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APPLICATION OF QUESTIONNAIRES IN ADDITION TO EVALUATING PHYSICAL ACTIVITY LEVELS

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Abstract: *This study systematizes the fields in which walking tests are used and the questionnaires most frequently associated with them in scientific studies published over the last year in the medical database PubMed. A total of 45 out of 46 identified Randomized Controlled Trials with Free Full Text were analyzed. In 91% of the studies, the 6-minute walk test was the primary assessment tool. The test was mainly applied in cardiovascular (33%) and respiratory disorders (31%), followed by COVID-19-related conditions (20%). The accompanying questionnaires focused on specific disease-related assessment (33%), quality of life (27%), mental health (23%), and physical activity (17%). The findings highlight the 6-minute walk test as a widely preferred method for evaluating cardiorespiratory function and support the complementary use of questionnaires, particularly those assessing physical activity, in screening and prevention research.*

Key words: *walk test, questionnaire, physical activity.*

1. Introduction

The importance of the level of physical activity for the prevention and course of several socially significant diseases and dysfunctions is the subject of study by many researchers. The idea of developing a test for assessing functional capacity through walking dates back to the last century and belongs to Balke B et al. [3]. Afterward, a 12-minute field functional capacity test was developed by Cooper KH to assess the physical fitness of healthy individuals [6]. McGavin CR et al. [10] applied a 12-minute walk test to individuals with chronic bronchitis, and later Butland R presented the 6- and 12-minute walk test to patients with respiratory diseases. The American Thoracic Society states that Solway S. highlights the use of the 6-minute walk test as better tolerated [2]. The 6-minute walk test (6MWT) is one of the most widely used tests to assess physical activity levels. It is included as a primary outcome in a large number of studies. Depending on the objectives of the study, their methodology usually includes specific indicators, as well as questionnaires with different orientations.

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In the available literature, we have not found a systematization of the directions for applying the walking test, as well as the combination of the application of the test with different questionnaires. This necessitates a systematic review that would systematize existing trends in the methodology of contemporary scientific research.

This systematic review aims to summarize the directions in which the walking test is used and how it is combined with various questionnaires in scientific studies published in the medical database PubMed.

The specific research questions we posed include: 1. In which areas of diseases and dysfunctions is the assessment of the level of physical activity through walking tests most often applied? 2. What are the types of questionnaire directions that are combined with the application of a walking test, and 3. What is the essence of the most commonly used questionnaires?

2. Methods

2.1. Research methodology

Population

No population-related restrictions were placed on those included in this literature review in terms of age, gender, race, etc.

Intervention

The study included scientific studies that were related to the application of a walk test and a questionnaire.

Outcomes

The studies included in the analysis had a walking test described in the results.

2.2. Study Design

Publication Characteristics

The main inclusion criteria for this study were that the studies were Randomized Controlled Trials. Studies published in the last year (from January 2025 to January 2026) in English were included. Other criteria are publications with published free full text in the medical database PubMed.

Data synthesis groups

For the synthesis, the studies were grouped according to: walking tests applied, areas of diseases and dysfunctions; types of questionnaire areas that are combined with the application of walking tests.

Justification of the limitations

The time restriction of including studies from the last year was imposed in consideration of including the most recently published studies and optimizing the scope of the included studies. The language restrictions were imposed due to a lack of resources for reliable translation.

A systematic search using the keywords “walk test+ questionnaire” was conducted in the medical database PubMed, with the last search being conducted on Saturday, January 31, 2026. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews [12] was used as a guiding guideline in structuring the study.

3. Results and Data analysis and Interpretation

When searching PubMed with the keywords “walk test + questionnaire” and the restrictions: period 1 year; Free full text; Randomized Controlled Trial, the results obtained were 46 studies. In this systematic review, 45 studies were analyzed, as one study whose full text was

not in English was excluded from the results. Data were collected for the following outcome domains: 1. Applied walking tests; 2. Disease and dysfunction areas; 3 Number of participations studied; 4. Follow-up duration: 5. Questionnaires included in the research methodology: 6. Questionnaire domains.

3.1. Applied walking tests

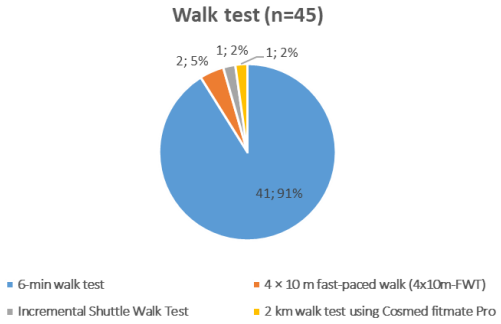

Fig 1. *Walk tests*

The six-minute walk test was used in 91% of the studies. Other tests used are: Incremental Shuttle Walk Test; 4 × 10 m fast-paced walk (4x10m-FWT); 2 km walk test using the Cosmed fitmate pro device.

The six-minute walk test is a method for objectively assessing functional capacity, and its performance standard has been developed in detail by the American Thoracic Society [2]. The test measures how far a patient can walk quickly on a flat, hard surface in 6 minutes. The typical walking route is 30 m (indoors or outdoors), with the distance marked every three meters and a cone placed at the end to indicate the place to reverse the direction of walking. The starting line is also marked. The test taker counts the number of sixty-meter laps and adds the length of the incomplete lap. Using a treadmill to perform the test is a technical convenience, but it is not recommended, as the patient cannot determine their own walking pace, and this changes the final result. For patients with cardio-respiratory diseases, it is necessary to provide a chair, an oxygen source, a sphygmomanometer, a telephone, and an automated electronic defibrillator. The test is performed without a warm-up. Before the test, the patient sits in a chair in a calm state for 10 minutes and must not have performed any strenuous exercise for two hours before the test. The test can be combined with pulse oximetry. In this case, the pulse rate (HR) and oxygen saturation (SpO2) are recorded as baseline data. Before and after the test, the degree of fatigue and possible dyspnea are assessed using the Borg scale.

Reference values for the test in healthy adult populations are not well established. The American Thoracic Society encourages researchers to move forward in this area, taking into account gender, age, weight, and other factors that may affect the result.

Incremental Shuttle Walk Test

The essence of the test is to achieve the maximum distance traveled within 12 minutes, at a sound-set pace and increasing speed. There are 12 speeds, starting at 0.5 meters per second and increasing each time by 0.17 meters per second. Blood pressure, pulse rate, and Borg dyspnea scale are measured before and after the test. Oxygen saturation is measured at the beginning and during the measurement. During the test, the patient is guided by an audible signal indicating the increase in speed. The practical measurement is performed by marking a 10-meter distance between two cones [4].

4 × 10 m fast-paced walk (4x10m-FWT)

The subject walks around two cones 10 meters apart as fast as possible twice, while keeping track of time. Before the actual timekeeping, the patient performs a test (preparatory) lap at a submaximal pace [15].

2 km walk test using the Cosmed fitmate pro device

The 2-kilometer brisk walking test is an indicator of cardiorespiratory fitness in healthy adults. The test is performed using a treadmill and a device that has pre-set data for the test subjects (height, weight, body composition). During the walk, the device analyzes submaximal VO2 [14].

3.2. Domains of disease and dysfunction

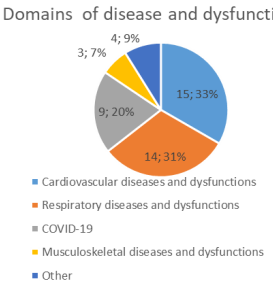

Fig. 2. *Domains of disease and dysfunction*

We systematized the conducted research into the following areas: cardiovascular diseases and dysfunctions, respiratory diseases and dysfunctions, musculoskeletal diseases and dysfunctions, COVID-19, and various other diseases. The largest percentage of studies is related to the application of walking tests in patients with cardiovascular (33%) and respiratory diseases (31%). Walking tests are also applied in musculoskeletal dysfunctions, post-COVID-19 (again in relation to cardiorespiratory function), as well as in healthy individuals (Figure 2).

3.3. Number of participations studied

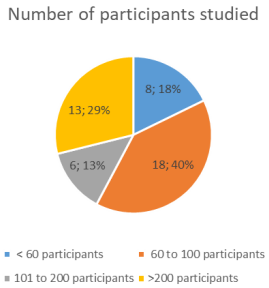

Fig 3. *Number of participations studied*

For the analysis, we grouped the studies according to the number of subjects studied into four categories, shown in Figure 3. The study population comprised between 60 and one hundred participants in 40% of the studies. It is striking that a significant percentage of the studies (29%) included over 200 participants. This is the reason for the large total number of subjects presented in this study, namely, 8,615 people tested with walking tests.

3.4. Follow-up duration

Figure 4 presents the duration of follow-up of the studies we analyzed.

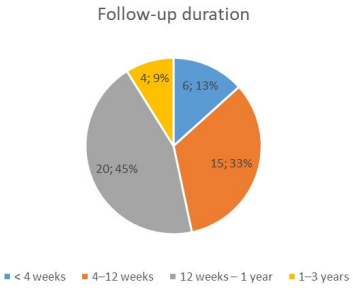

Fig. 4. *Follow-up duration*

The duration of follow-up of the results ranged from 5 days to 36 months. We grouped the duration of follow-up into four categories. 45% of the studies were between 12 weeks and one year in duration, followed by studies. The second longest follow-up (33%) was between one and three years. Along with studies in which walking tests are a method for reporting treatment effects, there are also those that look for correlation between individual assessment methods, and accordingly, follow-up is not applicable.

3.5. Questionnaires included in the research methodology

Table 1 lists in alphabetical order the questionnaires that are included in the methodology of the studies we analyzed. They are systematized by direction and repeatability. The number of studies (n) in which the respective questionnaire was used is indicated.

Table 1

Questionnaire, Scale, Abbreviation	Domains	n
7-item falls efficacy scale-international (FES-I)	PA	1
11-point Numerical Rating Scale (NPRS)	QL	1
12-item MS Walking Scale (MSWS)	PA	1
Acceptance and Action Questionnaire-Version 2 (AAQ-II)	MH	1
Anxiety Sensitivity Index-3 (ASI-3)	MH	1
Asthma Quality of Life Questionnaire (AQLQ)	MH	1
Brief Illness Perception Questionnaire Score (BIPQ)	MH	1
COPD assessment test (CAT) questionnaire	SQ	6
Clinical COPD Questionnaire 24 h and 7 days (CCQ)	SQ	1
Depression Anxiety Stress Scale	MH	1
Dyspnoea-12 (D-12)	SQ	2
EQ-5D-5L index	QL	6
EQ-5D-5L VAS	QL	1
EQ-VAS (EuroQoL Visual Analog Scale)	QL	1
Exercise Sensitivity Questionnaire (ESQ)	PA	1
Extra-muscular global VAS	MH	2
Fatigue Severity Scale (FSS)	QL	2
Generalized Anxiety Disorder-7 (GAD-7)	MH	2
Global Physical Activity Questionnaire (GPAQ)	PA	1
Health Assessment Questionnaire Disability Index (HAQ Disability Index)	PA	1
Health-related quality of life (HRQoL) MacNew questionnaire	QL	1
Hip Disability and Osteoarthritis Outcome Score (HOOS)	PA	1
Hospital Anxiety and Depression Scale (HADS)- A	MH	6
Hospital Anxiety and Depression Scale (HADS)- D	MH	4
International Physical Activity Questionnaire (IPAQ) Short form	PA	3
Kansas City Cardiomyopathy Questionnaire–Clinical Summary Score (KCCQ-CSS)	SQ	1
Kansas City Cardiomyopathy Questionnaire overall summary score (KCCQ-OSS)	SQ	7
Knee Injury and Osteoarthritis Outcome Score (KOOS)	PA	1
London Chest Activity of Daily Living Scale (LCADL)	PA	1

Questionnaire, Scale, Abbreviation	Domains	n
MD global disease activity VAS	SQ	1
mMRC: modified Medical Research Council dyspnea scale	SQ	4
MRC Dyspnea Score	SQ	1
Modified Covid-19 Yorkshire Rehabilitation Scale C19-YRSm	SQ	1
Newcastle Satisfaction with Nursing Scales score	QL	1
Nijmegen questionnaire	SQ	1
Nutrition Knowledge Score	SQ	1
Patient global disease activity VAS	QL	1
Patient Health Questionnaire-4 (PHQ-4)	MH	1
Patient Health Questionnaire-9 (PHQ-9)	MH	4
Personal Health Questionnaire Depression Scale-8	MH	1
Physical activity scale for individuals with physical disabilities (PASIPD)	PA	1
Post-COVID-19 Functional Status (PCFS)	SQ	1
Patient-Reported Outcomes Measurement Information System (PROMIS questionnaires)	QL	1
Pulmonary VAS	SQ	1
Quality of Life-8 Dimensions (AQol-8D)	QL	1
QLQ-C30 questionnaire	QL	1
Oxford Knee Score (OKS)	SQ	1
Roland Morris Disability Questionnaire (RMDQ)	SQ	2
Self-administered chronic respiratory questionnaire (CRQ-SA)	SQ	3
Self-Efficacy for Managing Chronic Disease scale	MH	1
Self-Rating Anxiety Scale (SAS)	MH	1
Self-Rating Depression Scale (SDS)	MH	1
Short-Form Health Survey 12 (SF-12)	QL	1
Scale for Evaluating Rehabilitation-Participation (USER-P)	SQ	1
Sleep Disturbance Numerical Rating Scale (Sleep Quality NRS)	QL	1
St. George's Respiratory Questionnaire (SGRQ)	SQ	1
UCSD dyspnoea score	SQ	6
University of California San Diego Shortness of Breath Questionnaire	SQ	1
VAS pain scores (0–10 scale)	QL	1
VAS health-related quality of life (HR-QoL) 0–100	QL	3
Walking Impairment Questionnaire distance score	PA	1
Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)	SQ	1
World Health Organization scores (WHOQOL-BREF)	QL	1
World Health Organization Well-Being Index (WHO-5)	QL	2

In our systematic review, we found that 64 different questionnaires were included in the research methodology. Of these, 47 questionnaires (73%) were used once in the studies we analyzed, while another 17 (27%) were included in more than one study. We systematize the repeated questionnaires in descending order - Kansas City Cardiomyopathy Questionnaire–Clinical Summary Score (KCCQ-CSS) (7 times); COPD assessment test (CAT) questionnaire (6 times); EQ-5D-5L index (6 times); Hip Disability and Osteoarthritis Outcome Score (HOOS) (6 times); St. George's Respiratory Questionnaire (SGRQ) (6 times); Hospital

Anxiety and Depression Scale (HADS)- A (4 times); MD global disease activity VAS (4 times); Patient Health Questionnaire-4 (PHQ-4) (4 times); Hospital Anxiety and Depression Scale (HADS)- D (3 times); Roland Morris Disability Questionnaire (RMDQ) (3 times); VAS pain scores (0–10 scale). (3 times); Dyspnoea-12 (D-12) (2 times); Extra-muscular global VAS (2 times); Fatigue Severity Scale (FSS) (2 times); Generalized Anxiety Disorder-7 (GAD-7) (2 times); Oxford Knee Score (OKS) (2 times); World Health Organization Well-Being Index (WHO-5)(2 times). Seven of the repeated questionnaires are related to a specific assessment of dysfunction; five are related to mental health; four are for assessing quality of life, and one is for assessing physical activity.

3.6. Questionnaire domains

Figure 6 presents the systematized areas of the questionnaires used in the studies we analyzed.

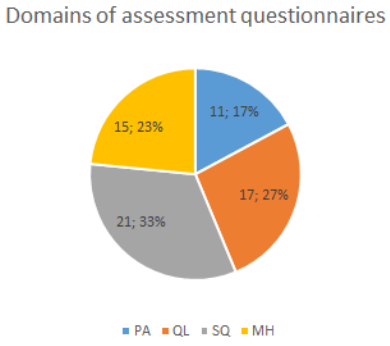

Fig. 6. *Questionnaire domains*

Four areas of the questionnaires are systematized, which are relatively evenly represented. We defined the first group of questionnaires as those related to a specific assessment of function/dysfunction/symptoms and characteristics of a certain condition or disease. 21 questionnaires, or 33% of all questionnaires, were used. In second place in terms of application were questionnaires related to the assessment of quality of life – 17 questionnaires (27%). 15 questionnaires (23%) were used to assess mental health, and 11 questionnaires (17%) to assess physical activity.

4. Discussion

The present study demonstrates an established trend for researchers to use a combination of walking tests and questionnaires of different natures in their methodologies. While the preference for using walking tests is clearly directed towards the 6-minute test, the large number and variety of questionnaires used is striking. While the preference for using walking tests is definitely towards the 6-minute test, the large number and variety of questionnaires used is striking.

As expected, walking tests have been applied mostly to assess cardiorespiratory function. The ease of application of the tests and their high informativeness are directly related to their potential for application in clinically healthy individuals and screening studies for health prevention.

In the studies reviewed, the specific tests used are mostly related to respiratory and cardiovascular diseases. There are also questionnaires related to musculoskeletal dysfunctions, as well as those developed according to the specifics of post-COVID conditions.

In this discussion, we will focus our attention specifically on the possibilities for applying questionnaires in the context of health prevention and health promotion.

Several areas are differentiated, and below we provide examples. For the area of physical activity assessment – 7-item falls efficacy scale-international (FES-I) [8]; 12-item MS Walking Scale (MSWS)[8], Global Physical Activity Questionnaire (GPAQ); For the area of mental – Generalized Anxiety Disorder-7 (GAD-7)[17], Hospital Anxiety and Depression Scale (HADS)- A [17], Patient Health Questionnaire-4 (PHQ-4)[1 BERY]; Patient Health Questionnaire-9 (PHQ-9)[4]; For quality of life direction – EQ-5D-5L index [9], EQ-5D-5L VAS, Fatigue Severity Scale (FSS) [4]; Quality of Life-8 Dimensions (AQol-8D)[1], Short-Form Health Survey 12 (SF-12)[17], World Health Organization scores (WHOQOL-BREF)[7], World Health Organization Well-Being Index (WHO-5)[8].

Physical activity, mental health, wellness, and overall well-being are directly related and should be the focus of initiatives related to health promotion and health prevention. A first step towards promoting a healthy lifestyle is to focus attention on the assessment and self-assessment of physical activity, the level of anxiety, as well as the subsequent education of the population in the correct attitude and other key factors related to nutrition and the identification of harmful habits. Completing structured questionnaires is a useful tool in the process of transitioning to a healthy lifestyle and, accordingly, accepting personal responsibility for one's own health.

In the context of health promotion, achieving the set goals and taking minimal time to complete, shorter questionnaires are a natural first choice. The advantages of questionnaires, including a larger number of questions, are, of course, in the possibility of deeper insight and revealing specifics of the subject areas.

5. Study limitations

The main limitation of the study is the fixed follow-up period of one year. Another limitation of the study is that only Free Full-Text studies were analyzed.

6. Conclusions

The 6-min walk test is a preferred method for assessing cardiorespiratory function and can be applied in the methodology of screening studies for the prevention of conditions and diseases related to cardiorespiratory activity. In this context, the widespread use of questionnaires to assess physical activity could be particularly beneficial.

7. Support

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