

Primary Medication Adherence in a Rural Population: The Role of the Patient-Physician Relationship and Satisfaction with Care

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Introduction: Although correlates of overall medication adherence have been studied, little is known about primary medication non-adherence—patients' failing to fill a prescription provided by a practitioner—and whether it relates to how patients view their physician, satisfaction with their care, and how easy or hard it is for them to travel for care.

Methods: This study uses telephone survey data from adults in 150 rural counties in 8 southeastern states. Bivariate and multivariable analyses were used to identify factors associated with adults' self-reports of delaying or not filling prescriptions.

Results: Of the 3926 respondents who had received care in the previous year, 894 (21.6%) reported that they had delayed or did not fill a prescription over that time. In multivariate analysis, delaying or not filling prescriptions was more common among respondents who were under age 65, African American, reported incomes less than \$25,000, and reported fair or poor health. Non-adherence was also more common among patients who reported transportation problems, a lack of confidence in their doctor's ability to help them, a lack of satisfaction with the concern shown them by their physicians, and a lack of satisfaction with how welcome and comfortable they are made to feel by office staff.

Conclusions: Prescription primary non-adherence is prevalent in the rural South. Adherence may be improved by remedying patient dissatisfaction and lack of confidence in their physicians as well as addressing transportation barriers. (J Am Board Fam Med 2006;19:478–86.)

People do not take approximately half of the medicine prescribed to them for chronic conditions,¹ which undermines their care and leads to increased health care costs,² morbidity, and mortality.³ Prescription non-adherence has been linked to potentially avoidable hospitalization,⁴ emergency department use,⁵ and institutionalization for the frail elderly.⁶ Furthermore, non-adherence to medications reduces treatment benefits and can confound the clinician's assessment of therapeutic effectiveness, and is thought to account for 30% to 50% of

cases where drugs fall short of their therapeutic goals.⁴

Adherence is defined as the extent to which a patient's health behavior coincides with their physician's recommendations, whether taking medications or following advice for some type of behavioral change.² Adherence is a more accurate term than compliance: compliance suggests a process in which dutiful patients passively follow the advice of their physicians. Adherence, in contrast, better fits how most patients actively participate in their care and decide for themselves when and whether to follow their doctor's advice. Medication non-adherence encompasses a range of behaviors, both intentional and unintentional, and can lead to either underuse or overuse of medications. Underuse includes not initially filling a prescription, skipping doses, splitting pills, and stopping a medication sooner than the physician intended.⁷ This study focuses on medication underuse due to patients' delay or failure to fill a prescription, which has been termed "primary medication non-adherence."⁸

People's beliefs about the benefits and risks of medicines influence whether they take medications

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prescribed to them.⁹ As patients decide whether to fill a prescription, they take into account the seriousness of their symptoms, the medication's anticipated effectiveness, the necessity of treatment and possible side-effects.¹⁰ Patient-physician concordance—the extent to which patients and their physicians agree on whether, when, and how a medication should be taken—is also associated with medication adherence.^{4,9,11} Furthermore, the cost of medications and lack of adequate prescription drug coverage influences whether people take prescribed medications.^{3,6,12}

It is quite reasonable to believe that the quality of patients' relationship with their physicians also influences their decisions about filling prescriptions, just as doctor-patient relationships affect adherence to preventive care recommendations¹³ and behavioral change advice.⁵ Trust and confidence in one's physician improves medication adherence.^{11,14} Not much is known, however, about the specific aspects of patients' relationships with their doctors that influence medication adherence, such as the importance of trust and confidence beyond simply having a physician one regularly sees, or whether satisfaction with care received from that physician further promotes adherence beyond that promoted by trust.

The inability of many elderly to afford their medications received great national attention currently, and led to the passage of the Medicare Prescription Drug Improvement and Modernization Act of 2003.¹⁵ At the anticipated cost to Medicare of \$593 billion over the next 10 years, Medicare Part D expands the program to provide partial coverage for the drug expenses of older persons to help them not face the choice between purchasing medications or paying for other more basic needs like food and home heat.^{16,17} Although the financial challenges facing many elderly are clear, it is not clear if the elderly are more likely than younger adults to forgo prescribed medications, whether due to costs or other reasons.^{18,19}

For people living in rural areas, deciding whether to fill a prescription may entail the additional considerations of travel inconvenience and transportation challenges posed by greater distances to pharmacies, as to all services, in rural areas.²⁰ Rates of primary medication non-adherence and its causes have not been studied in rural populations, to our knowledge.

The purposes of this study are to examine the prevalence of self-reported primary medication non-adherence in the rural South and to explore its associations with various characteristics of patients and their relationships with their physicians and travel burden.

Methods

Study Design

This study uses data from a random digit dialing telephone survey conducted as part of an evaluation of the Southern Rural Access Program, a Robert Wood Johnson Foundation initiative to improve access to basic medical care in targeted rural areas of 8 southeastern states (AL, AR, GA, LA, MS, SC, TX, and WV).²¹ The survey collected baseline data to assess adults' use of health care services, their reported barriers to care, and selected outcomes of care.²² Among the previously published analyses of these data have been assessments of the relationships between local physician-to-population densities and access measures and differences in access between blacks and whites in these counties.²³ We use these data to understand primary medication non-adherence and its correlates.

Sample

Between November 2002 and July 2003, the survey was fielded by Professional Research Consultants, Inc. of Omaha, Nebraska (<http://www.prconline.com>) using accepted random digit dialing survey methods modeled after the Centers for Disease Control (CDC) Behavioral Risk Factor Surveillance System (BRFSS) survey.²⁴ An eligible adult within each household reached (age 18 or over, English or Spanish speaking, and having lived in the community for over 1 year) was identified through a random selection process and asked to participate in a 25-minute phone interview. Our analysis here was limited to respondents who indicated that they had visited a health care provider in the previous year and thus had the opportunity to receive a prescription.

Outcome Variable

The outcome variable was participants' response to the survey question, "In the past 12 months, did you delay filling a prescription or not get it at all?" This survey item was adapted from a closely

worded question in the Medical Panel Expenditure Survey.²⁵

Independent Variables

Survey items were obtained from well recognized national surveys including the BRFSS,²⁶ community tracking survey,²⁷ and the Medical Expenditure Panel survey.²⁵ Our main variables of interest here were those measuring aspects of the patient-physician relationship and patients' satisfaction with care. Individuals were asked whether they had a regular source of care, specifically whether they "had a place that they usually go to when they are sick or need advice about their health." People's satisfaction with care received from that usual source was assessed with 5 separate items that assessed overall satisfaction with their care, satisfaction with the quality of their care, confidence that their physician could help them with their health problems, and satisfaction with getting their health questions answered. Respondents were also asked how satisfied they were with how comfortable and welcome they were made to feel by the staff working where they received care. Response options to satisfaction items were "very satisfied," "satisfied," "neutral," "dissatisfied" and "very dissatisfied." For analysis, responses were dichotomized to satisfied versus not satisfied. "Neutral" responses were included with the not satisfied group to create a more even response distribution—most respondents reported satisfaction on each of the items—and because we reasoned that the goal of most physicians and their practices is for patients to rate their interactions with their physicians as satisfying and a neutral response indicates a "failure" to achieve satisfaction.

We were also interested in whether transportation challenges were associated with medication adherence. Individuals were asked how easy or difficult it had been to travel to their usual source of care. The 4 response options were dichotomized, combining responses that transportation was "somewhat" or a "great" problem and responses that transportation was "not a problem" or a "minor problem."

Subjects were also asked about the type of health insurance they had; however, there were no questionnaire items about prescription drug insurance coverage or out-of-pocket drug expenses. Self-reported health status was also queried, anticipating that those in poor health would have more medi-

cations prescribed and more opportunities not to fill a prescription. Responses were grouped "good" and "excellent" versus "fair" and "poor."

Sociodemographic variables queried included age, gender, marital status, education, income, employment, and race.

Analysis Strategy

We used statistical weights in analyses to adjust for county sampling probabilities and state-by-state participation likelihood by age, gender, household income, and race so that the weighted sample was representative of the adult population of the 150 surveyed counties. Summary statistics were used to describe demographic characteristics, health status, income, and insurance status.

Bivariate analyses were performed between the outcome variable (primary medication non-adherence in the past year) and each of the study independent and demographic variables. Unadjusted proportions and odds ratios were calculated with Pearson's χ^2 used to evaluate statistical differences in medication non-adherence rates for these categorical variables.

Multivariable analysis was performed using logistic regression models to identify factors associated with primary medication non-adherence after adjusting for groups of other factors. In a first model, associations between primary medication non-adherence and all sociodemographic variables and health status were assessed. In a second model, associations between primary medication non-adherence and factors that are potentially modifiable, including transportation challenges and insurance status, were assessed. A third logistic model assessed associations between the outcome variable and variables characterizing people's relationships with their physician and satisfaction with their care.

The STATA 8.0 (College Station, TX) statistical software package was used. This study with de-identified survey data was exempted from review by the University of North Carolina School of Medicine's Committee on the Protection of the Rights of Human Subjects.

Results

The survey participation rate of households reached was 51.0%. Of the 4879 respondents, 3926 (81%) had seen a health care provider in the past year and were included in these analyses. Many

Table 1. Characteristics of Respondents Who Have Seen a Healthcare Provider in the Last Year* (N = 3926)

Characteristics	N	Percentage
Age		
18 to 39 years	1447	36.9
40 to 64 years	1640	41.8
>65 years	839	21.4
Female	2615	66.6
Married	2163	55.1
Race/ethnicity		
White	2666	67.9
Black	1115	28.4
Other	90	2.3
Health status		
Good—Excellent	2901	73.9
Fair—Poor	1025	26.1
Education		
<High school graduate	726	18.5
High school graduate	1590	40.5
College graduate	1610	41.0
Household income		
<\$14,999	1017	25.9
\$15,000–\$24,999	612	15.6
\$25,000–\$49,999	1035	26.4
>\$50,000	822	20.9
Work Status		
Employed	2510	54.3
Unemployed	312	7.3
Insurance Coverage		
Uninsured	891	22.7
Private	1845	47.1
Medicare	836	21.3
Medicaid	212	5.4
Primary medication non-adherence	894	21.6

* Data weighted for county sampling fractions and to adjust demographics to that of the surveyed.

respondents were poor, with nearly half (45%) reporting household incomes under \$25,000, and 23% reporting that they had no health insurance (Table 1). Two thirds were female and 30% reported non-White race. A total of 21.6% of the study population reported delaying or not filling a prescription in the past year.

After adjusting for other sociodemographic characteristics, respondents who were under age 65 (OR = 2.4, 95% CI 1.79–3.45), female (OR = 1.4, 95% CI 1.10–1.68), married (OR = 1.3, 95% CI 1.03–1.62), and African American (OR = 1.7, 95% CI 1.01–2.96) were more likely to report having delayed or not filled a prescription in the previous

year (Table 2). Those with incomes less than \$25,000 (OR 2.0, 95% CI 1.38–2.78) and those who reported fair or poor health (OR 1.7, 95% CI 1.35–2.12) also had a greater likelihood of primary medication non-adherence. Education and employment status were not associated with medication non-adherence.

The relationships between medication non-adherence and insurance status and self-reported transportation problems were evaluated with and without controlling for sociodemographic characteristics and health status (Table 3). After adjusting for other characteristics, those who reported transportation problems were more likely to report primary medication non-adherence (OR = 1.8, 95% CI 1.35–2.38). Insurance coverage and type were not associated with primary medication non-adherence.

Associations between medication adherence and characteristics of patients' relationships with their physicians and satisfaction with care were also examined (Table 4). After controlling for sociodemographic characteristics and health status, individuals who were not confident in their doctor's ability to help them with their medical problems more often reported not filling a prescription (OR 1.4, 95% CI 1.04–1.79), as were those who were not satisfied with the concern shown them by their physicians (OR 1.8, 95% CI 1.03–3.03) and those who were not satisfied with how welcome and comfortable they were made to feel by office staff (OR 1.6, 95% CI 1.00–2.38). Satisfaction with getting one's questions answered during a visit, satisfaction with the perceived quality of care received, and overall satisfaction with care were associated with primary medication non-adherence in the bivariate analysis but not after controlling for other covariates. Simply having a regular source of care was not associated with primary medication adherence, whether or not adjusting for other factors.

Discussion

These findings suggest that primary medication non-adherence is common in the rural South, with 1 in 5 individuals who saw a physician in the past year reporting that they delayed or did not fill a prescription. It is difficult to directly compare this ratio to medication non-adherence rates of other studies because studies have used a variety of methodologies for identifying non-adherence (self-report, pill counts, electronic monitoring, collateral

Table 2. Sociodemographic Factors, Health Status, and Primary Medication Non-adherence (N = 3926)

Variable	Unadjusted Percentage of Primary Non-adherence	Primary Non-adherence, Unadjusted OR (95% CI)	Primary Non-adherence,* Adjusted OR (95% CI)
Age			
18–64 years	24.0	2.27 (1.72–3.03)‡	2.70 (1.89–3.85)‡
> 65 years†	12.2		
Gender			
Females	24.1	1.44 (1.19–1.74)‡	1.36 (1.10–1.68)‡
Males†	18.1	–	–
Race			
African American	22.8	1.50 (0.89–2.53)	1.72 (1.01–2.96)‡
White‡	20.6	–	–
Marital Status			
Married	21.6	1.00 (0.84–1.19)	1.29 (1.03–1.62)‡
Single†	21.6	–	–
Income			
<\$15,000	28.1	1.88 (1.41–2.49)‡	2.16 (1.46–3.19)‡
\$15,000–\$24,999	25.9	1.68 (1.26–2.23)‡	1.96 (1.38–2.78)‡
\$25,000–\$49,999	19.5	1.16 (0.89–1.53)	1.21 (0.90–1.64)
> \$50,000†	17.2	–	–
Education:			
< High School	21.0	1.29 (0.96–1.73)	0.88 (0.61–1.27)
High school	23.4	1.49 (1.17–1.89)‡	1.18 (0.90–1.56)
College grad†	17.1	–	–
Employment			
Unemployed	31.8	1.75 (1.27–2.43)‡	1.35 (0.95–1.15)
Employed†	21.0	–	–
Health Status:			
Fair/poor	28.4	1.70 (1.42–2.04)‡	1.69 (1.35–2.12)‡
Good/excellent†	18.9	–	–

* Adjusted for age, sex, marital status, race, education, income, employment, and health status.

† Referent group

‡ Statistically significant odds ratio

Table 3. Insurance Status, Transportation, and Primary Medication Non-adherence (N = 3926)

Variable	Unadjusted %	Primary Non-adherence, Unadjusted OR (95% CI)	Primary Non-adherence,* Adjusted* OR (95% CI)
Insurance			
Uninsured	28.7	1.70 (1.37–2.11)‡	1.24 (0.95–1.63)
Medicare	19.4	1.01 (0.81–1.28)	1.42 (0.97–2.10)
Medicaid	22.5	1.22 (0.86–1.74)	0.95 (0.59–1.51)
Private†	19.1	–	–
Ease of traveling to Doctor's office			
Somewhat/ Great problem	36.1	2.32 (1.82–2.94)‡	1.78 (1.35–2.38)‡
Not a problem/ Minor problem†	19.7	–	–

Model P 0.00

* Adjusted for age, sex, marital status, race, education, income, employment, health status

† Referent group

‡ Statistically significant odds ratio

Table 4. Physician-Patient Relationship Factors, Satisfaction With Care, and Primary Medication Non-adherence (N = 3926)

Variable	Unadjusted % Non-Adherence	Primary Non-Adherence, Unadjusted OR (95% CI)	Primary Non-Adherence, Adjusted* OR (95% CI)
Regular Source of Care			
Yes	21.1	0.77 (0.57–1.05)	1.27 (0.88–1.83)
No†	25.8	–	–
Confidence in Dr.'s Ability			
Somewhat/Not	32.3	2.00 (1.64–2.44)‡	1.37 (1.04–1.79)‡
Mostly/Very†	19.2	–	–
Satisfaction with Concern Shown			
Not satisfied	40.0	2.63 (1.85–3.70)‡	1.75 (1.03–3.03)‡
Satisfied†	20.4	–	–
Overall Satisfaction with Care			
Not satisfied	36.6	2.27 (1.67–3.03)‡	1.33 (0.81–2.17)
Satisfied†	20.4	–	–
Satisfaction With Getting Questions Answered			
Not satisfied	34.8	2.04 (1.45–2.86)‡	0.78 (0.45–1.33)
Satisfied†	20.7	–	–
Satisfaction with Quality of Care Received			
Not satisfied	34.4	2.00 (1.43–2.78)‡	0.72 (0.42–1.23)
Satisfied†	20.1	–	–
Satisfaction with Office Staff			
Not satisfied	36.5	2.22 (1.59–3.03)‡	1.56 (1.00–2.38)‡
Satisfied†	20.7	–	–

Model P 0.00

* Adjusted for age, sex, marital status, education, income, employment, health status

† Referent group

‡ Statistically significant odds ratio

reports) and time frames. Reported medication non-adherence rates across studies were found to range from 15% to 28% in one large meta-analysis of studies on adherence to medical recommendations in general.^{8,11,28} Furthermore, most studies have addressed medication adherence from all causes combined, including missed pills, early self-termination, and primary medication non-adherence. The only prior study we have found to also assess primary medication non-adherence specifically found a rate of 14.5%. This study was conducted in Britain, using pharmacy data and a 4-month window rather than our study's 12-month reporting period.⁸

Our study found that certain aspects of the patient-physician relationship and satisfaction with care are associated with medication adherence. There are several studies that establish the connection between satisfaction with care, a strong patient-physician relationship, and medication adherence.^{29–32} The majority of studies used overall satisfaction with care or a single, multi-item scale to

measure satisfaction. In our study, we were able to demonstrate associations between specific dimensions of satisfaction and medication adherence. Dissatisfaction with the concern shown by the physician and dissatisfaction with the office staff was associated with medication non-adherence after controlling for other dimensions of satisfaction. In our review of the literature, we found no previous data on the role of patients' perceptions of their physicians' concern in medication adherence. It may be that communicating empathy fosters medication adherence. Confidence in one's physician was found to be associated with adherence, consistent with recent work on trust, patient-physician agreement, and medication adherence.¹¹ Our study also suggests that when patients are made to feel welcome and comfortable by the staff in the practice environment, they are more likely to fill prescriptions. Further research is needed to understand which specific aspects of the practice environment are important in making patients feel welcome and comfortable. We further found that

overall satisfaction with care was not associated with primary medication non-adherence after controlling for other dimensions of satisfaction.

There has been recent concern about the elderly forgoing their medications because of rising out-of-pocket drug expenses and inadequate prescription drug coverage.^{17,33} Despite the attention the elderly have received, in this study they were *more* likely to report filling their prescriptions than younger adults, whether or not controlling for household income, health status, and other variables. In the face of rising out-of-pocket expenses for drugs, the elderly more reliably followed their doctor's recommendation to fill prescriptions and without delays. This finding is consistent with previous work demonstrating a positive correlation between advancing age and adherence.³⁴ Although we were not able to control for out-of-pocket drug costs or prescription drug coverage, insurance status was not found to be associated with primary medication non-adherence. Those who were uninsured and those with private insurance, Medicare, or Medicaid were just as likely to report delaying or not filling prescriptions. This suggests that promoting health insurance for all will not bolster primary medication adherence, although we cannot say whether it would be useful to promote health insurance with excellent drug coverage, about which our study had no specific data.

In our study, individuals who had difficulty with transportation were also less likely to fill their prescriptions. Although transportation problems are a known barrier to primary care services,³⁵ there has been little documented about transportation problems and medication adherence. This finding may be salient primarily in rural areas where travel distances are greater, pharmacies are fewer, and public transportation is scarce.²⁰

Limitations

This study has several limitations. The outcome variable relies on the self-report of delaying or not filling a prescription in the past year, which may be subject to recall inaccuracies. Research in the field of personality measurement suggests that self-reports of medication non-adherence are probably underestimated²⁸; therefore, our 21.6% estimate of the prevalence of not filling prescriptions may be an underestimate.

Our study findings cannot be generalized to all areas of the country. Respondents to this survey lived in rural counties in the South where incomes are generally low; primary medication non-adherence may be less common elsewhere. On the other hand, greater travel distances in the large counties of the West and Midwest may mean that primary medication non-adherence is more common there.

This study also does not provide a complete picture of patients' medication taking behaviors. The prevalence of total medication non-adherence is surely greater because many of the 78% of respondents who reportedly filled their prescriptions will not have then adhered to their medication regimen over time.³⁶

Conclusions

The high prevalence of primary non-adherence to prescribed drugs and its association with aspects of the physician-patient relationship and people's satisfaction with care have several important implications for health care providers and policy makers. Interventions to strengthen the patient-physician relationship and promote satisfaction with care, including satisfaction with the office environment, may improve medication adherence and thereby people's health. Education of medical students and residents should emphasize communication skills, cultural sensitivity, and patient-centered interviewing as competencies that may improve treatment adherence. Our study also suggests that programs to improve adherence might target those with lower incomes, those younger than age 65, racial minorities, and those with transportation problems. System changes to promote satisfaction with care, a strong patient-physician relationship, and adequate transportation may help improve medication adherence and prevent downstream morbidity and costs.

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