (CULS) in Prague, and all experiments were performed under relevant guidelines and regulations.

### **Questionnaire**

The questionnaire contained a set of 42 questions. Respondents provided demographic data, such as age, gender, nationality, and population size, in the place of permanent residence. Further, the respondents stated whether they lived in a family house or an apartment, whether they had children (and how many), and with whom they shared a household (the number of people). Respondents also answered questions concerning their dogs. Among other things, they stated its age and subjective level of training and evaluated its character. Some questions focused on the work or study. Respondents answered whether they worked full-time or part-time, were unemployed, or were students. Further, the questions focused on the work contract intensity and the possibility of working from home or home-schooling in the case of students.

The second part of the questionnaire was focused on dog walking. The respondents stated the frequency and duration of dog-walking at the time and before the LD. They specified a location of dog walking before and during the LD, whether they walked alone or with someone from their household. Also, they described who took care of the dog before and during the LD. Respondents also described their personal gain from walking the dog outside and, on the contrary, their concerns. Within their answers, they also assessed the perceived value of the dog at the time of LD.

All the questions were related to the particular respondent and the information about the frequency or length of dog walking they perform daily, not the frequency and length of the dog's daily walks.

### **Data analysis**

In addition to descriptive statistics, selected methods of statistical induction were also used to analyse the primary data. Before the statistical analysis, exploratory data analysis was executed to verify assumptions for subsequent statistical processing (which were the independence or dependence of the samples, homogeneity, and normality of the distribution).

The Wilcoxon non-parametric test of two independent samples was performed to assess and verify the statistically significant changes in the frequency and duration of dog walking before and during the LD. This was due to the discontinuity of the examined statistical feature and its ordinal character.

The significance of the presumed factors affecting the frequency and duration of dog walking before and during the LD was tested with contingency tables using

Pearson's  $\chi^2$ -test ("chi-square test"). In some cases, it was necessary to merge adjacent categories with regard to meeting the conditions for utilising the  $\chi^2$ -test (see different DF). If the qualitative characteristics' statistically significant correlation was demonstrated, this dependency's strength was evaluated based on Pearson's contingency coefficient (C).

Statistical significance was set at  $p < 0.05$ . The statistical analysis results were visualised using box plots and frequency graphs. All data were analysed using STATISTICA (StatSoft, Tulsa, USA, version 13.5.017).

## RESULTS

### The frequency of dog walking before and during the lockdown

The results showed that during the lockdown (LD), the frequency of dog walking was significantly lower than the frequency of dog walking before the LD ( $p < 0.001$ ) (see Fig 1). The highest frequency of dog walking before LD was stated as three times (32.5% of respondents) and four times a day (31.1%) before the LD. At the time of the lockdown, 62.1% of respondents stated that they walked the dog only once a day (compared to 16.4% of respondents before the LD), and 32.9% of respondents walked the dog four times a day (see Table 2). The results show that there was a reduced frequency of walking in most cases.

**Table 2** Frequency of walking the dog before and during the lockdown (N = 504)

| Dog walking frequency | before LD |      | during LD |      |
|-----------------------|-----------|------|-----------|------|
|                       | N         | %    | N         | %    |
| 0                     | 19        | 3.7  | 23        | 4.5  |
| 1                     | 83        | 16.5 | 313       | 62.1 |
| 2                     | 81        | 16.1 | 1         | 0.2  |
| 3                     | 164       | 32.5 | 1         | 0.2  |
| 4                     | 157       | 31.2 | 166       | 32.9 |

In 40.9% of respondents, the frequency of walking the dog did not change. In 11,5% of respondents, there was an increase in the frequency of dog walking. In 47.6%, the frequency of dog walking decreased. An increase of one dog walk per day was noted in 7.3% of respondents; a further higher increase occurred only minimally. On the other hand, a decrease of one dog walk per day was recorded in 15.7%, by two dog walks per day in 26.2% of respondents, and by three dog walks per day in 7.1% of respondents.

### The duration of an average single dog walk before and during the lockdown

On the contrary, the average dog walking time increased during the LD ( $p < 0.001$ ). Of the options offered, the most frequently stated duration of a dog walk before the LD was 30 minutes (29.5%), 60 minutes (23.2%), and 20 minutes (22.2%). At the time of the LD, 25.6% of respondents claimed they were occupied with dog walking for 30 minutes, 25.4% for 60 minutes, and 21.2% for 90 minutes (Fig. 2). The most sig-



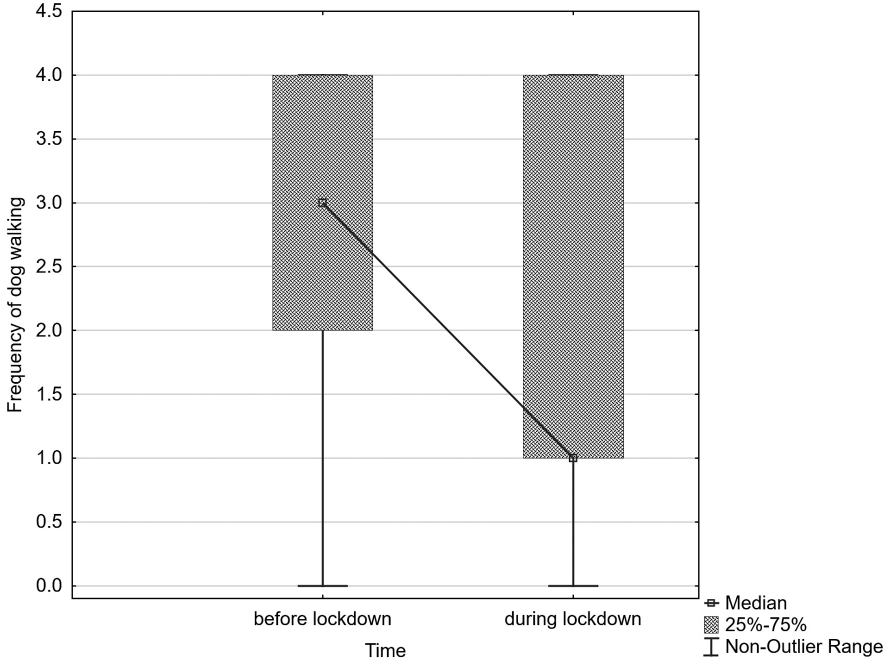


Figure 1 Boxplot comparing the frequency of dog walking before and during the lockdown

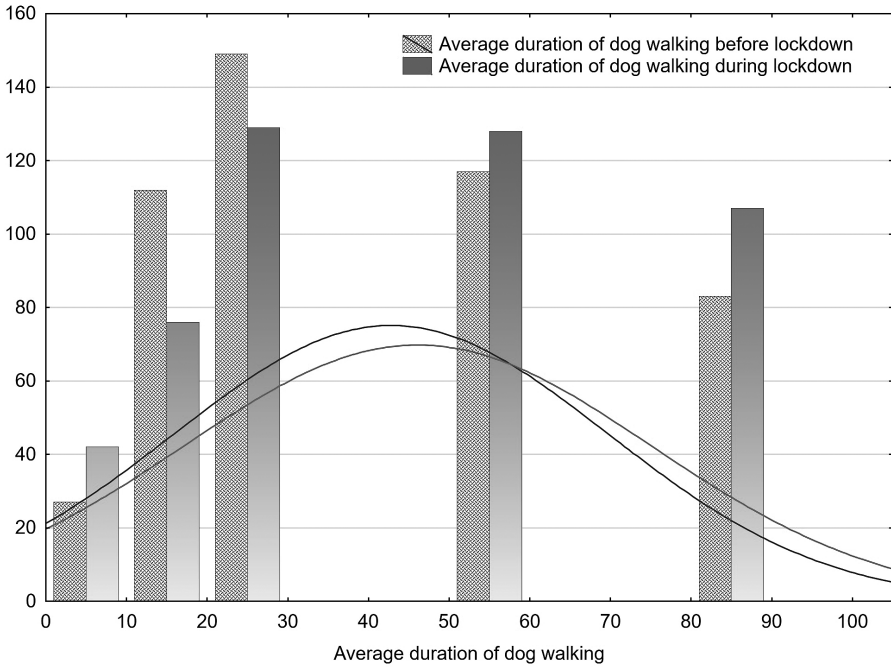


Figure 2 Histogram of average duration of dog walking, categorised by Time

nificant changes in the duration of dog walking were an increase of 30 minutes per 1 dog walk in 14% of respondents and by 10 minutes in 5.7% of respondents. Conversely, a decrease of 30 minutes was observed in 4.5% of respondents, and a decrease of 10 minutes was observed in 4.5%. In general, the duration of dog walking increased in 26.8% of respondents and decreased in 16.7%. For 57.5% of respondents, the duration of dog walking did not change.

### **The place of dog walking before and during the lockdown**

Before the LD, 15.9% of respondents walked their dogs on the streets in front of their houses, 31% of respondents walked their dogs in a park, 25% in a forest, and 26.5% in a meadow. 1.5% of respondents walked their dogs in their gardens.

At the time of the lockdown, respondents walked their dogs less in parks (18.9%) and, on the contrary, more in a forest (31.06%). 20% of respondents walked their dogs in a meadow. The number of respondents who walked the dog in their garden increased to 5.3%. During LD, 24.2% walked their dogs on the streets in front of their house. The most significant change, therefore, occurred precisely in the increase of dog walking in the immediate vicinity. This means compliance with restrictive measures when regulations impose movement in the immediate vicinity. This finding is interesting, given the increased length of individual walks. So, it seems the respondents moved outside for an extended period but to the nearest location.

### **Perception of the importance of dog walking during LD**

When assessing the personal value of the dog to the respondent before the LD, 96% chose values 4 (10.1%) and 5 (86.7%) on a 1–5-point scale, where 1 represented the lowest and 5 the highest importance. During the LD, a value of 5 was chosen by 88.8% of respondents. The respondents claimed that their dogs' presence provided them with distraction (5–43.7%) and social contact (5–30.5%) and reduced the feeling of loneliness (5–40.5%). By contrast, they stated much less often that the dog reduced their potential feelings of anxiety (5–17.5%) or sadness (5–20.6%). The lowest effect of the dog's presence on the feeling of anxiety was reported by 26.6% of respondents, and the feeling of sadness was reported by 28%. 81.5% of respondents stated they did not feel worried about getting infected with Covid-19 while walking the dog.

When assessing whether the possibility of taking the dog out allows them to take a break from work/classes at home, 31.3% of respondents selected the highest value 5, and 14.6%, the value 4 on a 1–5-point scale. 22.8% of respondents chose the lowest rating of 1 point. Most respondents (37.9%) evaluated walking the dog as a means to get some space from the other household members as the lowest point. 26% of respondents rated this item 4 or 5 points.

To the respondents, the opportunity to get some physical activity on the walks seemed to be the most significant benefit of dog walking. The highest value was rated by 53% of respondents and 4 points by 10% of respondents. 28% of respondents selected the value 3, while the values 1 and 2 were chosen by 8.9%. This was also connected to the possibility of maintaining a regular daily rhythm. In this case, value 5 was rated by 36.9% of respondents, value 4 by another 14.5%, value 3 was selected by 29.6%, and value 1 was chosen by 7.1%.

## Factors influencing the frequency and duration of dog walking before and during the LD

### *The factors of dog walking frequency-age category*

The age of respondents turned out to be an essential factor influencing the frequency of dog walking during the LD ( $p = 0.016$ ), which did not seem significant before ( $p = 0.232$ ). A detailed percentage representation of individual walking frequencies in different age categories before and during LD can be found in Table 3.

**Table 3** The relation between the age category of dog owners and the frequency of dog walking before and during the LD

| Dog walking frequency |   | Age category 20–29 |           | Age category 30–44 |           | Age category 45–65 |           | All categories 20–65 |           |
|-----------------------|---|--------------------|-----------|--------------------|-----------|--------------------|-----------|----------------------|-----------|
|                       |   | Before LD          | During LD | Before LD          | During LD | Before LD          | During LD | Before LD            | During LD |
| 0                     | n | 7                  | 7         | 8                  | 10        | 4                  | 6         | 19                   | 23        |
|                       | % | 2.65%              | 2.66%     | 5.33%              | 6.67%     | 4.44%              | 6.67%     | 3.77%                | 4.56%     |
| 1                     | n | 47                 | 177       | 26                 | 92        | 10                 | 44        | 83                   | 313       |
|                       | % | 17.80%             | 67.05%    | 17.33%             | 61.33%    | 11.11%             | 48.89%    | 16.47%               | 62.10%    |
| 2                     | n | 404                | 0         | 26                 | 1         | 15                 | 0         | 81                   | 1         |
|                       | % | 15.15%             | 00.00%    | 17.33%             | 0.67%     | 16.67%             | 00.00%    | 16.07%               | 0.20%     |
| 3                     | n | 93                 | 1         | 48                 | 0         | 23                 | 0         | 164                  | 1         |
|                       | % | 35.23%             | 0.38%     | 32%                | 00.00%    | 25.56%             | 00.00%    | 32.54%               | 0.20%     |
| 4                     | n | 77                 | 79        | 42                 | 47        | 38                 | 40        | 157                  | 166       |
|                       | % | 29.17%             | 29.92%    | 28%                | 31.33%    | 42.22%             | 44.44%    | 31.15%               | 32.94%    |
| Total n               |   | 264                | 264       | 150                | 150       | 90                 | 90        | 504                  | 504       |

### *The factors of dog walking frequency-the length of working hours or school hours*

The length of working hours or school hours was, too, a significant factor at the time of the pandemic ( $p < 0.001$ ), which was not significant before ( $p = 0.367$ ). The respondents who worked or studied a maximum of 4 hours a day most often walked dogs before the LD three times a day (29.56%), and 16.75% of respondents walked dogs once a day. At the time of the LD, 67.92% of these respondents walked dogs once daily and 25.16% at least twice daily, respectively.

Among the people working or studying 4–8 hours a day, they, before the LD, mostly walked the dog three times a day (34.81%), four times a day (24.05%), and once a day (19.6%). At the time of the LD, 72.39% of respondents walked dogs once daily, and 26.99% walked twice or more often.

The respondents working or studying 8–12 hours a day most often walked dogs three times a day (37.39%) before the LD; four dog walks a day were taken by 31.3% of respondents. Conversely, 10.71% of respondents in this group walked dogs once a day. A significant difference occurred during the LD when 17.71% of respondents

walked dogs once a day and 77.08% of respondents walked dogs twice or more often, contrasting with other groups working or studying fewer hours daily.

### ***The factors of dog walking frequency-household type and the population in the place of permanent residence***

A significant factor before and during the lockdown was whether the respondent lived in a house or an apartment ( $p = 0.006$ ). This factor was significant even before the LD ( $p < 0.001$ ). The same phenomenon was also observed regarding the number of children in the family. This, too, was significant before the LD ( $p < 0.001$ ), just as during the LD ( $p < 0.001$ ). A similar situation was also noted for the number of people in a shared household (before the LD  $p = 0.002$ ; during the LD  $p = 0.044$ ).

On the other hand, the size of the population in the place of permanent residence was significant before the LD ( $p < 0.001$ ) but was not significant during the LD ( $p = 0.267$ ). Before the LD, 24.71% of respondents living in towns with fewer than 1000 inhabitants walked dogs once a day, while only 8.25% of respondents from cities with more than 100,000 inhabitants did. At the time of the LD, one dog walking a day was taken by 59.14% of respondents from smaller towns (< 1000 inhabitants) and by 63.91% of respondents from large cities (> 100 000 inhabitants). Three dog walks a day were taken by 18.39% of residents of smaller towns and by 54.98% of residents from large cities. 29% of small towns' and large cities' residents walked dogs four times a day. Then, at the time of the LD, 33.34% of small-town residents and 34.59% of large-city residents walked dogs more than twice daily.

The same was accurate when it came to with whom the respondents shared a household, which was a significant factor before the LD ( $p = 0.002$ ) but was no longer significant during the LD ( $p = 0.561$ ).

People who were living alone mostly walked their dogs four times a day (28.22%). Slightly less (27.6%) were those who did it once a day and the same those who walked it twice (27.6%), followed by three times a day (15.95%).

People who lived with their parents or siblings walked dogs once daily (6.6%) and most often walked dogs thrice (56.95%). On the contrary, the people who shared a household with their partner walked dogs the most often, i.e., four times a day (51.05%). At the time of the LD, all respondents walked dogs more or less similarly often – approximately 60% from all groups (living alone, living with parents or siblings, living with partners) walked dogs once a day.

Table 4 summarises significant and non-significant factors concerning the frequency of dog walking before and during the LD.

### ***The factors of dog walk duration***

As described in Table 5, factors that affected the duration of dog walking time in the LD were the size of the population in the place of permanent residence ( $p = 0.009$ ) and whether the respondent lived in a house or an apartment ( $p < 0.001$ ). These factors influenced the duration of dog walking time even before the LD, with  $p < 0.001$  in both cases. The respondent's age was shown to be a significant factor only before the LD ( $p = 0.034$ ) but did not affect the duration of dog walking in the LD ( $p = 0.326$ ).

**Table 4** The factors influencing the frequency of dog walking before and during the LD

| Considered factors  | Before the lockdown |    |       | During the lockdown |    |       |
|---|---------------------|----|-------|---------------------|----|-------|
|   | p                   | DF | C     | p                   | DF | C     |
| 15. Age group   | 0.232               | 8  | x     | <b>0.016</b>        | 4  | 0.154 |
| 16. Gender  | 0.568               | 4  | x     | 0.631               | 2  | x     |
| 17. Size of the population in their place of permanent residence                    | <b>&lt; 0.001</b>   | 8  | 0.349 | 0.267               | 6  | x     |
| 18. Living in a house or a flat   | <b>&lt; 0.001</b>   | 4  | 0.420 | <b>0.006</b>        | 2  | 0.141 |
| 19. Number of children  | <b>&lt; 0.001</b>   | 12 | 0.708 | <b>&lt; 0.001</b>   | 6  | 0.581 |
| 20. With whom they shared a household   | <b>&lt; 0.001</b>   | 8  | 0.486 | 0.561               | 4  | x     |
| 21. Number of people in a shared household  | <b>0.002</b>        | 15 | 0.255 | <b>0.044</b>        | 8  | 0.175 |
| 25. Length of working hours or school hours   | 0.367               | 12 | x     | <b>&lt; 0.001</b>   | 6  | 0.439 |
| 26. How their working habits changed during the lockdown compared to a normal state | 0.677               | 8  | x     | 0.868               | 4  | x     |

**Table 5** The factors influencing the duration of dog walking before and during the LD

| Considered factors   | Before the lockdown |    |       | During the lockdown |    |       |
|--|---------------------|----|-------|---------------------|----|-------|
|  | p                   | DF | C     | p                   | DF | C     |
| 15. Age group  | <b>0.034</b>        | 10 | 0.193 | 0.326               | 10 | x     |
| 16. Gender   | 0.129               | 5  | x     | 0.371               | 5  | x     |
| 17. Size of the population in their place of permanent residence – city or village | <b>&lt; 0.001</b>   | 15 | 0.273 | <b>0.009</b>        | 12 | 0.224 |
| 18. Living in a house or a flat  | <b>&lt; 0.001</b>   | 5  | 0.213 | <b>&lt; 0.001</b>   | 5  | 0.295 |
| 20. With whom they shared a household  | 0.620               | 8  | x     | 0.945               | 8  | x     |
| 21. Number of people in a shared household   | 0.670               | 16 | x     | 0.934               | 20 | x     |
| 24. Type of working time   | 0.788               | 12 | x     | 0.422               | 15 | x     |
| 25. How many hours a day they worked or studied                                    | 0.794               | 15 | x     | 0.471               | 15 | x     |
| 26. How their working habits changed during the lockdown compared to a state       | 0.676               | 10 | x     | 0.159               | 10 | x     |

In the age group of 20–29 years, respondents most often walked dogs for 30 minutes (35.23%). Further, 21.21% of respondents walked dogs for one hour before the LD. Contrarily, at the time of the LD, the number of respondents who walked dogs for 30 minutes decreased (27.65%), while the number of people who walked their dogs for 60 minutes increased (26.52%). In the category of people who were 30–44 years old, respondents most often walked dogs for 20 minutes a day (29.33%), and the second most stated time length was 60 minutes (24%) before the LD. During the LD, the dog walking most often took 60 minutes (22.67%), and the second most reported

value was 90 minutes (21.33%). In the group of 45–65-year-old respondents, 60 minutes was the most frequently stated length of dog walking time (27.78%) before the LD, which did not differ significantly during the LD (26.67%). The second most reported time was 30 minutes (26.67%) before the LD, which became the most often reported time length during the LD (28.89%). Interestingly, of the groups examined, this was the group of respondents that walked dogs for 90 minutes the most often (18.89%), and even at the time of the LD, this remained very common (20%). These results are visualised in Table 6.

**Table 6** The duration of dog walking before and during the LD sorted by age categories

| Age of respondents         | 20–29     |           | 30–44     |           | 45–65     |           |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                            | Before LD | During LD | Before LD | During LD | Before LD | During LD |
| <b>Minutes per walking</b> |           |           |           |           |           |           |
| 10                         | 6.44      | 8.71      | 4.67      | 10.00     | 3.33      | 4.44      |
| 20                         | 19.32     | 12.50     | 29.33     | 19.33     | 18.89     | 15.56     |
| 30                         | 35.23     | 27.65     | 21.33     | 20.00     | 26.67     | 28.89     |
| 60                         | 21.21     | 26.52     | 24.00     | 22.67     | 27.78     | 26.67     |
| 90                         | 16.29     | 21.59     | 15.33     | 21.33     | 18.89     | 20.00     |

## DISCUSSION

Previous studies about dog ownership during Covid-19 focused mainly on psychological factors (i.e., pets as support for a human in quarantine) and dog well-being. This study aimed to determine if the frequency, time, and place of dog walking in the lockdown (LD) changed compared to before the Covid-19 pandemic restrictions. This information is vital in the context of globally decreased physical activity and the overall health of humans and dogs. We also looked for factors influencing dog walking behaviour in the LD situation.

The main finding of our study is that dog walking behaviour changed during the LD – the frequency of walks was significantly lower, and the duration was significantly higher. In our study, respondents most often walked the dog three times per day before the LD, and most respondents walked it only once a day during the LD. The study of (Bowen et al., 2020), describing the influence of the lockdown in Spain on humans, pets, and their relationships, also presented a decrease in dog walking frequency, though non-significant. Before the LD, dogs went on an average of 3 walks per day (SD = 1.14) compared to 2.5 walks per day during the LD (SD = 1.19). This is significantly more than at the time of the LD in the Czech Republic. In the study of (Owczarczak-Garstecka et al., 2021), a decrease in the dog walking frequency was also observed, in this case significant. Their study evaluated the number of walks per week, where the number changed from 10 to 7 walks per week, and it is possible to consider that it was one walk each day. Also, the results of the study of (Christley et al., 2021) showed that during the LD, dogs were typically walked less often and for

shorter time daily, with factors related to the dog, owner, household, and location of the home being associated with the extent to which dog walking had been reduced.

The authors of some studies state that dog owners in the pre-Covid-19 pandemic times had more physical activity than people who did not have a dog. The reason for higher physical activity was walking the dog (Brown & Rhodes, 2006; Coleman et al., 2008; Cutt, Giles-Corti, & Knuiiman, 2008; Garcia et al., 2015). In future studies, it would be appropriate to measure physical activity using, for example, the IPAQ questionnaire or an accelerometer and compare its volume before the pandemic and during the lockdown in a group of dog owners. This would make it possible to evaluate how the increase in the length of individual walks, but their lower frequency, was reflected in this variable. It would also be possible to compare the physical activity of dog owners and people who do not own dogs and find out whether the higher physical activity of dog owners lasted even during the lockdown. Another exciting finding would be how this might affect the welfare of dogs.

Interestingly, although half of the respondents in our study worked less during the LD than before, the frequency of walks did not increase, as might be expected, due to sufficient free time and the possibility of getting some fresh air, but on the contrary, it decreased. As 81.5% of respondents stated they did not feel worried about getting infected with Covid-19 while walking the dog, this reduction in the frequency of going out seems to reflect respect for the measures in place with an emphasis on the maximum limit of outdoor time. In many cases, the most common frequency was one walk per day. On the other hand, respondents who worked 8–12 hours a day very often walked their dogs 4 times a day, and the frequency of their dog walks did not change during the LD. Regarding age, it is also interesting that the highest frequency of dog walks remained unchanged in the age category of 20–30 years; in the other categories, it even increased.

In the study of (Bowen et al., 2020), the authors reported a reduced duration of dog walks, contrary to our results. However, it is not easy to compare the results of their study with the results obtained by us because, in their study, the total time the dog spends outside in one day is taken into account, while in our study, it was the time devoted to one walk. Another possible difference is whether the research focused on the dog's time walking (Owczarczak-Garstecka et al., 2021). In such a case, several people can go out with one dog. Our study was about the time and frequency of dog walking carried out by the given respondent.

Nevertheless, it is evident that in the study of (Bowen et al., 2020), there was an almost sevenfold increase in walking time of fewer than 30 minutes a day (before the LD – 7.9%; during the LD – 49.7%). In the study of (Owczarczak-Garstecka et al., 2021), a comparison of dog walking duration before and during the pandemic LD revealed no overall change ( $p = 0.41$ ; median of 420 min per week). Interestingly, longer walk duration included owners aged 30–50 ( $p = 0.001$ ) and over 50 ( $p = 0.03$ ) compared to younger ones. In our study, the age factor was significant at the time before the LD but was no longer significant at the time of the LD.

In addition to the abovementioned working hours, factors that influenced the frequency of walking were whether the respondent lived in a house or an apartment and the number of people with whom they shared a household. These factors were signif-

icant both during and before the LD, which is in agreement with some other authors (Cutt et al., 2008; Richards, 2015; Westgarth et al., 2016).

The study by (Owczarczak-Garstecka et al., 2021) reports that the weekly frequency of dog walks during the LD was significantly reduced for owners living alone ( $p = 0.04$ ) and those living with others ( $p = 0.009$ ); in our study, this was not the case.

On the other hand, we found that at the time of the LD, the age of the respondents became a significant factor. However, the size of the population in their place of residence lost its significance. It is often stated in the literature that there is a difference in the frequency of walking according to the size of the population in the place of permanent residence (Koohsari et al., 2020). However, no difference associated with this factor was observed during the LD.

Our study also focused on the feelings associated with dog walking. The most significant findings could be the claims that dogs' presence provided respondents with distraction and social contact and reduced the feeling of loneliness. By contrast, they did not rate highly the statements about reducing their potential feelings of anxiety or sadness. In a study by (Ratschen et al., 2020), animal ownership compared with non-ownership was associated with smaller decreases in mental health and smaller increases in loneliness during the lockdown. These authors state that animal ownership seemed to mitigate some detrimental psychological effects of the Covid-19 lockdown.

In the abovementioned study, 96.4% of subjects agreed with the statement, "My animal keeps me fit and active in the Covid-19 situation". This concurs with the statement that was part of our study's interview. Also, it is an essential point for decreased PA, seen worldwide due to the pandemic. Getting some physical activity on the walks seemed to be the most significant benefit of dog walking. The highest value was rated by 53% of respondents and 4 points by 10% of respondents. 28% of respondents selected the middle value 3, while values 1 and 2 were chosen by 8.9%.

This was also connected to the possibility of maintaining a regular daily rhythm. A fact that is mentioned in other studies (Owczarczak-Garstecka et al., 2021) is that dog walking helps to maintain a regular order of the day. It is essential at a time when many people had to change their stereotypical schedule of the day entirely and suddenly had to create a new schedule when it was, in many cases, no longer necessary for them to come to work at a specified time.

Our results, as well as the results of other studies, show a significant change in dog walking trends. It would be interesting to find out whether the frequency and duration of dog walking after the end of the lockdown returned to the state before the Covid-19 pandemic. The time spent walking dogs contributes to the recommended daily activity and thus contributes to the overall health of dog owners. It is, therefore, necessary to map the current situation and possibly motivate and support dog owners to return to healthy rituals.

## LIMITATIONS

The fact that the study was conducted through an online questionnaire survey when there was an effort to eliminate all possible personal contact caused differences in the age representation. However, the questionnaire was filled in upon social media contact, and its completion was voluntary and based on the respondents' interest.



Another limitation is that our sample consisted predominantly of female respondents, which could bring some bias. However, researchers commonly get most answers from females in many studies using questionnaires about animal-human interaction (Shoemsmith et al., 2021).

Also, the sample size of the respondents is smaller, and it is, therefore, difficult to generalise the answers obtained. The obtained answers are thus valid for the group of respondents we examined. Another limitation is the submitted statements, from which the respondents could choose and to which they assigned values. The results might also differ if another wording had been chosen or left up to the responders. However, this is not possible due to the evaluation of respondents' answers and the quantification of data. In a future study, it might help to allow the respondents to indicate the exact time spent by dog walking rather than create approximate categories from which the respondent has to choose. A daily or weekly summary was used in different studies, while in our case, we recorded the average time of each walk. Future studies might also aim to incorporate objective measurements of walks, such as accelerometers or pedometers, which would provide additional information on the distance or intensity of the walk.

The other variable factors, like the intensity of the terrain, weather, and interactions with other people during the activity, had to be neglected in this study.

In addition to the information such as the age of the dog and its sports activities, gathering information on the breed of affiliation to an FCI group might also be interesting, as it could be one of the potential factors influencing the dog walking trends.

## CONCLUSIONS

During the lockdown in the course of the Covid-19 pandemic, the frequency of dog walking decreased, and its duration increased. Factors associated with the dog walking frequency, such as age category or working time length, became newly significant. On the other hand, the size of the population in the place of permanent residence and with whom the respondents shared a household lost significance. The factors influencing the duration of dog walks before the lockdown were the respondents' age, the population's size at the place of permanent residence, and whether they lived in a house or an apartment. However, the age factor lost significance during the lockdown, and the other two factors remained significant.

This study brings a broad amount of data on current trends and changes in dog walking during the unprecedented lockdown, which might contribute to the organisation of public health or research methodology in future relatable situations. According to the respondents, dog walking motivated them to do the recommended daily activity and thus helped them maintain physical well-being. Also, the animal presence provided distraction and social contact and reduced their loneliness. These results imply that it might be essential to map the current situation to motivate and support dog owners to reintroduce healthy rituals into their lives.

For future studies, the authors recommend gathering data on the physical intensity of the walks while working with homogenous groups and exploring the individual factors mentioned above in more detail.

## ACKNOWLEDGEMENTS

### Declaration of Interest statement

The author(s) declare no competing interests.

### Data availability

Data are available on request.

### Ethical statement

The Czech University of Life Sciences Prague Ethics Committee approved the study.

## REFERENCES

- Applebaum, J. W., Adams, B. L., Eliasson, M. N., Zsembik, B. A., & McDonald, S. E. (2020). How pets factor into healthcare decisions for Covid-19: A One Health perspective. *One Health, 11*, 100176. <https://doi.org/10.1016/j.onehlt.2020.100176>.
- Applebaum, J. W., Tomlinson, C. A., Matijczak, A., McDonald, S. E., & Zsembik, B. A. (2020). The concerns, difficulties, and stressors of caring for pets during Covid-19: Results from a large survey of US pet owners. *Animals, 10*(10), 1882. <https://doi.org/10.3390/ani10101882>.
- Bowen, J., García, E., Darder, P., Argüelles, J., & Fatjó, J. (2020). The effects of the Spanish Covid-19 lockdown on people, their pets, and the human-animal bond. *Journal of Veterinary Behavior, 40*, 75–91. <https://doi.org/10.1016/j.jveb.2020.05.013>.
- Coleman, K. J., Rosenberg, D. E., Conway, T. L., Sallis, J. F., Saelens, B. E., Frank, L. D., & Cain, K. (2008). Physical activity, weight status, and neighborhood characteristics of dog walkers. *Preventive Medicine, 47*(3), 309–312. <https://doi.org/10.1016/j.ypmed.2008.05.007>.
- Cutt, H., Giles-Corti, B., Knuiman, M., Timperio, A., & Bull, F. (2008). Understanding dog owners' increased levels of physical activity: Results from RESIDE. *American Journal of Public Health, 98*(1), 66–69. <https://doi.org/10.2105/AJPH.2006.103499>.
- Delanoëije, J. (2020). Furry families in times of Covid-19: Cats and dogs at the home-office. *The Work-Life Balance Bulletin: A DOP Publication, 4*(1), 16–20.
- Hallman, D. M., Januario, L. B., Mathiassen, S. E., Heiden, M., Svensson, S., & Bergström, G. (2021). Working from home during the Covid-19 outbreak in Sweden: Effects on 24-h time-use in office workers. *BMC public health, 21*(1), 1–10. <https://doi.org/10.1186/s12889-021-10582-6>.
- Ham, S. A., & Epping, J. (2006). Dog Walking and Physical Activity in the United States. *Preventing Chronic Disease, 3*(2), A47.
- Hoerster, K. D., Mayer, J. A., Sallis, J. F., Pizzi, N., Talley, S., Pichon, L. C., & Butler, D. A. (2011). Dog walking: Its association with physical activity guideline adherence and its correlates. *Preventive Medicine, 52*(1), 33–38. <https://doi.org/10.1016/j.ypmed.2010.10.011>.
- Christley, R. M., Murray, J. K., Anderson, K. L., Buckland, E. L., Casey, R. A., Harvey, N. D., Harris, L., Holland, K. E., McMillan, K. M., Mead, R., Owczarczak-Garstecka, S. C., & Upjohn, M. M. (2021). Impact of the First Covid-19 Lockdown on Management of Pet Dogs in the UK. *Animals, 11*(1), Article 1. <https://doi.org/10.3390/ani11010005>.
- Koohsari, M. J., Nakaya, T., McCormack, G. R., Shibata, A., Ishii, K., Yasunaga, A., Liao, Y., & Oka, K. (2020). Dog-walking in dense compact areas: The role of neighbourhood built environment. *Health & Place, 61*, 102242. <https://doi.org/10.1016/j.healthplace.2019.102242>.

- O'Sullivan, K., McGrane, A., Clark, S., & Marshall, K. (2020). Exploring the impact of home-schooling on the psychological well-being of Irish families during the novel coronavirus (Covid-19) pandemic: A qualitative study protocol. *International Journal of Qualitative Methods*, 19, 1609406920980954. <https://doi.org/10.1177/1609406920980954>.
- Owczarczak-Garstecka, S. C., Graham, T. M., Archer, D. C., & Westgarth, C. (2021). Dog Walking before and during the Covid-19 Pandemic Lockdown: Experiences of UK Dog Owners. *International Journal of Environmental Research and Public Health*, 18(12), Article 12. <https://doi.org/10.3390/ijerph18126315>.
- Powell, K. E., Paluch, A. E., & Blair, S. N. (2011). Physical activity for health: What kind? How much? How intense? On top of what? *Annual Review of Public Health*, 32, 349–365. <https://doi.org/10.1146/annurev-publhealth-031210-101151>.
- Ratschen, E., Shoesmith, E., Shahab, L., Silva, K., Kale, D., Toner, P., Reeve, C., & Mills, D. S. (2020). Human-animal relationships and interactions during the Covid-19 lockdown phase in the UK: Investigating links with mental health and loneliness. *PLOS ONE*, 15(9), e0239397. <https://doi.org/10.1371/journal.pone.0239397>.
- Richards, E. A. (2015). Prevalence of Dog Walking and Sociodemographic Characteristics of Dog Walkers in the U. S.: An Update from 2001. *American Journal of Health Behavior*, 39(4), 500–506. <https://doi.org/10.5993/AJHB.39.4.6>.
- Sakib, N., Bhuiyan, A. I., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A. H., Sarker, M. A., Mohiuddin, M. S., Rayhan, I., & Hossain, M. (2020). Psychometric validation of the Bangla Fear of Covid-19 Scale: Confirmatory factor analysis and Rasch analysis. *International Journal of Mental Health and Addiction*, 1–12. <https://doi.org/10.1007/s11469-020-00289-x>.
- Shah, K., Kamrai, D., Mekala, H., Mann, B., Desai, K., & Patel, R. S. (2020). Focus on mental health during the coronavirus (Covid-19) pandemic: Applying learnings from the past outbreaks. *Cureus*, 12(3). <https://doi.org/10.7759/cureus.7405>.
- Shoesmith, E., Shahab, L., Kale, D., Mills, D. S., Reeve, C., Toner, P., Santos de Assis, L., & Ratschen, E. (2021). The influence of human – animal interactions on mental and physical health during the first Covid-19 lockdown phase in the UK: A qualitative exploration. *International Journal of Environmental Research and Public Health*, 18(3), 976. <https://doi.org/10.3390/ijerph18030976>.
- Westgarth, C., Knuiman, M., & Christian, H. E. (2016). Understanding how dogs encourage and motivate walking: Cross-sectional findings from RESIDE. *BMC Public Health*, 16(1), 1019. <https://doi.org/10.1186/s12889-016-3660-2>.
- White, R. L., Babic, M. J., Parker, P. D., Lubans, D. R., Astell-Burt, T., & Lonsdale, C. (2017). Domain-specific physical activity and mental health: A meta-analysis. *American Journal of Preventive Medicine*, 52(5), 653–666. <https://doi.org/10.1016/j.amepre.2016.12.008>.
- Xiao, Y., Becerik-Gerber, B., Lucas, G., & Roll, S. C. (2021). Impacts of working from home during Covid-19 pandemic on physical and mental well-being of office workstation users. *Journal of Occupational and Environmental Medicine*, 63(3), 181. <https://doi.org/10.1097/JOM.0000000000002097>.
- Young, J., Pritchard, R., Nottle, C., & Banwell, H. (2020). Pets, touch, and Covid-19: Health benefits from non-human touch through times of stress. *Journal of Behavioral Economics for Policy*, 4(2), 25–33.

**ACTA UNIVERSITATIS CAROLINAE**  
**KINANTHROPOLOGICA, Vol. 59, 2 – 2023**

Published by Charles University,  
Karolinum Press, Ovocný trh 560/5, 116 36 Prague 1  
[www.karolinum.cz](http://www.karolinum.cz)  
Prague 2023

Typeset by Karolinum Press  
Printed by Karolinum Press

Address correspondence to the Faculty of Physical Education and Sports,  
Charles University, José Martího 31, 162 52 Prague 6 – Veleslavín, Czech Republic  
e-mail: [auc-k@ftvs.cuni.cz](mailto:auc-k@ftvs.cuni.cz)

Full text is available at:  
<http://www.karolinum.cz/journals/kinanthropologica>