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TOOLS FOR ADVANCING PHARMACY PRACTICE

# Preliminary development of the Medication Nonpersistence Scale

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ABSTRACT

*Objectives:* To develop the Medication Nonpersistence Scale (MNPS)—a multi-item self-reported scale to measure medication persistence.
*Setting:* Six hundred seventy-five patients patronizing 3 separate independent community pharmacies in the southeastern United States participated in this research.
*Practice innovation:* The MNPS, a self-reported measure, developed to provide an estimate of, and reasons for, medication nonpersistence.
*Evaluation:* Cross-sectional survey data were linked with retrospective prescription fill data obtained from 3 independent community pharmacies in the southeastern United States. The MNPS factor structure was studied by means of confirmatory factor analysis (CFA), and its scale reliability and convergent validity were evaluated with the use of the results of this analysis. Its concurrent validity was tested against a standardized days-to-discontinuation measure calculated over the past 12 months, and an attempt was made to arrive at an optimum cutoff point to identify patients who have been nonpersistent with their medications.
*Results:* The survey yielded 675 usable patients. The CFA confirmed a single-factor solution with good model fit (root mean square error of approximation = 0.06 [90% CI 0.05-0.07]; comparative fit index = 0.96). Moderate to strong evidence of scale reliability (Cronbach alpha = 0.75; construct reliability = 0.94; index of composite reliability developed for binary items = 0.91), convergent validity (standardized factor loadings >0.5 and statistically significant), and concurrent validity (unstandardized regression coefficient = −3.97; $P = 0.03$) was observed. Individuals who score 1 or higher on the MNPS were considered to be nonpersistent.
*Conclusion:* The MNPS demonstrated good psychometric properties and offers a useful first step toward the self-reported measurement of medication persistence in clinical practice and research.


Medication nonpersistence refers to the stopping or discontinuation of a treatment regimen without a health care provider's consent.[1,2] Studies in patients with myocardial infarction, congestive heart failure, diabetes, hypertension, stroke, hypercholesterolemia, human immunodeficiency virus, etc. have demonstrated the detrimental clinical and economic effects of medication nonpersistence.[3-7]

Medication persistence is usually operationalized as the amount of time from initiation to discontinuation of treatment, or as a binary variable depicting whether the regimen was followed over the observation period.[1,2,6,8-10] Owing to the negative effects of nonpersistence,[3,6,7] identification of nonpersistent patients is important. Based on the recommendations by the National Collaborating Centre for Primary Care and the Royal College of General Practitioners (London) and National Institute of Health and Clinical Excellence (NICE) regarding the assessment of medication adherence, this may best be achieved by administering a self-reported measure in a clinical setting.[11] Though there are numerous self-reported measures of medication adherence in the scientific literature,[12] health care research and practice lack multi-item self-reported measures that can also help identify reasons for nonpersistence.

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**Key Points**

**Background:**

- Medication nonpersistence has been shown to have detrimental clinical and economic effects.
- Currently, there are no multi-item self-reported measures that can provide an estimate of medication nonpersistence and help to understand reasons behind it.

**Findings:**

- The MNPS demonstrated moderate to strong evidence of scale reliability, convergent validity, and concurrent validity.
- A score of 1 or higher on the scale was shown to indicate medication nonpersistence in patients' pharmacy prescription fill data.

## Objectives

The purpose of the present research was to develop the Medication Nonpersistence Scale (MNPS). Specifically, the objectives were to calculate scale reliability for the MNPS, provide evidence of its convergent and concurrent validity, and classify its scores into meaningful categories.

## Practice innovation

This report outlines the development of the MNPS. It is a self-reported measure designed to provide an estimate of a patient's medication persistence and to offer insights into reasons for nonpersistence. It also offers a self-reported estimate that is akin to "days to discontinuation," a measure of persistence that can be calculated with the use of prescription fill data. Similarly to the use of proportion of days covered (PDC) for medication adherence, the days to discontinuation measure is sometimes used by payers to evaluate provider performance.[8,13] The MNPS is designed to be self-administered, but it can also be administered by a health care provider. It is composed of 9 dichotomous items (yes/no response format), each concerned with a reason for nonpersistence—worries about side effects, experience of side effects, perceived need, perceived inefficacy of medication, worries about addiction, inconvenience, and worries about medication costs. The MNPS items are prefaced by the following question: "Sometimes, people stop taking their medication. Have you done the following things in the past ONE YEAR without being advised to do so by your doctor?" Each "yes" response is assigned a score of 1, and each "no" response, 0. These scores are then added to calculate a summed MNPS score.

## Evaluation

Approval was granted by the Institutional Review Board at the University of Mississippi.

### *Pretesting*

The MNPS underwent 2 qualitative and 1 quantitative pretests. The first qualitative pretest was conducted at a university in the southeastern United States among 8 faculty members with 5-30 years of experience in relevant fields. The purpose of this pretest was to ensure subjective validation.[14] Feedback was reviewed and incorporated into the instrument. The MNPS was then subjected to a second round of qualitative pretesting in the form of 6 cognitive interviews among users of prescription medications for diabetes, hypertension, and/or dyslipidemia. This pretest was conducted to identify potential sources of response error in the instrument.[15,16] No evidence of response error was observed.

Finally, for the quantitative pretest, the instrument was administered to 214 users of prescription medications for diabetes, hypertension, and dyslipidemia. This pretest was conducted to assess internal consistency reliability (Cronbach alpha[17] and construct reliability [CR][18]), convergent validity,[19,20] and evidence of socially desirable response bias.[21] For the latter, we included measures for egoistic response tendencies and moralistic response tendencies in the pretest survey. These analyses offered preliminary evidence for a 1-factor solution, reliability, and convergent validity. No evidence of socially desirable response bias was observed.

The MNPS is presented in Appendix 1.

### *Study*

#### *Sample design and data collection*

A retrospective observational study was conducted to meet the aforementioned objectives. Deidentified prescription fill data for a 12-month period were obtained from 3 independent community pharmacies in the southeastern United States. Data use agreements were executed with each pharmacy. Patients, 18 years of age and older, who filled at least 1 prescription for a medication in 1 of the 7 therapeutic categories of interest specified by the National Committee for Quality Assurance (NCQA) (beta-blockers, angiotensin-converting enzyme inhibitors or angiotensin-receptor blockers, calcium channel blockers, biguanides, sulfonylureas, thiazolidinediones, and statins),[10] starting at least 6 months before the end of the prescription fill data, were included in the sample frame. These data were then linked to patient names and addresses by an independent data manager.

Survey instrument packets were created for each patient in the sample frame. These included a cover letter from the patronized pharmacy and the survey instrument (containing a screener for whether they used the pharmacy we obtained their data from for most of their medications [i.e., patronization screener], MNPS, and demographic questions) printed on a business reply mailer.

#### *Data management*

Survey data were cleaned to eliminate patients who provided invalid responses on the MNPS or did not qualify on the patronization screener and, with the use of encrypted identifiers, merged with updated prescription fill data to calculate the criterion measure (days to discontinuation) for concurrent validation. Data were then aggregated to the patient–therapeutic category level. The measurement