Adherence characteristics and reasons for abandonment of physical exercise-based interventions in older adults in Latin America: A scoping review
Características de la adherencia y motivos del abandono de las intervenciones basadas en el ejercicio físico en adultos mayores en América Latina: una revisión de alcance

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Abstract. This review describes the adherence characteristics and reasons for abandonment physical exercise-based interventions in older adults in Latin America. This scoping review was conducted in accordance with the PRISMA statement. Articles were searched in MEDLINE by PubMed, ELSEVIER by SCOPUS and SciELO. The MeSH terms «Exercise», Exercise Therapy» and «Aged» were used between 2015 and 2020. We searched for articles in Spanish, English, and Portuguese carried out in people aged 65 years and over. 101 out of 4,642 randomized controlled trials (RCT) were included. A total sample of 5,013 older adults (79% women), with an average age of 68.2 years started their studies and 4,312 finished it, presenting an adherence to the interventions of 86%. Most of the studies were carried out in healthy older adults, in places enabled for the practice of physical activity, in charge of a physical activity professional, and the interventions were performed carried out through group therapeutic exercise. No article reported information on the minimum time of participation to the session to be considered as carried out. Only 30% of the articles reported the minimum participation of older adults in the intervention to include them in the study analysis, and 21% reported the average number of sessions attended to the intervention. The main reasons for abandonment were personal causes unrelated to the intervention. Only 5% of the articles reported injury of one of the participants (in two of them the injury was related to the intervention applied). This review characterized the physical exercise programs in older adults in Latin America, as well the adherence characteristics and the main reasons for abandonment to physical exercise-based interventions, by summarizing available evidence derived from RCTs.
Keywords: Aged; Exercise; Treatment Adherence and Compliance; Latin America; Scoping Review.

Resumen. Esta revisión describe las características de adherencia y motivos de abandono de las intervenciones basadas en ejercicio físico en adultos mayores en América Latina. Esta revisión de alcance se realizó de acuerdo con la declaración PRISMA. Los artículos fueron buscados en MEDLINE por PubMed, ELSEVIER por SCOPUS y SciELO. Los términos MeSH «Ejercicio», Terapia de ejercicio «y» Anciano «se utilizaron entre 2015 y 2020. Se buscaron artículos en español, inglés y portugués realizados en personas de 65 años o más. Se incluyeron 101 de 4.642 ensayos aleatorizados controlados (ECA), en una muestra total de 5.013 adultos mayores (79% mujeres), con una edad promedio de 68,2 años, que iniciaron sus estudios finalizando 4.312, presentando una adherencia a las intervenciones del 86%. La mayoría de los estudios fueron realizado en adultos mayores sanos, en lugares habilitados para la práctica de actividad física, a cargo de un profesional de actividad física, y las intervenciones se realizaron a través de ejercicio terapéutico grupal. Ningún artículo reportó información sobre el tiempo mínimo de participación a la sesión Sólo el 30% de los artículos informaron la participación mínima de los adultos mayores en la intervención para incluirlos en el análisis del estudio, y el 21% informó el número medio de sesiones. atendidos a la intervención. Los principales motivos de abandono fueron causas personales ajenas a la intervención. Solo el 5% de los artículos reportaron lesión de uno de los participantes (en dos de ellos la lesión estuvo relacionada con la intervención aplicada). Esta revisión caracterizó los programas de ejercicio físico en adultos mayores en América Latina, así como las características de adherencia y los principales motivos de abandono a las intervenciones basadas en ejercicio físico, al resumir la evidencia disponible derivada de ECA.
Palabras Clave: Envejecido; Ejercicio; Adherencia y Cumplimiento del Tratamiento; América Latina; Revisión de alcance.

Introduction

Nowadays, all countries are experiencing an increase in the prevalence of older adults (OA) (United Nation, 2019a). In 2019 the number of people aged 65 years and older was 703 million worldwide; however, this is projected to rise to 1.5 billion by 2050 (i.e., from 9% to 16%) (United Nation, 2019a, 2019b). Latin America is not exempted from this phenomenon. In fact, for this same period, it is estimated an increase from 56.4 to 144.6 million, leading to an increase of 156% of OA in the region (United Nation, 2019b). Aging is a heterogeneous process related to the health condition of each individual. Thus, significant differences in health status and functional capacity have been described in people with the same chronological age (Mitnitski et al., 2002). This phenomenon is known as pathological aging. On the other hand, half of the world's deaths are attributed to diseases associated with aging (Costantino et al., 2016; Huang et al., 2010).

Physical inactivity (PI) in the older population (i.e. less than 150 minutes of moderate-intensity aerobic physical activity or less than 75 minutes of physical

activity vigorous-intensity aerobics per week) has been recognized as one of the main causes of physical, cognitive and functional impairment in this population (WHO, 2020). Additionally, PI it is one of the most common causes of the heart disease, type 2 diabetes, chronic obstructive pulmonary disease, stroke, frailty syndrome, sarcopenia, Alzheimer's disease, cancer, chronic kidney disease and depression (McPhee et al., 2016). Although multiple studies have reported physical exercise (PE) in OA with varied results, the majority has concluded that PE decreases with aging (Sun et al., 2013). Therefore, it is proposed that PE practice on a regular basis reduces the mortality rate from all causes, disability, cardiovascular disease, and cognitive and functional impairment in OA (Mora & Valencia, 2018). Among the benefits of the regular practice of PE through different programs, studies have reported a lower risk of falls, improves balance and function (Hill et al., 2015), increases strength and maximum oxygen consumption (Fleg, 2012), improves and prevents sarcopenia (Landi et al., 2014). PE has also been associated with benefits in the psychosocial and cognitive aspect in this population, reducing symptoms of depression (Araque-Martínez et al., 2020; da Silva et al., 2019), preventing cognitive deterioration (Romero Ramos et al., 2020; Van Gelder et al., 2004), and increasing quality of life (Galloza et al., 2017).

Based on the above, it is proposed that all OA should perform PE to obtain the benefits that this entails - unless there are contraindications to do so. In Latin American countries, public health and PE institutions guide the community regarding PE realization to improve endurance, strength, balance, flexibility and quality of life in OA (ACEMI, 2011; Dirección de Promoción de la Salud y Control de Enfermedades No Transmisibles, 2013; Gobierno de Chile, 2017; Ministerio de Salud Pública del Ecuador, 2011; Secretaria Nacional de Deporte, 2018), proposing as alternative activities the ones in the aquatic environment (Secretaria Nacional de Deporte, 2018). Several studies have also been conducting programs using multi-component PE, where aerobic capacity, flexibility, balance, strength, and cognitive performances were increased, decreasing on the other hand symptoms of depression or anxiety (Bueno et al., 2018; Carvalho et al., 2009; Gonçalves et al., 2019; Nacional Costa Rica et al., 2018; Rico-Gallegos et al., 2020; Salinas et al., 2005).

However, to obtain the known benefits of PE, a continues participation in intervention programs is required. This is when we must understand the term «adherence», which can be understood as maintaining a regimen or exercise program for an extended period after an initial phase of adaptation has been completed (Lox et al., 2014). However, OA have a higher burden of comorbidities, lower social support, and higher disability and depression rates. These factors have been associated with lower adherence to exercise in people with specific health conditions (Picorelli et al., 2014). Other factors that have also been described as limiting the participation in PE-based interventions in this population are related to lack of time and motivation, boredom, fear of falling, and environmental factors such as accessibility, cost, and safety (Valenzuela et al., 2018).

Although there is recent evidence global focused on adherence to PE-based interventions, this evidence focused only on particular health conditions or programs of certain characteristics (Di Lorito et al., 2020; Hong et al., 2008; Medina-Mirapeix et al., 2009; Nicolson et al., 2017; Valenzuela et al., 2018). Currently, there is no review of the literature that reveals the available evidence on adherence and reasons for the abandonment of PE-based interventions for OA in Latin American. Therefore, this review aimed to describe the adherence characteristics and reasons for abandonment to PE-based interventions in OA in Latin America.

Survey methodology

The scoping review was carried out under the guidelines established by PRISMA declaration (Liberati et al., 2009). The PRISMA checklist can be found in the supplementary article files **(Appendix 1)**. The manuscript was not registered in PROSPERO. PROSPERO does not currently accept registrations for scoping reviews, literature reviews or mapping reviews.

Search strategy for identifying articles
The following databases were reviewed and presented in the following order: MEDLINE by PubMed, ELSEVIER by SCOPUS and SciELO. The search covered the period from 2015 to 2020. For the development of the research, the MeSH terms were used: «Exercise», Exercise Therapy» and «Aged». The search strategy followed the guideline of Peer Review of Electronic Search Strategies (PRESS) (McGowan et al., 2016).

The general search syntax was: («Exercise» OR «Exercise Therapy») AND («Aged») and was adapted to each database by applying the following filters: a) PubMed: Type of article: randomized controlled essay,

Publication date: five years, Languages: English, Spanish and Portuguese, Age: aged:65+ years and 80 and over. b) Scopus: Exclusion: Medline, Year of publication: 2015 to 2020, Publication status: final, Document type: article, Country: Latin American countries, Languages: English, Spanish and Portuguese, Keywords: words related to the subject under study. c) SciELO: Country: Brazil, Colombia and Chile, Year of publication: 2015 to 2020, Literature type: article.

Search strings for all databases is shown in the supplementary material (Appendix 2).

Study selection

The inclusion criteria were as follow: I) Intervention; Ia) Type of intervention: Endurance, strength, multi-component, concurrent, multidomain, HIIT or neuromotor, or other related to physical activity or exercise, Ib) Distinctive intervention: Must be the only intervention to use based on physical activity or exercise (no other interventions), Ic) Period of time: last at least for four weeks. II) Age: men and women 60 years and older who are community-dwelling older adults, living in long-term care, residential homes, or have been hospitalized with different health status. III) Type of article: Randomized controlled clinical trial, IV) Country of origin: Only Latin-American countries, V) Languages: English, Spanish and Portuguese. Revisions, editorial documents, protocols, or thesis were excluded.

Data extraction

In the first step, duplicate articles were removed from databases using Mendeley. According to the inclusion and exclusion criteria, all titles and abstracts were screened for suitability by two reviewers (G. L-G and I.C). In the next step, articles that met the inclusion criteria were selected, and, when decisions could not be taken using only the title and abstract of the article, the full-text was retrieved. The included articles were independently verified by the two reviewers (G. L-G and I.C); however. A consensus was achieved when there was a disagreement. The flowchart proposed by the PRISMA was used to show the search for articles (Figure 1). A standardized questionnaire was applied by the reviewers to extract the data from the included articles, in order to synthesize the evidence.

Risk of bias assessment tool

The Cochrane Tool «The Cochrane Manual of Systematic Reviews of interventions» (Sterne et al., 2019) was used to assess risk of bias. This tool allowed an assessment of the methodological validity of the 101 articles included in this review (Figure 2). The instrument consists in six items that evaluate: a) selection bias, b) completion bias, c) detection bias, d) wear bias and e) notification bias and f) other biases. However, for this review, the item «other Biases» was not considered due to characteristics of the interventions analyzed. Each article was scored independently by two reviewers (G. L-G and I.C), and scores were compared. When there was a disagreement, a consensus was achieved. A detailed description of the analysis is presented in the results section, along with a graphic representation. The risk of bias was measured using three categories: low risk (green color), unclear risk (yellow color), high risk (red color) according of weighted bar plot of the distribution of risk-of-bias judgements within each bias domain of Cochrane tool (Sterne et al., 2019).

Strategy for narrative synthesis

A summary of the articles' main findings included, related to adherence and grounds for abandonment of OA in PE-based interventions in Latin America, was provided. The main information is presented in figures and summary tables. The information extracted included: (a) general characteristics of articles and OA (Table 1); (b) Characteristics of PE-based intervention associated with adherence (Table 2); (c) reasons for the abandonment of PE-based interventions (Table 3); (d) characteristics of PE-based intervention associated with adherence and reasons for abandonment (Table 4) ;(e) Profile of PE-based intervention with adherence of 100% and less than 70% (Table 5).

Results

Literature research

Figure 1 shows the flowchart proposed by the PRIS-MA Declaration. A total of 4,642 potential articles on
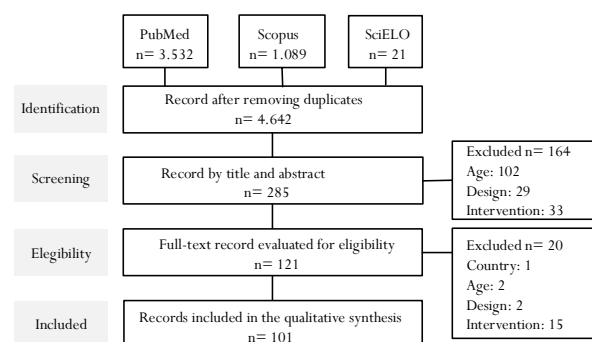

Figure 1. *PRISMA flow chart* (Liberati et al., 2009)

physical activity and physical exercise were identified in OA from Latin American. Following the exclusion of duplicates in the databases, the screening and eligibility criteria were applied. 101 articles were finally included for the narrative synthesis in this review (Figure 1).

Risk of bias assessment

Regarding the analysis by type of bias, it can be seen that the distribution of biases classified as low risk or unclear risk was similar, except for the performance bias that presented an 86% unclear risk, and the reporting bias, which presented 100% low risk. Only three types of components had high-risk of bias (selection, performance and detection), although for all cases, it was less than 10% (Figure 2).
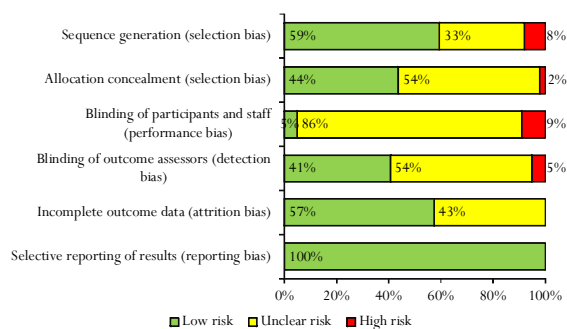

Figure 2. *Evaluation of the methodological quality of the reviewed studies*

General characteristics of the articles and Older Adults (OA)

A total of 101 articles were included in this scoping review corresponding to 5,013 individuals (79% women) with an average age of 68.2 years (age ranged from 63.6 to 84.8). A total of 91 studies were conducted in Brazil, five in Chile, two in Colombia, two in Mexico and one in Ecuador. Regarding the distribution of the age range of the selected OA, 97% of the articles included OA from 60 years or more, of these 70.83% included OA between 71 and 80 years, and 16% included OA older than 80 years. A total of 72% of the studies were conducted in OA without underlying pathology as the objective of the study, while 28% of the articles reported having performed intervention on OA with a particular health status. Among this health status, non-communicable diseases (NCDs) were those reported in the majority of the studies (53,6%), followed by neurodegenerative diseases (32.1%), musculoskeletal diseases, and cancer (10.7% and 0.6%%, respectively) (Table 1).

Table 1
General characteristics of the articles and older adults

(Authors, year), Country (ref.)	Age Range			Average age	Gender		Healthy Status			
	60-70	71-80	80 o+		Female %	Male %	ND	MSD	NCDs	CA
(de Queiroz et al., 2016), Brazil (37)	ü	ü	-	70.1	0	100	-	-	-	-
(Antunes et al., 2015), Brazil (38)	ü	-	-	67.0	0	100	-	-	-	-
(S. M. Santos et al., 2017), Brazil (39)	ü	ü	-	67.8	31	69	ü	-	-	-
(R. T. De Oliveira et al., 2017), Brazil (40)	ü	ü	ü	72.6	56	44	ü	-	-	-
(L. C. de Oliveira et al., 2016), Brazil (41)	ü	-	-	63.9	100	0	-	-	-	-
(Mazini Filho et al., 2017),Brazil (42)	ü	ü	-	64.7	100	0	-	-	-	-
(Teodoro et al., 2019), Brazil (43)	ü	ü	-	67.1	0	100	-	-	-	-
(G. O. R. Santos et al., 2019), Brazil (44)	ü	ü	-	69.5	100	0	-	-	-	-
(Dueñas et al., 2019), Colombia (45)	ü	ü	ü	76.1	84	16	-	-	-	-
(Pirauá et al., 2019), Brazil (46)	ü	ü	-	67.8	91	9	-	-	-	-
(Arantes et al., 2015), Brazil (47)	ü	ü	ü	73.1	100	0	-	-	-	-
(L. G. Lima et al., 2015), Brazil (48)	ü	ü	-	68.5	84	16	-	-	ü	-
(D.V. De Oliveira et al., 2019), Brazil (49)	ü	ü	-	69.0	100	0	-	-	-	-
(Langoni et al., 2019), Brazil (50)	ü	ü	ü	72.3	77	23	-	-	-	-
(Nascimento et al., 2019), Brazil (51)	ü	ü	-	68.5	100	0	-	-	-	-
(Dantas et al., 2016), Brazil (52)	ü	ü	-	66.1	100	0	-	-	ü	-
(Leandro et al., 2019), Brazil (53)	ü	ü	-	64.0	100	0	-	-	ü	-
(de Carvalho Fonseca et al., 2018), Brazil (54)	ü	ü	-	68.6	75	25	-	-	-	-
(Tiggemann et al., 2016),Brazil (55)	ü	ü	-	65.0	100	0	-	-	-	-
(R. G. da Silva et al., 2017), Brazil (56)	ü	ü	-	68.2	100	0	-	-	-	-
(Taglietti et al., 2018), Brazil (57)	ü	ü	-	68.3	68	32	-	ü	-	-
(Franco et al., 2016), Brazil (58)	ü	ü	-	69.0	93	7	-	-	-	-
(C. B. Ferreira et al., 2018), Brazil (59)	ü	ü	ü	76.1	-	-	-	-	-	-
(López et al., 2015), Chile (60)	ü	ü	ü	72.8	68	32	ü	-	-	-
(Suzuki et al., 2018), Brazil (61)	-	-	-	>60	100	0	-	-	-	-
(Ortiz-ortiz et al., 2019), Mexico (62)	ü	ü	ü	74.2	60	40	-	-	-	-
(Guedes et al., 2016), Brazil (63)	ü	ü	-	65.7	100	0	-	-	-	-
(Agner et al., 2018), Brazil (64)	ü	ü	-	66.6	66	34	-	-	ü	-
(Rodrigues-Krause et al., 2018), Brazil (65)	ü	-	-	65.0	100	0	-	-	-	-
(Ferrari et al., 2016), Brazil (66)	ü	-	-	65.0	0	100	-	-	-	-
(Ramirez-Campillo et al., 2016), Chile (67)	ü	ü	ü	70.3	100	0	-	-	-	-
(Neto et al., 2018), Brazil (68)	ü	ü	-	65.6	100	0	-	-	-	-
(Cavalcante et al., 2018), Brazil (69)	ü	ü	-	66.9	100	0	-	-	ü	-
(Dias et al., 2015), Brazil (70)	ü	ü	-	67.0	100	0	-	-	-	-
(Henrique et al., 2019), Brazil (71)	ü	ü	ü	76.0	55	45	-	-	-	-
(Ramírez-Villada et al., 2019), Colombia (72)	ü	-	-	64.1	100	0	-	-	-	-
(de Resende-Neto et al., 2019), Brazil (73)	ü	ü	-	64.8	100	0	-	-	-	-
(Neta et al., 2016), Brazil (74)	ü	-	-	63.6	100	0	-	-	-	-
(Bacha et al., 2018), Brazil (75)	ü	ü	-	69.3	74	26	-	-	-	-
(L. Dos Santos et al., 2018), Brazil (76)	ü	ü	-	67.8	100	0	-	-	-	-
(Gomeñuka et al., 2019), Brazil (77)	ü	ü	-	66.6	-	-	-	-	-	-
(Campos De Oliveira et al., 2015), Brazil (78)	ü	-	-	63.9	100	0	-	-	-	-
(Gomes et al., 2018), Brazil (79)	ü	ü	-	66.3	100	0	-	-	-	-
(Santiago et al., 2018), Brazil (80)	ü	-	-	63.0	100	0	-	-	-	-
(Botton et al., 2018), Brazil (81)	ü	ü	-	69.7	41	59	-	-	ü	-
(Gadelha et al., 2016), Brazil (82)	ü	ü	-	67.0	100	0	-	-	ü	ü
(Barbosa Rezende et al., 2015), Brazil (83)	ü	ü	-	65.0	100	0	-	-	-	-
(Martins et al., 2015), Brazil (84)	ü	ü	-	67.7	70	30	-	-	-	-
(Herminia Gallo et al., 2015), Brazil (85)	ü	ü	-	68.2	100	0	-	-	-	-
(Ruaro et al., 2019), Brazil (86)	ü	ü	-	65.9	100	0	-	-	-	-
(C. M. da S. e. Silva et al., 2018), Brazil (87)	ü	ü	-	67.6	59	41	-	-	ü	-
(Miranda-Aguilar et al., 2019), Chile (88)	ü	-	-	67.2	86	14	-	-	-	-
(Cadore et al., 2018), Brazil (89)	ü	-	-	66.2	0	100	-	-	-	-
(De Resende Neto et al., 2016), Brazil (90)	ü	ü	-	64.6	100	0	-	-	-	-
(I. G. Silva et al., 2018), Brazil (91)	ü	ü	-	68.6	39	61	-	-	ü	-
(M. A. R. Da Silva et al., 2019), Brazil (92)	ü	ü	-	67.0	74	26	-	-	ü	-
(Ramirez-Campillo et al., 2018), Chile (93)	ü	ü	-	67.4	100	0	-	-	-	-
(Brandão et al., 2018), Brazil (94)	ü	ü	-	68.0	88	12	-	-	-	-
(Hall López et al., 2017), Mexico (95)	ü	ü	-	67.5	100	0	-	-	-	-
(Medeiros et al., 2018), Brazil (96)	ü	ü	-	68.0	77	23	-	-	-	-
(Vargas & Rosas, 2019), Ecuador (97)	ü	-	-	67.3	70	30	-	-	ü	-
(Scarabottolo et al., 2017), Brazil (98)	ü	ü	ü	74.4	53	47	-	-	-	-
(Damorim et al., 2017), Brazil (99)	ü	-	-	63.4	71	29	-	-	-	-
(Leal et al., 2019), Brazil (100)	ü	-	-	65.1	50	50	ü	-	-	-
(Souza et al., 2019), Brazil (101)	ü	ü	-	69.2	100	0	-	-	-	-
(G. D. Santos et al., 2015), Brazil (102)	ü	ü	ü	75.2	60	40	ü	-	-	-
(Moreira et al., 2018), Brazil (103)	-	ü	ü	84.8	100	0	-	-	-	-
(Martinez et al., 2018), Chile (104)	ü	ü	ü	74.0	39	61	-	-	-	-
(Santana et al., 2016), Brazil (105)	ü	ü	-	68.7	87	13	-	-	-	-
(Gomeñuka et al., 2020), Brazil (106)	ü	ü	-	66.0	72	28	-	-	-	-
(Coelho-Júnior et al., 2019), Brazil (107)	ü	ü	-	66.8	100	0	-	-	-	-
(Pestana et al., 2018), Brazil (108)	ü	ü	-	70.0	82	18	-	-	ü	-
(Gambassi et al., 2015), Brazil (109)	ü	-	-	65.0	100	0	-	-	-	-
(Tomeleri et al., 2016), Brazil (110)	ü	ü	-	68.2	100	0	-	-	ü	-
(Ribeiro et al., 2015), Brazil (111)	ü	ü	-	66.4	100	0	-	-	-	-
(Cunha et al., 2019), Brazil (112)	ü	ü	-	70.2	100	0	-	-	-	-
(Ribeiro et al., 2017), Brazil (113)	ü	ü	-	68.5	100	0	-	-	-	-
(T. A. de Lima et al., 2019), Brazil (114)	ü	ü	-	66.7	-	-	ü	-	-	-
(Tomeleri et al., 2018), Brazil (115)	ü	ü	-	70.4	100	0	-	-	-	-
(Oliveira-Dantas et al., 2020), Brazil (116)	ü	ü	-	64.7	100	0	-	-	ü	-
(Lopes et al., 2016), Brazil (117)	ü	ü	-	67.0	100	0	-	-	-	-
(P. B. Da Silva et al., 2015), Brazil (118)	ü	ü	-	70.4	65	35	-	-	ü	-
(Alves et al., 2019), Brazil (119)	ü	ü	-	65.6	50	50	ü	-	-	-
(R. M. Ferreira et al., 2018), Brazil (120)	ü	-	-	65.9	-	-	ü	-	-	-
(Rosa et al., 2017), Brazil (121)	ü	ü	-	66.4	100	0	-	-	-	-
(Rodacki et al., 2017), Brazil (122)	ü	ü	-	70.3	100	0	-	-	-	-
(Aragão-Santos et al., 2019), Brazil (123)	ü	ü	-	65.4	100	0	-	-	-	-
(Ferraz et al., 2018), Brazil (124)	ü	ü	-	69.0	40	60	ü	-	-	-
(Sbardelotto et al., 2017), Brazil (125)	ü	ü	-	67.4	0	100	-	-	-	-
(Moreira Antunes et al., 2015), Brazil (126)	ü	-	-	64.7	100	0	-	-	-	-
(I. F. De Carvalho et al., 2017), Brazil (127)	ü	ü	-	69.8	100	0	-	-	-	-
(Barbalho et al., 2017), Brazil (128)	ü	ü	-	70.5	100	0	-	-	-	-
(de Oliveira Silva et al., 2019), Brazil (129)	ü	ü	ü	-	59	41	-	-	-	-
(Lixandrão et al., 2018), Brazil (130)	ü	ü	-	63.0	43	57	-	-	-	-
(Ribeiro et al., 2016), Brazil (131)	ü	ü	-	67.6	100	0	-	-	-	-
(Da Silveira Fontenele De Meneses et al., 2019), Brazil (132)	ü	ü	-	69.2	100	0	-	-	-	-
(Monteiro-Junior et al., 2017), Brazil (133)	-	-	ü	85.5	33	67	-	-	-	-
(Aveiro et al., 2017), Brazil (134)	ü	ü	-	68.7	100	0	-	ü	-	-
(M. R. Silva et al., 2018), Brazil (135)	ü	-	-	65.0	100	0	-	-	-	-
(V. H. De Oliveira et al., 2019), Brazil (136)	ü	-	-	64.2	-	-	-	-	-	-
(Simao et al., 2019), Brazil (137)	ü	ü	-	73.0	100	0	-	-	ü	-

Health Status: ND, Neurodegenerative Disease; MSD, Musculoskeletal disorders; NCDs, Non-communicable chronic disease; CA, Cancer.
Symbology: ü, stated variable; -, non-stated variable.

Characteristics of PE-based interventions associated with adherence

A total of 67% of the articles reported the exclusion criteria used to delimit the sample, 5,013 older adults started their studies and 4,312 finished it, presenting an adherence to the interventions of 86%. A total of 88% of the article (n=90) had complete adherence to the interventions equal to or greater than 70%. Of these, only 40% of the articles (n = 36) reported complete adherence to the intervention (100%). No article reported information on the minimum time of participation to the session to be considered completely. On the other hand, 30% (n = 30) of the articles reported the minimum requirements for participation in the interventions, to be considered in their analyzes. In this sense, on average the minimum percentage of participation required by the studies was 77%. This percentage was lower compared to the effective percentage of attendance to the interventions (87%). However, this information was declared only in 21% of the articles (n = 21) (Table 2).

Reasons of OA for abandonments during the PE-based interventions

A total of 66% of the articles reported the abandonment one or more OA during the PE-based intervention. On average, 13% of OA that initiated the intervention left for different causes. The main causes include lack of time, moving to another city, and lack of motivation (336 OA). Health reasons were indicated as reasons for abandonment in 35% of the articles (140 OA), followed by attendance (181 OA). Additionally, two studies reported decease of participants during the intervention period, none related to the intervention while five studies reported injury of one of the participants (in two of them, the injury was related to the intervention applied) (Table 3).

Characteristics of PE-based intervention associated with adherence and reasons of abandonment

Only 36 studies reported where the intervention took place and categorized into places enabled or not enabled for PE practice. A total of 88.6% of these articles (n=31) involved

Table 2
Characteristics of PE-based interventions associated with adherence

Ref.	Reports exclusion criteria	Initial Sample n°	Final Sample n°	Total adherence of OA to intervention %	Minimum of participation during the sessions %	Minimum participation requirement during interventions to be included in analysis %	Average number of sessions attended in the intervention %
(de Queiroz et al., 2016)	ü	62	62	100.0	-	80.0	-
(Antunes et al., 2015)	-	45	45	100.0	-	-	-
(S. M. Santos et al., 2017)	-	40	26	65.0	-	-	-
(R. T. De Oliveira et al., 2017)	ü	24	23	95.8	-	92.0	-
(L. C. de Oliveira et al., 2016)	ü	32	32	100.0	-	-	80.0
(Mazini Filho et al., 2017)	ü	79	79	100.0	-	-	-
(Teodoro et al., 2019)	ü	36	36	100.0	-	-	-
(G. O. R. Santos et al., 2019)	ü	34	20	58.8	-	60.0	76.5
(Dueñas et al., 2019)	ü	125	105	84.0	-	62.5	-
(Pirauá et al., 2019)	-	64	56	87.5	-	-	-
(Arantes et al., 2015)	ü	30	28	93.3	-	-	-
(L. G. Lima et al., 2015)	ü	44	44	100.0	-	-	-
(D. V. De Oliveira et al., 2019)	-	24	19	79.2	-	-	-
(Langoni et al., 2019)	-	60	52	86.7	-	-	89.5
(Nascimento et al., 2019)	-	62	45	72.6	-	85.0	-
(Dantas et al., 2016)	-	25	25	100.0	-	-	-
(Leandro et al., 2019)	-	30	24	80.0	-	-	95.0
(de Carvalho Fonseca et al., 2018)	ü	22	21	95.5	-	-	-
(Tiggemann et al., 2016)	-	30	25	83.3	-	-	-
(R. G. da Silva et al., 2017)	-	30	30	100.0	-	-	-
(Taglietti et al., 2018)	ü	60	49	81.7	-	-	-
(Franco et al., 2016), Brazil (58)	ü	82	71	86.6	-	-	-
(C. B. Ferreira et al., 2018)	ü	45	37	82.2	-	-	61.5
(López et al., 2015)	-	80	60	75.0	-	-	-
(Suzuki et al., 2018)	ü	37	31	83.8	-	-	-
(Ortiz-ortiz et al., 2019)	-	50	50	100.0	-	-	-
(Guedes et al., 2016)	ü	35	35	100.0	-	90.0	-
(Agner et al., 2018)	ü	41	35	85.4	-	-	-
(Rodrigues-Krause et al., 2018)	ü	30	26	86.7	-	-	-
(Ferrari et al., 2018)	ü	24	23	95.8	-	-	98.0
(Ramirez-Campillo et al., 2016)	-	24	24	100.0	-	-	-
(Neto et al., 2018)	-	32	32	100.0	-	75.0	-
(Cavalcante et al., 2018)	-	63	57	90.5	-	-	85.0
(Dias et al., 2015)	-	26	19	73.1	-	-	-
(Henrique et al., 2019)	ü	31	31	100.0	-	-	-
(Ramírez-Villada et al., 2019)	ü	60	47	78.3	-	-	-
(de Resende-Neto et al., 2019)	-	47	47	100.0	-	-	90.0
(Neta et al., 2016)	-	30	23	76.7	-	83.0	-
(Bacha et al., 2018)	-	50	46	92.0	-	-	-
(L. Dos Santos et al., 2018)	-	39	39	100.0	-	85.0	-
(Gomeñuka et al., 2019)	-	33	26	78.8	-	-	90.0
(Campos De Oliveira et al., 2015)	ü	32	32	100.0	-	-	-
(Gomes et al., 2018)	ü	42	27	64.3	-	80.0	-
(Santiago et al., 2018)	ü	23	19	82.6	-	85.0	-
(Botton et al., 2018)	ü	44	26	59.1	-	70.0	87.0
(Gadelha et al., 2016)	ü	133	133	100.0	-	75.0	-
(Barbosa Rezende et al., 2015)	ü	30	30	100.0	-	80.0	-
(Martins et al., 2015)	ü	47	40	85.1	-	-	-
(Herminia Gallo et al., 2015)	ü	31	26	83.9	-	80.0	-
(Ruaro et al., 2019)	-	40	33	82.5	-	-	-
(C. M. da S. e. Silva et al., 2018)	ü	58	51	87.9	-	-	-
(Miranda-Aguilar et al., 2019)	ü	21	12	57.1	-	85.0	-
(Cadore et al., 2018)	ü	65	52	80.0	-	-	-
(De Resende Neto et al., 2016)	-	55	44	80.0	-	85.0	-
(I. G. Silva et al., 2018)	-	48	33	68.8	-	-	-
(M. A. R. Da Silva et al., 2019)	ü	39	39	100.0	-	-	-
(Ramirez-Campillo et al., 2018)	ü	74	52	70.3	-	90.0	-
(Brandão et al., 2018)	ü	131	125	95.4	-	-	-
(Hall López et al., 2017)	ü	31	26	83.9	-	-	-
(Medeiros et al., 2018)	ü	78	71	91.0	-	70.0	86.0
(Vargas & Rosas, 2019)	-	50	50	100.0	-	-	99.6
(Scarabottolo et al., 2017)	ü	35	30	85.7	-	-	-
(Damorim et al., 2017)	ü	64	55	85.9	-	-	-
(Leal et al., 2019)	ü	54	54	100.0	-	-	-
(Souza et al., 2019)	ü	25	21	84.0	-	80.0	85.5
(G. D. Santos et al., 2015)	-	70	62	88.6	-	-	-
(Moreira et al., 2018)	-	45	45	100.0	-	-	-
(Martinez et al., 2018)	ü	33	33	100.0	-	-	-
(Santana et al., 2016)	ü	23	16	69.6	-	-	-
(Gomeñuka et al., 2020)	-	33	26	78.8	-	-	93.0
(Coelho-Júnior et al., 2019)	ü	45	39	86.7	-	-	89.0
(Pestana et al., 2016)	ü	78	45	57.7	-	-	-
(Gambassi et al., 2015)	ü	17	16	94.0	-	-	-
(Tomeleri et al., 2016)	-	38	35	92.1	-	-	85.0
(Ribeiro et al., 2015)	-	30	30	100.0	-	85.0	-
(Cunha et al., 2019)	-	48	48	100.0	-	85.0	85.0
(Ribeiro et al., 2017)	-	76	68	89.5	-	85.0	85.0
(T. A. de Lima et al., 2019)	ü	33	33	100.0	-	-	-
(Tomeleri et al., 2018)	ü	53	45	84.9	-	85.0	-
(Oliveira-Dantas et al., 2020)	-	25	25	100.0	-	-	-
(Lopes et al., 2016), Brazil (117)	ü	55	37	67.3	-	80.0	-
(P. B. Da Silva et al., 2015)	-	20	20	100.0	-	-	-
(Alves et al., 2019)	ü	32	28	87.5	-	75.0	-
(R. M. Ferreira et al., 2018)	ü	35	35	100.0	-	-	-
(Rosa et al., 2017)	ü	92	55	59.8	-	80.0	-
(Rodacki et al., 2017)	-	38	30	78.9	-	-	-
(Aragão-Santos et al., 2019)	-	44	44	100.0	-	-	-
(Ferraz et al., 2018)	ü	72	62	86.1	-	-	-
(Sbardelotto et al., 2017)	-	55	55	100.0	-	-	-
(Moreira Antunes et al., 2015)	ü	51	51	100.0	-	-	-
(I. F. De Carvalho et al., 2018)	ü	20	20	100.0	-	-	-
(Barbalho et al., 2017)	-	420	376	89.5	-	80.0	95.0
(de Oliveira Silva et al., 2019)	ü	56	46	82.1	-	-	-
(Lixandrão et al., 2016)	ü	14	14	100.0	-	-	-
(Ribeiro et al., 2016)	-	29	25	86.2	-	85.0	85.0
(Da Silveira Fontenele De Meneses et al., 2019)	ü	83	40	48.2	-	-	-
(Monteiro-Junior et al., 2017)	ü	29	18	62.1	-	-	-
(Aveiro et al., 2017)	ü	36	36	100.0	-	75.0	-
(M. R. Silva et al., 2018)	ü	41	33	80.5	-	-	89.0
(V. H. De Oliveira et al., 2019)	ü	52	43	82.7	-	-	-
(Simao et al., 2019)	ü	15	15	100.0	-	-	-

Ref: Reference. Symbology: ü, stated variable; -, non-stated variable.

Ref.	Death during the intervention	Get injured during the intervention	Total Abandonment %	Attendance %	For the intervention %	Health %	Personal issues %
(de Queiroz et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Antunes et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(S. M. Santos et al., 2017)	-	-	35.0	20.0	0.0	15.0	0.0
(R. T. De Oliveira et al., 2017)	-	-	4.2	0.0	0.0	4.2	0.0
(L. C. de Oliveira et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Mazini Filho et al., 2017)	-	-	0.0	0.0	0.0	0.0	0.0
(Teodoro et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(G. O. R. Santos et al., 2019)	-	-	41.2	5.9	8.8	8.8	17.6
(Dueñas et al., 2019)	-	-	16.0	11.2	0.0	1.6	3.2
(Pirauá et al., 2019)	-	ü	12.5	6.3	4.7	1.6	0.0
(Arantes et al., 2015)	-	-	6.7	0.0	0.0	3.3	3.3
(L. G. Lima et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(D.V. De Oliveira et al., 2019)	-	-	20.8	0.0	0.0	0.0	20.8
(Langoni et al., 2019)	-	-	13.3	0.0	0.0	1.7	11.7
(Nascimento et al., 2019)	-	-	27.4	1.6	0.0	9.7	16.1
(Dantas et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Leandro et al., 2019)	-	-	20.0	6.7	0.0	13.3	0.0
(de Carvalho Fonseca et al., 2018)	-	-	4.5	0.0	0.0	4.5	0.0
(Tiggemann et al., 2016)	-	-	16.7	0.0	0.0	10.0	6.7
(R. G. da Silva et al., 2017)	-	-	0.0	0.0	0.0	0.0	0.0
(Taglietti et al., 2018)	-	-	18.3	15.0	0.0	3.3	0.0
(Franco et al., 2016), Brazil (58)	-	-	13.4	0.0	1.2	0.0	12.2
(C. B. Ferreira et al., 2018)	-	-	17.8	0.0	0.0	0.0	17.8
(López et al., 2015)	-	-	25.0	0.0	0.0	0.0	25.0
(Suzuki et al., 2018)	-	-	16.2	16.2	0.0	0.0	0.0
(Ortiz-ortiz et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Guedes et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Agner et al., 2018)	-	ü	14.6	0.0	4.9	7.3	2.4
(Rodrigues-Krause et al., 2018)	-	-	13.3	0.0	0.0	10.0	3.3
(Ferrari et al., 2016)	-	-	4.2	0.0	0.0	0.0	4.2
(Ramirez-Campillo et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Neto et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Cavalcante et al., 2018)	-	-	9.5	0.0	0.0	0.0	9.5
(Dias et al., 2015)	-	-	26.9	0.0	0.0	0.0	26.9
(Henrique et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Ramírez-Villada et al., 2019)	-	-	21.7	0.0	0.0	0.0	21.7
(de Resende-Neto et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Neta et al., 2016)	-	-	23.3	23.3	0.0	0.0	0.0
(Bacha et al., 2018)	-	-	8.0	0.0	0.0	4.0	4.0
(L. Dos Santos et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Gomeñuka et al., 2019)	-	-	21.2	0.0	0.0	3.0	18.2
(Campos De Oliveira et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(Gomes et al., 2018)	-	-	35.7	16.7	0.0	0.0	19.0
(Santiago et al., 2018)	-	-	17.4	8.7	0.0	0.0	8.7
(Botton et al., 2018)	-	-	40.9	4.5	4.5	13.6	18.2
(Gadelha et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Barbosa Rezende et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(Martins et al., 2015)	-	ü	14.9	0.0	0.0	8.5	6.4
(Herminia Gallo et al., 2015)	-	-	16.1	9.7	0.0	6.5	0.0
(Ruaro et al., 2019)	-	-	17.5	2.5	0.0	0.0	15.0
(C. M. da S. e. Silva et al., 2018)	-	-	12.1	0.0	0.0	0.0	12.1
(Miranda-Aguilar et al., 2019)	-	-	42.9	0.0	0.0	0.0	42.9
(Cadore et al., 2018)	-	-	20.0	0.0	0.0	1.5	18.5
(De Resende Neto et al., 2016)	-	-	20.0	20.0	0.0	0.0	0.0
(I. G. Silva et al., 2018)	-	-	31.3	0.0	0.0	0.0	31.3
(M. A. R. Da Silva et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Ramirez-Campillo et al., 2018)	-	-	29.7	29.7	0.0	0.0	0.0
(Brandão et al., 2018)	-	-	4.6	0.0	0.0	2.3	2.3
(Hall López et al., 2017)	-	-	16.1	0.0	0.0	8.1	8.1
(Medeiros et al., 2018)	-	-	9.0	9.0	0.0	0.0	0.0
(Vargas & Rosas, 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Scarabottolo et al., 2017)	-	-	14.3	0.0	0.0	0.0	14.3
(Damorim et al., 2017)	ü	ü	14.1	6.3	0.0	3.1	4.7
(Leal et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Souza et al., 2019)	-	-	16.0	16.0	0.0	0.0	0.0
(G. D. Santos et al., 2015)	ü	-	11.4	4.3	0.0	2.9	4.3
(Moreira et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Martinez et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Santana et al., 2016)	-	ü	30.4	17.4	0.0	13.0	0.0
(Gomeñuka et al., 2020)	-	-	21.2	0.0	0.0	3.0	18.2
(Coelho-Júnior et al., 2019)	-	-	13.3	0.0	0.0	0.0	13.3
(Pestana et al., 2016)	-	-	42.3	15.4	0.0	7.7	19.2
(Gambassi et al., 2015)	-	-	6.0	0.0	0.0	0.0	6.0
(Tomeleri et al., 2016)	-	-	7.9	0.0	0.0	0.0	7.9
(Ribeiro et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(Cunha et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Ribeiro et al., 2017)	-	-	10.5	0.0	0.0	0.0	10.5
(T. A. de Lima et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Tomeleri et al., 2018)	-	-	15.1	0.0	0.0	5.7	9.4
(Oliveira-Dantas et al., 2020)	-	-	0.0	0.0	0.0	0.0	0.0
(Lopes et al., 2016), Brazil (117)	-	-	32.7	0.0	0.0	0.0	32.7
(P. B. Da Silva et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(Alves et al., 2019)	-	-	12.5	0.0	0.0	0.0	12.5
(R. M. Ferreira et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Rosa et al., 2017)	-	-	40.2	20.1	0.0	20.1	0.0
(Rodacki et al., 2017)	-	-	21.1	0.0	0.0	7.9	13.2
(Aragão-Santos et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0
(Ferraz et al., 2018)	-	-	13.9	0.0	0.0	8.3	5.6
(Sbardelotto et al., 2017)	-	-	0.0	0.0	0.0	0.0	0.0
(Moreira Antunes et al., 2015)	-	-	0.0	0.0	0.0	0.0	0.0
(I. F. De Carvalho et al., 2018)	-	-	0.0	0.0	0.0	0.0	0.0
(Barbalho et al., 2017)	-	-	10.5	3.5	0.0	3.5	3.5
(de Oliveira Silva et al., 2019)	-	-	17.9	0.0	0.0	0.0	17.9
(Lixandrão et al., 2016)	-	-	0.0	0.0	0.0	0.0	0.0
(Ribeiro et al., 2016)	-	-	13.8	0.0	0.0	0.0	13.8
(Da Silveira Fontenele De Meneses et al., 2019)	-	-	51.8	15.7	0.0	14.5	21.7
(Monteiro-Junior et al., 2017)	-	-	37.9	0.0	0.0	6.9	31.0
(Aveiro et al., 2017)	-	-	0.0	0.0	0.0	0.0	0.0
(M. R. Silva et al., 2018)	-	-	19.5	0.0	0.0	19.5	0.0
(V. H. De Oliveira et al., 2019)	-	-	17.3	0.0	0.0	0.0	17.3
(Simao et al., 2019)	-	-	0.0	0.0	0.0	0.0	0.0

Ref; Reference. Symbology: ü, stated variable; -, non-stated variable.

in enabled locations (16.1% sports centers, 22.6% health centers and 61.3% in laboratories or universities), while 13.4% (n=5) were carried out in non-enabled locations (20% at home and 80% of interventions at elderly's residence centers). Forty-nine articles reported the intervention format of which 36,7% (n=19) used an individual intervention format, while 63,2% (n=31) used a group intervention format. As for the intervention type used, 62% of the articles performed the intervention through physical exercises (PE), 25% performed the intervention based on therapeutic exercise (TE) and 13% in recreational activities (RA). Sixty-six articles reported the professional in charge. Of these articles, 53% of the interventions were led by physical activity professionals (n=52) and, 13% by health professionals (n=14 articles).

On the other hand, the intervention length was >1 to 3 months in 69 articles, while in the remaining 31% was longer than three months. Regarding the intervention frequency (i.e. total scheduled sessions per week), 50% of articles reported having performed interventions e»3 or more times per week, 43% of d»2 or fewer times per week, and 7% reported having changed the frequency from two to three times per week throughout the intervention. A total of 71% of the articles reported the session length (i.e. session duration in minutes). Of these articles, 38.9% reported 60-minute interventions (n=28), 36.1% reported interventions lasting between 40 and 50 minutes (n=26), 18.3% made interventions lasting less than 40 minutes (n=13), and only 6.7% made interventions lasting more than an hour (n=5) (Table 4).

Profile of PE-based interventions with adherence of 100% and less than 70%

About 36% of the articles had a 100% adherence to the intervention, while 11% had an adherence <70%. For both adherence conditions, OA's predominant characteristics were similar; between 60 and 70 years, female and without the presence of underlying pathology during the intervention period. As per the characteristics of the intervention, it was evident in both interventions that the

Table 4
Characteristics of PE-based intervention associated with adherence and reasons of abandonment

Ref.	Enabled SC	HC	L/U	Non-enabled Ho	RC	In	Gr	TE	PE	RA	HP	PAP	Intervention length (months)	Intervention frequency (sessions)	Session length (minutes)
(de Queiroz et al., 2016)	-	-	-	-	-	ü	-	-	ü	-	-	-	3.0	2	90
(Antunes et al., 2015)	-	-	-	-	-	-	ü	-	ü	-	-	-	6.0	3	40
(S. M. Santos et al., 2017)	-	ü	-	-	-	-	ü	-	-	ü	-	-	2.0	2	60
(R. T. De Oliveira et al., 2017)	-	ü	-	-	-	ü	-	ü	-	-	-	-	6.0	2	60
(L. C. de Oliveira et al., 2016)	-	-	-	-	-	-	ü	-	ü	-	ü	-	3.0	2	60
(Mazini Filho et al., 2017)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	3	50
(Teodoro et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	ü	5.0	2	75
(G. O. R. Santos et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.0	3	40
(Dueñas et al., 2019)	-	-	-	-	-	-	ü	-	ü	-	-	ü	2.0	1	60
(Pirauá et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	-	6.0	3	-
(Arantes et al., 2015)	-	-	-	-	-	-	ü	-	ü	ü	-	-	3.0	2	60
(L. G. Lima et al., 2015)	ü	-	-	-	-	ü	ü	-	-	-	-	-	2.5	3	-
(D. V. De Oliveira et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.5	-	40
(Langoni et al., 2019)	ü	-	-	-	-	ü	-	ü	-	-	ü	-	6.0	2	60
(Nascimento et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2-3	-
(Dantas et al., 2016)	-	-	-	-	-	ü	-	-	-	-	-	ü	2.5	2-3	-
(Leandro et al., 2019)	-	-	ü	-	-	-	ü	-	-	-	-	-	2.0	3	60
(de Carvalho Fonseca et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	ü	2.0	2	100
(Tiggemann et al., 2016)	ü	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2	-
(R. G. da Silva et al., 2017)	-	-	-	-	-	-	ü	-	-	-	-	ü	6.0	2-3	-
(Taglietti et al., 2018)	-	ü	-	-	-	ü	ü	-	-	ü	-	-	2.0	2	60
(Franco et al., 2016), Brazil (58)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.0	2	60
(C. B. Ferreira et al., 2018)	-	-	-	ü	-	ü	-	-	ü	-	-	ü	3.0	3	40
(López et al., 2015)	ü	-	-	-	-	ü	ü	-	-	-	-	ü	6.0	5	60
(Suzuki et al., 2018)	-	-	-	-	-	-	ü	-	ü	-	-	ü	14.0	2	75
(Ortiz-ortiz et al., 2019)	-	-	-	ü	-	ü	-	-	ü	-	-	ü	3.0	5	45
(Guedes et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	-	2.0	2	30
(Agner et al., 2018)	-	-	ü	-	-	-	ü	-	-	-	-	ü	6.0	2	90
(Rodrigues-Krause et al., 2018)	ü	-	-	-	-	ü	-	-	ü	-	-	ü	2.0	3	60
(Ferrari et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	ü	2.5	2-3	-
(Ramirez-Campillo et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2-3	60
(Neto et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	ü	2.0	3	60
(Cavalcante et al., 2018)	-	-	-	-	-	ü	-	-	-	-	-	ü	3.0	2-3	30
(Dias et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2	-
(Henrique et al., 2019)	-	ü	-	-	-	ü	-	-	-	ü	ü	-	3.0	2	30
(Ramírez-Villada et al., 2019)	-	-	-	-	-	-	ü	-	-	ü	-	ü	8.0	3	60
(de Resende-Neto et al., 2019)	-	-	-	-	-	ü	-	ü	-	-	-	ü	8.0	3	45
(Neta et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	3	50
(Bacha et al., 2018)	-	-	-	-	-	ü	-	ü	-	ü	ü	-	1.8	2	60
(L. Dos Santos et al., 2018)	-	-	-	-	-	ü	-	-	ü	-	-	ü	2.0	3	-
(Gomeñuka et al., 2019)	-	-	ü	-	-	ü	-	-	ü	ü	-	ü	3.0	3	45
(Campos De Oliveira et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2	60
(Gomes et al., 2018)	-	-	-	-	-	ü	-	-	ü	-	-	ü	4.0	3	60
(Santiago et al., 2018)	-	-	-	-	-	-	ü	-	ü	ü	-	-	2.0	3	50
(Botton et al., 2018)	-	-	-	-	-	ü	-	-	-	-	-	-	3.0	3	-
(Gadelha et al., 2016)	-	-	ü	-	-	-	ü	-	-	-	-	ü	6.0	3	-
(Barbosa Rezende et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	-	2.0	3	30
(Martins et al., 2015)	-	-	ü	-	-	-	ü	-	ü	ü	-	-	2.0	2	-
(Herminia Gallo et al., 2015)	-	-	-	-	-	ü	-	-	ü	-	-	ü	2.0	3	40
(Ruaro et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	-	3.5	2	-
(C. M. da S. e. Silva et al., 2018)	-	-	ü	-	-	-	ü	-	ü	-	ü	-	2.0	3	45
(Miranda-Aguilar et al., 2019)	-	-	-	-	-	-	ü	-	ü	-	ü	-	1.5	2	60
(Cadore et al., 2018)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.0	2	-
(De Resende Neto et al., 2016)	-	-	-	-	-	ü	-	ü	-	-	ü	-	3.0	3	60
(I. G. Silva et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	-	3.0	3	60
(M. A. R. Da Silva et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	3	50
(Ramirez-Campillo et al., 2018)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.0	3	60
(Brandão et al., 2018)	-	-	-	ü	-	ü	-	-	ü	-	ü	-	3.0	3	40
(Hall López et al., 2017)	-	-	ü	-	-	-	ü	-	ü	-	-	-	3.0	5	50
(Medeiros et al., 2018)	-	-	ü	-	-	-	ü	-	-	-	-	ü	3.0	3	50
(Vargas & Rosas, 2019)	-	ü	-	-	-	-	ü	-	-	-	-	ü	6.0	3	45
(Scarabottolo et al., 2017)	-	-	-	ü	-	-	ü	-	-	-	-	-	3.0	2	45
(Damorim et al., 2017)	-	-	ü	-	-	-	ü	-	-	-	-	-	4.0	3	30
(Leal et al., 2019)	-	-	-	-	-	ü	ü	-	-	-	-	ü	6.0	2	35
(Souza et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.5	2	-
(G. D. Santos et al., 2015)	-	ü	-	-	-	ü	ü	-	-	-	-	-	3.0	2	-
(Moreira et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	-	4.0	3	50
(Martinez et al., 2018)	-	-	-	ü	-	-	ü	-	-	-	-	-	3.0	3	-
(Santana et al., 2016)	-	-	ü	-	-	ü	-	-	-	ü	-	ü	2.0	3	30
(Gomeñuka et al., 2020)	-	-	ü	-	-	-	ü	-	-	ü	-	-	2.0	3	-
(Coelho-Júnior et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	4.5	2	40
(Pestana et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	ü	5.0	2	60
(Gambassi et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	-	3.0	2	-
(Tomeleri et al., 2016)	-	-	ü	-	-	ü	-	-	ü	-	-	ü	2.0	3	45
(Ribeiro et al., 2015)	-	-	ü	-	-	ü	-	-	ü	-	-	ü	4.2	3	-
(Cunha et al., 2019)	-	-	ü	-	-	ü	-	-	ü	-	-	ü	3.0	3	20
(Ribeiro et al., 2017)	-	-	ü	-	-	ü	-	-	ü	-	-	-	2.0	3	-
(T. A. de Lima et al., 2019)	-	-	-	-	-	ü	ü	-	ü	-	-	-	5.0	2	40
(Tomeleri et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	3	-
(Oliveira-Dantas et al., 2020)	-	-	-	-	-	ü	ü	-	-	-	-	ü	2.5	2-3	-
(Lopes et al., 2016), Brazil (117)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	3	60
(P. B. Da Silva et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	ü	1.5	2	30
(Alves et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	4.0	2	35
(R. M. Ferreira et al., 2018)	-	ü	-	-	-	-	ü	-	-	-	-	ü	6.0	2	35
(Rosa et al., 2017)	-	-	-	-	-	-	ü	-	ü	-	-	-	6.0	2	60
(Rodacki et al., 2017)	-	-	-	-	-	-	ü	-	ü	ü	-	-	2.0	3	60
(Aragão-Santos et al., 2019)	-	-	-	-	-	ü	-	-	ü	-	-	ü	3.0	3	60
(Ferraz et al., 2018)	-	ü	-	-	-	-	ü	-	-	-	ü	-	2.0	3	50
(Sbardelotto et al., 2017)	-	-	-	-	-	-	ü	-	-	-	-	-	2.0	3	60
(Moreira Antunes et al., 2015)	-	-	-	-	-	-	ü	-	-	-	-	ü	6.0	3	60
(I. F. De Carvalho et al., 2018)	-	-	-	-	-	ü	-	-	ü	-	-	-	3.0	2	30
(Barbalho et al., 2017)	-	-	-	-	-	ü	-	-	ü	-	-	-	3.0	3	-
(de Oliveira Silva et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	ü	3.0	2	60
(Lixandrão et al., 2016)	-	-	-	-	-	-	ü	-	-	-	-	-	2.5	2	-
(Ribeiro et al., 2016)	-	ü	-	-	-	ü	-	-	ü	-	-	ü	9.0	3	-
(Da Silveira Fontenele De Meneses et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	-	4.0	3	50
(Monteiro-Junior et al., 2017)	-	-	-	-	-	ü	-	-	ü	-	ü	-	2.0	2	37.5
(Aveiro et al., 2017)	-	-	ü	-	-	ü	-	-	-	-	-	ü	3.0	2	45
(M. R. Silva et al., 2018)	-	-	-	-	-	-	ü	-	-	-	-	-	3.0	2	-
(V. H. De Oliveira et al., 2019)	-	ü	-	-	-	-	ü	-	ü	-	-	-	4.0	2	-
(Simao et al., 2019)	-	-	-	-	-	-	ü	-	-	-	-	-	3.0	3	-

Ref: Reference. Place of intervention: SC, Sport Center; HC, Health Center; L/U, Laboratory /University; Ho, Household; RC, Residence Center. Intervention Format: In, Individual; Gr, Group. Type of intervention: TE, Therapeutical Exercise; PE, Physical Exercise; RA, Recreational activity. Professional in charge: HP, Health professional, PAP; Physical Activity Professional. Symbology: ü, stated variable; -, non-stated variable.

predominant type of intervention was based on PE, guided by a physical activity professional, with an intervention length of 1.5 - 3 months, a frequency of three sessions per week and a session length of about 50 minutes. However, in interventions with 100% adherence, the main intervention format used was groups, while for interventions with < to 70% adherence, the main intervention format was individual (Table 5).

Discussion

Main results of this review

The key findings of this review were that total adherence to the interventions was 87%. No article reported adherence to the session. Only 30% of the articles reported the minimum percentage required to be included in the study analysis. The main reasons of abandonment to the PE-based interventions were personal causes unrelated to the intervention. Additionally, a low percentage of OA deaths was observed during the intervention, none related to exercise programs and a low percentage of injured OA was detected. On the other hand, most of the PE-based interventions were developed in spaces set up for PE practice, in charge of a physical activity professional, in a group modality and using therapeutic exercise as a base intervention. The most frequently used parameters for PE-based interventions included intervention length of three or fewer months, with an intervention frequency of three or fewer times a week, and a session length of 60 minutes.

Table 5
Profile of PE-based interventions with adherence of 100% and less than 70%

Intervention Adherence	n°	Age Rage (Years)	Age (Years) (Mean)	Gender	Health Condition	Place of intervention	Intervention Format	Type of intervention	Professional in charge	Intervention Length (months)	Intervention frequency (sessions)	Session Length (minutes)
		OA Characteristics					Characteristics of the intervention					
Adherence 100% (36% of the articles; n=36)	1.453	60 - 70	68.1	F	WUP	L/U	GROUP INDIVIDUA	PE	PAP	1.5 – 3	3	47.1
Adherence < 70% (11% of the articles; n=11)	589	60 – 70	69.7	F	WUP	L/U- HC	L	PE	PAP	1.5 - 3	3	52.5

Gender: F, Female. Health Condition: WUP, Without underlying pathology. Place of intervention: L/U, Laboratory/University; HC, Health center. Type of Intervention: PE, Physical exercise. Professional in charge: PAP, Physical activity professional

What was already known and contrasted with the findings of this review?

Regarding the general characteristics of the articles, it should be noted that they were developed in only five countries in Latin America, where 91% correspond to Brazil, which could be associated with the fact that it is the country that develops the most research in the region (Grupo Banco Mundial, 2019). Only 16% of the interventions included OA over 80 years old, a fact that attracts attention as it is known that the PE brings both physical and psychosocial benefits in OA no matter the age of subjects (Mora & Valencia, 2018; Van Gelder et al., 2004). This could be because as age progresses, the health condition changes and the presence of chronic diseases increases in OA (Peranovich, 2016), which could lead to an increased risk of unwanted side effects associated with PE practice, although these should be minimized by adapting interventions individually to the needs and characteristics of participating subjects (Van Gelder et al., 2004). In terms of sex distribution of each intervention, studies included more women (79%) than men. Regarding OA's health condition recruited for interventions, the highest prevalence was a 15% of chronic NCDs, followed by neurodegenerative diseases, which is consistent with the phenomenon of progressive ageing population (Peranovich, 2016). In terms of remaining conditions, only 3% and 1% developed OA interventions with musculoskeletal diseases and cancer, respectively. This could be due to some key factors common in subjects with these conditions, such as physical discomfort and fatigue, among others (Buffart et al., 2014). Other reviews have also managed to identify very few studies in these particular health conditions in OA (Forbes et al., 2020; Nicolson et al., 2017), which draws attention due to the high prevalence of these diseases today.

A total of 67% of the articles report exclusion criteria. This is consistent with previous reviews that demonstrated exclusion criteria defined in 69 out of 101 selected articles (Porzsolt et al., 2019). The importance of correctly defining exclusion criteria in clinical trials lies in integrating characteristics of subjects prone to lose during intervention or follow-up for various reasons, which, if not applied correctly, could increase the risk of both adverse events and biased results (Patino & Ferreira, 2018). The average adherence to PE intervention was 87%, using as a measurement method the percentage of subjects who completed the intervention, values identical to previous studies (Hong et al., 2008). However, other studies have highlighted the varied methodology used to measure adherence to interventions (Findorff et al., 2009; Picorelli et al., 2014), including the percentage of subjects who completed the intervention, the percentage of attendance at available sessions and the average number of attendance sessions per week. Concerning session adherence, no article in this review reported adherence to the session, which is in agreement with previous systematic reviews where this factor is not considered (Hong et al., 2008; Picorelli et al., 2014). Besides, only 21% of the articles detailed the average percentage of sessions attended, which averaged 87%, which is consistent with averages obtained in previous reviews (Hong et al., 2008; Picorelli et al., 2014). On the other hand, only 30% of articles reported the minimum percentage required to be included in the data analysis, information of great value to know the effective participation of OA, which should be recorded in future interventions.

A low percentage of OA deaths was observed during the intervention. None related to exercise programs and a low percentage of injured OA was detected, which could indicate that the PE-base interventions in Latin America interventions are safe, reliable and potentially replicable (Peranovich, 2016). The reason for abandonment corresponding to personal causes was reported in 49% of the articles, where they were considered in the same line as previous studies, aspects such as lack of time, traveling problems or lack of motivation (Hancox et al., 2019; Picorelli et al., 2014) as well as health reasons (cause reported in 35% of the articles), but which, as it has highlighted, not derived from the intervention applied. For attendance, 25% of the articles reported excluding OA for this reason and, finally, only 5% of the articles reported OA exclusion whose abandonment was motivated by the intervention. While elimination by attendance is not considered a barrier to adherence to the PE-based interventions, it would be logical to infer that the non-attendance could

be due to reasons not informed by the OA and related to both personal characteristics and sociodemographic factors presented in their environment (Findorff et al., 2009).

Although some studies have shown good results in terms of adherence and impact of OA interventions carried out both at home and in residential centers (Faber et al., 2006; Hill et al., 2015), it was not possible to establish relationships between the place of intervention and OA adherence due to a large number of articles that did not report this information, coupled with the fact that only one article used an PE-based intervention performed at the home of the OA. As for the intervention format, the preference for using group interventions may be given by the social support that could occur between OA, which is an important factor in promoting adherence to the PE-based interventions in this population (Fraser & Spink, 2002), in addition to the reduced use of time and resources of this format compared to individual interventions. Finally, concerning the type of intervention used, 63% of the articles used structured PE-based interventions, which is characterized by being a planned and structured activity, to improve or maintain physical fitness or any of its components (WHO, 2020), 25% of the articles used interventions based on therapeutic exercise, which is characterized by being used to recover function in subjects with certain health conditions (Taylor et al., 2007). Only 13% of the articles made interventions through recreational activities, which could be based on researchers' interest in knowing the effects of structured and therapeutic PE on elderly, controlling the different variables that could affect the results obtained with the interventions.

The interventions' design–mainly group session in those who reported a 100% adherence versus individual session in those with 70% - might explain the adherence difference. Apparently doing physical activity in other OA companies and receiving their support and companionship would be an important factor in increasing adherence (Fraser & Spink, 2002).

What are the contributions and scope of this review?

This scoping review provides a broad and updated view of the characteristics of PE-based interventions that are being developed in Latin America, which made it possible to generate a profile of the OA that most benefit from PE programs, the characteristics of adherence and most frequent reasons for abandoning

these interventions. In addition, this review allowed us to know the existing gaps in relation to the attendance record and reasons for abandoning the OA to PE-base interventions, being able to encourage the development of future studies in this area, as well as their inclusion as relevant factors when designing and prescribing PE-base intervention for this population.

Strengths and limitations

The work was conducted according to the PRISMA guidelines and it was not limited to one language only; therefore, the language bias risk was minimal. We found that the search was restricted to the last five years to find the latest and updated available evidence among the limitations. We are aware that there may be high-quality evidence in previous years that was not included. Furthermore, this scoping review lacked meta-analysis due to the studies' heterogeneity, so there is only a qualitative analysis of the phenomenon studied.

Conclusions

Total adherence to interventions was 87%. No article reported information on the minimum time of participation to the session to be considered as done. Only 30% of the articles reported the minimum participation of the OA in the intervention to include them in the study analysis and 21% reported the average session attendance to the intervention. The main reasons for abandonment were personal causes unrelated to the intervention. A low percentage of OA deaths was observed during the intervention, none related to exercise programs and only 5% of the articles reported injury of one of the participants (in two of them the injury was related to the intervention applied). Most of the PE-based interventions were developed in spaces set up for the practice of PE, in charge of a physical activity professional, in a group modality and using therapeutic exercise as a base intervention. The most frequently used parameters for PE-based interventions included intervention length of three or fewer months, with an intervention frequency of three or fewer times a week, and a session length of 60 minutes.

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