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Knowledge, perceptions, and attitudes about physical fitness assessment among physical exercise practitioners: A cross-sectional study

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ABSTRACT

Objectives: To evaluate knowledge, perceptions, and attitudes about physical fitness assessment among practitioners of regular physical exercise.
Methods: A total of 400 practitioners of regular physical exercise participated in the study. A self-administered 12-item survey was developed, including five questions on exercise experience and training characteristics, two on knowledge, one on perception, and four on attitude toward fitness assessments.
Results: Most participants reported positive perceptions regarding the usefulness of physical fitness assessments, yet regular participation in such assessments was limited. Participants who had previously performed physical assessments or received guidance from a personal trainer demonstrated greater knowledge and more favorable attitudes toward assessment. Statistically significant associations were found between perception of assessment usefulness and guidance by a personal trainer ($p = 0.039$, Cramer's $V = 0.16$ [small]) and having performed physical assessments ($p < 0.001$, Cramer's $V = 0.35$ [medium]). Knowledge about the importance of physical assessments for monitoring training effects was also associated with training experience ($p = 0.023$, Cramer's $V = 0.18$ [small]), personal trainer guidance ($p = 0.011$, Cramer's $V = 0.11$ [small]), and previous performance of physical assessments ($p < 0.001$, Cramer's $V = 0.71$ [large]).
Conclusions: The present study showed that participants who have training or physical assessment experience presented a positive perception about physical fitness assessment and that knowledge of physical fitness assessment is associated with better perceptions and attitudes.
Practice implications: Personal trainers play a crucial role in providing assessment-related guidance, which can improve training methods and enhance clients' awareness of the importance of fitness monitoring.

1. Introduction

Physical exercise is considered one of the behaviors that determines better health status as it plays a positive role in preventing morbidity and improving physical wellness (Myers et al., 2002). In addition, physical exercise can be a protective factor against a series of non-communicable diseases, such as obesity, cardiovascular diseases, diabetes mellitus, and systemic arterial hypertension (Pedersen and Saltin, 2015) and both men and women who reported higher levels of physical exercise and physical fitness present a reduction in the relative

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risk of death by about 20 %–35 % (Macera et al., 2003; Macera and Powell, 2001). Moreover, physical exercise is a useful tool to improve aesthetics and performance (Mazzetti et al., 2000; Ruegsegger and Booth, 2018). Therefore, physical exercise programs are an important part of health status.

Ideally, all individuals interested in joining a physical exercise program should start their practice with a proper physical assessment (American College of Sports Medicine, 2010). Furthermore, all regular physical exercise practitioners should consider undergoing a physical assessment periodically. According to the American College of Sports Medicine (American College of Sports Medicine, 2010), physical assessment aims to evaluate physical fitness, which comprises a set of measurable attributes related to health and sports performance (e.g., body composition, cardiorespiratory fitness, strength/endurance, flexibility, speed, agility, motor coordination, balance, and muscle power) that inform safe and effective exercise prescription and monitoring. In fact, several evidences recognize that physical assessment results can be useful in clinical and nonclinical exercise facilities as a reference for current and future health status (Ortega et al., 2008; Ruiz et al., 2009). Moreover, information from an individual's health and medical records, combined with information from physical fitness assessment, is very helpful in meeting individual-specific health or performance goals (Wilder et al., 2006).

Despite the central role of fitness assessment in both clinical and nonclinical settings, little is known about how exercise practitioners understand and value these assessments in their day-to-day training. Therefore, a study that investigates this gap is warranted given the well-established benefits of physical fitness assessment, particularly among the large and growing population of typical gym-goers, a group often overlooked in favor of clinical or athletic populations. To address this gap, we aimed to evaluate practitioners' knowledge, perceptions, and attitudes toward physical fitness assessment among those attending typical gym settings and to explore factors associated with these outcomes. The main hypothesis of the present study was that greater knowledge of physical fitness assessment would be associated with more favorable perceptions and attitudes.

2. Methods

2.1. Participants

A total of 400 regular physical exercise practitioners (254 women and 146 men; mean age: 32.0 ± 15.0 years) participated in this study (a convenience sample). Participants were recruited from urban gyms located in two Brazilian cities (Goiânia—a state capital— and Jataí—a medium-sized city, both cities located in the Brazilian Midwest) through direct invitation (n = 276) and social media (Facebook and Instagram, n = 124). The inclusion criteria were: (i) age ≥18 years, (ii) both sexes, and (iii) engaged in regular, structured exercise (gym-based resistance training, aerobic training, group classes, or sport) at least three times per week, accumulating a minimum of 150 min of physical exercise per week during the preceding month. These criteria were chosen to capture a realistic spectrum of training exposure, from novice to experienced practitioners, consistent with our objective to describe knowledge, perceptions, and attitudes in typical gym settings and to identify potential misconceptions even among early-stage trainees. The exclusion criteria were: (i) physical education/sports science undergraduate students and (ii) physical education/sports science professionals. These exclusion criteria were adopted because it is reasonable to assume that these individuals have a more comprehensive knowledge and the right attitude and perception about the problem under investigation (Leal et al., 2018).

All participants were informed of the intent, procedures, benefits, and risks of the study and signed an informed consent form before data collection. All experimental procedures were approved by the University Human Research Ethics Committee (CAAE: 67357717.5.0000.5083) and were in accordance with the principles outlined in the Declaration of Helsinki.

2.2. Survey

A self-administered survey was created for this study (Table 1). The questionnaire was composed of 12 close-ended questions grouped into

Table 1
Questions about physical exercise performance and physical fitness assessment.

Questions	Answers
1. What type of physical exercise do you practice?	Resistance training Aerobic training (e.g., walking, running, swimming) Resistance training and aerobic training
2. How long have you been exercising regularly?	≤3 months >3 to ≤6 months >6 months to ≤1 year >1 to ≤2 years >2 to ≤5 years >5 years
3. How often do you exercise weekly?	1 day/week 2 days/week 3 days/week 4 days/week 5 days/week 6 days/week 7 days/week
4. How long is your daily training session?	≤30 min >30 to ≤60 min >60 to ≤90 min >90 min I do not control my training session duration.
5. Do you receive physical exercise guidance from a personal trainer?	Yes No
6. Have you ever performed any kind of physical assessment?	Yes No
7. If yes, go to the next question. If not, for what reason?	Lack of guidance Financial reasons Lack of interest I do not know who does it or where it is done. Difficulty in finding a professional I do not know about this matter. I do not think it is necessary.
8. What type of physical assessment was carried out?	Body composition (Yes/No) Muscle strength (Yes/No) Flexibility (Yes/No) Speed (Yes/No) Agility (Yes/No) Muscle power (Yes/No) Cardiorespiratory fitness (Yes/No) Cardiological (Yes/No) Coordination (Yes/No) Postural (Yes/No) Balance (Yes/No)
9. How often do you perform a physical assessment?	1x/month 1x/bimester 1x/trimester 1x/semester 1x/year No regular attendance
10. Evaluate the usefulness of physical assessments	Extremely useful Very useful Relatively useful Not so useful Nothing useful
11. Did you know that physical assessment is important to monitor the effects of physical training?	Yes No
12. Did you know that physical assessment results can be used for exercise prescriptions?	Yes No

two domains: physical exercise experience and characteristics of physical exercise routine (five questions), and knowledge, attitudes, and perceptions regarding physical fitness assessment (seven questions). All questionnaires were checked for completeness. Although the reliability and validity of the questionnaire were not formally established, its construction followed previously published recommendations (Burns et al., 2008; Kelley et al., 2003; Tsang et al., 2017). Furthermore, the questionnaire was designed by two PhD-level researchers in exercise physiology, who independently evaluated each item for clarity and relevance; any discrepancies were resolved through discussion.

The constructs of knowledge, perception, and attitude were operationally defined according to the type and purpose of each question. Knowledge was assessed through two binary items addressing participants' awareness of the role of fitness assessments in monitoring training effects and informing exercise prescription (Questions 11–12). Perception was measured by a five-point Likert-type item evaluating the perceived usefulness of physical assessments (Question 10). Attitude was inferred from behavioral indicators of engagement, including whether participants had ever performed a fitness assessment (Question 6–7), the frequency of assessments (Question 9), and whether they received professional supervision from a personal trainer (Question 5). These definitions clarify how each construct was measured in the present study. Table 1 presents the questions that composed the questionnaire.

2.3. Statistical analysis

A descriptive statistical analysis was performed, and the results were presented as absolute and relative frequencies. *Chi-square* (X^2) tests were applied to evaluate possible associations between participants' knowledge, perception, and attitude about physical fitness assessment and sex, training background, type of training, guidance by physical exercise professionals, and performance of physical assessments. The Cramer's V scores illustrating the effect sizes were also calculated from the chi-square test and were classified as trivial (<0.10), small (0.10–0.29), medium (0.30–0.49), and large (≥0.50). These analyses were performed using Jeffreys's Amazing Statistics Program (JASP, version 0.16.0.0, the Netherlands).

To further explore the associations, a multinomial logistic regression analysis was used to identify factors associated with the perceived usefulness of physical fitness assessments. The dependent variable was perceived usefulness (Question 10), categorized as "Extremely useful" (reference), "Very useful," and a combined category "Relative/Not so/Nothing useful." This grouping was performed to ensure sufficient number of responses in each cell of the model, thereby maintaining the stability of the estimates. Independent variables included sex, type of training, training experience (grouped the first two categories 0–3 months and 3–6 months), professional guidance, and history of physical assessment. Odds ratios (OR) and 95 % confidence intervals (95 % CI) were calculated for both crude and age-adjusted models.

Additionally, Generalized Linear Models (GLM) with Poisson distribution and robust estimator were applied to estimate prevalence ratios (PR) and 95 % confidence intervals (95 % CI), adjusted for age. This analysis assessed the association between knowledge (Question 11–12) regarding the utility of physical assessments and the variables sex, training experience, type of training, personal training guidance, and history of performing physical assessments. These analyses were performed using SPSS software (version 26.0; IBM Corp., Armonk, NY, USA), and a significance level of 0.05 was adopted for all statistical procedures.

3. Results

3.1. Participants' physical training characteristics

A total of 269 participants (67.3 %) reported practicing resistance and aerobic training, whereas 110 participants (27.5 %) reported practicing only resistance training, and 21 participants (5.3 %) reported practicing only aerobic training. A total of 135 participants (33.8 %) had more than five years of training experience, followed by 2–5 years of training experience (18.8 %, n = 75). The most common weekly training session frequency was five (36.3 %, n = 145), followed by three (22.3 %, n = 89) and four (17.8 %, n = 71). Most of the participants reported a training session duration of 30–60 min (58.0 %, n = 232), followed by 60–90 min (29.8 %, n = 119), >90 min (4.5 %, n = 18), and <30 min (2.8 %, n = 11). A total of 20 participants (5.0 %) reported having no control over the training session duration. Most of the participants (69.5 %, n = 278) reported not receiving guidance from a personal trainer; however, 122 participants (30.5 %) reported receiving guidance from a personal trainer. Table 2 shows participants' physical training characteristics according to sex.

3.2. Participants' knowledge, perceptions, and attitudes about physical fitness assessment

A total of 342 participants (85.5 %) had performed some type of physical assessment. The main reasons reported by the remaining participants (14.5 %, n = 58) for not performing any kind of physical assessment were lack of interest (~37.9 %, n = 22) and guidance (~29.3 %, n = 17). The most common frequency of physical assessment for those who had performed previous physical assessments was once per year (15.0 %, n = 60), followed by once per semester (11.0 %, n = 44), once per quarter (9.0 %, n = 36), once per bimester (6.5 %, n = 26), and once per month (6.3 %, n = 25). On the other hand, 150 participants (37.5 %) reported never performing any kind of physical assessment and 59 participants (14.8 %) did not answer this question.

Body composition (n = 301) and agility (n = 138) assessments were the most common physical assessment reported by those participants who had already performed physical assessments. Other physical assessments performed were muscle power (n = 79), cardiorespiratory fitness (n = 78), muscular strength (n = 72), cardiological (n = 57),

Table 2
Characteristics of the participants.

Physical training characteristics	Total n (%)	Men n (%)	Women n (%)
Type of training			
Resistance training and aerobic training	269 (100)	93 (34.6)	176 (65.4)
Resistance training	110 (100)	46 (41.8)	64 (58.2)
Aerobic training	21 (100)	7 (33.3)	14 (66.7)
Physical training experience			
0 ⊢ 3 months	46 (100)	17 (37.0)	29 (63.0)
3 ⊢ 6 months	46 (100)	9 (19.6)	37 (80.4)
6 months ⊢ 1 year	43 (100)	14 (32.6)	29 (67.4)
1 year ⊢ 2 years	55 (100)	24 (43.6)	31 (56.4)
2 years ⊢ 5 years	75 (100)	22 (29.3)	53 (70.7)
>5 years	135 (100)	60 (44.4)	75 (55.6)
Sessions per week			
1 day/week	2 (100)	0 (0)	2 (100)
2 days/week	17 (100)	6 (35.3)	11 (64.7)
3 days/week	89 (100)	30 (33.7)	59 (66.3)
4 days/week	71 (100)	27 (38.0)	44 (62.0)
5 days/week	145 (100)	52 (35.9)	93 (64.1)
6 days/week	66 (100)	29 (43.9)	37 (56.1)
7 days/week	10 (100)	2 (20.0)	8 (80.0)
Duration sessions			
0 ⊢ 30 min	11 (100)	4 (36.4)	7 (63.6)
30 ⊢ 60 min	232 (100)	81 (34.9)	151 (65.1)
60 ⊢ 90 min	119 (100)	53 (44.5)	66 (55.5)
> 90 min	18 (100)	5 (27.8)	13 (72.2)
No control	20 (100)	3 (15.0)	17 (85.0)
Do you receive guidance regarding physical exercise from a personal trainer?			
Yes	122 (100)	35 (28.7)	87 (71.3)
No	278 (100)	111 (39.9)	167 (60.1)

Data are shown as relative frequency (absolute frequency).

flexibility (n = 43), postural (n = 34), balance (n = 32), speed (n = 30), and coordination (n = 27). It should be noted that the sum of frequencies does not result in 400 participants because some participants answered more than one type of physical fitness assessment (see Fig. 1).

Almost half of the participants reported that physical assessments are extremely useful (44.0 %, n = 176), followed by very useful (38.7 %, n = 155), relatively useful (13.0 %, n = 52), not so useful (3.5 %, n = 14), and nothing useful (0.8 %, n = 3). Most of the participants reported knowing that physical assessment is important to monitor the effects of physical training (80.0 %, n = 344), while 85.5 % (n = 342) reported knowing that physical assessment results can be used for exercise prescription. Table 3 shows participants' knowledge, perceptions, and attitudes about physical fitness assessment according to sex.

3.3. Associations

There were significant associations between knowing the usefulness of physical assessments and physical exercise guidance by personal trainers (χ^2 [4] = 10.097, p = 0.039, Cramer's V = 0.16 [small]) and performing physical assessments (χ^2 [4] = 47.998, $p < 0.001$, Cramer's V = 0.35 [medium]). However, there was no significant association between knowing the usefulness of physical assessments and sex (χ^2 [4] = 2.603, p = 0.626, Cramer's V = 0.08 [trivial]), training experience (χ^2 [20] = 15.924, p = 0.721, Cramer's V = 0.10 [small]), and type of training (χ^2 [8] = 12.287, p = 0.139, Cramer's V = 0.12 [small]) (see Table 4).

The multinomial logistic regression analysis (Table 5), using the category 'Extremely useful' as the reference and adjusting for age, revealed that participants with six months to one year of training experience had significantly higher odds of rating the assessments as 'Very useful' (OR = 2.65; 95 % CI: 1.17–6.00; p = 0.019) compared to the most experienced group. The same less experienced group also had higher odds of rating them in the combined category 'Relative/Not so/Nothing useful ' (OR = 2.74; 95 % CI: 1.02–7.33; p = 0.044). Individuals who performed only resistance training had a lower likelihood (OR = 0.25, 95 % CI: 0.06–0.98, p = 0.047) of perceiving physical fitness assessment as "relative/not so/nothing useful" compared with those who performed only aerobic training, after adjusting for age.

Additionally, participants who were not receiving guidance from a personal training were more likely to perceive the assessments as 'Very useful' (adjusted OR = 2.11; 95 % CI: 1.30–3.42; p = 0.002) or 'Relative/Not so/Nothing useful' (adjusted OR = 2.02; 95 % CI: 1.07–3.81; p = 0.028), rather than 'Extremely useful,' when compared to those under professional supervision.

Table 3
Participants' perceptions about physical fitness assessment according to sex.

Perceptions about physical fitness assessment	Total n (%)	Men n (%)	Women n (%)
Have you ever performed any kind of physical assessment?			
Yes	342 (100)	119 (34.8)	223 (65.2)
No	58 (100)	27 (46.6)	31 (53.4)
If not, for what reason?			
Lack of guidance	17 (100)	9 (52.9)	8 (47.1)
Financial reasons	2 (100)	2 (100)	0 (0)
Lack of interest	22 (100)	10 (45.5)	12 (54.5)
I do not know who does it or where it is done.	2 (100)	1 (50.0)	1 (50.0)
Difficulty in finding a professional	1 (100)	1 (100)	0 (0)
I do not know about this matter.	3 (100)	2 (66.7)	1 (33.3)
I do not think it is necessary.	9 (100)	2 (22.2)	7 (77.8)
Other reason	2 (100)	0 (0)	2 (100)
How often do you perform a physical assessment?			
1x/month	25 (100)	9 (36.0)	16 (64.0)
1x/bimester	26 (100)	10 (38.5)	16 (61.5)
1x/trimester	36 (100)	11 (30.6)	25 (69.4)
1x/semester	44 (100)	15 (34.1)	29 (65.9)
1x/year	60 (100)	21 (35.0)	39 (65.0)
No regular attendance	150 (100)	52 (34.7)	98 (65.3)
No previous performance of physical assessment	59 (100)	28 (47.5)	31 (52.5)
Usefulness of physical assessments			
Extremely useful	176 (100)	57 (32.4)	119 (67.6)
Very useful	155 (100)	61 (39.4)	94 (60.6)
Relatively useful	52 (100)	22 (42.3)	30 (57.7)
Not so useful	14 (100)	5 (35.7)	9 (64.3)
Nothing useful	3 (100)	1 (33.3)	2 (66.7)
Did you know that physical assessment is important to monitor the effects of physical training?			
Yes	344 (100)	123 (35.8)	221 (64.2)
No	56 (100)	23 (41.1)	33 (58.9)
Did you know that physical assessment results can be used for exercise prescriptions?			
Yes	342 (100)	123 (36.0)	219 (64.0)
No	58 (100)	23 (39.7)	35 (60.3)

Data are shown as relative frequency (absolute frequency).

Similarly, individuals who had never undergone a physical assessment were significantly more likely to consider them 'Relative/Not so/Nothing useful' (adjusted OR = 8.92; 95 % CI: 4.08–19.50; p < 0.001), compared to those with prior assessment experience. No significant associations were observed for sex.

Knowledge about the importance of physical assessment on monitoring the effects of physical training presented significant associations with training experience (χ^2 [5] = 13.060, p = 0.023, Cramer's V = 0.18

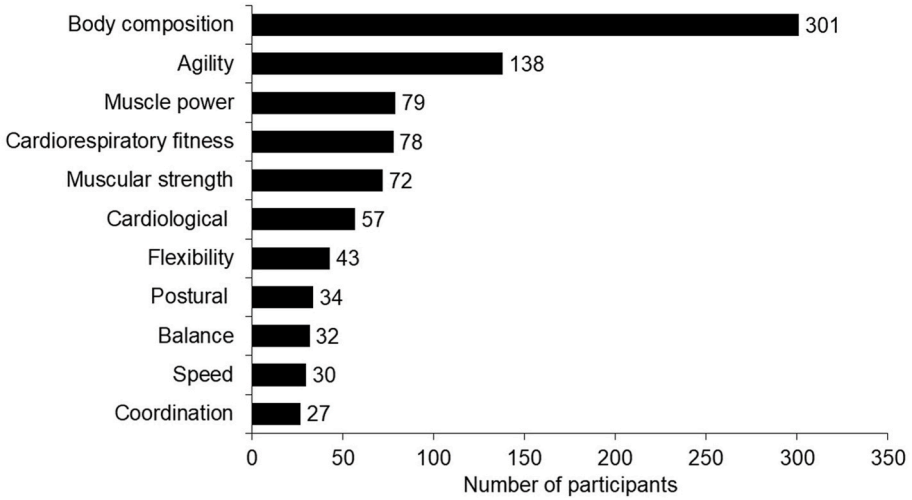

Fig. 1. Type of physical fitness assessments performed by the participants **Note:** The sum of frequencies does not result in 400 participants because some participants answered more than one type of physical fitness assessment.

Table 4
Association between the usefulness of physical assessments and sex, training background, professional guidance regarding physical exercise, and performance of physical assessments.

Variables	Usefulness of physical assessments					*p*-value[¥]	*Cramer's V*
	Extremely useful (n = 176)	Very useful (n = 155)	Relatively useful (n = 52)	Not so useful (n = 14)	Nothing useful (n = 3)		
	n (%)	n (%)	n (%)	n (%)	n (%)		
Sex							
Women	119 (67.6)	94 (60.6)	30 (57.7)	9 (64.3)	2 (66.7)	0.626	0.08
Men	57 (32.4)	61 (39.4)	22 (42.3)	5 (35.7)	1 (33.3)		
Type of training							
Resistance training and aerobic training	125 (71.0)	95 (61.3)	35 (67.3)	11 (78.6)	3 (100)	0.139	0.12
Resistance training	46 (26.1)	50 (32.3)	11(21.2)	3 (21.4)	0 (0)		
Aerobic training	5 (2.8)	10 (6.5)	6 (11.5)	0 (0)	0 (0)		
Physical training experience							
0 ⊢ 3 months	17 (9.7)	19 (12.3)	8 (15.4)	2 (14.3)	0 (0)	0.721	0.10
3 ⊢ 6 months	22 (15.5)	15 (9.7)	7 (13.5)	2 (14.3)	0 (0)		
6 months ⊢ 1 year	12 (6.8)	21 (13.5)	9 (17.3)	1 (7.1)	0 (0)		
1 year ⊢ 2 years	29 (16.5)	21 (13.5)	3 (5.8)	2 (14.3)	0 (0)		
2 years ⊢ 5 years	31 (17.6)	31 (20.0)	10 (19.2)	2 (14.3)	1 (33.3)		
>5 years	65 (36.9)	48 (31.0)	15 (28.8)	5 (35.7)	2 (66.7)		
Personal training guidance regarding physical exercise							
Yes	68 (38.6)	37 (23.9)	12 (23.1)	4 (28.6)	1 (33.3)	0.039	0.16
No	108 (61.4)	118 (76.1)	40 (76.9)	10 (71.4)	2 (66.7)		
Have you ever performed any kind of physical assessment?							
Yes	164 (93.2)	138 (89.0)	34 (65.4)	7 (50.0)	1 (33.3)	<0.001	0.35
No	12 (6.8)	17 (11.0)	18 (34.6)	7 (50.0)	2 (66.7)		

Data are shown as relative frequency (absolute frequency). [¥]p-value is derived from the chi-square test with continuity correction (χ^2).

Table 5
Multinomial logistic regression analysis of factors influencing the perceived usefulness of physical fitness assessments.

Variables	Crude				Adjusted*			
	Very useful		*Relative/Not so/Nothing useful*		*Very useful*		*Relative/Not so/Nothing useful*	
	OR (95 % CI)	*p* **	OR (95 % CI)	*p***	OR (95 % CI)	*p* **	OR (95 % CI)	*p* **
Sex								
Woman	1.35 (0.86–2.12)	0.187	1.42 (0.80–2.53)	0.227	1.38 (0.87–2.17)	0.162	1.45 (0.81–2.59)	0.203
Men	1		1		1		1	
Type of training								
Resistance training and aerobic training	0.38 (0.12–1.14)	0.086	0.32 (0.09–1.12)	0.075	0.38 (0.12–1.15)	0.088	0.32 (0.09–1.12)	0.076
Resistance training	0.54 (0.17–1.70)	0.297	0.25 (0.06–0.95)	**0.043**	0.55 (0.17–1.75)	0.316	0.25 (0.06–0.98)	**0.047**
Aerobic training	1		1		1		1	
Physical training experience								
0 ⊢ 6 months	1.18 (0.65–2.13)	0.583	1.43 (0.69–2.99)	0.329	1.29 (0.71–2.37)	0.397	1.57 (0.74–3.31)	0.232
6 months ⊢ 1 year	2.37 (1.06–5.28)	**0.035**	2.46 (0.93–6.48)	0.068	2.65 (1.17–6.00)	**0.019**	2.74 (1.02–7.33)	**0.044**
1 year ⊢ 2 years	0.98 (0.50–1.92)	0.955	0.50 (0.17–1.47)	0.215	1.11 (0.56–2.22)	0.755	0.57 (0.19–1.69)	0.316
2 years ⊢ 5 years	1.35 (0.72–2.52)	0.339	1.23 (0.55–2.78)	0.603	1.42 (0.76–2.67)	0.267	1.30 (0.57–2.93)	0.525
>5 years	1		1		1		1	
Personal training guidance regarding physical exercise								
No	2.00 (1.24–3.23)	**0.004**	1.92 (1.03–3.60)	**0.040**	2.11 (1.30–3.42)	**0.002**	2.02 (1.07–3.81)	**0.028**
Yes	1		1		1		1	
Have you ever performed any kind of physical assessment?								
No	2.53 (1.90–5.04)	**0.028**	9.07 (4.15–19.80)	**<0.001**	2.30 (1.07–4.96)	**0.032**	8.92 (4.08–19.50)	**<0.001**
Yes	1		1		1		1	

* *Adjusted by age (years); ** significance level of 0.05.*

[small]), personal training guidance (χ^2 [1] = 6.395, p = 0.011, Cramer's V = 0.13 [small]), and performing physical assessments (χ^2 [1] = 16.349, $p < 0.001$, Cramer's V = 0.71 [large]). The Poisson regression with robust estimate (Table 6) refined these findings, revealing that participants with less than six months of training had a lower prevalence of this knowledge compared to the most experienced group (PR = 0.85, 95 % CI 0.75–0.97, p = 0.017). Conversely, both receiving guidance from a personal trainer (PR = 1.12, 95 % CI 1.04–1.20, p = 0.002) and having previously performed an assessment (PR = 1.28, 95 % CI 1.07–1.53, p = 0.006) were positively associated with knowledge.

A similar pattern was observed for knowledge about using assessment results for exercise prescription. The initial chi-square analysis revealed significant associations for training experience (χ^2 [5] = 23.333, p < 0.001, Cramer's V = 0.24 [small]) and personal training guidance (χ^2 [1] = 5.626, p = 0.018, Cramer's V = 0.12 [small]). These findings were deepened by the Poisson regression (Table 7), which showed that less experienced participants (up to one year of training) were less likely to possess this knowledge compared to those with over five years of experience. Professional guidance again demonstrated a positive association (PR = 1.10, 95 % CI 1.02–1.19, p = 0.008). No significant associations were found for sex or type of training.

Table 6
Poisson regression for the association between the importance of physical assessment on monitoring the effects of physical training and sex, training experience, physical exercise professional guidance, and performance of physical assessments.

Variables	Did you know that physical assessment is important to monitor the effects of physical training?		*Crude*		*Adjusted**	
	Yes (n = 344)	No (n = 56)	PR (95 % CI)	*p***	PR (95 % CI)	*p***
	n (%)	n (%)				
Sex						
Women	221 (64.2)	33 (58.9)	1.03 (0.94–1.12)	0.456	1.03 (0.95–1.12)	0.412
Men	123 (25.8)	23 (41.1)	1		1	
Type of training						
Resistance training and aerobic training	234 (68.0)	35 (62.5)	1.14 (0.89–1.45)	0.286	1.14 (0.89–1.45)	0.293
Resistance training	94 (27.3)	16 (28.6)	1.12 (0.87–1.44)	0.371	1.11 (0.86–1.43)	0.392
Aerobic training	16 (4.7)	5 (8.9)	1		1	
Physical training experience						
0 ⊢ 6 months	72 (20.9)	20 (35.7)	0.87 (0.77–0.98)	**0.029**	0.85 (0.75–0.97)	**0.017**
6 months ⊢ 1 year	33 (9.6)	10 (17.8)	0.85 (0.71–1.01)	0.081	0.83 (0.70–1.00)	0.051
1 year ⊢ 2 years	52 (15.1)	3 (5.4)	1.05 (0.96–1.14)	0.221	1.03 (0.94–1.12)	0.527
2 years ⊢ 5 years	66 (19.2)	9 (16.1)	0.98 (0.88–1.08)	0.723	0.97 (0.87–1.07)	0.599
>5 years	121 (35.1)	14 (25.0)	1		1	
Personal training guidance regarding physical exercise						
Yes	113 (32.8)	9 (16.1)	1.11 (1.03–1.19)	**0.004**	1.12 (1.04–1.20)	**0.002**
No	231 (67.2)	47 (84.9)	1		1	
Have you ever performed any kind of physical assessment?						
Yes	329 (95.6)	43 (76.8)	1.28 (1.08–1.53)	**0.005**	1.28 (1.07–1.53)	**0.006**
No	15 (4.4)	13 (23.2)	1		1	

Data are shown as relative frequency (absolute frequency). *Adjusted by age (years); **p-value is derived from Poisson Regression with robust estimator.

Table 7
Poisson regression for the association between knowledge about physical assessment results and sex, training experience, professional guidance regarding physical exercise, and performance of physical assessments.

Variables	Did you know that physical assessment results can be used for exercise prescriptions?		Crude		Adjusted*	
	Yes (n = 342)	No (n = 58)	PR (95 % CI)	*p***	PR (95 % CI)	*p***
	n (%)	n (%)				
Sex						
Woman	219 (64.0)	35 (60.3)	1.02 (0.93–1.11)	0.596	1.02 (0.93–1.11)	0.633
Men	123 (36.0)	23 (39.7)	1		1	
Type of training						
Resistance training and aerobic training	235 (68.7)	34 (58.6)	1.14 (0.89–1.46)	0.271	1.14 (0.90–1.46)	0.268
Resistance training	91 (26.6)	19 (32.8)	1.08 (0.84–1.40)	0.525	1.08 (0.84–1.40)	0.517
Aerobic training	16 (4.7)	5 (8.6)	1		1	
Physical training experience						
0 ⊢ 6 months	74 (21.6)	18 (31.0)	0.88 (0.78–0.98)	**0.032**	0.88 (0.78–0.98)	**0.031**
6 months ⊢ 1 year	28 (8.2)	15 (25.9)	0.71 (0.57–0.89)	**0.003**	0.71 (0.57–0.89)	**0.003**
1 year ⊢ 2 years	49 (14.3)	6 (10.3)	0.97 (0.87–1.08)	0.680	0.97 (0.87–1.08)	0.675
2 years ⊢ 5 years	68 (19.9)	7 (12.1)	0.99 (0.91–1.08)	0.915	0.99 (0.91–1.08)	0.907
>5 years	123 (36.0)	12 (20.7)	1		1	
Personal training guidance regarding physical exercise						
Yes	112 (32.7)	10 (17.2)	1.11 (1.02–1.19)	**0.007**	1.10 (1.02–1.19)	**0.008**
No	230 (67.3)	48 (82.8)	1		1	

Data are shown as relative frequency (absolute frequency). *Adjusted by age (years); **p-value is derived from Poisson Regression with robust estimator.

4. Discussion and conclusions

4.1. Discussion

The main aims of this study were to evaluate knowledge, perceptions, and attitudes about physical fitness assessment among practitioners of regular physical exercise. Overall, the results revealed that most participants had a positive perception of physical fitness assessments, recognizing their usefulness for monitoring and exercise prescription. However, this favorable perception was not consistently accompanied by regular engagement in assessments, especially among those without professional supervision or with less training experience. Participants who had performed physical assessments or received guidance from a personal trainer demonstrated greater knowledge and more positive attitudes toward fitness assessment. Most participants reported performing both resistance and aerobic training as their main exercise modalities, with training experience of over one year and a weekly routine of five sessions lasting 30–60 min each. These findings are in line with the recommendations of the American College of Sports Medicine (Garber et al., 2011), which establishes a weekly training frequency of three to five times with a session duration of 20–60 min (Garber et al., 2011).

A total of 85.5 % (n = 342) of the participants performed some type of physical assessment. However, 43.9 % (n = 150) of the participants reported not having a regular frequency of performing a physical assessment and 14.5 % (n = 58) reported never having participated in a physical assessment despite knowing that physical assessment is important for monitoring the effects of physical training and can be used for exercise prescription. The high proportion of participants who reported having performed at least one physical assessment indicates a general awareness of its relevance. However, the low regularity of such assessments suggests that this awareness does not consistently translate

into practice. Some possible explanations for this finding point, at the individual level, to the well-known intention–behavior gap, widely documented in sport and physical activity psychology. Although positive intentions are known to predict desirable behaviors, they often fail to translate into concrete routines, especially when the perceived benefits are distant or intangible (Conner and Norman, 2022). In settings such as gyms, where aesthetic goals and immediate visual rewards tend to dominate, behaviors aimed at systematic monitoring such as regular physical assessments are often neglected.

Additionally, a structural barrier present in the Brazilian context relates to the financial cost involved. In many fitness centers, physical assessments are offered as an additional service beyond the monthly membership fee, often charged as part of an enrollment fee or marketed as a separate product. Considering the country's economic inequality (Mielke et al., 2022), this recurring expense, particularly in proposals that require quarterly reassessments, can represent a prohibitive cost for a significant portion of the physical exercise practitioners.

Strath et al. (2013) showed that physical fitness assessment is an essential procedure for gathering information that can support physical exercise prescription, such as the method, the type of exercise, and other procedures to be adopted, promoting benefits to the conditioning and health of the participants. Indeed, beyond clinical or high-performance contexts, regular fitness assessments can guide individualized progression, support realistic goal-setting, and identify modifiable risks in everyday training, thereby promoting adherence and long-term functional health. In the current study, we found that participants who underwent a pre-assessment (cardiological) for risk stratification recommended for initiating an exercise program had low adherence to physical fitness assessment. The pre-assessment (cardiological) is the main tool for preventing sudden death; therefore, it is fundamental in anamnesis and physical examination protocols (Glaab and Taube, 2022). Surprisingly, among those that performed physical assessments, the most reported physical assessments were agility and body composition. Approximately 138 of the participants reported performing an agility test, which is easy to administer and commonly applied to athletes (Altmann et al., 2021; Paul et al., 2016). It is worth mentioning that the assessment of agility evaluates a person's ability to change the body's direction quickly, which is the result of speed, agility, and strength. It is usually related to the performance and specific conditions of different sports (Zemková and Hamar, 2013). Furthermore, an adequate place and specialized and trained personnel are necessary for its accomplishment, factors that are not usually found in gyms.

It is important to emphasize that irregular perceptions of the participants regarding the evaluation of the agility test can mean exposing the individuals to possible fragile planning, which can directly influence their responses to training. These attitudes reported by the participants may probably be related to the level of guidance given to the participants. As previously demonstrated, health professionals have misconceptions about a series of concepts related to sport and exercise science (Leal et al., 2018).

In Brazil, physical education professionals are responsible for essential procedures related to physical exercise such as physical fitness assessment. These professionals provide exercise guidelines, based on the client's technical analysis and physical tests. In the present study, we observed that 30.5 % of the participants were under the guidance of a physical education professional (a personal trainer) and these participants presented better perceptions about the usefulness of physical assessment, knowledge about the importance of physical assessment to monitor the effects of training and knowledge about physical assessment. Indeed, the findings revealed that individuals without professional guidance or with limited training experience (up to one year) were significantly more likely to perceive physical assessments as less useful. This association, supported by multinomial logistic regression analysis, underscores the role of structured supervision in fostering more positive perceptions regarding the purpose and importance of physical evaluations in monitoring training outcomes.

However, most of the participants reported not receiving guidance from a personal trainer. It is not surprising that among unsupervised participants, engagement in physical assessment programs is lower as the results that are useful for a prescription would not be beneficial if the person does not follow a structured training program. This situation is alarming because, at least theoretically, training supervision by specialized professionals should help to control important training variables, such as load, rest interval, and exercise technique, and provide motivation and psychological reinforcement (Gentil and Bottaro, 2010). Several studies that have investigated the role of training supervision by specialized professionals show the benefits of this strategy in healthy and clinical populations (Mazzetti et al., 2000; Ratamess et al., 2008; Steele et al., 2017). This underscores the importance of professional supervision, qualification and continuing education for trainers to effectively communicate the value of regular fitness assessments to clients.

The results of the present study further support the association between professional guidance and knowledge outcomes. Participants receiving supervision were more likely to understand the importance of fitness assessments for both monitoring training effects and informing exercise prescription. Conversely, less experienced practitioners showed lower awareness, indicating a potential gap in early training stages that could be addressed through educational strategies or more structured onboarding in gym settings.

A total of 301 participants reported undergoing body composition assessment, which is a test that presents specific details of body mass, height, body mass index, fat mass percentage, and lean mass percentage (Heymsfield et al., 2005). Body composition can be estimated using laboratory and field techniques that vary in terms of complexity, cost, and accuracy (Duren et al., 2008a), such as hydrostatic weighing, skinfold measurements, and anthropometric measurements (Wilder et al., 2006; Wilson and Durnin, 1995). Body composition assessment has received increasing importance due to the role of body components in determining the state of an individual's health. Excess body adiposity and its centralized distribution are associated with non-communicable diseases, especially cardiovascular diseases (Cercato et al., 2004). Thus, assessing body composition is essential as its alteration can affect an individual's health and increase cardiovascular and diabetes mellitus risk, in addition to affecting the individual's fitness level (Duren et al., 2008b; Stodden et al., 2017).

In Brazilian gym environments, adherence to regular fitness assessments may be influenced by practical and systemic factors, including the out-of-pocket cost of assessments, limited time or scheduling flexibility, variable supervision ratios, the availability of trained and specialized professionals, a prevailing emphasis on aesthetic goals rather than objective monitoring, and the quality of gym infrastructure. These hypotheses warrant further exploration through qualitative and mixed-methods research that also considers possible gender-related preferences for specific tests.

4.2. Study limitations and strengths

The present study is not without limitations. First, we used a convenience sample from two urban municipalities in Brazil's Midwest; generalizability to other regions or settings should be made with caution. Second, only physical exercise practitioners recruited from gyms were investigated; therefore, the extrapolation of the results to other populations should be made with caution. Third, we did not collect socioeconomic data, which may influence access to and perceptions of assessments. Fourth, the reliability and validity of the instrument used in this study were not formally established; however, the questionnaire was reviewed by two experts with extensive experience in sports science and psychometric scale. Future studies should develop and validate multi-item scales for key constructs. Fifth, this study employed a cross-sectional design, which precludes the establishment of causal relationships. Finally, our adoption of a broad inclusion criterion (at least one

month of regular activity) was intended to capture a spectrum of practitioners, but it may have introduced heterogeneity that could influence the findings.

Regarding strengths, this study surveyed a relatively large sample (n = 400) of real-world gym practitioners across different training modalities, including both supervised and unsupervised trainees, and combined descriptive and association analyses with effect sizes. These features offer pragmatic insights for professionals working in community and fitness settings.

4.3. Practice implications

Awareness is the key to understanding and carrying out physical assessments. One of the challenges for health professionals is making the lay public aware of the importance of physical assessments. It is necessary to address the need for practitioners of regular physical exercise to carry out these evaluations periodically and emphasize the importance of a well-trained professional so that knowledge about physical exercise, and especially physical assessment, can be widely transmitted and interest can be generated among people. Thus, personal trainers have the task of providing adequate guidance related to tests, which will contribute to the development of the participants. Such guidance will help improve the training method and raise the awareness of their audience. Therefore, future studies investigating knowledge, perception, and attitudes about physical fitness assessment among exercise and sport science professionals are needed.

4.4. Conclusions

Overall, the present study showed that participants presented positive perceptions about physical fitness assessment (e.g., frequency of performing a physical assessment, the usefulness of physical assessments, and the importance of physical assessment to monitor the effects of physical training).

CRediT authorship contribution statement

Wellington Fernando da Silva: Conceptualization. **Ricardo Borges Viana:** Conceptualization. **Hudson Rosa da Silva:** Conceptualization. **Rizia Rocha-Silva:** Formal analysis, Methodology, Software, Visualization, Writing - original draft, Writing - review. **Naiane Silva Morais:** Conceptualization. **Douglas Assis Teles Santos:** Conceptualization. **Rodrigo Luiz Vancini:** Conceptualization. **Marilia Santos Andrade:** Conceptualization. **Katja Weiss:** Writing – review & editing. **Beat Knechtle:** Writing – review & editing. **Claudio Andre Barbosa de Lira:** Conceptualization.

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Declaration of competing interest

None.

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Appendix A. - supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jbmt.2025.11.023.

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