Continuity of Care During Pregnancy: The Effect of Provider Continuity on Outcome

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Continuity of care during pregnancy was examined in a family practice residency setting. The effect of provider continuity on the rate of pregnancy complications and patient satisfaction was studied prospectively in a sample of 61 patients. Patients in this study placed relatively low value on continuity of care. Pregnancy complications were predicted by traditional prenatal risk factors. Perceived waiting time in the office had the greatest effect on patient satisfaction. Provider continuity had no significant effect on either outcome.

Continuity of care is considered a principle of family medicine[1-3] and an essential component of residency training.[4] Continuity of care is thought to promote a closer relationship between the provider and patient. The development of this personal relationship is believed to have inherent value for many family physicians.[5] Critics argue, however, that providing continuous care may be costly and inconvenient and that it can be justified only if quality of care is enhanced.[6]

Many efforts have been made to demonstrate the advantages of continuous care, but the favorable effects of continuity on actual patient health status are still uncertain. Several studies have shown no difference resulting from continuity,[7,8] while a few have demonstrated some benefit.[9,10] In most of these studies, patients were cared for in one of two distinct settings, a "continuity" clinic or a more conventional clinic. The results were frequently confounded by other characteristics of the continuous care group, such as the use of nurse providers, home visits, improved telephone access, and coordination of multidisciplinary teams. This evidence has been reviewed in recent articles by Wall[11] and by Dietrich and Marton[12] with the conclusion that any beneficial effect of continuous care on patient health status remains unproven.

In this prospective study the effect of provider continuity on the quality of care during pregnancy was examined. Provider continuity was chosen because it represents an important element of continuous care and is readily measurable. The quality of care outcomes included pregnancy complications and patient satisfaction. Pregnancy was selected as the study model because of its duration, well-defined outcomes, and frequent patient-provider contact, which provides an opportunity for continuity to develop. Also, it is believed that continuity might have more impact in this setting because of the special value attached to the pregnancy experience.[5]

While this study was in progress, a similar study was reported by Shear et al,[13] examining continuity of care during pregnancy retrospectively. The authors used a number of different individual outcomes and found a lower mean birth weight in the low-continuity group. No significant difference was noted in patient satisfaction. Patients were cared for in two different clinic settings, obstetrics and family practice, with different types of physicians. Patients were assigned to low-continuity and high-continuity groups solely on the basis of which clinic they attended. The continuity index used was not sensitive to the total number of dif-

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ferent providers involved in a patient's care. These factors raised the possibility of confounding and misclassification biases. The prospective design of this study, using the same providers in similar settings, avoided some of these problems.

Methods

Sample

Pregnant patients in a university-based family medicine residency practice were invited to participate in the study between September 1982 and June 1983. Patients who began prenatal care after 20 weeks' gestation or who had fewer than four prenatal visits were excluded. Patients were enrolled at two sites, the university medical center office and a rural satellite clinic 25 miles away. The physician providers consisted of 18 family practice residents and five faculty and fellows from the same program. Deliveries were performed at the medical center and at a rural community hospital. For purposes of continuity, resident physicians were assigned to work in pairs as partners. If the primary physician was unavailable, the partner physician would usually see the patient, although this was not always possible.

Data and Measurement

Patients were contacted by mail or telephone during their third trimester. Those agreeing to participate completed a mailed questionnaire that recorded sociodemographic characteristics and attitudes about family medical care. The patients were asked to rate the importance of ten attributes of family medicine in choosing the site for their obstetrical care. The ten attributes, including continuity, were rated on a scale of 1 to 10 from least to very important.

After delivery, clinic and hospital charts were reviewed to determine provider continuity, prenatal risks, and pregnancy complications. Provider continuity was conceptualized and measured as two components, continuity during prenatal care and continuity at delivery. Individual provider continuity during prenatal care was measured using the continuity of care (COC) index[14]:

$$COC = \frac{\Sigma\, n_j^2 - N}{N(N-1)}$$

where n_j = number of visits to each individual provider (j = 1) and N = total number of visits. This index is sensitive to the total number of visits and the number of different providers seen. The score ranges from 0 for no continuity (seeing a different provider each visit) to 1 for perfect continuity (seeing the same provider each visit).

Continuity at delivery was assessed by classifying the individual provider attending the delivery into one of four categories: (1) primary physician, (2) partner physician, (3) other physician, previously known to patient, and (4) other physician, previously unknown to patient.

Prenatal risk and pregnancy complications were measured using a modification of the scoring system developed by Hobel et al.[15] This prenatal risk index assigns a numerical value (5 for minor and 10 for major) to adverse factors that occur before and during the pregnancy. For example, a previous history of sexually transmitted disease is scored 5, whereas a previous stillborn or chronic hypertension is scored 10. Usually all events, both prenatal and intrapartum, are treated as risk factors to predict neonatal outcome.

In this study the scoring was modified by considering only those events occurring before 20 weeks' gestation as prenatal risk factors and treating all events after 20 weeks' gestation as pregnancy complications. Neonatal and maternal events in the immediate postpartum hospital period were also included by assigning values of 5 or 10 to complications in accordance with the values attached to similar events prenatally. This method resulted in separate numerical scores summarizing prenatal risk and pregnancy complications for each patient. The goal was to create a summary measure of pregnancy outcome rather than examine many individual obstetrical outcomes with only a few events in each category. Although not truly linear, the numerical scales provide some indication of the degree of risk and complications for each patient.

Patient satisfaction with obstetrical care was assessed two months after delivery. This interval was selected to exclude the immediate emotional response at the time of delivery, yet to be soon enough to allow accurate recall. Patients completed a questionnaire, by mail or in person, based on their experience during pregnancy. Three components of the Ware Patient Satisfaction Questionnaire[16] were used. The subscales measured patient attitudes about general satisfaction with

care, the humaneness of physicians, and the quality of care. For each component patients were asked to agree or disagree, on a five-point Likert scale, with several statements about medical care or physicians. A total numerical score was reported for each component by adding the scores for the individual statements within that subscale. A single statement about perceived waiting time in the office was scored separately using the same scale. Patients were asked to agree or disagree with the following statement based on their experience during their obstetrical care: "People are usually kept waiting a long time when they are at the doctor's office." This method was similar to that used by Breslau.[17]

Analysis

The association between provider continuity and pregnancy complications was analyzed using multiple linear regression. Pregnancy complications were regressed on continuity and the following control variables: gravidity, prenatal risk, level of provider training, clinic and hospital site, and prenatal childbirth class. Both forward stepwise and hierarchal regressions were performed. Since the results were very similar, only the results of the stepwise regressions are presented.

Multiple regression was used also to study the association between continuity and patient satisfaction, controlling for patient educational level, occupational status, gravidity, site of delivery, and perceived waiting time. Again both forward stepwise and hierarchal analyses were performed. Only the results of the stepwise regression are presented, since the results were similar.

Results

Eighty-two pregnant patients were contacted by telephone or mail during the study period. Sixty-one agreed to participate, for a response rate of 74 percent. Ten of these patients failed to return the patient satisfaction questionnaire and were excluded from that part of the analysis only.

The mean age of the women in the study was 24.8 years, with a range of 17 to 36 years. Seventy-seven percent of the patients were white and 21 percent black. Eighty-seven percent were married and 72 percent were multiparous. Fifty-four percent of the women had completed high school only, and 25 percent had graduated from college. The subjects were drawn from a university town and a neighboring rural community and provided a cross section of the local population.

Table 1. Patient Rating of Family Medicine Attributes

Rank	Attributes	Mean Score*
1	Availability	9.89
2	Compassion	9.88
3	Awareness of limitations	9.77
4	Family care	9.25
5	Comprehensiveness	9.08
6	Cost	9.00
7	Expertise	8.75
8	Continuity	8.47
9	Convenience	8.27
10	Coordination	8.25

*Scale ranges 1 to 10

During the third trimester, the patients rated the importance of ten attributes of family medicine in choosing their site for obstetrical care. Table 1 lists the attributes along with the mean patient score for each. Since 10 was the maximum score, all attributes were considered important by the patients in this sample. However, in comparison with other characteristics, provider continuity was rated less important. The most important attribute was availability.

The mean number of prenatal visits per patient was 13.5, with a range of 7 to 25. The median prenatal risk score was 10.9, with a range of 1 to 45. Although somewhat arbitrary, a score greater than 15 is often considered high risk. Twenty-three percent of patients had prenatal risk scores above 15. Sixty-two percent of the patients were cared for and were delivered of their babies at the university medical center. The remainder were delivered of their babies at the rural community hospital.

The degree of provider continuity during prenatal care varied considerably. The mean COC score was 0.43, with a range of 0.14 to 1.0. The deliveries were attended by the primary physician in 52 percent of cases, the partner physician in 20 percent, another known physician in 10 percent, and a previously unknown physician in 18 percent. The results of the multiple regression analyses are displayed in tabular form, listing the variables

Table 2. Results of Regression Analysis of Pregnancy Complications on Provider Continuity (COC)* and Control Variables

Independent Variable	Standardized Regression Coefficient	Variance Explained	P Value
Prenatal risk	0.45	0.21	.0002
Prenatal COC	0.05	0.002	NS
Physician at delivery	0.11	0.01	NS
Other variables**	—	0.02	NS

*Continuity of care
**Site of delivery, gravidity, level of provider training, and childbirth preparation classes

Table 3. Results of Regression Analysis of General Satisfaction on Provider Continuity (COC)* and Control Variables

Independent Variable	Standardized Regression Coefficient	Variance Explained	P Value
Waiting time	−0.51	0.21	.001
Prenatal COC	−0.10	0.01	NS
Physician at delivery	−0.004	0.00001	NS
Other variables**	—	0.05	NS

*Continuity of care
**Gravidity, education, occupation, and site of care

under study along with the variance explained by each. The standardized regression coefficients are included for the continuity factors and any other significant variables to indicate the relative strength and direction of the association.

For example, Table 2 illustrates the results when examining the outcome of pregnancy complications. The prenatal risk score was the only significant factor and accounted for the overwhelming majority of the total variance explained. The positive regression coefficient indicated that complications increased as prenatal risk increased, as expected. Both continuity factors contributed only a small and statistically insignificant amount of the variance. The other control variables explained a small amount of the variance but did not reach statistical significance.

When examining the outcome of patient satisfaction, each subscale component was analyzed separately. Table 3 illustrates the results for the general satisfaction subscale. In this case, the patient's perception of waiting time when visiting the physician's office was the major and only significant predictor, accounting for 21 percent out of the total 27 percent variance explained. The negative regression coefficient indicated that general satisfaction decreased as perceived waiting time increased. The continuity factors explained a very small and statistically insignificant amount of variance. The other variables together explained a greater percentage of the variance, but no individual variable was statistically significant.

For the humaneness of physicians subscale, perceived waiting time was again the only significant predictor of satisfaction and was associated negatively with this outcome (Table 4). The site of care and delivery contributed a larger portion of the variance in this case, but still did not reach statistical significance. None of the other variables, including continuity, explained a significant amount of the variance.

Finally, the quality of care subscale demonstrated several significant predicting variables (Table 5). Waiting time was the major predictor as previously, but patient educational level and gravidity also explained a significant amount of the

Table 4. Results of Regression Analysis of Humaneness on Provider Continuity (COC)* and Control Variables

Independent Variable	Standardized Regression Coefficient	Variance Explained	P Value
Waiting time	−0.28	0.13	.01
Prenatal COC	0.03	0.001	NS
Physician at delivery	0.07	0.005	NS
Other variables**	—	0.04	NS

*Continuity of care
**Gravidity, education, occupation, and site of care

Table 5. Results of Regression Analysis of Quality of Care on Provider Continuity (COC)* and Control Variables

Independent Variable	Standardized Regression Coefficient	Variance Explained	P Value
Waiting time	−0.34	0.15	.006
Gravidity	−0.29	0.07	.05
Education	0.29	0.07	.04
Prenatal COC	−0.12	0.01	NS
Physician at delivery	0.07	0.005	NS
Other variables**	—	0.03	NS

*Continuity of care
**Occupation and site of care

variance. The regression coefficient for education indicated that satisfaction in this case increased as the level of formal education increased. The negative coefficient for gravidity meant that satisfaction decreased as gravidity increased, ie, primigravidas had higher levels of satisfaction on this scale than multiparous patients. Again, the continuity factors did not contribute significantly to the model.

Discussion

The effect of provider continuity on pregnancy complications and patient satisfaction in a family practice residency setting was examined. The results from 61 cases suggest several conclusions.

First, provider continuity during pregnancy was less important to the patients in this study than were other attributes of family medicine in selecting the site for their obstetrical care. This finding was surprising, since continuity was expected to be valued highly in this instance. The possibility of a selection bias exists, as patients seeking more continuity may have avoided care in a residency practice, where a certain amount of discontinuity is inevitable. In both clinical settings of this study, private practice sites were available to obstetric patients.

Second, traditional prenatal risk factors were the major predictors of pregnancy outcome by a wide margin. This finding was even more striking, since only risk factors occurring prior to 20 weeks' gestation were used to predict outcome. Provider continuity demonstrated no beneficial effect on the rate of pregnancy complications. The possibility of falsely concluding that provider continuity had no important effect (a type II statistical error) may be raised because of the relatively small sample size of 61. Since the magnitude of the continuity effect was so small in comparison with other factors and in the wrong direction, however, the possibility of missing a beneficial clinical effect appears unlikely.

More likely, high levels of provider continuity are not required to decrease the preventable complications of pregnancy. Good record keeping and

appropriate attention to recorded data by all providers (informational continuity) may be sufficient to avoid this type of adverse outcome, regardless of whether the patient sees the same provider each visit.

Third, provider continuity did not have any significant association with any of the patient satisfaction subscales. Perceived patient waiting time when visiting the physician was an extremely strong predictor of satisfaction in the study population. Actual waiting times were not measured in this study, but patients had individually scheduled appointments and rarely waited more than one hour in the office. Nonetheless, this finding would suggest that more attention should be directed to maintaining a timely flow of office patients, especially in a residency practice, to ensure patient satisfaction.

The failure to demonstrate an effect of continuity on patient satisfaction was unexpected and may be due to a selection bias as previously discussed. The patients in the study sample placed a relatively low value on seeing the same physician each visit. Patients desiring more provider continuity may have selected a private practice setting for their obstetrical care. Another possible explanation is that provider continuity is not always the major determinant of patient satisfaction even when continuity is desired. Patient satisfaction may be related more to the underlying concept of attitudinal continuity, a sense of belonging and commitment between the patient and the source of health care.[18] In a residency setting, attitudinal continuity may involve more of a commitment to the institution or practice than to individual providers, who change periodically. This possibility was suggested in this study by a number of patients who listed the clinic site as their primary physician instead of a specific individual. By measuring only provider continuity, an association between attitudinal continuity and patient satisfaction may have been overlooked.

Finally, the inability to demonstrate any significant effect of provider continuity during pregnancy cannot be generalized to other outcomes, conditions, patients, or practice settings. An important outcome not examined was the possible economic impact of provider continuity. In some cases, continuity may result in shorter lengths of hospitalization, fewer unnecessary laboratory tests, and decreased costs overall.[19] However, the focus of this study was on the effect of provider continuity on patient health status directly. Although not evident in this study, continuity may improve this outcome in other settings, such as chronic illness, elderly patients, or private practice. Yet existing evidence to date has failed to demonstrate this direct association. The type and degree of continuity necessary to promote desired medical outcomes and engender patient satisfaction still remains uncertain.

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