Community Effects on Mental Health Outcomes in Subjects With and Without Panic Attacks: Results From a Population-Based Study in San Antonio, Texas

David A. Katerndahl, M.D.

Objective: The purpose of this study was to determine the proportion of variance in mental health outcomes accounted for by census tract in community-dwelling adults with and without panic attacks.

Method: This is a secondary analysis of a population-based study (conducted from August 1989 through December 1991) of subjects with and without panic attacks (DSM-III-R criteria) from 18 census tracts in San Antonio, Texas. All subjects completed measures of symptomatology, health care utilization, substance use, and quality of life. Subjects with panic attacks completed measures of panic-related disability and health care utilization, as well as measures of sense of control and secondary mental disorders. Hierarchical modeling was used to estimate the proportion of the variance of each outcome accounted for by census tract.

Results: Census tract accounted for less than 4% of the variance in psychiatric symptomatology and quality of life. However, census tract contributed to the proportional variance in panic-related outcomes, accounting for 13% of the variance of mental health utilization for panic symptoms when compared with individual-level variance.

Conclusions: The use of more homogeneous levels such as block group could increase the measured multilevel effects found in this study. Studies of disease-specific mental health outcomes in multiple neighborhoods or clinics should consider whether multilevel effects are present.

(Prim Care Companion J Clin Psychiatry 2007;9:429–432)

Simple cause-and-effect models are becoming increasingly recognized for their limitations in mental illness. The biopsychosocial model of disease[1] emphasizes the interplay of biomedical, psychological, and social factors in illness. Consequently, morbidity may depend upon a "web of causation," which may include factors at a level above that of the individual.[2] This model has been advocated as a way of understanding panic disorder.[3] In addition, complexity science suggests that behavior often varies in unpredictable ways, depending on multilevel (e.g., family and/or neighborhood) factors.[4]

Panic disorder has been linked to the development of depression, substance abuse, and agoraphobia[5]; increased health care utilization[6]; and decreased quality of life.[7] The relationship between panic disorder and such mental health outcomes has been well studied in both community[8] and health care settings.[9] However, these studies often involve subjects who are nested within neighborhoods or clinics. Just as Ferrer et al.[10] demonstrated that the family level can account for up to 26% of the variance in health status, so the community may also contribute to health outcomes. For example, Aneshensel and Sucoff[11] found that neighborhood perceptions affected the mental health of adolescents. In fact, there is growing awareness that such higher-order factors may impact mental health outcomes.[12]

Although previous studies have not looked for community effects on psychiatric symptoms, Curtis[13] found that functional status was lower among subjects living in underprivileged communities. Outpatient mental health utilization has not been shown to be associated with community variables. However, utilization of general practitioners[13] and rehospitalization for mental illness[14] are associated with community factors. In a previous analysis of the Panic Attack Care-Seeking Threshold Study database, census tract descriptors were significantly associated with psychiatric symptomatology (range, $R^2 = 0.042–0.136$) and life satisfaction ($R^2 = 0.044$), as well as with sense of control ($R^2 = 0.087$) and comorbid mental disorders ($R^2 = 0.159$) among subjects with panic attacks.[15] However, that analysis used descriptors in linear regression models; it did not look at proportions of variance accounted for by census tract membership. Census tract is a governmentally determined geographic area

429

designed to yield clusters that are demographically homogeneous.

The impact such nested effects may have on mental health outcomes has not been assessed. The purpose of this study was to determine the proportion of variance in mental health outcomes accounted for by census tract in community-dwelling adults with and without panic attacks.

METHOD

Sample

This study represents a secondary analysis of data collected from August 1989 through December 1991 for the Panic Attack Care-Seeking Threshold Study designed to study care-seeking behavior among community-dwelling people with panic attacks.[16,17] Households were randomly selected from 18 census tracts in San Antonio, Texas. One adult (≥ 18 years old) was randomly selected from each household and asked to participate. Each adult was screened in English or Spanish for the presence of panic attacks using the Structured Clinical Interview for DSM-III-R (SCID).[18] The proportion of subjects selected from each census tract was chosen so that the sample would be representative of the U.S. population in terms of age, gender, and race. Because San Antonio is predominantly Hispanic, representativeness in terms of ethnicity was not attempted. Subjects meeting DSM-III-R criteria for panic attacks were asked to participate in a long interview; subjects did not have to meet criteria for panic disorder. In addition, 97 subjects without panic symptoms but matched in terms of census tract and demographics (gender, race/ethnicity, and age [± 3 years]) to the 97 subjects with panic attacks were also asked to participate. This study was approved by the institutional review board at the University of Texas Health Science Center at San Antonio.

Procedure

All subjects completed informed consent and were interviewed in English or Spanish by a trained bilingual research assistant. All subjects completed measures of symptomatology, health care utilization, substance use, and quality of life. Subjects with panic attacks completed measures of panic-related disability and health care utilization, as well as measures of sense of control and secondary mental disorders. The presence of secondary psychiatric disorders was assessed using the SCID sections dealing with major depressive disorder, generalized anxiety disorder, substance abuse, specific and social phobia, and obsessive-compulsive disorder as a measure of secondary mental disorders (those that developed after the onset of panic symptoms).[18] Psychiatric symptomatology was assessed using the depression, anxiety, and phobic anxiety scales of the Symptom Checklist (SCL-90).[19]

Table 1. Description of the 18 Census Tracts in San Antonio, Texas, From Which Adult Subjects Were Randomly Selected[a,b]

Variable	Median	Range
Social		
Dependency ratio[c]	0.36	0.31–0.48
Isolation, %[d]	7.8	0.7–30.7
Education, %		
Middle school education	24.6	6.0–69.2
High school education	53.8	26.5–75.9
College education	10.0	2.2–59.3
Economic		
Receiving social security, %	28.5	9.8–60.9
Receiving public assistance, %	91.2	59.7–98.1
Below poverty level, %	23.9	7.2–69.2
Median household income, $	22,716	5,603–40,610
Housing		
Vacancy, %	10.5	8.0–33.5
Median rent, $	383	132–582
Renting, %	39.3	23.2–77.1
Rent as fraction of income, %	27.9	22.3–35.1
Median value of dwelling, $	47,350	29,300–129,300
Residing in tract ≥ 5 years, %	51.7	28.6–65.5

[a]Reprinted with permission from Katerndahl.[15]
[b]From the 1990 U.S. Census.
[c]Dependency ratio = number of people ≥ 65 years old divided by number of adults < 65 years old.
[d]Isolation proportion = fraction of adults ≥ 65 years old who live alone.

Subjects were also asked to report the number of days in the previous month that they had used any alcohol or illicit drugs.

Quality of life measures included panic-related work disability and overall quality of life and were assessed using the Panic Attack Quality of Care questionnaire, an instrument designed for this study. The 5-item work disability scale has a Kuder-Richardson-20 (KR-20) coefficient of 0.74 and construct validity, while the 4-item quality of life scale has a Cronbach α of .60 and construct validity.[20]

To assess recent (within the previous 2 months) health care utilization, all subjects reported the number of visits to general health settings (emergency departments, minor emergency rooms, general health clinics, and physician offices) and mental health settings (mental health clinics and offices of psychiatrists, psychologists, and social workers) for panic symptoms and for any reason. Previous studies support the accuracy of patient recall in utilization over the prior 2 months.[21] The Health Care Utilization Questionnaire was designed for this study and has Cronbach α's of .82 and .91 for general medical and mental health settings, respectively. In addition, barriers in access to care were assessed using a checklist of barriers and grouped into 3 scales: Transportation Barriers (5 questions with a KR-20 = 0.610), Personal Barriers (3 questions with a KR-20 = 0.539), and Coverage of Services (7 questions with a KR-20 = 0.948).[22]

Finally, a sense of control was also assessed.[23] Perceived control over panic was measured using the 4-item Appraisal Dimension Scales.[24]

Table 2. Variance in General and Panic-Related Outcomes Accounted for by Census Tract

Outcome	Panic Coefficient, β (SE)	Variance		Variance Proportion, %[a]	χ^2 (p value)
		Census Tract	Individual		
General outcomes (N = 194)					
Symptomatology					
Phobic anxiety	1.10 (.114)	0.022	0.674	3.3	93.85 (< .001)
Anxiety	1.38 (.100)	0.004	0.528	0.8	189.32 (< .001)
Depression	1.24 (.108)	0.015	0.611	2.5	130.13 (< .001)
Substance use	.08 (.137)	0	1.002	0	0.36 (.550)
Quality of life	−.90 (.123)	0.005	0.802	0.6	52.77 (< .001)
Health care utilization					
General health settings	−.01 (.046)	0	0.110	0	0.02 (.893)
Mental health settings	.17 (.053)	0	0.147	0	10.74 (.001)
Panic-related outcomes (N = 97)					
Work disability	0	0	0.073	0	19.91 (< .001)
Sense of control	0	0.003	0.085	3.5	0.17 (.677)
Secondary mental disorders	0	0.003	0.076	3.9	2.75 (.098)
Health care utilization for panic					
General health settings	0	0	0.285	0	0.01 (.920)
Mental health settings	0	0.022	0.169	13.0	0.92 (.339)

[a]Variance proportion = (census tract variance)/(individual variance).

Analysis

To adjust for nonnormality, the natural logarithmic transformation was used for health care utilization variables. For each outcome, hierarchical linear modeling using MLWin software (Center for Multilevel Modeling, London, United Kingdom) was performed to identify the influences of individual and census tract levels on outcomes. The hierarchical model accounts for the nested data structure of individuals within census tracts. Because the purpose of the analyses was to determine variance at the individual and census tract levels, and not identification of predictors, all demographic variables were entered into each model, but β coefficients were not recorded. In addition, for health care utilization outcomes, the 3 barrier scale scores were also forced into each analysis. For general outcomes, the presence of panic attacks was also included in each model. Models of general outcomes were computed using the total sample (those with panic attacks and matched controls); models of panic-related outcomes were computed using only those subjects with panic attacks. The variance proportion (census tract variance over individual variance) was calculated for each model.

RESULTS

Demographically, of the 194 matched subjects in this study, 56% were Hispanic, 30% Anglo-American, and 14% African American, with 78% women. The mean ± SD age was 39.8 ± 14.5 years. Forty-three percent of those with panic attacks met criteria for panic disorder. Table 1 describes the 18 census tracts from which the subjects came. The census tracts show a broad range of diversity.

Table 2 presents results of the hierarchical analysis. With the exception of substance use and general health utilization, general outcome analyses were statistically significant and the presence of panic attacks was a significant predictor. Conversely, the model for work disability was the only significant model for panic-related outcomes. Census tract accounted for little of the variance overall; in addition, as a proportion of variance compared with individual level effects, census tract accounted for little variance in general outcomes. Although census tract accounted for some variance in psychiatric symptomatology and quality of life, it amounted to less than 4% in any outcome. However, census tract contributed to the proportion of variance in panic-related outcomes (secondary mental disorders, sense of control, and mental health utilization), accounting for 13% of mental health utilization for panic symptoms.

DISCUSSION

This study found that census tract accounted for little of the variance in general outcomes. Although most outcomes in this study showed minimal cluster effects, census tract accounted for more than 3% of the variance in secondary mental disorders and sense of control when compared with individual-level variance and more than 13% of the variance in mental health utilization among subjects with panic attacks.

This study builds on the previous analysis of census tract descriptors by demonstrating nested effects on outcomes. Even though several descriptors were significant in previous analyses, the effect of census tract membership was far less. Although any relationship with census tract may be due to differences in ethnicity across census tracts,[25] previous analysis of the Panic Attack Care-Seeking Threshold Study database failed to find differences in mental health utilization between Hispanics and non-Hispanic whites.[26]

This study has potential clinical and research implications. The importance of community on variance in mental health utilization suggests that underutilization of care and unmet needs, so prevalent in panic disorder,[27] should perhaps be addressed at a community rather than individual level. As with most of Texas, San Antonio has limited access to mental health facilities, but city-wide education has been employed in recent years to improve care-seeking. Both of these strategies (community intervention and improved access) could increase perception of unmet needs for mental health care. From a research standpoint, this study suggests that studies of general outcomes can probably ignore census tract effects on modeling. However, researchers should consider evaluating multilevel effects in studies of disease-specific mental health outcomes, especially those studying mental health utilization. Failure to do so may result in errant results.

This study has several limitations. In addition to using DSM-III-R rather than DSM-IV criteria, this study involved 194 subjects from 18 census tracts, barely enough to evaluate multilevel effects; this limitation is even more problematic for the panic-related outcomes. The use of census tracts to define "level" is also problematic. Previous work suggests that block groups are more homogeneous in terms of socioeconomic status than are census tracts and, consequently, better proxies for "neighborhood."[28] Thus, the use of heterogeneous census tracts may diminish our ability to detect higher-order effects. Finally, due to the demographic uniqueness of San Antonio, the generalizability of these results may be limited.

In conclusion, this study found that, while census tract accounted for only a small portion of the variance in outcomes and general outcomes specifically showed minimal multilevel effects, some panic-related outcomes demonstrated relevant effects of census tract when compared with individual-level effects. The use of more homogeneous levels such as block group could increase these measured multilevel effects. Studies of disease-specific mental health outcomes in multiple neighborhoods or clinics should consider whether multilevel effects are present.

REFERENCES

1. Engel G. The need for a new medical model: a challenge for biomedicine. Science 1977;196:129–136
2. Krieger N. Epidemiology and the web of causation: has anyone seen the spider? Soc Sci Med 1994;39:887–903
3. Noyes R Jr. Is panic disorder a disease for the medical model? Psychosomatics 1987;28:582–584, 586
4. Office of Behavioral and Social Sciences Research (OBSSR). Towards Higher Levels of Analysis: Progress and Promise in Research on Social and Cultural Dimensions of Health. Washington, DC: OBSSR; 2000. NIH Publication 00–4820
5. Faravelli C, Degl'Innocenti BG, Giardinelli L. Epidemiology of anxiety disorders in Florence. Acta Psychiatr Scand 1989;79:308–312
6. Shapiro S, Skinner EA, Kessler LG, et al. Utilization of health and mental health services: three Epidemiologic Catchment Area sites. Arch Gen Psychiatry 1984;41:971–978
7. Markowitz JS, Weissman MM, Ouellette R, et al. Quality of life in panic disorder. Arch Gen Psychiatry 1989;46:984–992
8. Klerman GL, Weissman MM, Ouellette R, et al. Panic attacks in the community: social morbidity and health care utilization. JAMA 1991; 265:742–746
9. Katon W, Vitaliano PP, Russo J, et al. Panic disorder: epidemiology in primary care. J Fam Pract 1986;23:233–239
10. Ferrer RL, Palmer R, Burge S. Family contribution to health status. Ann Fam Med 2005;3:102–108
11. Aneshensel CS, Sucoff CA. Neighborhood context of adolescent mental health. J Health Soc Behav 1996;37:293–310
12. Pearlin LI. The stress process revisited. In: Aneshensel CS, Phelan JC, eds. Handbook of the Sociology of Mental Health. New York, NY: Academic/Plenum Publishers; 1999
13. Curtis SE. Use of survey data and small area statistics to assess the link between individual morbidity and neighborhood deprivation. J Epidemiol Community Health 1990;44:62–68
14. Husted J, Jorgens A. Population density as a factor in the rehospitalization of persons with serious and persistent mental illness. Psychiatr Serv 2000;51:603–605
15. Katerndahl DA. Community correlates of outcomes in subjects with panic attacks. Depress Anxiety 2001;13:194–197
16. Katerndahl DA, Realini JP. Lifetime prevalence of panic states. Am J Psychiatry 1993;150:246–249
17. Realini JP, Katerndahl DA. Factors affecting the threshold for seeking care. J Am Board Fam Pract 1993;6:215–223
18. Spitzer RL, Williams JBW. Structured Clinical Interview for DSM-III-R, Upjohn Version, Revised. New York, NY: Biometrics Research, New York State Psychiatric Institute; 1989
19. Derogatis LR, Lipman RS, Rickels K, et al. The Hopkins Symptom Checklist (HSCL): a self report symptom inventory. Behav Sci 1974; 19:1–15
20. Katerndahl DA, Realini JP. Quality of life and panic-related work disability in subjects with infrequent panic and panic disorder. J Clin Psychiatry 1997;58:153–158
21. Brown JB, Adams ME. Patients as reliable reporters of medical care process. Med Care 1992;30:400–411
22. Katerndahl DA, Realini JP. Use of health care services by persons with panic symptoms. Psychiatr Serv 1997;48:1027–1032
23. Salzer MS, Berenbaum H. Somatic sensations, anxiety, and control in panic disorder. J Behav Ther Exp Psychiatry 1994;25:75–80
24. Vitaliano PP. Manual for Appraisal Dimension Scale and Revised Ways of Coping Checklist. Seattle, Wash: Department of Psychiatry, University of Washington; 1985
25. Phillips KA, Mayer ML, Aday LA. Barriers to care among racial/ethnic groups under managed care. Health Aff (Millwood) 2000;19:65–75
26. Katerndahl DA, Realini JP. Panic disorder in Hispanic patients. Fam Med 1998;30:210–214
27. Wittchen HU. Met and unmet need for interventions in community cases with anxiety disorders. In: Andrews G, Henderson S, eds. Unmet Needs In Psychiatry. Cambridge, Mass: Cambridge University Press; 2000
28. Frisbie WP, Kasards JD. Spatial processes. In: Smelser N, ed. Handbook of Sociology. Beverly Hills, Calif: Sage Publications; 1988