

## Improving Medication Adherence: The Role of the Health Care Delivery System and Health Care Providers

The HMG-CoA reductase inhibitors (statins) are widely used in pharmaceutical therapy for lowering low-density lipoprotein cholesterol. It has been demonstrated that long-term use of statin medications is associated with lower cholesterol levels and lower levels of coronary heart disease morbidity and mortality.<sup>1-4</sup> However, adherence to statin medications is typically low. For instance, in a study of managed care organization enrollees from January 1998 to November 2001, the primary and secondary prevention groups went without medication 20.4% and 21.5% of the time, respectively.<sup>5</sup> Thus, it came as no surprise that Pedan et al. observed suboptimal adherence to statins in a study reported in the July/August 2007 issue of *JMCP*.<sup>6</sup>

Pedan et al. conducted a retrospective cohort study of 6,436 patients who initiated statin therapy. The computerized pharmacy records of 2 large national pharmacy chains were analyzed. In addition to suboptimal adherence to statins, the authors identified great variation in adherence across pharmacies and physicians. For patients treated by physicians in the top 2.5 percentile and bottom 2.5 percentile of statin adherence, mean refill counts *per year* were 6.1 and 2.9, respectively. For patients who patronized pharmacies in the top 2.5 percentile and bottom 2.5 percentile of statin adherence, mean refill counts *per year* were 6.6 and 2.5, respectively. Adherence increased at a rate of 28.4% for each additional 100 statin patients per patronized pharmacy ( $P < 0.001$ ) and decreased at a rate of about 6.5% for each 10 additional statin patients per treating physician ( $P < 0.001$ ).

The uniqueness of Pedan et al.'s study is their finding of great variations in patient adherence among prescribing physicians and pharmacies in a large sample. Although the study did not answer the question of why there were such great variations among physicians and pharmacies, the observed variations suggested that there might be a link between patients' adherence behavior and the characteristics or behaviors of health providers. The findings beg an explanation to better understand this relationship.

Extensive research has been conducted on patients' adherence behavior. Besides patient-level behavioral models, a systems approach and a communications approach have received considerable attention.<sup>7-8</sup> The systems approach emphasizes how the environment, including health care delivery systems, affects patients' adherence. The communications approach views improving provider-patient interaction and patients' satisfaction as a way to improve patients' adherence.

Pedan et al.'s observed variation in patient adherence among physicians and pharmacies may best be explained by a combination of the systems approach and the communications approach. The systems approach begins by identifying features of the

organization and financing of care, representing a macro perspective. It takes into account both societal and individual determinants of health services use, emphasizing interrelationships between different components of health systems and the environment. Characteristics of health delivery systems are understood to affect the use of health services.<sup>9</sup> A majority of studies on health systems have investigated how health insurance, which could be considered an enabling factor in the systems approach, influences individuals' use of medical care.<sup>10</sup> For example, numerous studies have documented a cross-sectional association between higher copayment levels and reduced compliance, consistent with Pedan et al.'s findings.<sup>5,10</sup> However, controlled studies of the effect of copayment change on adherence have produced mixed results, usually demonstrating inelasticity (price insensitivity) in prescription drug purchases.<sup>11-13</sup> The mixed findings appear to reflect what many providers already know—that patient responses to features of the health insurance system are complex and not entirely predictable.

In addition, Pedan et al. identified the pharmacy as part of the health care system that might affect patients' behavior. Although the study did not shed light on how a pharmacy might affect patients' adherence behavior, the published studies in the literature appear to support Pedan et al.'s observation.<sup>14</sup> For example, in a randomized controlled trial, a pharmacy care program was associated with a high level of medication adherence among patients compared with a usual care group. Six months after randomization, the persistence of medication adherence was 69.1% among the patients assigned to usual care compared with 95.5% in the pharmacy care group ( $P < 0.001$ ).<sup>14</sup> Pharmacy-based programs, including patient education, medications dispensed using adherence aids such as custom-packaged blister packs, or regular follow-up with pharmacists, might improve patient adherence.<sup>14</sup>

Good communication between patients and health providers and higher patient satisfaction are also possible factors related to adherence to medication. Failure of health care providers to satisfy patient needs for information may lead to nonadherence.<sup>15</sup> Communication between patients and health care providers could affect adherence by influencing patients' understanding of their treatment regimen or by increasing patients' knowledge about ways of performing the recommended action.<sup>7,16</sup>

In Pedan et al.'s study, the observed variation in patient adherence among prescribing physicians might be explained by the communications approach. Suboptimal communication between patients and providers has been reported in previous research.<sup>17</sup> For instance, in a study of physician-patient interactions during outpatient visits in the United States, 47% of patients taking at least 1 medication did not ask their doctors any questions about their medications. A mean of only 3.94 minutes per office visit was spent discussing medications,

and two thirds of physicians did not ask patients any questions about barriers or side effects of drug use.<sup>17</sup> This lack of communication may contribute to suboptimal adherence, particularly because of insufficient knowledge of possible side effects. In Pedan et al.'s study, some physicians might have communicated more effectively with patients on medication adherence, leading to the observed variations in adherence among prescribing physicians. Some physicians might spend more time with patients to discuss statin use. Additionally, patients might be more willing to discuss their problems in medication use with physicians with good interpersonal and communication skills. Pedan et al. were unable to explore these attributes of physicians.

In addition, it is plausible that patient characteristics unmeasured by Pedan et al., such as education, socioeconomic status, and motivation to seek out and follow health advice, might contribute to the observed variation in adherence. Better-educated and -informed patients might be more likely to find physicians with good skills. Unfortunately, these complex interactions between patients' and health providers' characteristics were not examined in the Pedan et al. study.

Additional limitations to the study by Pedan et al. were acknowledged by the authors. For example, it is hard to interpret the positive association between volume of statin prescriptions filled in the pharmacy and higher patient adherence. On one hand, we would expect that pharmacists might have less time to communicate with customers as prescription volume increases. On the other hand, the higher volume of statin users for a particular pharmacy might be associated with the attraction of statin patients to the local pharmacy. Patient self-selection of particular pharmacies could be due to the offering of disease-specific programs or could reflect the development of disease-specific programs by a particular pharmacy based on the number of patients who might benefit from the service. Pedan et al. were not able to report on such pharmacy characteristics.

Similarly, it is difficult to interpret the inverse relationship between patient adherence and volume of statin patients per physician. On one hand, it seems logical that a higher volume of statin patients would be associated with physician experience in management of dyslipidemia and more attention to patient needs, including interventions to improve serum lipid targets and adherence to statin medication. On the other hand, a higher volume of statin patients may be associated with less time with patients in a busy medical practice. However, Pedan et al. were not able to investigate the relationship between prescribers' volume of statin patients and overall patient volume. Therefore, the observed inverse relationship between prescriber volume of statin patients and statin adherence might not be fully explained by the amount of communication time spent by the physicians.

Despite the unanswered questions in the study, from the perspective of intervention there is a need to look at the system

(provider) level. As Pedan et al. suggested, statistical methods should be used to identify specific physicians or pharmacies that represent patients with particularly poor adherence. With the identification of the providers, customized interventions might be used to improve medication adherence. In addition, it is important to identify pharmacies or physicians that serve patients with higher adherence, finding out why they are doing well and replicating the success in other providers. Although it would be difficult to apply the hierarchical model in the identification process due to the complex nature of the method, some simple algorithms based on claims data from health plans could be developed to identify these higher-performing providers. The potential measures could be similar to the Healthcare Effectiveness Data and Information Set measures that are developed by the National Committee for Quality Assurance.

In sum, although the study by Pedan et al. was not conclusive and some of its findings are hard to interpret, it was generally consistent with previous research. This study confirmed that patient medication adherence behavior is a complex subject. Variation in medication adherence among physicians and pharmacies suggests a compelling need to know more—and do more—about system factors that have the potential to improve patient compliance.

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*This commentary represents the personal opinions of the author.*

#### DISCLOSURES

The author discloses no potential bias or conflict of interest relating to the subject of this commentary.

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## Commentary

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