

Brief Report

The Relationship Between Two Performance Scales: New York Heart Association Classification and Karnofsky Performance Status Scale

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Abstract

Context. Performance status is used to quantify the well-being and functional status of people with illness. Clinicians and researchers from differing fields may not instinctively understand the scales, typically disease specific, used in other disciplines.

Objectives. To provide a preliminary description of the relationship between the Karnofsky Performance Status Scale (KPS) and the New York Heart Association Classification (NYHA) and to stimulate discussion in research and clinical practice.

Methods. Simultaneous KPS and NYHA data (172 observations) from three studies of people with chronic heart failure were pooled. Linear regression was used to predict the mean KPS from NYHA. The strength of association between the scales was investigated using a Kendall's Tau-b correlation coefficient. The agreement between the predicted and observed KPS scores was investigated using weighted kappa with quadratic weights.

Results. Linear regression demonstrated a relationship between KPS and NYHA ($P < 0.0001$; $R^2 = 0.3$). Predicted KPS from NYHA class rounded to the nearest 10 gave the following values: Class I, predicted KPS 90%; Class II, predicted KPS 80%; Class III, predicted KPS 70%; and Class IV, predicted KPS 60%. A moderate strength of association between KPS and NYHA (Kendall's Tau-b correlation

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coefficient of -0.49 ; $P < 0.0001$) and agreement between observed and predicted KPS (kappa coefficient = 0.52) was shown.

Conclusion. We suggest that the NYHA discriminates poorly between clinically important performance states in people with advanced disease (NYHA III and IV; KPS $< 50\%$). The KPS, used in conjunction, would provide useful additional information in research and clinical practice. *J Pain Symptom Manage* 2014;47:652–658. © 2014 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.

Key Words

Performance status, Karnofsky Performance Status Scale, New York Heart Association Classification

Introduction

Performance status (PS) is used to quantify quickly the general well-being of people with illness and their ability to perform activities of daily living.^{1–3} It is usually a proxy measure estimated by the clinician or researcher and influences the decision to apply treatment regimens, particularly with regard to conservative vs. nonconservative care, and to plan capacity for self-care. There are several well-established measures, although routine clinical use is uncommon except as an aid to decision making in oncology (e.g., “Is this patient fit enough to receive chemotherapy?”) and as an estimate of disease severity in heart failure. In the research setting, PS often forms part of eligibility criteria and provides an intuitive description of the population studied.⁴

The choice of PS instruments typically aligns with disease-specific disciplines (e.g., oncology, cardiology, geriatrics). Little is known how the different discipline-specific scores relate to each other, and clinicians and researchers may not instinctively understand the descriptions used in other fields. This is an issue in the context of multiple chronic illnesses and a particular problem for palliative care clinicians and researchers, as palliative care serves as a single catchment for people with progressive severe disease irrespective of the diagnosis. Palliative care clinicians must intuitively create an “equals sign” to align severity of illness across diseases (e.g., metastatic cancer, heart failure, obstructive lung disease) to match clinical interventions with needs and define research populations.

A common understanding of regularly used PS measures in varying disease groups is

needed. Furthermore, a common measure would help clinicians to appraise the relevance of research reports to their own practice and would aid pooling of data sets for secondary analyses.

In this article, we focus on a commonly used PS measure in cancer—the Karnofsky Performance Status Scale (KPS), and one from cardiology—the New York Heart Association Classification (NYHA), to demonstrate the issue. We present a preliminary exploration of the direct relationship between the KPS and NYHA as a hypothesis-generating exercise intended to stimulate discussion and prospective research and outline a pathway for current and future clinical practice.

Methods

Description of Scales

Karnofsky Performance Status Scale. The KPS, first described in 1948, is regarded as the gold standard performance scale for cancer patients.⁵ It correlates well with physical functioning across its 11 ordinal measures and with survival at lower levels. Modified versions based on functional ability rather than the original focus on the place of care have been devised. The most recent (Australian-modified KPS) is most predictive of survival and has better face validity at the lower end of the scale.⁶ Importantly, patient and clinician rating have been assessed.³

New York Heart Association Classification. The NYHA was first developed in 1928 and has undergone several revisions, the latest in 1994.⁷ However, the measure is highly dependent

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