JAMA®
THE JOURNAL of the American Medical Association
Nov 2, 1984 Vol 252, No. 17

Original Contributions

Continuity of Outpatient Medical Care in Elderly Men

A Randomized Trial

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• **If an outpatient repeatedly sees the same practitioner, is his care influenced? This double-blind randomized trial examines the effects of outpatient health care provider continuity on the process and outcome of the medical care for 776 men aged 55 years and older. Participants were randomized to two different groups of provider care: provider discontinuity and provider continuity. The outcome of the continuity group was significantly different from that of the discontinuity group. During an 18-month period, patients who had been randomized to the continuity group had fewer emergent admissions (20% *v* 39%) and a shorter average length of stay (15.5 *v* 25.5 days). These patients also perceived that the providers were more knowledgeable, thorough, and interested in patient education. We conclude that continuity of outpatient provider care for men aged 55 years and older results in more patient satisfaction, shorter hospitalizations, and fewer emergent hospital admissions.**

(*JAMA* 1984;252:2413-2417)

PROVIDER continuity can be defined as the ongoing relationship between a patient and a health care provider, independent of the patient's particular medical problem. Twenty-nine studies of provider continuity published between 1964 and 1980, and based on primary data, have been reviewed recently.[1] In 16 of the 29 studies, provider continuity was the only independent variable. In only four of the 16 studies[2-6] were the conclusions decisive; in the remainder, methodologic problems cast doubt on the findings. The conclusions were as follows: (1) patient and staff satisfaction increased when continuity was achieved, (2) no negative effects of provider continuity on quality of care were demonstrated, and (3) in pediatric practices, patient appointment and medication compliance was increased, and disclosure of behavioral problems was enhanced for children who experienced continuity with a provider.

For editorial comment see p 2459.

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If provider continuity does alter either the process or the outcome of medical care, the result of provider continuity might be most evident with those persons who frequently visit medical care providers. Because the medical care system can administratively effect provider continuity, studying the impact of continuity on patients who frequently visit medical care providers may suggest implementable changes in medical care system policies.

This study of provider continuity was undertaken for two reasons. The first was to determine, using a controlled experimental design, the impact of provider continuity on the course of patients' illnesses. The second was to determine if the results of the previous studies,[2-6] all four of which were based either on pediatric patients or on physicians-in-training, could be generalized to elderly patients in a more conventional clinical setting than a house staff training program.

METHODS

Generalized Design and Patient Follow-up

Male outpatients visiting the White River Junction (Vt) Veterans Administration Hospital General Medical Clinic (VAGMC) during the study period were randomly assigned to "discontinuous" and "continuous" provider care groups. Neither the

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Table 1.—Source of Variables Measured to Assess the Impact of Provider Continuity

Variables	Equilibration Period Baseline	Analysis Period 12 mo	Analysis Period 30 mo
Medical Care Variables Process			
Indexes for provider continuity[7-9]	R*	R	R
Medical care related			
Diagnoses	R	R	R
Medications	R	R	R
Scheduled clinic visits	R	R	R
Unscheduled clinic visits	R	R	R
Missed appointments	R	R	R
Outpatient specialty referrals	R	R	R
Outpatient tests and procedures†	R	R	R
Hospital days per patient	R	R	R
Use of non-study site health care facilities	Q‡		Q
Patient-provider interactions			
Patient satisfaction[10]	Q	Q	Q
Patient perception of continuity	Q	Q	Q
Time spent with provider for history, examination, or patient education	. . .	. . .	T§
Preventive care			
Hemoccult slide test if patient over age 60 yr	. . .	. . .	R
Patient blood pressure, weight	R	R	R
Smoking status	Q	Q	Q
Medical record accuracy			
Recording of current medications compared with pharmacy audit	. . .	. . .	R
Outpatient Outcome Variables			
Patient mobility, pain, emotion, or activity of daily living status[11-14]	Q	Q	Q

*R indicates information from patient's medical records.
†Tests were coded in four categories: routine laboratory tests (blood, urine, and culture), ECGs or chest roentgenograms, other laboratory tests, and procedures.
‡Q indicates self-administered patient questionnaire.
§T indicates tape-recorded interview for a 25% subsample of patients.

patients nor their general medical providers were aware of the patients' group assignment.

Patients were followed up for 2.5 years after randomization. The dependent process and outcome variables appear in Table 1. A fair test of the hypothesis required that the experimental intervention have sufficient time for the differences in provider continuity of care to be established. Twelve months were allowed for this purpose. The initial 12 months of the study were called "the equilibration period." Thereafter, during the final 18 months of the study, the process of care and the outcome variables were analyzed for possible effects of the different types of provider continuity experienced by the patients. The final 18 months were considered the analysis period.

The Setting and Providers

All 17 members of the permanent medical staff (ten board-certified internists, three nurse practitioners, and four physician assistants) at the VAGMC whose employment spanned the entire study period agreed to participate. Together, these clinicians accounted for 7.7 full-time equivalents and provided approximately 78% of the general medical daytime outpatient care for either scheduled or unscheduled study patients. Twelve percent of the remaining general medical visits involved a nonparticipating staff member whose employment did not span the entire study period, and 9% involved the seven internal medicine residents who followed up patients in the clinic.

Inpatient medical care, night calls, and weekend coverage were provided by the internal medicine house staff, supervised both by the participating internists as well as three nonparticipating specialists on a rotating basis. A unit record allowed the inpatient staff to be aware of the outpatient treatments and providers.

Patient Selection and Exclusion

To be included in the study, a patient had to be age 55 years or older, and his one-way mileage from home to the VAGMC had to be 144 km (90 miles) or less. Patients were excluded who (1) used the VAGMC less than they used another provider within or outside of the Veterans Medical System, (2) used specialty care only, (3) had a single psychiatric diagnosis including the diagnosis of alcohol abuse, (4) had not used the VAGMC during the previous six months, (5) were not mentally competent or alert, and (6) refused to consent to the study. Of the 1,074 patients who met the age and mileage criteria, 298 were excluded, the majority because of the first exclusion criterion.

At the time of enrollment in the study, the average participant had used the VAGMC for 6.5 years and had experienced discontinuous provider care until major reorganization of the VAGMC in 1977. From 1977 to 1978, patients were routinely scheduled to see the same provider for follow-up visits. The study began in 1979.

Informed Consent and Random Assignment to Study Modes

After giving written informed consent (as approved by the Institution Review Board), patients were randomized in triplets to either the discontinuity (one third of patients) or continuity (two thirds of patients) groups of provider care. The patients' identification cards were coded so that only the scheduling clerks and research assistants knew the meaning of the code.

Patients assigned to the discontinuity group had a die tossed at each scheduled follow-up visit so that, at each visit, they had a 33% chance of being sent to a different provider. In addition, after one year of the study, the schedules of these patients were examined weekly by the research assistants. Whenever the same general medical provider had been seen more than twice in a row by a patient in the discontinuity group, the patient was assigned to a different provider.

Patients assigned to receive continuity care were routinely scheduled by the scheduling clerks to see the same provider for follow-up visits.

Double-blind Design

To keep patients and providers unaware of patient assignment, the following four mechanisms were used. First, providers were not aware of patient-scheduling changes because rescheduling at the VAGMC site was always performed by the clerical staff. Providers did not know about the code used to identify patients and the study group to which the patients had been assigned. Second, assigned providers were *not* notified of a patient's admission to the hospital by special channels. Third, only 10% of the patients seen annually in the VAGMC were study participants. Fourth, the changes in scheduling that affected the patients in the discontinuity group occurred gradually. Since many of these patients had experienced discontinuous provider care in the past, the changes were not unusual experiences for them.

Deaths, Withdrawals, and Data Completion Rates

After 30 months, 78 (51 continuity, 27 discontinuity) of the 776 patients had died

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and 11 patients had moved away. Of these 89 patients, 11.6% (60/520) were in the continuity group and 11.3% (29/256) in the discontinuity group.

Of the 43 patients who withdrew during the 30 months of the study, 8% (21/256) were in the discontinuous and 4% were (22/520) in the continuous provider groups ($P<.05$). The patients who withdrew most frequently cited dissatisfaction or a desire to be followed up by a specialist.

The final patient questionnaire was completed by 579 (84%) of the 687 patients who were still living in the area at the end of the study. The final questionnaire assessed the patient's functional ability, attitudes toward health care received in the study site, and utilization of health care facilities outside the study site.

At 30 months, study site clinic and hospitalization data obtained from the medical record were complete for 729 (94%) of the 776 patients who were randomized and for 99% of the 738 patients who were alive and living in the area after the first 12 months of the study.

Data Measurement and Analysis

The dependent variables shown in Table 1 were obtained by the research assistants, using the methods listed. In addition, the hospital discharge summaries of patients admitted to the hospital during the final 18 months of the study were reviewed by two physicians (J.H.W. and A.E.S.) and categorized as emergent, urgent, or elective. In all discharge summary audits, the physicians were unaware of the patient's study group. The two physicians' assessments of the admission were in initial agreement 91% of the time. Classification disagreements were resolved by discussion of patient data by the physicians using the following criteria:

1. Emergent: immediate hospitalization for lifesaving care. Examples were sepsis, pulmonary emboli, acute respiratory decompensation, incarcerated hernia, to "rule out" acute myocardial infarction, and new arrhythmia with hypotension.

2. Urgent: hospitalization required within a period of two weeks or less. Examples were new gross hematuria, progressive respiratory decompensation, and undiagnosed syncope of several weeks' duration.

3. Elective: neither urgent nor emergent. These admissions were often scheduled weeks in advance.

The independent variable—the degree of provider continuity—was measured by the following previously developed measures:

1. The raw percentage of total medical visits a patient experienced with their primary provider.[7]

2. The series of sequential visits a patient had with a provider in the VAGMC.[8]

Table 2.—Characteristics of Patients During the Equilibration Period*

Characteristics	Discontinuity Group (N=256)	Continuity Group (N=520)	Probability (P) of Difference Being Due to Chance
Average age, yr	65 (±0.3)	65 (±0.3)	>.5
Diagnosis			
Atherosclerotic cardiovascular disease	48%	47%	>.5
Respiratory disease	28%	28%	>.5
Hospital days per patient	6.4 (±1.3)	6.6 (±0.8)	>.5
Total outpatient visits per patient	6.4 (±0.3)	6.8 (±0.2)	=.3
Emotional impairment (4)†	1.8 (±0.1)	1.8 (±0.1)	>.5
Limitations in activities of daily living (8)†	1.3 (±0.1)	1.3 (±0.1)	>.5
Mobility limitations (8)†	4.2 (±0.1)	4.3 (±0.2)	=.5
Chronic pain (4)†	1.6 (±0.1)	1.6 (±0.1)	>.5
Dead or moved away	5.3%	4.8%	>.5

*First year after randomization. Values are expressed as means ± SEMs.
†Number adjacent to category indicates highest possible score.

3. A modification of a continuity of care index,[9] which was expressed as follows:

$$[(a^2+b^2+c^2)-(a+b+c)]/[(a+b+c)(a+b+c-1)]$$

where variables a, b, and c are the number of visits with different general medical providers. Specialty visits were summed separately. Thus, the continuity of care index for a patient visiting provider a ten times would be

$$\frac{10^2-10}{10(9)} = \frac{90}{90} = 1.0$$

The continuity of care index for a patient visiting provider a six times, provider b two times, and provider c two times would be

$$\frac{36+4+4-10}{10(9)} = \frac{34}{90} = 0.38$$

The percentage of visits with a primary provider is easily derived, but it considers one provider and is only reliable when the number of visits is large. The continuity of care index adjusts for numbers of different providers and the total number of visits. The series of sequential visits provides another estimate of the longitudinal relationship between the patient and provider.

The data were analyzed using the F test (for parametric data), the χ^2, and the Kruskal-Wallis test on ranks (for nonparametric data).

When a patient died or withdrew from the study, data collected on him were analyzed in the study group to which he had been assigned. Incomplete data were not entered into the calculation of independent and dependent variables.

RESULTS

Patient Characteristics

Patients randomly assigned to the discontinuous (N=256) and continuous care groups (N=520) were medically comparable prior to the analysis period of the study (Table 2).

Measurement of Provider Continuity

For the final 18 months of the study, significant variation in provider continuity was measurable between patients in the discontinuity and continuity groups (Table 3). In addition, Table 3 shows that when patients were asked if they could identify their single provider of care, 71% of those in the continuity group answered "yes" at completion of the study in contrast to 51% for patients assigned to receive discontinuous care ($P<.001$). Patient responses were not sensitive to low continuity of care indexes: when the measured continuity of care index was less than 0.25, 51% of the patients claimed continuity, as compared with 83% of the patients who claimed continuity when the index was greater than 0.60.

Effects of Provider Discontinuity

Patients who received discontinuous care experienced an almost twofold increase in the amount of emergency admissions and hospital days. Since hospitalization rates were identical (0.6 per patient per year; $P>.5$), the increased average hospital days for patients in the discontinuity group was due to a greater length of stay per admission. Increased emergency admission and hospital length of stay were appropriately associated, with more time spent in the intensive care unit by patients in the discontinuity group.

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Table 3.—Measurements of Provider Continuity During the Analysis Period*

Measurements	Discontinuity Group (N=238)	Continuity Group (N=490)	Probability (P) of Difference Being Due to Chance
Ratio of visits with same provider†	0.34 (±0.02)	0.56 (±0.02)	<.001
Sequential visits with same provider†	0.35 (±0.03)	0.48 (±0.02)	=.004
Continuity of care index†	0.21 (±0.01)	0.42 (±0.01)	<.001
Percentage of patients claiming continuity	51 (. . .)	71 (. . .)	<.001

*Final 18 months of study. Values are expressed as means ± SEMs.
†Perfect continuity = 1.0.

Table 4.—Effects of Provider Discontinuity of Process and Outcome of Medical Care*

Measurement	Discontinuity Group (N=238)	Continuity Group (N=490)	Probability (P) of Difference Being Due to Chance
Hospital days per patient	9.1 (±1.7)	5.6 (±0.7)	=.02
Intensive care days per patient	1.4 (±0.6)	.4 (±0.1)	=.01
Length of stay if hospitalized, days	25.5 (±4.0)	15.5 (±1.4)	=.008
Percent emergent hospitalizations	39	20	=.002
Patient satisfaction with continuity (8)†	4.5 (±0.2)	5.9 (±0.1)	<.001
Patient satisfaction with provider knowledge and thoroughness (20)†	14.4 (±0.3)	15.0 (±0.2)	=.04
Patients believe provider gives excellent patient education	10%	19%	<.001
No. of outpatient chest roentgenograms and ECGs	1.3 (±0.2)	1.7 (±0.1)	=.03

*Values are expressed as means ± SEMs.
†Number adjacent to category indicates highest possible score.

Compared to patients in the continuity group, patients in the discontinuity group were less satisfied with the continuity and educational aspects of the medical care they received. The patients in the discontinuity group also believed that the providers were not as knowledgeable and thorough.

Of the many variables studied (Table 1), only those cited in Table 4 demonstrated significant differences ($P<.05$) between the groups.

COMMENT

We sought to determine, using a controlled experimental design, the effects of provider continuity on the medical care and clinical outcome of patients' illnesses.

We observed that lack of continuity—defined as either discontinuity or a disruption of the relationship between patient and provider—was associated with more emergency hospitalizations and an increased time in both the intensive care unit and the hospital.

We also sought to determine if the results of previous studies, largely based on pediatric patients, cared for by house staff, would be observed in an older population where ambulatory care was not provided by house staff. We observed that continuous care positively influenced some patient attitudes about the quality of care they had received. We observed no negative effects of provider continuity on patient care. This study did not show, for patients receiving continuous care, greater accuracy in the medical records' medication lists, better use of prevention measures (smoking cessation, blood pressure control, or Hemoccult slide), an effect on a patient's perception of access or quality of care, an improvement of functional status, or a difference in the prescription of medications. Outpatient visits, referrals, missed appointment rates, and unscheduled visits were similar for both study groups. No differences in the use of non-study site health care facilities were observed.

The controlled experimental design seemed to be executed adequately. Patient diagnostic and demographic characteristics were similar between study groups at the time of randomization and subsequently during the course of the study. By all indications, patients and clinicians remained blinded to the patient assignment. Less than 6% of the patients asked to be withdrawn from the study. Questionnaire response rates and utilization of non-VA health facilities were similar between patients assigned to the discontinuity and the continuity groups of provider care. During the final 18 months of the study, all measures of outpatient provider continuity were significantly different between patients assigned to receive discontinuous provider care and patients assigned to receive continuous provider care.

Four aspects of this study deserve further comment. First, the findings suggest that policies favoring improved outpatient provider continuity may result in significant financial savings. This study does not address the issue of inpatient provider continuity. When patients were admitted, they were cared for by supervised house staff, and the clinician who cared for each patient in the clinic was not, by protocol, routinely notified of the patient's admission. Therefore, one could argue that the study protocol, by not ensuring inpatient continuity, might have minimized the difference (and potential financial savings) between the discontinuity and the continuity provider groups. Second, this study required the analysis of multiple process and outcome measures; therefore, one is confronted with an increased risk of falsely concluding that an observed difference is significant. The significantly ($P=.03$) increased use of chest roentgenograms and ECGs by continuity providers may fall into this category, since no similar pattern for other outpatient tests or procedures was measured. However, the observed adverse effects of provider discontinuity—increased number of hospital days and dissatisfaction with some aspects of care received—are consistently supported by several variables. Third, many of our patients had experienced discontinuous care prior to the beginning of the study.

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Such patients might accept and express satisfaction with fragmented outpatient care more readily than private patients would. Finally, although this study reported measurements of provider continuity for both groups of patients, it is difficult to ascertain whether the measurements reported here are high or low in comparison with other studies. The reason for this is that the published studies[8,15,16] using comparable measures have suggested that patient characteristics affect provider continuity, yet these same studies do not provide adequate descriptions of their patient populations to allow comparison with the patients described herein.

We conclude that continuity of outpatient provider care results in more patient satisfaction and also fewer emergent, prolonged hospitalizations.

This study was supported by grant 481 of the Health Services Research and Development Section, Veterans Administration.

Paul M. Densen, DSc, Theodore Colton, DSc, and Michael Zubkoff, PhD, consulted on this study. Thomas P. Almy, MD, James Strickler, MD, and Allen J. Dietrich, MD, reviewed the manuscript. Jean Ducharme prepared the manuscript.

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