





Article

# Stay Home, Stay Active with SuperJump<sup>®</sup>: A Home-Based Activity to Prevent Sedentary Lifestyle during COVID-19 Outbreak

Alice Iannaccone <sup>1</sup>, Andrea Fusco <sup>1</sup>, Salvador J. Jaime <sup>2</sup>, Sara Baldassano <sup>3</sup>, Jill Cooper <sup>4</sup>, Patrizia Proia <sup>4</sup> and Cristina Cortis <sup>1,\*</sup>

<sup>1</sup> Department of Human Sciences, Society and Health, University of Cassino and Lazio Meridionale, 03043 Cassino, Italy; alice.iannaccone@unicas.it (A.I.); andrea.fusco@unicas.it (A.F.)

<sup>2</sup> Department of Exercise and Sport Science, University of Wisconsin-La Crosse, La Crosse, WI 54601, USA; sjaime@uwlax.edu

<sup>3</sup> Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF), University of Palermo, 90133 Palermo, Italy; sara.baldassano@unipa.it

<sup>4</sup> Sport and Exercise Sciences Research Unit, Department of Psychological, Pedagogical and Educational Sciences, University of Palermo, 90133 Palermo, Italy; info@jillcooper.it (J.C.); patrizia.proia@unipa.it (P.P.)

\* Correspondence: c.cortis@unicas.it

Received: 10 November 2020; Accepted: 1 December 2020; Published: 4 December 2020



**Abstract:** The purpose of this study was to investigate the intensity of SuperJump<sup>®</sup> workout as a home-based activity for fulfilling physical activity recommendations during COVID-19 home-confinement. Seventeen (males:  $n = 10$ ; females:  $n = 7$ ) college students (age:  $25.8 \pm 2.7$  years; height:  $1.7 \pm 0.1$  m; weight:  $66.2 \pm 12.1$  kg) participated in the study. To assess the intensity of the activity (30-min), heart rate (HR), expressed as percentages of age-predicted maximal HR (%HRmax), and session ratings of perceived exertion (sRPE), collected on a CR10 scale, were used. %HRmax data were categorically separated in five classes of intensity according to the American College of Sport Science's guidelines. Enjoyment was evaluated using the Physical Activity Enjoyment Scale (PACES). Repeated measures ANOVA was used to evaluate differences ( $p < 0.05$ ) in relation to gender and exercise intensity. No gender difference emerged for %HRmax and sRPE. Significantly higher ( $p < 0.05$ ) %HRmax were found for the moderate intensity ( $47.1 \pm 34.4\%$ ) with respect to very light ( $3.6 \pm 6.9\%$ ), light ( $14.5 \pm 23.3\%$ ) and vigorous ( $34.6 \pm 39.6\%$ ) and for the vigorous intensity with respect to very light; no near maximal to maximal values were observed. Subjects perceived SuperJump<sup>®</sup> as moderate (sRPE =  $3.1 \pm 1.2$ ) while showing high levels of enjoyability (PACES =  $86.6 \pm 16.2\%$ ). SuperJump<sup>®</sup> can be classified as moderate-to-vigorous activity, representing an effective alternative and enjoyable home-based activity for preventing the effects of a sedentary lifestyle during home-confinement.

**Keywords:** home training; coronavirus; exercise; heart rate; mini-trampoline; rate of perceived exertion

## 1. Introduction

On January 30th, the World Health Organization (WHO) declared the outbreak of the novel coronavirus (COVID-19) disease to be a public health emergency of international concern [1]. Due to the COVID-19 person-to-person transmission, isolation and strict quarantine were required as extensive preventive measures to reduce its spreading. Those preventive measures involved the restriction of several activities including sport, exercise, and physical activity (PA) [2,3], with a consequent reduction in frequency and volume of all (vigorous, moderate, walking, and overall) PA intensity levels [4,5]. Prolonged home confinement may also induce sedentary behaviors such as increases in

sitting and screen time and unhealthy eating behaviors [4,5]. The combination of the reduction of healthy behaviors and the increase of unhealthy ones may increase the risk of occurrence of chronic health conditions, representing an even higher risk for the COVID-19 infection [6].

Regular exercise is necessary to prevent the detrimental effects of a sedentary lifestyle, such as chronic health conditions and mental distress due to home-confinement [7]. Physical inactivity may lead to a decrease up to 35–40% of the daily activity-induced energy expenditure [8] and to an increased risk of developing viral infections [9]. Therefore, thanks to its potential beneficial physiological and psychological factors [10,11], PA may represent a preventive therapy to potentially reduce a further incidence of COVID-19. In fact, PA stimulates the Immunoglobulin-A, the antibody contained in the secretion of the immune system's mucosal with a defensive role against pathogens of the upper respiratory tract, crucial during the current and future situations [12]. Furthermore, home-confinement induced a change in the daily routine with an increase of anxiety states and a reduction of levels of perception of basic psychological needs, such as satisfaction, in particular in young people [13], and PA may be useful to cope with these stressful conditions.

As strategies to promote healthy lifestyles during home confinement are fundamental, the American College of Sports Medicine (ACSM) recommended avoiding sedentary behaviors by practicing regular PA of moderate intensity [14], as higher intensities may suppress the immune function, especially in untrained people [15]. People are usually recommended to engage in at least 150 to 300 min per week [16,17]. During quarantine, a minimum amount equivalent to 30 min per day has been considered necessary for counteracting the potential negative effects of sedentarism [8]. The positive outcomes in physiological and psychological parameters may induce improvements of quality of life during home confinement, highlighting the sustainability of an home-based PA intervention [18].

Home-based PA programs may also contribute to reducing the symptoms of depression and anxiety [19]. For this reason, there has been a proliferation of livestream workouts accessible online and/or via free mobile apps. Gyms and fitness instructors are offering inexpensive virtual fitness classes and personal training sessions that can be safely and easily practiced at home [20]. Virtual fitness classes might be provided via varying forms such as online group fitness classes, one-to-one online personal training with a real personal trainer via chat or video, or virtual fitness practiced by means of home-based equipment allowing the interaction with a live or recorded workout and online communities in real time or after workouts [21,22]. In particular, virtual fitness apps may represent a motivating tool for being engaged in PA with the advantage of being always accessible as workouts may take place in any location [23].

Among the different forms of home-based activities, the mini-trampoline training has been recommended for specific target populations, such as premenopausal [24] or overweight [25,26] women, elderly [27], or for post-stroke survivors [28]. A recent study [29] showed that exercising on a mini-trampoline provides benefits similar to running on a treadmill at the same intensity and that it may lead to additional benefits related to the anaerobic system, such as improvements in muscle mass and lactate tolerance. SuperJump<sup>®</sup>, an activity mixing aerobic and anaerobic exercises, is a new fitness activity performed on mini trampoline. Within a workout, upper and lower muscle groups are involved, facilitating the blood flow redistribution through different muscle groups, resulting in significant improvements in cardiometabolic parameters, such as total body mass, body fat, and lipid profile [25,26,30–32]. Therefore, in the context of the current world situation of forced home-staying, it was hypothesized that SuperJump<sup>®</sup> may represent a valid alternative workout contributing to fulfil daily PA recommendations. Thus, the aim of this study is to investigate the exercise intensity by means of heart rate (HR), perceived exertion, and enjoyment of a SuperJump<sup>®</sup> workout.

## 2. Materials and Methods

### 2.1. Participants and Study Design

Seventeen healthy recreationally active college students participated in the study. Descriptive characteristics of participants are presented in Table 1.

**Table 1.** Descriptive characteristics of participants reported by gender. Values represent mean  $\pm$  standard deviation.

	Men ( <i>n</i> = 10)	Women ( <i>n</i> = 7)
Age (years)	27.1 $\pm$ 2.8	24 $\pm$ 0.8
Weight (kg)	72.4 $\pm$ 11.4	57.5 $\pm$ 6.8
Height (m)	1.7 $\pm$ 0.1	1.6 $\pm$ 0.0
BMI * ( $\text{kg}\cdot\text{m}^{-2}$ )	24.3 $\pm$ 2.7	22.6 $\pm$ 2.5
HRmax ( $\text{beat}\cdot\text{min}^{-1}$ )	189 $\pm$ 2	191 $\pm$ 0.6

\* BMI: Body Mass Index; HRmax: Maximal heart rate.

The short version (7 items) of the Italian version of the International Physical Activity Questionnaire [33] was used to determine the individual level of PA. Men declared to participate in  $8.3 \pm 4.4$  h $\cdot$ week $^{-1}$  of vigorous and  $6.1 \pm 4.0$  h $\cdot$ week $^{-1}$  of moderate PA, whereas women in  $6.0 \pm 3.9$  h $\cdot$ week $^{-1}$  of vigorous and  $4.2 \pm 3.5$  h $\cdot$ week $^{-1}$  of moderate PA.

Testing procedures were fully explained to all participants and informed consent was provided prior the beginning of the study. The study has been approved by the Institutional Review Board of Department of Human Sciences, Society, and Health of the University of Cassino and Lazio Meridionale (approval No.: 26898.2019.11.27; date: 4 December 2019) following the tenets of the Declaration of Helsinki. Criteria for inclusion in the study were: No previous experience in SuperJump<sup>®</sup>, any cardiovascular, respiratory, and/or metabolic disease or physical injury. To make sure that participants rigorously followed the study's protocol, the data collection was held in the Sport and Exercise Physiology Laboratory (temperature:  $24.4 \pm 0.4$  °C, humidity:  $45.1 \pm 2.9\%$ ) of University of Cassino and Lazio Meridionale and supervised by experienced researchers (C.C., A.F., A.I., S.J.J.).

### 2.2. SuperJump<sup>®</sup> Training

SuperJump<sup>®</sup> training is an innovative training modality developed in 2009 by modifying an elastic mini trampoline (CoalSport, Rome, Italy) with the following characteristics: Diameter 122 cm, height 26 cm, weight 15 kg, 40 springs, 8 folding feet, and supports up to 150 kg (price around 100€).

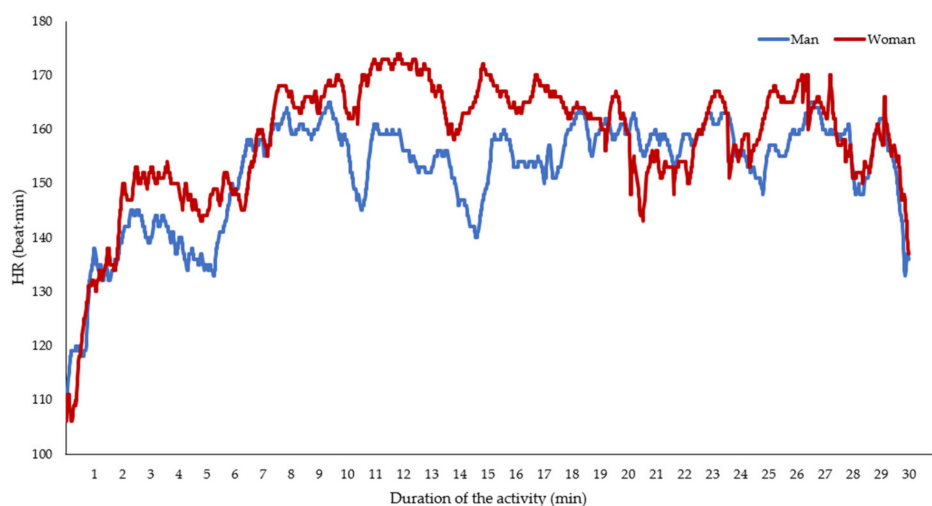
Workouts are based on a jumping aerobics class recorded on a DVD and/or available online. Eight SuperJump<sup>®</sup> workouts are available, differing in difficulties and intensities. In fact, varying intensities and planes of motion while bouncing influences the physiological demands of the activity [29,34]. The easiest workout is SuperJump<sup>®</sup> Original, being suitable for all untrained and/or beginner users. It includes a warm-up with breathing and mobility exercises, a central phase with jumping exercises alternating upper and lower limb movements, and a cool-down phase. The peculiarity of dance-based aerobic workout is that it contributes to increase the positive well-being of participants, thus representing an effective strategy for promoting PA and psychosocial health in community-based programs [35].

### 2.3. Experimental Procedures

Anthropometric measures (body weight and height) were assessed with a scale (Seca, model 709, Vogel & Halke, Hamburg, Germany) with integrated stadiometer (precision: 0.1 kg and 0.1 cm).

Since the participants included in the study were novice to SuperJump<sup>®</sup>, a familiarization session was administered to ensure an adequate training with the workout and to gain confidence with the elastic surface of the mini trampoline. For the experimental session, the video-workout was played

on a computer screen, placed in front of the mini-trampoline, and participants were instructed to follow the instructions given via DVD. The video-workout had a duration of 30 min. During the workout, HR was registered (Polar H7 transmitter, Polar Electro, Kempele, Finland) every 1 s for the entire duration of the workout. An example of HR during a workout in relation to gender is shown in Figure 1.



**Figure 1.** Heart rate (HR) during a SuperJump® workout in a representative man and woman.

HR data were then expressed as percentages of individual theoretical maximal HR ( $208 - 0.7 \cdot \text{age}$ , %HRmax) [36] and used for quantifying the intensity of the workout, according to the classes of intensity proposed by the ACSM [17]. Additionally, ratings of perceived exertion (RPE) scale was administered to evaluate the subjects' perception of effort [37]. As it has been demonstrated that the RPE scales are interchangeable [38,39], for the current study, the Category Ratio 10 scale modified by Foster [40] was used to monitor exercise intensity. Before the beginning of each session standard instructions were given and session-RPE (sRPE) [41] was collected 30 min following the end of the workout.

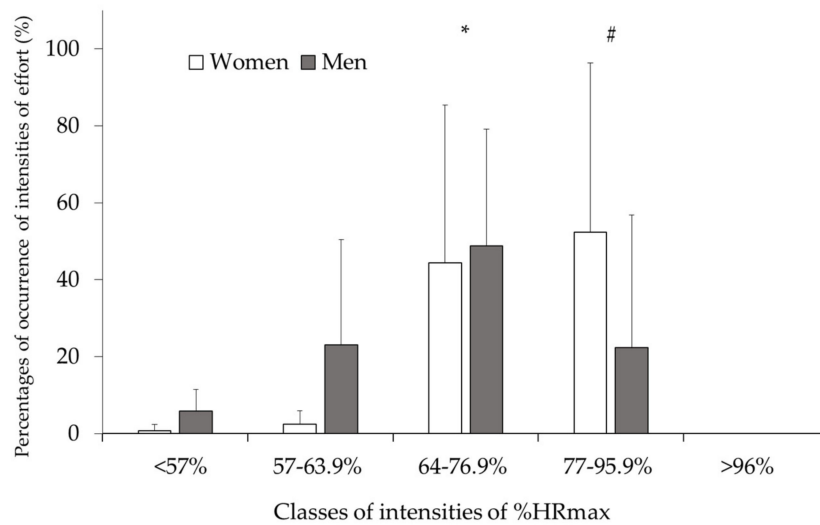
Participants were asked to rate the level of enjoyment of the activity by answering the Physical Activity Enjoyment Scale (PACES) composed by 5-items on a 7-points Likert scale. The score of each item was summated and the percentage of enjoyment (%PACES) was calculated, according to a previous research [42].

#### 2.4. Statistical Analysis

Shapiro-Wilk test was used to assess the normal distribution of the data. All data are reported as means and standard deviations. Analysis of variance (ANOVA) for repeated measures was applied to investigate differences in relation to gender and exercise intensity while one-way ANOVA was applied to PACES%. When statistically significant results were found, post hoc analysis was applied using Bonferroni correction. Statistical analysis was performed using Stata statistical software version 15.1 (StataCorp, College Station, USA) and the level of significance was set at 0.05.

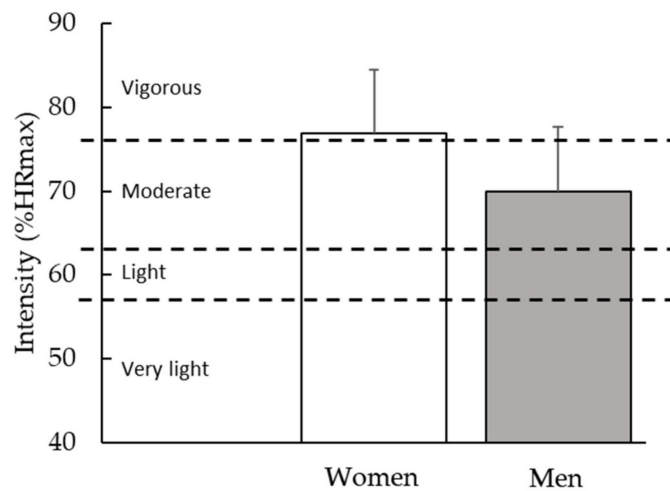
### 3. Results

No difference emerged for gender for %HRmax. Regardless of gender, %HRmax revealed higher ( $p < 0.05$ ) frequency of occurrence for the moderate intensity ( $47.1 \pm 34.4\%$ ) with respect to very light ( $3.6 \pm 6.9\%$ ), light ( $14.5 \pm 23.3\%$ ), and vigorous ( $34.6 \pm 39.6\%$ ) intensities. The %HRmax showed higher ( $p < 0.05$ ) frequency of occurrence for the vigorous intensity with respect to very light intensity. None of the subjects experienced near maximal to maximal values (Figure 2).



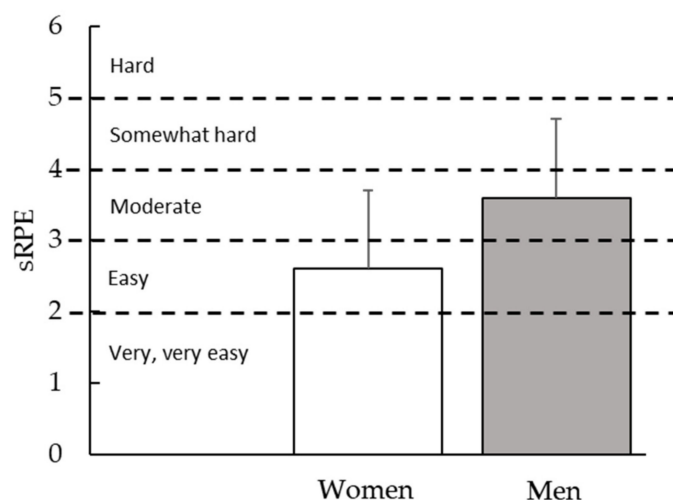
**Figure 2.** Heart rate responses during a SuperJump® workout in women and men. Abbreviations: HRmax: Maximal heart rate. \* significantly higher ( $p < 0.05$ ) than other classes of intensity, # significantly higher ( $p < 0.05$ ) than very light intensity.

No difference emerged for gender for mean %HRmax data (Figure 3). The mean %HRmax data for all participants were  $72.8 \pm 7.6$  %HRmax.



**Figure 3.** Heart rate responses during a SuperJump® workout in women and men. Note: Dash lines represent the classification of intensity according to the American College of Sports Medicine guidelines [17].

No gender differences were shown for sRPE ( $3.1 \pm 1.2$ ) (Figure 4) and %PACES ( $86.6 \pm 16.2$ ).



**Figure 4.** Session ratings of perceived exertion (sRPE) for SuperJump<sup>®</sup> in women and men. Note: Dash lines represent the intensity classification.

#### 4. Discussion

With the purpose of assessing an alternative and engaging home-based activity for preventing the effects of a sedentary lifestyle induced by COVID-19 home-confinement, this study aimed to investigate the exercise intensity and subjective responses of a SuperJump<sup>®</sup> workout. The main findings indicated that: (a) SuperJump<sup>®</sup> can be classified as moderate-to-vigorous PA, contributing to fulfil the ACSM recommendations; (b) no difference for gender was observed for %HRmax although, considering the whole sample, in the moderate intensity category, it was significantly higher than the other classes of intensity and in the vigorous intensity with respect to very light intensity; (c) subjects rated the SuperJump<sup>®</sup> workout as moderate; and d) the activity was enjoyable. Thus, SuperJump<sup>®</sup> could be considered a home-based PA that could contribute to support people's engagement in moderate PA during isolation for COVID-19. When considering %HRmax, SuperJump<sup>®</sup> could be classified [17] as a moderate-to-vigorous intensity activity in both men and women. Present findings are in line with Cugusi et al. [25] where the %HRmax measured during a 50-min workout on a mini-trampoline was on average  $72.2 \pm 3.3\%$ . Those findings suggest that home-based PA supported by video recorded choreographies with specific instructions, such as during SuperJump<sup>®</sup> workouts, elicit cardiovascular responses potentially useful to maintain adequate levels of PA, if regularly practiced for 3–5 days per week following the ACSM's recommendations.

According to sRPE values subjects rated the SuperJump<sup>®</sup> session as “moderate” [40], regardless of gender. Even though no statistically significant difference for gender was found, men perceived the activity as “moderate” based on the Category Ratio 10 scale, corresponding to 12 on the 6–20 RPE scale [38] while women classified the SuperJump<sup>®</sup> session “easy” according to the Category Ratio 10 scale, corresponding to 10 on the 6–20 RPE scale [38]. The present results are lower from those reported by Cugusi et al. [25] where participants rated the activity  $13.2 \pm 1.3$  on a 6–20 RPE scale [37], corresponding to 4 on the Category Ratio 10 scale classified as a “somewhat hard” perceived effort. This difference could be related to the sample participating in the study [25] carried out on overweight women untrained for at least one year and the duration of the workout (50 min), longer than the present study.

Present findings showed that the intensity of the SuperJump<sup>®</sup> workout can be defined as moderate, independently from subjective (sRPE) or objective (%HRmax) assessments. In the context of planning home-based unsupervised workouts based on choreographies, near maximal to maximal intensities should be avoided to decrease the risk of sudden adverse unpredictable events, such as musculoskeletal injuries or cardiovascular complications [17]. As in the present study, none of the subjects experienced

maximal values of both %HRmax and sRPE, SuperJump<sup>®</sup> may represent an activity for engaging people in moderate unsupervised PA during COVID-19 home-confinement by contributing to meet the minimum recommended amount of daily exercise [8].

The present study provides useful data regarding the intensity and the level of enjoyment of a SuperJump<sup>®</sup> workout, which may be considered a home-based activity contributing to fulfilling the recommended levels of PA levels during quarantine or self-isolation. However, some limitations should be acknowledged. In this study, only young healthy college students were evaluated. A previous study [24] demonstrated that jumping exercise may contribute to improve bone health in premenopausal women by stimulating the bone's response, in particular at the level of femoral neck and trochanter. In particular, jumping on a mini-trampoline increase the rate of hip moment generation, resulting in an improved dynamic stability contributing to prevent falls [27]. A balance improvement has been observed also in post-stroke survivors, compared to a balance program without mini-trampoline [28]. Likewise, in overweight women, improvements were found for physical, functional, and psychosocial status, in addition to a decrease of the pain's interference of participants' functioning [26]. Moreover, mini-trampoline training also induces significant decrease in the lipid profile, rather than only in body mass and body fat following bodyweight circuit training protocols [32]. Those results highlight the numerous benefits induced by mini-trampoline training over a bodyweight training. Therefore, further research should investigate the intensity of SuperJump<sup>®</sup> workout including participants of different ages, including specific target participants such as patients with osteoporosis, elderly, post-stroke survivors, or overweight people. Moreover, only the acute effects of SuperJump<sup>®</sup> Original have been investigated. Thus, future research should be carried out to examine also chronic effects on different parameters (i.e., cardiorespiratory fitness, muscular strength, or balance) as a consequence of a regular practice of SuperJump<sup>®</sup> workouts, also with respect to adherence during unsupervised home-based SuperJump<sup>®</sup> fitness program. However, a mini-trampoline fitness program [26] had a 95% adherence rate with any adverse event, suggesting that it could potentially represent an engaging and sustainable form of exercise. Finally, in the current study, only the cardiovascular response has been investigated; hence, a more comprehensive evaluation program should be provided for assessing other potential benefits induced by the regular practice of training on a mini trampoline.

## 5. Conclusions

In this COVID-19 context, virtual fitness classes are provided in different forms such as online group fitness classes, one-to-one online personal training, or with live or recorded workouts using home-based equipment. An example of a home-based activity is the activity SuperJump<sup>®</sup>, performed on a mini trampoline. The present study demonstrated that SuperJump<sup>®</sup> workouts elicit cardiovascular responses classified as moderate-to-vigorous PA, contributing to fulfil the ACSM recommendations, representing a valid enjoyable home-based fitness activity to prevent sedentary lifestyle during COVID-19 outbreak.

**Author Contributions:** Conceptualization, S.B., J.C., P.P., and C.C.; methodology, A.I., A.F., S.J.J., and C.C.; formal analysis, A.I.; investigation, A.I., A.F., S.J.J., and C.C.; writing—original draft preparation, A.I., and C.C.; writing—review and editing, A.I., A.F., S.J.J., S.B., J.C., P.P., and C.C.; supervision, C.C. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Acknowledgments:** The authors would like to express their gratitude to the participants involved in the study for their committed participation. A special thanks to CoalSport for the generous use of the mini-trampolines for data collection.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. World Health Organization. Coronavirus Disease 2019 (COVID-19) Situation Report—11. Available online: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-sitrep-11-ncov.pdf?sfvrsn=de7c0f7\\_4](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-sitrep-11-ncov.pdf?sfvrsn=de7c0f7_4) (accessed on 23 June 2020).
2. Rothan, H.A.; Byrareddy, S.N. The epidemiology and pathogenesis of Coronavirus disease (COVID-19) outbreak. *J. Autoimmun.* **2020**, *109*, 102433. [[CrossRef](#)] [[PubMed](#)]
3. Wang, Z.; He, T.; Zhu, L.; Sheng, H.; Huang, S.; Hu, J. Active quarantine measures are the primary means to reduce the fatality rate of COVID-19. *Bulletin World Health Organ.* **2020**, 1–12. [[CrossRef](#)]
4. Chen, P.; Mao, L.; Nassis, G.P.; Harmer, P.; Ainsworth, B.E.; Li, F. Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. *J. Sport Health Sci.* **2020**, *9*, 103–104. [[CrossRef](#)] [[PubMed](#)]
5. Ammar, A.; Brach, M.; Trabelsi, K.; Chtourou, H.; Boukhris, O.; Masmoudi, L.; Bouaziz, B.; Bentlage, E.; How, D.; Ahmed, M.; et al. Effects of COVID-19 home confinement on eating behaviour and physical activity: Results of the ECLB-COVID19 International online survey. *Nutrients* **2020**, *12*, 1583. [[CrossRef](#)]
6. Martínez-Ferran, M.; de la Guía-Galipienso, F.; Sanchis-Gomar, F.; Pareja-Galeano, H. Metabolic impacts of confinement during the COVID-19 pandemic due to modified diet and physical activity habits. *Nutrients* **2020**, *12*, 1549. [[CrossRef](#)]
7. Jakobsson, J.; Malm, C.; Furberg, M.; Ekelund, U.; Svensson, M. Physical activity during the Coronavirus (COVID-19) pandemic: Prevention of a decline in metabolic and immunological functions. *Front. Sport. Act. Living* **2020**, *2*, 57. [[CrossRef](#)]
8. Narici, M.; De Vito, G.; Franchi, M.; Paoli, A.; Moro, T.; Marcolin, G.; Grassi, B.; Baldassarre, G.; Zuccarelli, L.; Biolo, G.; et al. Impact of sedentarism due to the COVID-19 home confinement on neuromuscular, cardiovascular and metabolic health: Physiological and pathophysiological implications and recommendations for physical and nutritional countermeasures. *Eur. J. Sport Sci.* **2020**, 1–22. [[CrossRef](#)]
9. Ravalli, S.; Musumeci, G. Coronavirus outbreak in Italy: Physiological benefits of home-based exercise during pandemic. *J. Funct. Morphol. Kinesiol.* **2020**, *5*, 31. [[CrossRef](#)]
10. Cortis, C.; Puggina, A.; Pesce, C.; Aleksovska, K.; Buck, C.; Burns, C.; Cardon, G.; Carlin, A.; Simon, C.; Ciarapica, D.; et al. Psychological determinants of physical activity across the life course: A “DEterminants of Diet and Physical ACTivity” (DEDIPAC) umbrella systematic literature review. *PLoS ONE* **2017**, *12*, e0182709. [[CrossRef](#)]
11. Amato, A.; Baldassano, S.; Cortis, C.; Cooper, J.; Proia, P. Physical activity, nutrition, and bone health. *Hum. Mov.* **2018**, *19*, 1–10. [[CrossRef](#)]
12. Yousfi, N.; Bragazzi, N.L.; Briki, W.; Zmijewski, P.; Chamari, K. The COVID-19 pandemic: How to maintain a healthy immune system during the lockdown—A multidisciplinary approach with special focus on athletes. *Biol. Sport* **2020**, *37*, 211–216. [[CrossRef](#)] [[PubMed](#)]
13. Antunes, R.; Frontini, R.; Amaro, N.; Salvador, R.; Matos, R.; Morouço, P.; Rebelo-Gonçalves, R. Exploring lifestyle habits, physical activity, anxiety and basic psychological needs in a sample of portuguese adults during COVID-19. *Int. J. Environ. Res. Public Health* **2020**, *17*, 4360. [[CrossRef](#)] [[PubMed](#)]
14. American College of Sports Medicine. Staying Active during the Coronavirus Pandemic. Available online: [https://www.exercisemedicine.org/assets/page\\_documents/EIM\\_RxforHealth\\_StayingActiveDuringCoronavirusPandemic.pdf](https://www.exercisemedicine.org/assets/page_documents/EIM_RxforHealth_StayingActiveDuringCoronavirusPandemic.pdf) (accessed on 24 July 2020).
15. Liz, J. Staying Active During COVID-19. Available online: [https://www.exercisemedicine.org/support\\_page.php/stories/?b=892](https://www.exercisemedicine.org/support_page.php/stories/?b=892) (accessed on 16 July 2020).
16. Bushman, B.A. Physical activity guidelines for Americans. *ACSMs Health Fit. J.* **2019**, *23*, 5–9. [[CrossRef](#)]
17. American College of Sports Medicine. *ACSM’s Guidelines for Exercise Testing and Prescription*, 10th ed.; Wolters Kluwer: Philadelphia, PA, USA, 2017; ISBN 9788578110796.
18. Grazioli, E.; Cerulli, C.; Dimauro, I.; Moretti, E.; Murri, A.; Parisi, A. New strategy of home-based exercise during pandemic COVID-19 in breast cancer patients: A case study. *Sustainability* **2020**, *12*, 6940. [[CrossRef](#)]
19. Aguiñaga, S.; Ehlers, D.K.; Salerno, E.A.; Fanning, J.; Motl, R.W.; McAuley, E. Home-based physical activity program improves depression and anxiety in older adults. *J. Phys. Act. Health* **2018**, *15*, 692–696. [[CrossRef](#)]
20. Nyenhuis, S.M.; Greiwe, J.; Zeiger, J.S.; Nanda, A.; Cooke, A. Exercise and fitness in the age of social distancing during the COVID-19 pandemic. *J. Allergy Clin. Immunol. Pract.* **2020**, *8*, 2152–2155. [[CrossRef](#)]



21. DeSimone, G.T. Virtual fitness: Choosing a program that is right for you. *ACSMs. Health Fit. J.* **2020**, *24*, 3–4. [[CrossRef](#)]
22. Cortis, C.; Giancotti, G.F.; Rodio, A.; Bianco, A.; Fusco, A. Home is the new gym: Exergame as a potential tool to maintain adequate fitness levels also. *Hum. Mov.* **2020**, *21*, 79–87. [[CrossRef](#)]
23. Mokmin, N.A.M.; Jamiat, N. The effectiveness of a virtual fitness trainer app in motivating and engaging students for fitness activity by applying motor learning theory. *Educ. Inf. Technol.* **2020**, 1–18. [[CrossRef](#)]
24. Zhao, R.; Zhao, M.; Zhang, L. Efficiency of jumping exercise in improving bone mineral density among premenopausal women: A meta-analysis. *Sport. Med.* **2014**, *44*, 1393–1402. [[CrossRef](#)]
25. Cugusi, L.; Manca, A.; Romita, G.; Bergamin, M.; Di Blasio, A.; Mercurio, G. Exercise intensity and energy expenditure during a mini-trampoline rebounding exercise session in overweight women. *Sci. Sport.* **2017**, *32*, e23–e28. [[CrossRef](#)]
26. Cugusi, L.; Manca, A.; Serpe, R.; Romita, G.; Bergamin, M.; Cadeddu, C.; Solla, P.; Mercurio, G. Effects of a mini-trampoline rebounding exercise program on functional parameters, body composition and quality of life in overweight women. *J. Sports Med. Phys. Fit.* **2018**, *58*, 287–294. [[CrossRef](#)]
27. Aragão, F.A.; Karamanidis, K.; Vaz, M.A.; Arampatzis, A. Mini-trampoline exercise related to mechanisms of dynamic stability improves the ability to regain balance in elderly. *J. Electromyogr. Kinesiol.* **2011**, *21*, 512–518. [[CrossRef](#)] [[PubMed](#)]
28. Miklitsch, C.; Krewer, C.; Freivogel, S.; Steube, D. Effects of a predefined mini-trampoline training programme on balance, mobility and activities of daily living after stroke: A randomized controlled pilot study. *Clin. Rehabil.* **2013**, *27*, 939–947. [[CrossRef](#)] [[PubMed](#)]
29. Draper, N.; Clement, T.; Alexander, K. Physiological demands of trampolining at different intensities. *Res. Q. Exerc. Sport* **2020**, *91*, 136–141. [[CrossRef](#)]
30. White, J.R. Changes following ten weeks of exercise using a mini-trampoline on overweight women (Abstract). *Med. Sci. Sport Exerc.* **1980**, *12*, 103.
31. Edin, J.; Gerberich, S.; Leon, A.; McNally, C.; Serfass, R.; Shaw, G.; Moy, J.; Casal, D. Analysis of the training effects of minitrampoline rebounding on physical fitness, body composition, and blood lipids. *J. Cardiopulm. Rehabil.* **1990**, *10*, 401–408. [[CrossRef](#)]
32. Contrò, V.; Bianco, A.; Cooper, J.; Sacco, A.; Macchiarella, A.; Traina, M.; Proia, P. Effects of different circuit training protocols on body mass, fat mass and blood parameters in overweight adults. *J. Biol. Res. Boll. Della Soc. Ital. Di Biol. Sper.* **2017**, *90*, 10–12. [[CrossRef](#)]
33. Mannocci, A.; Di Thiene, D.; Del Cimmuto, A.; Masala, D.; Boccia, A.; De Vito, E.; La Torre, G. International physical activity questionnaire: Validation and assessment in an Italian sample. *Ital. J. Public Health* **2010**, *7*, 369–376. [[CrossRef](#)]
34. Clement, T.; Alexander, K.; Draper, N. Investigating the effect of bouncing type on the physiological demands of trampolining. *Eur. J. Sport Sci.* **2020**, 1–6. [[CrossRef](#)]
35. Domene, P.A.; Moir, H.J.; Pummell, E.; Easton, C. Salsa dance and Zumba fitness: Acute responses during community-based classes. *J. Sport Health Sci.* **2016**, *5*, 190–196. [[CrossRef](#)] [[PubMed](#)]
36. Tanaka, H.; Monahan, K.D.; Seals, D.R. Age-predicted maximal heart rate revisited. *J. Am. Coll. Cardiol.* **2001**, *37*, 153–156. [[CrossRef](#)]
37. Borg, G. *Borg's Perceived Exertion and Pain Scales*; Human Kinetics: Champaign, IL, USA, 1998.
38. Arney, B.E.; Glover, R.; Fusco, A.; Cortis, C.; de Koning, J.J.; van Erp, T.; Jaime, S.; Mikat, R.P.; Porcari, J.P.; Foster, C. Comparison of rating of perceived exertion scales during incremental and interval exercise. *Kinesiology* **2019**, *51*, 150–157. [[CrossRef](#)]
39. Arney, B.E.; Glover, R.; Fusco, A.; Cortis, C.; de Koning, J.J.; van Erp, T.; Jaime, S.; Mikat, R.P.; Porcari, J.P.; Foster, C. Comparison of RPE (Rating of Perceived Exertion) scales for session RPE. *Int. J. Sports Physiol. Perform.* **2019**, *14*, 994–996. [[CrossRef](#)] [[PubMed](#)]
40. Foster, C.; Hector, L.L.; Welsh, R.; Schrage, M.; Green, M.A.; Snyder, A.C. Effects of specific versus cross-training on running performance. *Eur. J. Appl. Physiol. Occup. Physiol.* **1995**, *70*, 367–372. [[CrossRef](#)]

41. Foster, C.; Florhaug, J.A.; Franklin, J.; Gottschall, L.; Hrovatin, L.A.; Parker, S.; Doleshal, P.; Dodge, C. A new approach to monitoring exercise training. *J. Strength Cond. Res.* **2001**, *15*, 109–115.
42. Graves, L.E.F.; Ridgers, N.D.; Williams, K.; Stratton, G.; Atkinson, G.; Cable, N.T. The physiological cost and enjoyment of Wii fit in adolescents, young adults, and older adults. *J. Phys. Act. Health* **2010**, *7*, 393–401. [[CrossRef](#)]

**Publisher’s Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).