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Medication Compliance and Persistence: Terminology and Definitions

Joyce A. Cramer, BS,[1] Anuja Roy, MBA, MSc,[2] Anita Burrell, MBA,[3] Carol J. Fairchild, PhD,[4] Mahesh J. Fuldeore, PhD, RPh, MBA,[5] Daniel A. Ollendorf, MPH,[6] Peter K. Wong, PhD, RPh, MS, MBA[7]

[1]Yale University School of Medicine, New Haven, CT, USA; [2]West Virginia University, Morgantown, WV, USA; [3]Sanofi-Aventis, Paris, France; [4]Alcon Laboratories, Ft. Worth, TX, USA; [5]TAP Pharmaceuticals, Lake Forest, IL, USA; [6]PharMetrics, Watertown, MA, USA; [7]Mercy Health Partners, Southwest Ohio, Cincinnati, OH, USA

ABSTRACT

Objective: The aim of the study is to provide guidance regarding the meaning and use of the terms "compliance" and "persistence" as they relate to the study of medication use.

Methods: A literature review and debate on appropriate terminology and definitions were carried out.

Results: Medication compliance and medication persistence are two different constructs. Medication compliance (synonym: adherence) refers to the degree or extent of conformity to the recommendations about day-to-day treatment by the provider with respect to the timing, dosage, and frequency. It may be defined as "the extent to which a patient acts in accordance with the prescribed interval, and dose of a dosing regimen." Medication persistence refers to the act of continuing the treatment for the prescribed duration. It may be defined as "the duration of time from initiation to discontinuation of therapy." No overarching term combines these two distinct constructs.

Conclusions: Providing specific definitions for compliance and persistence is important for sound quantitative expressions of patients' drug dosing histories and their explanatory power for clinical and economic events. Adoption of these definitions by health outcomes researchers will provide a consistent framework and lexicon for research.

Keywords: adherence, compliance, definitions, persistence, terminology.

Introduction

Inadequate medication compliance and persistence are age-old problems. When taken in varying degrees of deviation from the prescribed dosing regimen, medications have situation-specific alterations in benefit/risk ratios, either because of reduced benefits, increased risks, or both. Numerous studies have demonstrated that inadequate compliance and nonpersistence with prescribed medication regimens result in increased morbidity and mortality from a wide variety of illnesses, as well as increased health-care costs [1–5]. Factoring in actual compliance and persistence is central to an accurate assessment of effectiveness and cost-effectiveness of therapy [6]. Health outcome and cost-effectiveness analyses incorporating measures of medication usage have been hampered by the lack of uniformity in standards of definitions and measurements used to describe the concepts of medication compliance or persistence [7]. Health outcomes researchers need general and operationally useful definitions that would help in standardizing the literature, in building a common platform for comparing and combining results, and for aiding in the development of effective and efficient intervention strategies to enhance medication compliance and persistence.

The International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Medication Compliance and Persistence Work Group developed definitions for compliance and persistence during 3 years of international review and discussion. The purpose of this article is to provide guidance regarding the meaning of the terms "compliance" and "persistence," to define them as two separate constructs, and to provide some examples of how to operationalize them for use in research.

Address correspondence to: Joyce A. Cramer, Department of Psychiatry, Yale University School of Medicine, 950 Campbell Avenue (151D), West Haven, CT 06516-2770, USA. E-mail: joyce.cramer@yale.edu

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Methods

Terminology

Selection of "compliance" as the primary term and "adherence" as a synonym was based on similar usage by indexing services (e.g., MEDLINE, PubMed). We

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found no authoritative support for the assumption that "adherence" is a less derogatory term or whether it is preferred by patients. Commenting on the proliferation of terms representing compliance, Feinstein [8] described reasons why such synonyms were not superior terms: "Adherence seems too sticky; Fidelity has too many connotations; and Maintenance suggests a repair crew. Although Adherence has its adherents, Compliance continues to be the most popular term."

Literature Review of Definitions

We reviewed English-language reports of compliance, adherence, or persistence during the period from 1966 to 2005. Investigations have also used disease-specific or study-specific operational definitions, sometimes mixing the terms compliance, adherence, and persistence without adequate delineation. Some authors carefully separate compliance data from persistence data but use the term adherence to combine the two sets of results without a rationale or stated metric. The use of arbitrary categories of good and poor compliance (often set at 80%) usually was unsupported by research documenting the appropriateness of the cutoff for a specific medication class or disease (e.g., lack of sensitivity testing or link to outcome) [9]. Reports rarely document that lower compliance might be a more precise cutoff point (e.g., 50% or 75%).

Most of the suggested definitions offered no concrete guidance to researchers in methodological or operational approaches. The result has been a series of general reviews over the past 30 years, revealing the difficulty of presenting a composite view of compliance, other than to say that patients take less medication than prescribed [10–15]. The development of electronic monitors to assess compliance improved the reliability of the data but did little to address the confusion created by variations in operational definitions [16,17].

Similarly, a review of the persistence literature revealed that, although different aspects or constructs have generally been measured under the heading "persistence," it was not uncommon to have the same measures referred to by different names (e.g., persistency, continuous adherence, and discontinuation rates). "Persistence" has been reported in chronic prevention therapies and described as the time of continuous therapy, demarcated by the time from initiation of therapy to discontinuation of therapy [18–20]. Persistence was found to be operationally defined alternatively as the time between refills, number of refills, renewal of prescription with an allowance for a prespecified gap [21,22], the proportion of patients dispensed a certain number of days' supply of medication [23,24], as well as the proportion of patients continuing to refill prescriptions after a specified time interval. Some arbitrary measures such as longer duration of therapy or greater number of patients completing the therapy, or the proportion of patients receiving some kind of therapy after commencement of treatment have also been used to define persistence [25,26]. Many reports measure persistence but call it compliance and vice versa [27].

Results

The ISPOR Work Group completed 3 years of review and discussion at five international conferences, as well as review and response to drafts on the website. We propose definitions for two discrete terms to describe two aspects of medication-taking behavior (Fig. 1). Conceptually, compliance and persistence represent two constructs that are based on one's belief in the efficacy of the medication, the severity of their illness, and their ability to control it with medication. Compliance follows the initial appraisal of the health threat and behavioral changes to develop the habit of taking

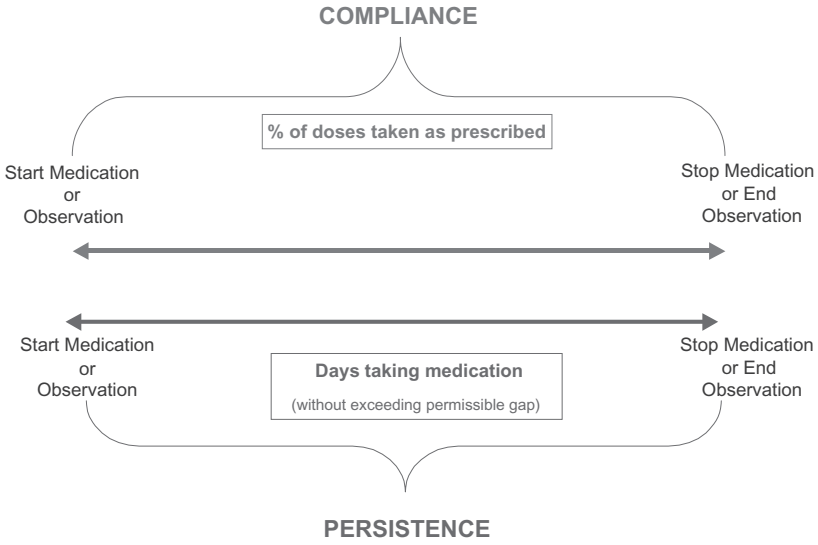

Figure 1 Definitions of compliance and persistence.

Table 1 Compliance rates by time period. Compliance for the first 4 weeks was 100% (28/28 days), declining to 36% (10/28 days) in the second month, or 68% overall for 2 months (28 + 10/56 days)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
I	I	I	I	I	I	I
I	I	I	I	I	I	I
I	I	I	I	I	I	I
I	I	I	I	I	I	I
I				I		
I		I		I		I
	I					
I			I	I		

medication in accordance with the physician's prescription (time, quantity, and frequency).

Proposed Definitions

Medication compliance. Medication compliance (synonym: adherence) refers to the act of conforming to the recommendations made by the provider with respect to timing, dosage, and frequency of medication taking. Therefore medication compliance may be defined as "the extent to which a patient acts in accordance with the prescribed interval and dose of a dosing regimen." Compliance is measured over a period of time and reported as a percentage (Fig. 1). This definition is operationalized in prospective assessments as dose taking in relation to what was prescribed. Table 1 shows compliance patterns for a patient prescribed a once-daily medication. Electronic monitoring provides sufficient details to calculate the number of doses taken daily as well as whether the doses were taken at appropriate intervals (e.g., approximately 12 hours apart for a twice-daily dosing). Additional details can be obtained as number of days with extra doses or without any doses. The definition is operationalized in retrospective assessments as the number of doses dispensed in relation to the dispensing period, often called the "medication possession ratio (MPR)" [28]. Compliance with the prescription is assumed when the medication is dispensed. Retrospective prescription claims database analyses lack the details of daily dosing that are available with prospective electronic monitoring; however, as these tools are often the only sources available for assessing compliance, it is suggested that this caveat is noted when describing compliance in these instances.

Medication persistence. Medication compliance refers to the act of conforming to a recommendation of continuing treatment for the prescribed length of time. Therefore, medication persistence may be defined as "the duration of time from initiation to discontinuation of therapy" (Fig. 1). Continuing to take any amount of the medication is consistent with the definition of persistence. This definition can be operationalized in both prospective and retrospective assessments by determining the initiation of treatment, or a point in time during chronic treatment, to a point in time defined as the end of the observation period. Persistence analyses must include a prespecified limit on the number of days allowed between refills, considered the "permissible gap." Methods for gap determination should be based on the pharmacologic properties of the drug and the treatment situation (i.e., the maximum allowable period until when patients could go without a dose and not anticipate reduced or suboptimal outcomes) [29,30]. By definition, persistence is reported as a continuous variable in terms of number of days for which therapy was available. Persistence may also be reported as a dichotomous variable measured at the end of a predefined time period (e.g., 12 months), considering patients as being "persistent" or "nonpersistent."

Conclusions

Clinical outcomes of treatment are affected not only by how well patients take their medications but also by how long they take their medications. Thus, compliance and persistence should be defined and measured separately to characterize medication-taking behavior comprehensively. Addressing both compliance and persistence provides a richer understanding of medication-taking behavior. Determining the clinical sequelae of being fully or partially compliant or persistent is necessary before dichotomous declarations about "good" or "poor" compliance and persistence can be made.

The proposed definitions are focused on promoting consistency in terminology and methodology to aid in the conduct, analysis, and interpretation of scientific studies of medication compliance. The definitions are geared toward future standardization in medical research to allow for comparisons among reports, and use of compliance and persistence data for pharmacoeconomic evaluations. They will also assist researchers in re-evaluating both the earlier literature and its application in practice, with a better understanding of the differences between compliance and persistence measures. Standardization will facilitate health policy decisions based on consistent evidence. The adoption of these definitions will also help standardize the medical literature.

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