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ORIGINAL RESEARCH

Measurement properties of the Human Activity Profile questionnaire in hospitalized patients

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Abstract

Objective: To test the measurement properties (reproducibility, internal consistency, ceiling and floor effects, and construct validity) of the Human Activity Profile (HAP) questionnaire in hospitalized patients.

Methods: This measurement properties study recruited one-hundred patients hospitalized for less than 48 h for clinical or surgical reasons. The HAP was administered at baseline and after 48 h in a test–retest design). The International Physical Activity Questionnaire (IPAQ-6) was also administered at baseline, aiming to assess the construct validity. We tested the following measurement properties: reproducibility (reliability assessed by type 2,1 intraclass correlation coefficient (ICC_{2,1}); agreement by the standard error of measurement (SEM) and by the minimum detectable change with 90% confidence (MDC₉₀), internal consistency by Cronbach's alpha, construct validity using a chi-square test, and ceiling and floor effects by calculating the proportion of patients who achieved the minimum or maximum scores).

Results: Reliability was excellent with an ICC of 0.99 (95% CI = 0.98–0.99). SEM was 1.44 points (1.5% of the total score), the MDC₉₀ was 3.34 points (3.5% of the total score) and the Cronbach's alpha was 0.93 (alpha if item deleted ranging from 0.94 to 0.94). An association was observed between patients classified by HAP and by IPAQ-6 ($\chi^2 = 3.38$; $p = 0.18$). Ceiling or floor effects were not observed.

Conclusion: The HAP shows adequate measurement properties for the assessment of the physical activity/inactivity level in hospitalized patients.

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Introduction

Physical activity level is an important predictor of hospital admission, complications, and mortality in patients with chronic diseases, such as chronic obstructive pulmonary disease¹ and heart failure,² and acute diseases, such as spinal cord injury³ and acute myocardial infarction.⁴ Inactive patients are more likely, in daily life, to develop complications after surgeries^{5,6} and hospital readmission.^{7,8} This susceptibility to worse outcomes is probably associated with more comorbidities and a lower recovery capacity.⁹ On the other hand, patients with a high physical activity level in daily life are more likely to recover early in the postoperative period,¹⁰ accelerating their hospital discharge and reducing their functional impairment, immobilization, mortality rate, and healthcare costs.^{11,12} Therefore, assessing the level of physical activity before hospital admission is important to detect inactivity in the daily life of hospitalized patients aiming to develop strategies for early rehabilitation, such as muscle strengthening and improved fitness, which can reduce the risk of poor outcomes.

There are many methods to assess physical activity level in daily life, such as questionnaires, accelerometers and pedometers.¹³ A good measurement tool should take into account the frequency, intensity, and duration of physical activity.¹⁴ Other aspects to consider when choosing a measurement tool to be used in clinical studies would involve the costs, the sample size, the time and number of assessors available for data collection.¹⁴ Questionnaires have been increasingly used in healthcare research and in clinical practice due to their low cost and ease of administration.¹⁵ In a hospitalized population, questionnaires are especially useful because they can assess the level of physical activity in daily life before hospital stay.¹³ On the other hand, although the accelerometers and pedometers are more precise measurement tools, they can only be useful to measure physical activity level when the patients are available for data collection, e.g., during hospital stay or before admission to hospital).¹³

The accuracy of information obtained by a questionnaire depends on three aspects: (1) whether the patient understands the questions properly,¹⁶ (2) ease of the scoring system, and (3) measurement properties' estimates on the target population.¹⁷ We are unaware of any questionnaires aimed at assessing physical activity levels in the daily life of hospitalized patients in general that have had their measurement properties tested. The only exception is a previous study that tested the measurements properties of the Human Activity Profile (HAP) questionnaire in hospitalized patients after allogeneic hematopoietic stem cell transplantation.¹⁸ The authors showed good results, indicating that it can be an appropriate questionnaire for hospitalized patients in general.

The International Physical Activity Questionnaire (IPAQ-6) is one of the most widely used questionnaires in health care practice to assess level of physical activity. The IPAQ-6 considers the intensity of physical activity in a patient's routine, at work, at home, and means of transportation.¹⁹ The weaknesses of this questionnaire are that it considers only the last days of activities, it does not have an objective score, and it is too extensive.²⁰ A questionnaire that evaluates the

physical activity levels in daily life and that has been increasingly used worldwide is the HAP.^{21,22} This questionnaire has been used in both healthy and symptomatic population as it assesses physical activities ranging from very easy to very strenuous.²¹ The HAP estimates the energy expended in daily activities and physical fitness.^{21,22} The questions involve self-care activities, work, social activities and exercise, and activities that require the use of muscle groups of the hands, legs, and trunk and the use of wheelchairs.²³ A systematic review showed that the HAP's measurement properties are consistent, but limited in multiple languages and populations with different chronic conditions.²³ Furthermore, this systematic review also suggested that some measurement properties, such as the minimum detectable difference of the HAP, still need to be better investigated, possibly due to the small samples enrolled in the previous studies.²³ Although the HAP has already been translated and cross-culturally adapted to Portuguese, its measurement properties have not been tested in the Brazilian population.²¹

Therefore, the objective of this study was to test the reproducibility (reliability and agreement), internal consistency, construct validity, and ceiling and floor effects of the Human Activity Profile questionnaire administered to hospitalized patients.

Methods

Participants

The study included one-hundred consecutive patients admitted to a university hospital for less than 48 h for clinical or surgical reasons (during the preoperative period). The inclusion criteria were patients over 18 years old, able to read and understand the questionnaires, expected to remain hospitalized for at least three days, able to perform activities of daily living (with or without assistance) and not bedridden.

According to the COSMIN guidelines to conduct reproducibility, construct validity, and ceiling and floor effect analyses, a sample of 100 patients is required.^{24,25} Therefore, a sample size of 100 patients^{24,25} was chosen. This study was approved by the Ethics Committee of Hospital das Clínicas (CAAE: 06324412.9.0000.0068), São Paulo, SP, Brazil, and all participants signed an informed consent form prior to data collection.

Procedure

All participants answered the HAP and IPAQ-6 questionnaires to provide the baseline data. After 48 h, all patients answered the HAP again. This time interval was chosen to prevent changes in clinical status between the test and retest as the need for referral to intensive care unit or change in level of consciousness would make the administration of the questionnaire impossible.

Instruments

Human Activity Profile (HAP): The HAP was cross-culturally adapted to Brazilian Portuguese by Souza et al.²¹ The items of this instrument do not focus on a specific time point, and the patient is asked to indicate whether they are "still doing

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