Contextual Socioeconomic Status and Mental Health Counseling Use Among U.S. Adolescents with Depression

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Abstract

Most adolescents with depressive disorders do not receive any mental health services, even though effective treatments exist. Although research has examined numerous individual-level factors associated with mental health service use among depressed adolescents, less is known about the role of contextual factors. This study examines the relationship between contextual-level socioeconomic status (SES) and clinic-based mental health counseling use among U.S. adolescents with high depressive symptoms in urban and suburban areas. Data from the first two waves of the National Longitudinal Study of Adolescent Health (N=1,133; 59% female) were analyzed using multilevel logistic models in which adolescents were nested within counties. After controlling for individual-level predisposing, enabling, and need characteristics, as well as county racial/ethnic composition, county SES was positively associated with clinic-based counseling use among depressed youth. A one standard deviation increase in the county affluence index was associated with 43% greater odds of receiving any clinical counseling services. Furthermore, the positive relationship between county affluence and clinical counseling use was no longer significant after controlling for the county supply of mental health specialist physicians. The results indicate that county residential context is a key correlate of mental health service use among depressed adolescents, such that those who live in lower SES counties with fewer mental health specialists are less likely to receive treatment.

Keywords

Community Socioeconomic Status; Mental Health Services; Adolescents; Depression

INTRODUCTION

Depressive disorders, including major depressive disorder and dysthymia, are common among adolescents and are associated with substantial health, social, and developmental consequences. Approximately 8% of adolescents experience an episode of major depression in a given year (SAMHSA 2009), and 12% of adolescents have experienced a depressive disorder in their lifetime (Merikangas et al. 2010). In the short term, depressive disorders are

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associated with adverse outcomes among adolescents, including an increased risk for comorbid mental health problems (Goodman et al. 2000; Lewinsohn, Rohde, and Seeley 1998), substance use disorders (Lewinsohn et al. 1998), and obesity (Goodman and Whitaker 2002). Research has also reported that major depressive disorder places adolescents at greater risk for later mental health problems, substance use disorders, educational underachievement, unemployment, poorer functioning in work, and social problems (Fergusson and Woodward 2002; Weissman et al. 1999). In addition to these consequences, depressive disorders are also potentially life-threatening. Major depression places adolescents at greater risk for first suicide attempts, lifetime suicide attempts, and completed suicides (Weissman et al. 1999) – the third leading cause of death for those between the ages of 10 and 24 (Centers for Disease Control and Prevention 2012).

Most adolescents with depressive disorders do not receive any mental health services, even though effective treatments are available (Merikangas et al. 2011; Michael and Crowley 2002). Although studies have examined correlates of mental health service utilization among this population to better understand barriers to service use (Cummings and Druss 2011; Olfson et al. 2003; Wu et al. 2001), research has generally focused on attributes of the individual or family with less attention paid to the role of the residential context. Contextual–level socioeconomic status (SES) may be especially important for mental health service use among depressed adolescents because of its relationship with the available mental health care infrastructure and other county-level sociocultural factors.

When considering the broader youth-focused mental health services literature (not just limited to those with depression), few studies have included any contextual-level measures in the analyses. In a study of children involved with the child welfare system, county-level linkages between child welfare and mental health agencies were associated with a stronger relationship between mental health need and specialty mental health service use. However, the percentage of county residents living in poverty was not significantly associated with specialty mental health service use in this population (Hurlburt et al. 2004). Two additional studies of adolescents reported that elements of the health care infrastructure were associated with increased mental health counseling use in school settings (Slade 2002) or multiple settings (Fletcher 2008); elucidating the role of contextual-level SES, however, was not a focus of either study. The current study advances the literature by developing a conceptual framework of mental health service use among a vulnerable group of adolescents that emphasizes the role of contextual SES; examining measures of contextual SES that capture multiple dimensions of this construct (i.e., affluence and disadvantage); and testing hypotheses concerning the links between contextual SES, mental health care resources, and clinic-based mental health service use in this sample.

Determinants of Adolescent Mental Health Service Use in Clinical Settings

The current study draws on two existing conceptual frameworks, as well as theory from economics and sociology, to create a conceptual model of mental health service use among adolescents that guides the derivation of study hypotheses for the study sample. As a starting point, Cauce and colleagues (2002) identify three steps in the mental health help-seeking process of youth: (1) problem recognition, (2) decision to seek treatment, and (3) service

selection. Regarding the third step, the authors note that mental health services may take place in the formal mental health services sector (e.g., psychiatrists and psychologists), in the collateral services sector (e.g., schools or the juvenile justice system), and/or by relying on informal supports (e.g., family, friends, and clergy). The current study focuses on determinants of service use in the formal mental health services sector (i.e., clinical settings), and draws on Cauce et al.'s framework to assess whether the propensity to use services in alternative sectors explains differences in the use of clinic-based mental health services for adolescents in the study sample.

To elucidate the potential determinants of mental health service use in clinical settings among adolescents, the current study also draws on the Behavioral Model of Health Services Use; this framework identifies the importance of individual- *and* contextual-level predisposing, enabling, and need-related factors when examining the use of personal health services (Andersen and Davidson 2001). At the individual level, predisposing characteristics are demographic (e.g. age) and social (e.g. race/ethnicity) factors that may affect the proclivity to use services, but are not directly responsible for service use. Enabling characteristics include resources that may facilitate or impede the use of services, such as family income and health insurance. Enabling characteristics also include factors that allow an adolescent and/or family to more easily navigate the mental health care system, such as English language proficiency and/or prior experience with the mental health care system. Finally, individual need-related characteristics include an adolescent's perceived need for mental health services and the evaluated need for mental health services by a trained professional. Individual mental health need also encompasses the type and severity of the mental health problem(s).

At the contextual level, predisposing characteristics include the social and demographic composition of the community, as well as community beliefs regarding health conditions and appropriate treatment. For mental health service use, attitudes and beliefs about mental health problems and treatment in the community may be especially relevant for the mental health help-seeking process (Corrigan 2004). Enabling characteristics at the contextual level comprise health policies and the financial resources available for the health care system, as well as the organization of the health care system. Contextual need characteristics include population health indices and health-related measures of the physical environment (Andersen and Davidson 2001). In this study, *context* is operationalized at the county level because policies that shape the local mental health care market can be determined, implemented, and funded at this level through county property taxes, sales taxes, or fines. Counties also play an especially important role in the coordination and provision of mental health services for disadvantaged populations, including low-income individuals, those with public insurance, and the uninsured (Kelch 2011).

County SES and Adolescent Mental Health Service Use

One contextual–level characteristic that may be especially important for mental health service use among depressed adolescents is the SES of the county, because of its relationship with the available mental health care infrastructure and other county-level sociocultural factors. Turning first to the mental health care infrastructure, economic theory

of provider location decisions predicts that mental health providers will be attracted to communities with a higher aggregate income because of the greater aggregate purchasing power that enables providers to charge higher fees for a given service (Rosko and Broyles 1988). A greater supply of mental health providers in the county may, in turn, be positively associated with adolescent mental health service use because of a distance decay effect in which reduced travel distance decreases the opportunity cost associated with seeking services. Indeed, research has documented that higher SES counties have a greater supply of mental health providers (Thomas et al. 2009), and that travel distance is negatively associated with the use of mental health services (Fortney et al. 1999). Another element of the clinical mental health care infrastructure that may be more robust in higher SES counties with a larger residential tax base is the supply of public safety-net facilities for disadvantaged populations (Andersen and Davidson 2001).

Contextual SES may also be positively associated with clinic-based mental health service use through its association with contextual sociocultural factors, such as community-level differences in attitudes and beliefs concerning mental health problems and treatment. For example, the Behavioral Health Model of Health Services Use posits that underlying community attitudes and beliefs affecting individual health care utilization might be correlated with a component of contextual SES – aggregate education level (Andersen and Davidson 2001). Furthermore, research has documented that individuals with higher education have more favorable attitudes towards clinical mental health services (Pescosolido et al. 2007), and economic theory indicates that individual preferences for mental health services can be aggregated to the market segment. Thus, communities with higher aggregate education levels may have a greater demand for clinical mental health services that, in turn, is positively associated with both the supply of mental health providers and with mental health service use.

To isolate the hypothesized positive contextual relationship between county SES and mental health service use in clinical settings suggested by these pathways, analyses must control for individual-level predisposing, enabling, and need-related factors associated with mental health service. Furthermore, because adolescents may seek services in other settings such as schools and churches (Cauce et al. 2002), and because the availability of services in these settings may differ across counties (Brener, Martindale, and Weist 2001), models should also adjust for an adolescent's propensity to seek services outside of the clinical infrastructure to isolate the relationship between county SES and mental health service use in clinical settings. Lastly, given the correlation between race/ethnicity and contextual SES in U.S. metropolitan areas (Acevedo-Garcia and Lochner 2003), and other factors that may influence service use such as adolescent mental health problems (Wight et al. 2005) and mental health provider supply (Komaromy et al. 1996), analyses must also control for the county's racial/ethnic composition.

HYPOTHESES

Although there is ample reason to believe that contextual SES is an important determinant of mental health service use for a vulnerable population in need of mental health treatment, no known study has comprehensively examined this issue. Using data from a nationally

representative sample of depressed adolescents, this analysis tests several hypotheses. First, because of the associations among contextual SES, provider supply, and community attitudes and beliefs about mental health treatment, contextual SES is hypothesized to be positively associated with mental health service use in clinical settings after controlling for differences in individual-level predisposing, enabling, and need-related factors and county-level racial/ethnic composition. Second, the positive relationship between contextual SES and mental health service use in clinical settings is hypothesized to remain significant after adjusting for adolescent propensity to seek services in alternative settings. And third, the positive relationship between contextual SES and mental health service use in clinical settings is hypothesized to attenuate after controlling for the supply of mental health providers.

In addition to examining the role of residential context in clinic-based mental health service use among depressed adolescents, this study also contributes to the literature by assessing whether an enhanced model specification has implications for the relationships among individual-level constructs that have been examined in prior studies. Of particular interest is the literature documenting significantly lower rates of mental health service use in medical settings among Black, Hispanic, and Asian adolescents with depression, relative to their White counterparts (Cummings and Druss 2011). Findings from other studies in the mental health services literature indicate that the inclusion of contextual-level measures can provide further insight into understanding racial/ethnic differences in the receipt of treatment (Cook et al.; Hurlburt et al. 2004). Therefore, a fourth hypothesis tests whether lower rates of mental health service use among racial/ethnic minorities, relative to Whites, are partially explained by controlling for contextual-level measures of sociodemographic characteristics and the health care infrastructure.

METHOD

The Sample

Data come from the first two waves of the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative school-based sample of adolescents in grades 7–12 at baseline. An in-home interview was conducted between April and December 1995 as part of the first wave of data collection. Adolescents who did not graduate and who were not part of a targeted subsample in Wave I (i.e. disabled adolescents and genetic siblings) were re-interviewed during the second wave of data collection between April and August 1996.

Of the 13,568 adolescents from the baseline probability sample who participated in both waves, 1,408 adolescents (i.e., 10.4%) were identified with high depressive symptoms using a score on the Center for Epidemiologic Studies Depression Scale (CES-D) that exceeds a clinically significant threshold. This metric (i.e., 22+ for males, 24+ for females) was established by Roberts et al. to identify likely cases of major depressive disorder and dysthymia (Roberts, Lewinsohn, and Seeley 1991). Depressive symptoms were measured using the modified Add Health 18-item version of the CES-D (Radloff 1977), with two of the eighteen items slightly altered for the adolescent population after pretesting ($\alpha=0.86$). Response categories ranged from rarely (0) to most or all of the time (3), allowing

summation scores to range from 0 to 54. Because two items from the CES-D were not included in Add Health, the total scale score was augmented by multiplying the mean item response by 20 to allow comparisons to the cutoff scores established by Roberts et al. Consistent with prior literature, adolescents with high depressive symptoms were less likely to be White and have lower family incomes on average, than those without high depressive symptoms (Siegel et al. 1998).

Of the 1,408 adolescents with high depressive symptoms, adolescents in rural communities (n=239) were excluded because the theoretical pathways linking key study constructs differ in urban/suburban versus rural communities. Those with missing data on key variables (i.e., outcome variable and county codes, n=7), and those who moved to a different county between Wave 1 and 2 (n=29) were also excluded. This yielded an analytic sample of 1,133 depressed adolescents who lived in urban and suburban U.S. areas and resided in the same county in Waves I and II. Missing values on other analysis variables were handled using multiple imputation for analysis (Collins, Schafer, and Kam 2001).

Individual-Level Measures

The dependent variable was assessed at wave 2, and all individual-level control variables were assessed at baseline.

Clinic-based mental health service use encompasses the psychotherapeutic (i.e., talk therapy) and pharmacological treatments that adolescents can receive from a licensed professional for a depressive disorder in a medical setting, such as an outpatient clinic, hospital, or mental health provider's private office. The Add Health data contain information about whether the adolescent received a psychotherapeutic treatment in the past year, and the setting in which this treatment was received. Specifically, adolescents were asked, "In the past year, have you received psychological or emotional counseling?" If the respondent answered "yes," he or she was subsequently asked to indicate from which of the following setting(s) they received those services: private doctor's office, community mental health clinic, hospital, school, or other setting. Using this information and drawing on Cauce et al.'s framework (Cauce et al. 2002) that distinguishes between mental health services in three sectors (i.e., formal mental health services sector; collateral services sector, [e.g., schools]; and informal supports [e.g., clergy]), the dependent variable was assessed with a dichotomous indicator for those who received any mental health counseling in a clinical setting (i.e., private doctor's office, community health clinic, and/or hospital).

Although the dependent variable did not capture the full spectrum of mental health services that can be provided to depressed adolescents in the formal mental health services sector (e.g., medication management), this measure served as a strong proxy for the theoretical construct by capturing a crucial component of the services that depressed adolescents should receive (i.e., counseling). A meta-analysis found that several psychotherapeutic interventions produced moderate to large treatment gains that were clinically meaningful for youth suffering from depressive disorders (Michael and Crowley 2002), and the American Academy of Child and Adolescent Psychiatry recommends that all adolescents with depressive disorders should receive some type of psychotherapeutic intervention. In

contrast, antidepressant medication is only recommended for more severe forms of depression in this population (Birmaher et al. 2007).

There was no specific information available in the dataset about counseling services received in some "other" setting, a category that could encompass a range of settings that are part of the informal services sector (e.g., clergy) or part of the formal mental health services sector (e.g., office of a master's-level therapist). Therefore, an alternative specification of the dependent variable was created for sensitivity analyses in which counseling services received in some "other" setting were included when deriving the measure of clinic-based counseling service utilization.

Individual-level predisposing and enabling characteristics controlled for in the analyses included those that have been empirically established in prior research (Cummings and Druss 2011; Olfson et al. 2003): (1) age measured in years; (2) gender; (3) race/ethnicity [non-Hispanic White, Hispanic, Black, Asian American/Pacific Islander, and other race/ethnicity]; (4) family status assessed with an indicator identifying adolescents who live with both biological parents versus those who do not; (5) family income assessed with a continuous measure and log-transformed to account for its highly skewed distribution; and (6) health insurance status [any private insurance, public coverage including Medicare and/or Medicaid, other health insurance, and uninsured].

Individual-level need characteristics controlled for in the analyses include measures of the severity of mental health problems, in keeping with prior research (Cummings and Druss 2011; Wu et al. 2001). In particular, models adjusted for the number of depressive symptoms using the CES-D score described above (α=0.86), and two indicators for those who reported having any suicidal thoughts or making a suicide attempt in the past year.

Several proxy measures for mental health service need were also included in the analyses. Because substance use is highly correlated with mental health problems (Costello et al. 2004), an indicator for illicit substance use in the past 30 days and a typology for drinking behavior were also included. Similar to prior research (Botticello 2009), non-drinkers, moderate drinkers, and heavy drinkers were classified with variables measuring frequency of consumption, frequency of drunkenness, and frequency of consuming five or more drinks. Non-drinkers were those who have not had any alcohol within the past year. Heavy drinkers comprised those who have been drunk at least three times during the past year, consumed five drinks or more at least three times during the past year, *or* reported drinking at least once a week. Moderate drinkers were those who have had alcohol in the past year and did not meet the criteria for heavy drinking. Lastly, because lower health status is also associated with depression among adolescents (Lewinsohn et al. 1998), self-reported health status (1 [excellent] to 5 [poor]) was measured with a dichotomous indicator of fair (4) or poor (5) health versus not.

Adolescent propensity to seek mental health services in alternative settings was assessed with two indicators that measure whether, at baseline, the adolescent received any mental health counseling in: (1) a school setting; and (2) some other setting(s).

County-Level Measures

Socioeconomic status comprises the collective economic resources and education capital of a county. To hypothesize which dimension of county SES is the most relevant for mental health service use among depressed adolescents (e.g., affluence or disadvantage), the potential mechanisms linking these constructs were considered. County affluence may be a stronger predictor of service use than disadvantage because economic theory suggests that availability of more financial resources attracts mental health providers to a community (Rosko and Broyles 1988); additionally, the Behavioral Model of Health Services Use suggests that more financial resources in an area create a stronger tax base to support public facilities (Andersen and Davidson 2001). Consequently, these mechanisms suggest that it would especially important to operationalize county SES in a manner that captures variability in the higher end of the distribution (i.e., affluence) rather than the lower end of the distribution (i.e., disadvantage), and a measure of affluence was created for the main models presented below. A measure of county-level disadvantage was also created for use in sensitivity analyses.

County-level affluence and disadvantage were operationalized using measures from the 1990 U.S. Census in the Add Health database, which were chosen based on prior research (Beyers et al. 2003; Wight et al. 2008). Factor analysis was implemented with the principal-component factor option using Stata software, and affluence was operationalized with a single factor derived from three county-level variables: (1) proportion of households with an income of at least $75,000; (2) proportion of residents aged 25 years and over with a college degree or more; and (3) proportion of residents employed in managerial and professional specialty occupations. Similarly, socioeconomic disadvantage was operationalized with a single factor derived from four county-level variables: (1) proportion of persons with income below the poverty level; (2) proportion of households with public assistance income; (3) proportion of residents aged 25 years and over without a high school diploma or equivalency; (4) and the unemployment rate for males.

Racial/ethnic composition was measured using data from the 1990 Census in the Add Health database to assess: (1) the percentage of county residents who were Black; and (2) the percentage of county residents who were Hispanic.

Mental health providers per capita encompasses the number of licensed professionals per county resident who can deliver mental health services to adolescents. Similarly to prior research (Gresenz, Stockdale, and Wells 2000), data from the Area Resource File in the Add Health contextual database were used to derive two measures of county-level mental health provider supply: (1) the total number of psychiatrists per 100,000 persons, and (2) the total number of general and family practice physicians per 100,000 persons in 1993. The former captures mental health specialist physicians who can provide counseling services to this population, whereas the latter measures the number of general practitioners who may also speak with adolescents about mental health problems during a health care visit. Although Add Health does not contain other measures of the supply of mental health providers such as psychologists and social workers, psychiatrists per capita served as a proxy for the overall supply of mental health specialists. Supplemental analyses (not shown) indicated that the

supply of psychiatrists was highly correlated with the supply of psychologists (R=0.68, p<0.001) and social workers (R=0.47, p<0.001) across urban counties in 1990 (Area Resource File (ARF) 2008).

Analysis

To account for the hierarchical nature of the data in which adolescents (Level 1) were nested within counties (Level 2), analyses were conducted using multilevel modeling. Random effects multilevel logistic models were conducted in Stata software using the xtlogit function (Raudenbush and Bryk 2002; Stata Corporation 2007). The Intra-class Correlation Coefficient was calculated in each model to facilitate the interpretation of variance in clinical counseling use that occurs at the county level (Snijders and Bosker 1999).

To explore the role of county context in clinical counseling use and test the study hypotheses, regression models were estimated in six sequential steps. First, an unconditional model that contains only a random intercept was estimated to assess the gross variance in clinical counseling use that is associated with county-level context. Following this Empty Model, Model 1 was estimated with measures of county-level affluence and racial/ethnic composition to examine the association between the predictor variable of interest and clinical counseling use before adjusting for any individual-level measures. Model 2 estimated the role of individual-level predisposing, enabling, and need-related measures before adjusting for any county-level measures. The third and fourth models built on Model 1 to test whether the relationship between county-level affluence and clinical counseling use remained significant after further adjusting for individual-level predisposing-, enabling-, and need- related factors (Model 3) and adolescent propensity to seek mental health services in alternative settings (Model 4). In the final model (Model 5), county-level measures of provider supply were added to assess whether the relationship between county-level affluence and mental health counseling use in clinical settings was attenuated after controlling for these measures. All continuous measures except for age were standardized such that a one unit increase corresponds with a one standard deviation increase in the measure.

RESULTS

Approximately 14% of adolescents with depression in the sample received clinical counseling services in the previous year (Table 1). Descriptive statistics also indicate that there is considerable racial/ethnic and socioeconomic diversity among adolescents in the sample and in the county-level measures. Because the factor score for county-level affluence was normalized, it is more informative to examine its components. For example, among the counties represented in the sample, the average percentage of adults age 25 and older with a college degree is 27% (S.D.= 7%) and the average percentage of households with income greater than $75,000 is 11% (S.D.= 6%).

As a preliminary step to the multivariate analyses, correlations among the contextual variables were examined (not shown). Most were not statistically significant, but county affluence was significantly associated with percent of Hispanic residents (R=0.38; p<0.001) and psychiatrists per capita (R=0.62; p<0.001).

Results from the multilevel analyses are presented in Table 2. The Empty model indicates that 8% of the variation in clinical counseling use is attributed to living in different U.S. counties. Model 1 shows that there is a significant positive association between county-level affluence and clinical counseling use (OR=1.35, 95% CI=1.10, 1.66), controlling for county-level racial/ethnic composition. Results from the first and second hypotheses are confirmed, as county-level affluence remains positively and significantly associated with clinical counseling use after further controlling for individual-level predisposing, enabling, and need-related measures (Model 3: OR=1.43, 95% CI=1.15, 1.79) and adolescent propensity to seek services in alternative settings (Model 4: OR=1.42, 95% CI=1.14, 1.76).

A comparison of Models 4 and 5 informs the hypothesis concerning whether the positive relationship between county-level SES and clinic-based counseling use is attenuated after controlling for measures of provider supply at the county level; the positive relationship between county-level affluence is no longer significant after including these additional measures (OR=1.24, 95% CI=0.94, 1.64). An examination of results from an additional model (not shown) indicate which measure of provider supply accounts for this finding– psychiatrist supply per capita. When Model 5 is re-estimated without county-level affluence and racial/ethnic composition, psychiatrist supply per capita is positively associated with the receipt of counseling services (OR=1.35, 95% CI=1.13, 1.61), whereas the supply of general and family physicians is not (OR=0.98, 95% CI=0.81, 1.19).

A comparison of Model 2 to Models 3 and 5 informs the final hypothesis that the inclusion of county-level measures partially accounts for lower rates of service use among racial/ethnic minority adolescents compared to Whites. At the individual-level (Model 2), Black (OR=0.54, 95% CI=0.33, 0.91), Hispanic (OR=0.43, 95% CI=0.24, 0.76), and Asian American/Pacific Islander adolescents (OR=0.27, 95% CI=0.10, 0.71) are significantly less likely to receive clinical counseling services than White adolescents. However, counter to the hypothesis, these findings are appreciably unchanged after the addition of county-level affluence, racial/ethnic composition, and provider supply.

Sensitivity analyses were conducted to assess the robustness of these findings. All models were re-estimated using county-level disadvantage in lieu of county-level affluence (not shown), and the results for county-level disadvantage were similar in strength and direction for Models 1– 4. County-level disadvantage was negatively associated with clinic-based counseling use after sequentially adjusting for county racial/ethnic composition (OR=0.66, 95% CI=0.47, 0.92), individual-level predisposing, enabling, and need-related measures (OR=0.62, 95% CI=0.43, 0.89) and adolescent propensity to seek services in alternative settings (OR=0.61, 95% CI=0.43, 0.86). When provider supply was added to the model in Model 5, however, the odds ratio associated with county SES disadvantage increased as hypothesized, but remained statistically significant at the 0.05 level (OR=0.70, 95% CI=0.49, 0.99). This difference is likely due to the fact that psychiatrist supply is strongly correlated with county affluence (R=0.62, p<0.001), but not county disadvantage (R=−0.12, p=0.26).

Sensitivity analyses were also conducted in which models included additional measures of individual- and family-level enabling characteristics and in which an alternative

specification of the dependent variable was implemented. One series of models included proxy measures for acculturation and immigration status (i.e., dichotomous indicators for whether a language other than English was spoken at home and whether the parent(s) were born in the U.S). A second series of models included additional proxy measures for enabling resources, including household size and a categorical measure of parent education. A third series of models included an additional control variable for clinical counseling use at baseline as a proxy for familiarity with the mental health care system. Finally, a fourth series of models implemented an alternative specification of the dependent variable; in this analysis counseling use in "other" settings was included as part of the dependent variable, and 27 additional adolescents (2.4% of the sample) were classified as receiving counseling in a clinical setting. Key findings remained significant and robust in all of these alternative model specifications.

DISCUSSION

The results of this study demonstrate that county residential context is a key correlate of mental health service use among depressed adolescents. Those who live in less affluent counties are significantly less likely to receive treatment, after controlling for county-level racial/ethnic composition and individual-level predisposing, enabling, and need-related characteristics. Lower rates of clinical counseling use in less affluent counties are also not explained by differences in adolescent propensity to seek services in alternative settings, such as schools, across counties. Furthermore, the relationship between county affluence and clinical counseling use is no longer significant after the county-level supply of mental health specialist providers is included in the model.

There are two possible explanations as to why the inclusion of mental health providers in the model accounts for the positive relationship between county affluence and mental health counseling use, and each of these yields different policy implications. As one possibility, there may be excess demand for mental health services in lower SES counties, relative to the available supply of mental health providers. In this case, an increase in mental health provider supply in less affluent counties including–psychiatrists, psychologists, and social workers -- could help reduce unmet need for mental health services among depressed adolescents. Indeed, evidence suggests that many counties have a large gap between the available supply of mental health providers and the estimated local need for mental health services, as more than three-fourths (77%) of urban and suburban counties were designated by the Health Resources and Services Administration as partial or whole Mental Health Professional Shortage Areas (Area Resource File (ARF) 2008). Research has also reported that mental health provider shortages are more likely to occur in lower SES counties than in higher SES counties (Thomas et al. 2009).

Policy mechanisms that could help address mental health provider shortages in lower SES counties include an increase in student loan forgiveness programs (e.g, National Health Service Corps) that encourage more mental health providers to practice in underserved areas (Health Resources and Services Administration 2011), and greater investment in the mental health care safety-net system in these counties. Not only does the mental health safety-net system include clinics that specialize in mental health services such as community mental

health centers, but it also includes primary care safety-net facilities (e.g. federally qualified health centers) that are increasingly providing onsite mental health services (Lo Sasso and Byck 2010). Because the Patient Protection and Affordable Care Act of 2010 establishes $11 billion in new funding for the federal Health Centers program to enhance existing physical and behavioral health services (National Association of Community Health Centers 2010), there exists an important opportunity to expand the availability of mental health services for the adolescent population in lower SES counties.

Another possible explanation as to why the supply of mental health providers accounts for the positive relationship between county affluence and mental health counseling involves the role of aggregate beliefs and attitudes about mental health services across socioeconomically diverse counties. If adolescents in less affluent counties are less likely to seek mental health services in clinical settings because of differences in preferences, beliefs, and attitudes about these services, this could result in a lower supply of mental health providers due to reduced demand for services *and* a lower overall rate of service use. To the extent that county-level differences in beliefs and attitudes account for differences in mental health provider supply and lower levels of service use in less affluent counties, policy-makers should consider implementation of targeted educational outreach efforts to these communities about depression and the benefits of evidence-based treatment options.

Sensitivity analyses that examined county SES disadvantage in lieu of county affluence were similar to the main findings, with one exception: county SES disadvantage remained significant after controlling for the supply of mental health providers. Bivariate correlations indicated that this difference may be explained because psychiatrist supply is strongly correlated with county affluence but not county SES disadvantage. Considered together, these findings suggest that when the operationalization of county SES captures variability in the higher end of resource distribution (i.e., affluence), variation in the mental health provider supply accounts for its relationship with clinical counseling use in this sample. If county SES is operationalized by measuring the lower end of resource distribution (i.e., disadvantage), other unmeasured pathways such as community stigma and attitudes towards mental health treatment could be playing a stronger role in its association with clinical counseling use. Future research should continue to examine the most meaningful measurement of county SES and the pathways that link these different dimensions of SES to mental health service use among vulnerable populations.

This study also has important implications when considered in tandem with prior research documenting how low contextual SES negatively affects mental health outcomes among adolescents. For example, Aneshensel and Sucoff (1996) found that low neighborhood SES is associated with the perception of threatening conditions in the neighborhood (e.g., crime) among adolescents, and that this perception is associated with an increase in mental health problems (Aneshensel and Sucoff 1996). Thus, there may be cause for concern that adolescents who live in lower SES neighborhoods and lower SES counties are doubly disadvantaged – they may face a higher risk of depressive symptoms *and* a lower likelihood of receiving any mental health treatment. Future studies should examine the extent to which low contextual SES at multiple levels has additive, or potentially multiplicative, consequences for vulnerable populations by both increasing the risk for poor mental health

outcomes and concomitantly reducing the likelihood that these populations receive timely, effective treatment.

Contrary to the hypothesis, the inclusion of county-level measures of SES and provider supply did not appreciably change the lower rates of mental health service use among racial/ethnic minorities relative to Whites. Because a study of adults reported that the positive association between the county-level supply of mental health care providers and mental health service use was greater for Latinos and Blacks than for whites (Cook et al.), an additional model (not shown) also included an interaction between individual race/ethnicity and provider supply to test whether any racial/ethnic group may have differentially benefited from the available supply of mental health specialists in a given county. These interaction terms were not significant. The study findings suggest that lower rates of clinic-based mental health counseling use among racial/ethnic minority adolescents with depression are not explained after controlling for differences in the county sociodemographic context and mental health provider supply. Rather, these differences are due to alternative unmeasured pathways that may include differences in cultural health beliefs concerning mental health problems and treatment (U.S. Dept. of Health and Human Services 2001).

Given the lower rates of service use among adolescents with depression from racial/ethnic minority backgrounds and the increasing diversity of the U.S. population, efforts to address mental health provider shortages must also be accompanied by efforts to improve the delivery of culturally competent care and the racial/ethnic diversity of the mental health workforce. As one step to address the former, the American Academy of Child and Adolescent Psychiatry recently adopted practice parameters for cultural competence in child and adolescent psychiatric practice (American Academy of Child and Adolescent Psychiatry 2013). In addition to improving cultural competence in clinical practices, it is also crucial to improve the diversity of the mental health workforce. Although health care providers from racial/ethnic minority backgrounds are more likely than their White peers to practice in minority and underserved communities, racial/ethnic minorities are currently underrepresented among mental health care providers (Substance Abuse and Mental Health Services Administration 2013). Increased federal funding for current initiatives that aim to improve workforce diversity would help improve access to care for socioeconomically and racially/ethnically diverse populations.

In the context of these findings, several study limitations should be noted. First, causality cannot be firmly established in these relationships, due to potential selection effects from unmeasured characteristics that are associated with individuals sorting into counties with higher SES and with greater physician supply. Second, data are not available to measure county-level attitudes and beliefs concerning mental health treatment or comorbid mental health problems among the study sample (e.g., attention deficit hyperactivity disorder). Third, the available data to measure mental health service use in the sample are limited to past year counseling use for psychological or emotional problems. Other dimensions of mental health service use, such as the prescribing and monitoring of psychotropic medications, are not captured in the data.

Lastly, the study is limited in that data were collected more than fifteen years ago, and the patterns of mental health service use among adolescents have changed since this time. Although the use of psychotropic medication has increased among this population since the mid-1990s (Thomas et al. 2006), clinical practice guidelines of the American Academy of Child and Adolescent Psychiatry recommend that *all* adolescents with depression should receive a psychotherapeutic intervention. Therefore, an examination of the association between county SES and the receipt of counseling among depressed adolescents remains relevant when seeking to better understand barriers to needed mental health treatment among this population. Nevertheless, future research is needed to assess whether changes in health and education policy and changes in patterns of mental health service utilization since the study period have implications for the key findings.

CONCLUSIONS

This study informs a richer conceptualization of the determinants of mental health service use among depressed adolescents. Those who live in less affluent counties are less likely to receive mental health counseling services than those who live in more affluent counties, after controlling for individual- and county-level confounders. Furthermore, the positive relationship between county affluence and clinical counseling use is no longer significant after controlling for the county-level supply of mental health providers. And finally, the addition of county-level measures to the model – specifically county affluence, racial/ethnic composition, and mental health provider supply -- did not appreciably change the lower rates of mental health service use among racial/ethnic minorities relative to Whites. Considered altogether, these results highlight the importance of the county residential context as a key correlate of mental health service use among depressed adolescents even if the inclusion of county-level characteristics does not further explain individual-level differences in service use across racial/ethnic groups.

Results from this study provide an important foundation for future research. Future studies should examine the relationships between contextual SES, the broader mental health care infrastructure, and access to mental health services for other vulnerable adolescents. The conceptual framework presented in this study could be adapted to derive hypotheses for adolescents with other mental health problems, such as attention deficit hyperactivity disorder. Also, studies should examine the extent to which low contextual SES at multiple levels creates a double disadvantage (i.e., worse mental health outcomes and less access to treatment) for vulnerable adolescents. Lastly, future research should build upon this study to examine the relationship between the sociodemographic context and current patterns of mental health service utilization among adolescents, including the receipt of psychotropic medication. To pursue research in each of these domains, improved data collection efforts are needed so that large-scale surveys with geographic identifiers also include comprehensive measures of mental health outcomes, mental health service use, and mental health care resources.

Acknowledgments

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Biography

Janet Cummings is an Assistant Professor of Health Policy and Management at the Emory University Rollins School of Public Health. She received her Ph.D. in Health Services with a concentration in Economics from the UCLA Fielding School of Public Health. Dr. Cummings' work examines issues concerning access to and quality of mental health services, with a particular emphasis on socioeconomic, geographic, and racial/ethnic disparities among youth. Dr. Cummings currently has a five-year career development award (K01) from the National Institute of Mental Health to study children's mental health services in the public safety net.

Table 1

Descriptive Statistics for Urban and Suburban U.S. Adolescents with High Depressive Symptoms (N=1,133)

	Mean/Pct.	S.D.
Outcome Variable		
Any Counseling in Clinical Setting	14.2%	-
Sociodemographic Characteristics		
Age	15.8	1.5
Male	40.8%	-
Race		
White	38.9%	-
Hispanic	25.6%	-
Black	24.0%	-
Asian/PI	9.6%	-
Other Race/Ethnicity	1.9%	-
Two Biological Parents	44.4%	-
Family Income ($10,000)	$38,808	$43,461
Insurance Status		
Private Insurance	63.7%	-
Insured with Medicaid/Medicare	14.6%	-
Other Insurance	4.9%	-
Uninsured	16.8%	-
Need Characteristics		
Depressive Symptoms (22–54)	25.9	5.0
Suicidal Thoughts	41.0%	-
Suicide Attempt	15.3%	-
Alcohol Use		
No Alcohol Use	40.1%	-
Moderate Drinker	27.1%	-
Heavy Drinker	32.8%	-
Illicit Drug Use (1=yes)	28.6%	-
Self-rated health fair/poor (1=yes)	19.0%	-

	Mean/Pct.	S.D.
Propensity to Seek Services in Alternative Settings		
Any counseling in school setting (at baseline)	9.8%	-
Any counseling in other setting (at baseline)	3.7%	-
County Variables‡		
Affluence Index	0.0	1.0
Percent Households with Income >$75,000	10.7%	6.1%
Percent Adults Age 25+ with College Degree	27.2%	7.2%
Percent Employed in Managerial and Professional Specialty Occupations	26.3%	5.0%
Percent Black	14.6%	12.5%
Percent Hispanic	14.0%	15.3%
Health Care Infrastructure		
Number of psychiatrists per 100K	13.0	11.5
Number of general and family practitioners per 100K	26.6	9.4

Notes: Data come from National Longitudinal Study of Adolescent Health (Add Health); Outcome variable was measured at Wave 2, and individual-level predictor variables were measured at baseline. County-level measures come from U.S. Census data and Area Resource File data included in the Add Health contextual database.

‡
Adolescents in sample clustered within 87 counties

Table 2

Multilevel Logistic Regressions Examining Determinants of Counseling Use Among Urban and Suburban U.S. Adolescents with High Depressive Symptoms (N=1,133)

	Empty Model		Model 1		Model 2		Model 3		Model 4		Model 5	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Individual-Level Variables												
Age					1.02	0.90 1.16	1.02	0.90 1.17	1.02	0.90 1.16	1.02	0.89 1.16
Male					0.70	0.47 1.06	0.72	0.47 1.08	0.75	0.50 1.13	0.74	0.49 1.12
Hispanic§					0.43**	0.24 0.76	0.36***	0.20 0.67	0.37**	0.20 0.69	0.37**	0.20 0.69
Black§					0.54*	0.33 0.91	0.50*	0.29 0.87	0.52*	0.30 0.90	0.52*	0.30 0.90
Asian/PI§					0.27**	0.10 0.71	0.22**	0.08 0.59	0.24**	0.09 0.62	0.25**	0.09 0.65
Other Race/Ethnicity§					0.78	0.22 2.83	0.64	0.18 2.33	0.67	0.19 2.37	0.69	0.19 2.44
Lives with Both Biological Parents					0.48***	0.32 0.72	0.48***	0.32 0.72	0.50***	0.33 0.75	0.50***	0.33 0.74
Family income (Natural log)					1.16	0.91 1.48	1.13	0.88 1.45	1.14	0.90 1.46	1.14	0.90 1.46
Insured with Medicaid/Medicare±					0.60	0.32 1.13	0.63	0.34 1.19	0.62	0.33 1.16	0.62	0.33 1.16
Other Insurance±					0.51	0.16 1.64	0.54	0.17 1.72	0.56	0.17 1.82	0.57	0.18 1.82
Uninsured±					0.35**	0.17 0.69	0.35**	0.18 0.70	0.35**	0.17 0.69	0.34**	0.17 0.68
Depressive Symptoms†					1.16	0.97 1.39	1.17	0.98 1.40	1.15	0.96 1.38	1.15	0.96 1.38
Any Suicidal Thoughts Past Year					1.12	0.71 1.76	1.13	0.72 1.78	1.10	0.70 1.73	1.09	0.69 1.72
Any Suicide Attempt Past Year					2.86***	1.65 4.96	2.79***	1.61 4.82	2.59***	1.49 4.49	2.64***	1.52 4.59
Moderate Alcohol Use[a]					1.11	0.70 1.77	1.11	0.70 1.77	1.09	0.68 1.74	1.09	0.68 1.73
Heavy Alcohol Use[a]					0.73	0.43 1.22	0.73	0.44 1.23	0.74	0.44 1.24	0.73	0.43 1.22
Illicit Drug Use Past 30 Days					1.48	0.95 2.32	1.39	0.89 2.17	1.37	0.88 2.14	1.40	0.90 2.19
Self-Rated Health Fair/Poor					1.40	0.89 2.19	1.48	0.94 2.31	1.45	0.93 2.28	1.46	0.93 2.30
Propensity to Seek Services in Alternative Settings												
Any school counseling									1.97*	1.16 3.33	1.97*	1.16 3.33
Any counseling other setting									2.12	0.99 4.53	2.11	0.99 4.50
County-Level Variables												
Affluence Index‡			1.35**	1.10 1.66			1.43**	1.15 1.79	1.42***	1.14 1.76	1.24	0.94 1.64

	Empty Model	Model 1		Model 2	Model 3		Model 4		Model 5	
	OR	OR	95% CI	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
% Black Residents[§,†]		0.91	0.73 1.12		1.04	0.82 1.33	1.06	0.83 1.34	1.00	0.78 1.28
% Hispanic Residents[†]		0.76	0.58 1.00		1.05	0.77 1.44	1.03	0.76 1.40	1.04	0.77 1.41
Psychiatrists Per 100K[†]									1.18	0.94 1.49
General and family physicians per 100K[†]									1.01	0.84 1.23
Random Effects										
Intra-class correlation (ρ)	0.084	0.042		0.078	0.045		0.033		0.030	

Notes:

*
$p<0.05$,

**
$p<0.01$,

***
$p<0.001$

Omitted reference categories -

§Non-Hispanic White;

±Any Private Insurance;

aNo Alcohol Use

†Variable standardized so that one unit increase equals a one standard deviation increase in measure