Service System Integration, Access to Services, and Housing Outcomes in a Program for Homeless Persons With Severe Mental Illness

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ABSTRACT

Objectives. This study evaluated the hypothesis that greater integration and coordination between agencies within service systems is associated with greater accessibility of services and improved client housing outcomes.

Methods. As part of the Access to Community Care and Effective Services and Supports program, data were obtained on baseline client characteristics, service use, and 3-month and 12-month outcomes from 1832 clients seen at 18 sites during the first year of program operation. Data on interorganizational relationships were obtained from structured interviews with key informants from relevant organizations in each community (n = 32–82 at each site).

Results. Complete follow-up data were obtained from 1340 clients (73%). After control for baseline characteristics, service system integration was associated with superior housing outcomes at 12 months, and this relationship was mediated through greater access to housing agencies.

Conclusions. Service system integration is related to improved access to housing services and better housing outcomes among homeless people with mental illness. (*Am J Public Health.* 1998;88:1610–1615)

The fragmentation of service delivery systems has long been recognized as a serious impediment to the delivery of community-based care for people with severe and persistent mental illness[1–3] and, more specifically, for those who are homeless.[4,5] Community survival for people with serious mental illness requires a broad range of services, including mental health care, medical care, income support, housing assistance, substance abuse treatment, and social and vocational rehabilitation. Although programs addressing these service needs have been widely established in many communities, there is widespread agreement that greater integration and coordination of delivery are needed to optimize the accessibility and effectiveness of these services.[1–5]

Factors related to coordination of service delivery can be identified at 2 distinct levels.[2] At the interorganizational or service system level, it is believed that service delivery can be improved by strengthening or centralizing relationships between agencies to foster cooperation and communication.[1–3,6] At the client level, in contrast, delivery of comprehensive services can be effected directly by clinical case management teams.[1,7,8]

Although several studies have examined the association of service system interventions and characteristics with client outcomes,[2,9–12] few empirical studies have systematically addressed what we refer to as "the services integration hypothesis." This hypothesis can be stated in the form of 3 related propositions. First, more integrated service systems provide better access to a broad range of services; second, clients treated in more integrated service systems have better outcomes; and third, the resulting improvement in outcomes is mediated through increased accessibility and continuity of service delivery.

Previous studies of this issue have suffered from serious methodological limitations. The number of sites has been small[2,9,11–12]; data on interorganizational relationships have been limited[11–12]; clinical services have not been standardized or evaluated[2,11–13]; data have been available from only small numbers of clients[11–12]; and data have been cross sectional rather than longitudinal.[11,12]

The current study tested the service integration hypothesis using data from the Access to Community Care and Effective Services and Supports (ACCESS) program, a 5-year, 18-site demonstration program sponsored by the Center for Mental Health Services.[14] The 2 major goals of the ACCESS demonstration are to increase service system integration through site-specific development strategies and to evaluate the impact of these strategies on homeless clients with mental illness. Previous publications on the ACCESS program have revealed that site factors are

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better predictors than client characteristics of observed variations in access to diverse services, but these publications have not addressed the relationship of service system integration to client outcomes.[15]

In this article we use data from the cohort of clients who entered case management during the first year of the ACCESS demonstration, in order to evaluate the relationship of service system integration to service use and housing outcomes. In contrast to previous studies, this study involved many sites (n = 18) and used extensive data on interorganizational relationships at the start of the project. Furthermore, case management was standardized and its implementation assessed, and client data were obtained 3 and 12 months after the baseline assessment. Finally, sample sizes were substantial (100 clients per site), and analyses were conducted via structural equation modeling, allowing allocation of shared variance among predictors based on a hypothesized causal sequence.[16]

This study addressed 3 questions: (1) Does service system integration increase access to a broad array of key services among homeless mentally ill clients? (2) Is service system integration associated with improved housing outcomes? and (3) Are housing outcomes mediated by access to key services?

Methods

The ACCESS Program

In September 1993, 9 states were awarded approximately $17 million in cooperative agreement grants for 18 communities (2 in each state) to test strategies encouraging cooperation among agencies and thereby reducing service system fragmentation.[15] All sites received similar amounts of designated funds in order to provide assertive outreach and case management services to 100 clients enrolled in the study annually. We examined the relationship between variations in the level of service system integration at the beginning of the project and differences in access to services and housing outcomes among clients who were accepted into the case management program during the first year of operation, before active integration efforts began.

Eligibility Criteria and Sources of Data

Clients were eligible for case management if they were homeless, suffered from serious mental illness, and were not involved in ongoing community treatment. Operational entry criteria have been described elsewhere, along with validating data.[15]

Clients who met program eligibility criteria were invited by their outreach worker to participate in the ACCESS Program. Those who provided written informed consent were evaluated by means of a comprehensive baseline interview. They were reinterviewed 3 and 12 months later. Clients entered the first evaluation cohort between May 1994 and July 1995.

Client Characteristics and Outcomes

Sociodemographics, housing and income. Documented client characteristics included age, gender, race, income, social support, duration of current episode of homelessness, and housing status during the 60 days prior to each interview. The measures used have been described in detail elsewhere.[15] Clients also identified their personal service preferences and priorities from a structured list.

Psychiatric and substance use status. Psychiatric status was assessed via self-reported symptoms of depression[17] and psychosis,[18] as well as interviewer ratings of psychotic behavior on standardized scales. Substance use was assessed with items from the Addiction Severity Index.[19] Diagnoses were the working clinical diagnoses of the admitting clinicians on the case management teams.

Service use. Service use was assessed with a series of 23 questions concerning clients' use of various types of health and social services during the 60 days prior to the interview. A second series of questions addressed receipt of public support payments and housing subsidies.

Summary measures of service use. Two measures of service use were developed through a 2-stage process. First, we developed dichotomous (yes–no) variables reflecting clients' use of each of 6 types of services particularly germane to fostering improvements in the well-being of homeless persons: (1) housing assistance or support from a housing agency, (2) mental health services, (3) general health care, (4) substance abuse services, (5) income support (at least $100 per month), and (6) vocational rehabilitation. Next, since the principal outcome examined in this study was housing, the dichotomous measure reflecting contact with and/or use of the services of a housing agency was included, by itself, in the analytic model. Because the target population suffers from numerous problems, each of which may impede achievement of independent housing, the diversity of other services received (e.g., mental health, substance abuse, public support) was also measured (as the number of domains in which services were received [range: 0–5]).

Independent Housing

Clients were considered to be stably housed at the 12-month interview if they had been living in their own apartment, room, or house (either alone or with someone else) for 30 consecutive days.

Service System Integration

The degree of integration of the service system in each city was assessed through in-person surveys addressing interorganizational relationships between agencies that provide services to homeless persons with mental illness. These data were collected between August and November 1994 (3 months after client enrollment began). These methods, described in detail elsewhere,[20] are summarized briefly here.

First, a comprehensive list of agencies offering services of relevance to the care of homeless people with mental illness at each site was developed (the number of organizations ranged from 32 to 82).

An in-person interview lasting 60 to 90 minutes was then conducted by a trained interviewer with key informants from each agency on the list. These individuals rated the strength of their agency's relationship with each of the other agencies on the network list. From these data, 4 basic indicators of service system integration were measured at each site: (1) organizational ties (the number of agencies with at least 1 relationship to another agency [range: 0 to the total number of agencies]), (2) service ties (the number of distinct relationships between organizations per tie [range: 0–6, reflecting sending and receiving relationships for each of the 3 types of resource transactions, that is, information, clients, and funds]), (3) tie strength (the ratio of service ties to organizational ties [range: 1–6, reflecting the multistranded content of each relationship]), and (4) network strength (the proportion of agencies with multiple ties to other agencies [range: 0–1]). These measures of service system integration were assessed from 2 perspectives: the perspective of the entire network, taking into consideration all possible ties between all agencies [n × (n − 1)], and the perspective of the mental health agency sponsoring the ACCESS initiative, considering only the n − 1 possible links involving this particular agency. Thus, 8 measures of service system integration were generated for each site. A composite index of service system integration was constructed by converting the 8 measures to standardized scores, which were then averaged.

Fidelity of Case Management to the Assertive Community Treatment Model

Case management services provided through the ACCESS program were evaluated by means of a 27-item rating scale developed by Teague.[8] The average score across the 18 ACCESS case management teams on this measure was 3.30 (SD = 0.24, potential range = 0–5), showing high and consistent fidelity to Teague's assertive community treatment model[8] and limited variation across the 18 sites. This measure was not included in the causal model.

Plan of Analysis

Explorations of etiological hypotheses using nonexperimental data have generally been limited by the available analytic techniques. Structural equation modeling, an extension of multiple regression analysis[16] that at least partially addresses these limitations, was used to examine the sequential relationships between 3 sets of variables: (1) individual client characteristics measured at program entry that predict housing outcomes and the site-level measure of service system integration, (2) use of services provided by a housing assistance agency and a measure of the diversity of other types of services used during the first 3 months of program involvement (i.e., mental health, substance abuse, medical, job training, and public financial support), and (3) stable independent housing 1 year after program entry. In this analysis, each variable was viewed as having direct effects on achieving independent housing as well as indirect effects on achieving such housing through its influence on each of the subsequent variables (access to housing and other services), which were, themselves, hypothesized to affect housing outcomes.

Since the kurtosis of the data revealed that the distribution was flatter than normal, the assumption of multivariate normality could not be made. We therefore used generalized least squares for estimation of parameters, rather than maximum likelihood estimation, because it does not depend on the assumption of multivariate normality. Structural equation analyses were conducted with the CALIS procedure in SAS.[21]

A 2-stage procedure was used to model the relationship between individual client characteristics and housing outcomes. In the first stage, a logistic regression analysis was used to fit a model of the relationship between various client characteristics and the housing outcome measure. In the second stage, we generated the probability of achieving independent housing, as predicted by the model, for each individual on the

basis of his or her personal attributes (age, race, psychopathology, etc.). We then used the predicted probability as one of the first set of variables in the causal model described earlier. This single variable was used to represent the influence of client characteristics to simplify the model. Addressing the client factors singly, or even as latent variables, would have been quite cumbersome. Thus, our model did not test whether there was a causal relationship between client characteristics and housing outcomes. It did, however, evaluate the relative importance of client characteristics (taken as a whole) and service system integration in predicting housing outcomes, under the conservative assumption that shared variance between client characteristics and service system integration should be attributed to client characteristics. The resultant variable thus permitted evaluation of whether client characteristics are directly related to housing outcomes or whether their impact is mediated through access to housing or other services.

Results

Sample Characteristics

During the first year of ACCESS data collection (May 1994–July 1995), 1832 clients provided informed consent to participate in the study and completed baseline assessments (94% of eligible referred clients; mean = 102 clients per site, SD = 15.7).

Clients entering case management averaged 38.5 years of age (SD = 9.4); 65.2% were male, 44.5% were African American, and 5.2% were Latino. Altogether, 48% had been homeless less than 6 months; 27%, from 6 months to 2 years; and 24%, for more than 2 years. They had limited sources of social support (the number of people they could count on for transportation, money, or emotional support) (mean = 1.92, SD = 0.77). The average score on the 5-point depression symptom scale was 3.31 (SD = 9.5), with higher scores reflecting a greater number of symptoms; average scores on the 40-item scale of psychotic symptoms and the 52-item scale of interviewer observations of psychotic behavior were 11.71 (SD = 9.5) and 10.9 (SD = 8.9), respectively. Clients averaged 2.4 (SD = 6.1) days of intoxication during the previous month and 3.8 (SD = 11.2) days of drug use. Ratings of physical ill health averaged 3.3 (SD = 1.2) on a 5-point scale (5 = poor). Average monthly income was $326 (SD = 427).

All clients received at least 1 clinical psychiatric diagnosis. In order of frequency, non–mutually exclusive diagnoses included

major depression (50%), schizophrenia (34%), other psychoses (30%), personality disorder (25%), anxiety disorder (19%), and bipolar disorder (18%). Substance abuse was also frequently diagnosed, with 57% of clients having both psychiatric and substance abuse disorders (48%, alcohol abuse; 40%, drug abuse).

Follow-Up Rates

A total of 1535 clients (84%) were successfully followed up at 3 months, 1449 (79%) at 12 months, and 1340 (73%) at both time points. Clients successfully interviewed at 3 and 12 months were compared, on 25 baseline measures, with those who were not interviewed. Those interviewed at both 3 and 12 months differed significantly (P < .05) on 3 of 25 measures from those lost to follow-up: they were more likely to be female (38% vs 26%) and to be Black (47% vs 37%), and they had a higher number of social supports (1.98 vs 1.65).

Changes in Service Use and Housing Status

Significant changes in the expected directions were observed, from baseline to follow-up, on almost all measures of service use and housing outcome (Table 1). The percentage of clients who had lived in an apartment room or house of their own increased from 5% at baseline to 25% at 3 months and 44% at 12 months.

Baseline Client Characteristics Predicting Housing Outcomes

The logistic regression model of the relationship of client characteristics to obtaining independent community housing revealed that significant (P < .001) predictors were psychotic behavior (standardized regression coefficient = –0.17), being Black (–0.14), age at baseline (0.12), number of days housed in the past 60 days at baseline (0.12), being male (–0.12), symptoms of depression (0.11), client-identified need for housing assistance (0.10), and entry through community outreach (–0.10). The model explained 16% of the variance in housing outcomes.

Structural Equation Model

Figure 1 presents the results of the causal model predicting independent housing status 12 months after program entry. Altogether, the model explained 20% of the variance in housing outcomes and had a high normed fit index (0.97). All path coefficients presented in Figure 1 were significant at

TABLE 1—Changes From Program Entry to 3-Month and 12-Month Follow-Up Interviews in Clinical Status and Service Use (Repeated Measures Analysis of Variance; n = 1340)

	Program Entry, %	3-months, %	12-months, %	Overall time effect (F)	P	Change: Baseline–3 Months		Change: 3–12 Months	
						F	P	F	P
Service use									
Psychiatric care	60.1	74.4	71.0	46.73	.0001	78.98	.0001	4.67	.0309
Substance abuse care	17.7	19.7	15.2	5.80	.0031	2.38	.1232	11.34	.0008
Medical care	40.4	47.3	44.2	8.96	.0001	17.88	.0001	5.32	.0212
Housing services	11.7	24.2	24.7	62.81	.0001	90.49	.0001	0.08	.7733
Income support	51.3	63.1	69.7	98.03	.0001	47.76	.0001	40.13	.0001
Job assistance	14.4	17.3	15.6	2.98	.0510	6.01	.0144	2.02	.1559
Diversity of services									
Nonhousing services (0–5)	1.82[a]	2.21	2.15	75.89	.0001	131.66	.0001	3.75	.0529
Total services (0–6)	1.94[a]	2.45	2.39	109.50	.0001	181.90	.0001	3.44	.0637
Independent housing	5.1	24.6	43.5	375.91	.0001	242.03	.0001	155.71	.0001

[a]Mean.

$P < .05$. These coefficients are standardized multiple regression coefficients representing the strength of relationship between pairs of variables after adjustment for the effect of the temporally antecedent and concurrent variables in the model.

As hypothesized, significant relationships were observed between service system integration and use of public housing services at 3 months (0.31) and between use of housing services and independent housing at 12 months (0.27). No relationship was observed between service system integration and use of nonhousing services or between use of nonhousing services and independent housing at 12 months. An additional unexpected finding was the direct relationship between service system integration and independent housing (0.10), unmediated by use of any specified services.

As expected from the construction of the measure, client characteristics were strongly associated with the achievement of independent housing (0.24).

A limitation of this analytic approach is that it does not account for nonindependence among clustered observations (specifically, similarities of clients attributable to their being from the same site) and thus risks underestimating standard errors based on an assumption of independence of observations. As a means of addressing this problem, data were reanalyzed via hierarchical linear modeling with MIXOR, a software package designed for the analysis of correlated dichotomous dependent variables.[22] The intracluster correlation was modest in size (0.07), and the relationship between systems integration and housing outcomes, after control for baseline characteristics, remained highly significant ($Z = 3.01, P = .002$).

Discussion

Service System Integration and Client Outcomes

Consistent with the hypothesis set forth at the beginning of this article, we found that service system integration was significantly related to improved access to housing services 3 months after program entry and, through these services, to the achievement of independent housing 12 months after program entry. The absolute value of the correlations was moderate in magnitude; however, this is impressive, since the study had several advantages over previous empirical studies of the impact of service system integration on client outcomes. It involved a large number of sites; measures of interorganizational relationships were based on extensive interviews with key informants; funding support for case management services was standardized across sites; and operational variations in the implementation of case management were systematically measured. Furthermore, extensive data were obtained through detailed face-to-face follow-up interviews, at multiple time points, with a large number of clients. These models allowed statistical adjustment for the influence of client characteristics. Finally, the unambiguous temporal sequencing of the data allowed evaluation of a causal model of housing outcomes using structural equation methods.

In several respects, the hypothesis, as originally formulated, was not confirmed. For example, in addition to the outcomes mediated by increased service accessibility, a notable direct effect of service system integration on outcomes was still observed (i.e., a relationship that was not mediated by access to relevant housing services). Further-

more, service system integration was not found to be significantly related to use of services in domains other than housing. Several possible explanations for these results deserve consideration.

Service System Integration and Civic Culture

The observation of superior housing outcomes in more integrated service systems, independent of the greater accessibility of housing agencies, may be explained by the general characteristics of the culture and institutional history in these communities, by economic factors that influence the availability of housing resources, or by a combination of the two. High levels of integration in service networks that care for homeless people may reflect general features of civic culture[23,24] that also enhance the opportunities for homeless people with serious mental illness to find stable housing. It is also possible that superior housing outcomes may reflect more favorable local economic conditions, such as higher per capita funding of public housing programs (e.g., through Section 8 vouchers or "shelter plus care" programs) or a greater stock of available low-cost housing.[25] Our inability to evaluate the cultural and economic interpretations of our findings is a notable limitation of this study.

Service System Integration: Homogeneous or Sector Specific?

The observation that service system integration was associated with access to housing services but not with access to nonhousing services may argue against a generalist perspective on the impact of service system integration on service accessibility. If

FIGURE 1—Results of causal model.
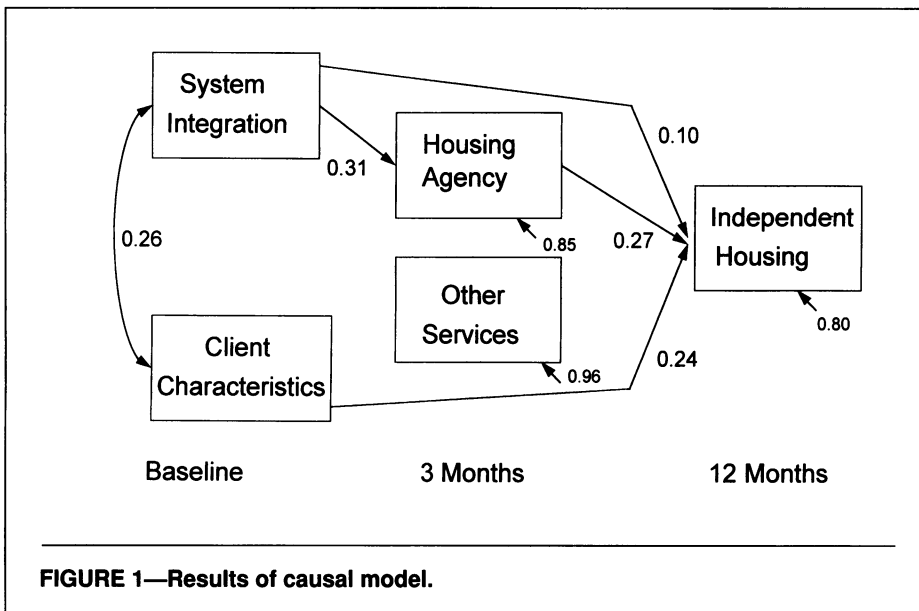
service networks in these 18 communities were homogeneous in their impact on service use, we would expect to find significant relationships between measures of service system integration and client use of other services (or at least some services in addition to housing services).

As a means of clarifying these relationships, additional correlation analyses were conducted of bivariate relationships between service system integration and the use of each of the 5 specific nonhousing services (i.e., psychiatric, medical, substance abuse, income, and job training) at both 3 months and 1 year. Of the relationships thus examined, 4 were significant. In only 2 cases was service system integration associated with increased access to services: job training at 3 months ($r = 0.06$, $P < .05$) and medical services at 12 months ($r = 0.06$, $P < .05$). In 2 other cases, service system integration was associated with reduced access to services: substance abuse services at 12 months and income support at 12 months ($r = -0.08$, $P < 0.01$, and $r = -0.06$, $P < .05$, respectively). These supplementary analyses do not support the conceptualization of service integration as a homogeneous characteristic of a service network that affects the accessibility of many of the services available through that network.

It is important to note that, in contrast to the increased use of housing services, change in use of other services was relatively modest in magnitude. This is probably due to the fact that substantial linkage with nonhousing services was accomplished during the outreach phase of the program, in which clients were engaged with the health care system, but before formal case management services were initiated. It is thus likely that our failure to identify a relationship between service

system integration and use of nonhousing services reflects limited new linkages with nonhousing services during the case management phase of the program. Linkage with housing services, in contrast, typically builds on access to basic health and mental health services; thus, it is less likely to have occurred during outreach and, as a result, more likely to be the central focus of the case management phase of the program.

Methodological Limitations

Before concluding, we must acknowledge several methodological limitations. First, in any quasi-experimental study such as this, unmeasured differences in client characteristics across conditions (i.e., across levels of service integration) can bias the results. We tried to minimize this threat to validity by adjusting for these factors in our model; however, this limitation is intrinsic to the study of geographically dispersed service systems.

Second, key informant reports on interorganizational relationships and assessments of the operation of the case management teams were based on rater judgments and were not independently validated in this study (although they have been validated elsewhere).[26]

Third, although we attempted to standardize case management services across sites, we do not have data on the availability of other services (e.g., subsidized housing or welfare resources) in the community at large or on the state of the local housing or labor markets. It is possible that service system integration is related to the availability of these resources; such a relationship would at least partially explain our findings.

Finally, the client samples were clinical convenience samples. Since they were not

drawn from a systematic sampling frame at each site, we do not know how representative they are of the site's target population. It is virtually impossible to construct a communitywide sampling frame of homeless individuals with mental illness, and here, too, we encountered one of the unavoidable conditions of research at the service system level.

Conclusion

This study is the first of which we are aware to demonstrate a significant relationship between service system integration and client outcomes. The completion of the ACCESS demonstration will provide additional information on the effectiveness of efforts to raise the level of service system integration in these service networks and will assess the impact of those efforts on the well-being of the clients served. □

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