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ORIGINAL ARTICLE

Association between Psychosocial Factors and Asthma in a Demographically Representative Adult Sample

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We conducted an analysis of a demographically representative community health survey to examine the association between psychosocial factors and asthma. Data from the Speak to Your Health! Community Survey, a community-based survey designed and implemented by university and community partners using Community Based Public Health (CBPH) principles to investigate health and social issues in Genesee County, Michigan, was used in the analysis presented. The survey gathered information on self-reported mental and physical health status, disease diagnoses, health access and utilization, health-promoting and health-adverse behaviors, neighborhood conditions, and other topics. We sampled households in all residential census tracts in Genesee County, Michigan. One resident over 18 years of age was randomly selected within each household and participated in a telephone interview. The total sample size for the telephone survey in 2007 was 1,748. The mean age of the participants was 54.7 (SD = 15.69); 66% of participants were white, 26% African American, and 7% other race/ethnicity; and 15% of the population reported being diagnosed with asthma. Adults with asthma had significantly higher body mass index, higher levels of social support, and higher levels of stress than adults without asthma. Clinicians and researchers should be aware of psychosocial factors affecting their adult patient populations and tailor patient care, communication, and community-based educational interventions to specifically address these.

Keywords asthma, BMI, stress, social support, community influences

INTRODUCTION

Asthma continues to be a prevalent chronic disease for both children and adults and is one of the only chronic diseases that affects individuals across the lifespan. The asthma prevalence rate for adults in the United States is estimated at 8.2%. Disparities in asthma prevalence are widely recognized with African Americans and Puerto Ricans having disproportionate rates and females having higher rates of asthma in adulthood (1–5). The costs associated with asthma health care are driven by the high ambulatory care use and over 1.5 million emergency department visits each year (3, 6–7).

Geographic variation in the disparities of asthma prevalence and mortality in communities have been observed (3, 8). Therefore, it is important to examine the link between asthma, psychosocial factors, and community level factors, including socioeconomic status and violence. Several studies examining the link between community indicators, including violence, and asthma morbidity in children have been conducted (9–12). Findings indicate that asthma exacerbations are affected by high family stress and low levels of family social support (10), caregivers' depression (13), and socioeconomic factors (14).

Less examined has been the impact of these community factors on adult asthma morbidity. Therefore, very little is known about the impact of community-level factors on an adult population with asthma. In one study for example, it was found that residing in a community with low educational

levels was associated with adult asthma independently of individual education attainment and social class (15). Current research suggests that although we do not know exactly how community factors influence asthma morbidity, those living in communities with higher prevalence most likely have different asthma management challenges. The study presented here was conducted to describe and understand the impact of psychosocial factors in a population of adults with asthma compared to adults without asthma.

METHODS

The Prevention Research Center of Michigan's (PRC/MI) Speak to Your Health! Community Survey was developed through a collaborative process by a Survey Committee composed of members from the University of Michigan's School of Public Health, the Genesee County Health Department, the Greater Flint Health Coalition, University of Michigan-Flint, and the Flint Odyssey House Health Awareness Center. The survey was designed to monitor and understand community health and community concerns, monitor the impact of PRC/MI and other health initiatives on community health outcomes, and promote change that improves the health of Genesee County communities.

To ensure that the survey respondents represented all geographic regions of Flint and Genesee County, random samples of households were drawn from Genesee County Census Tracts. At least 20 residents were obtained for each of the 39 residential Census Tracts in the city of Flint (two Census Tracts in Flint had few or no households) and at least 10 from each of the 90 Census Tracts outside of Flint. Adults 18 years of age and over residing in Genesee County were sought for the sample. Professional survey staff at the Michigan Public Health Institute conducted telephone interviews. The

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Institutional Review Board-Health Sciences at the University of Michigan and the Institutional Review Board at the Michigan Public Health Institute approved the survey instrument and design.

Demographics

Demographic items included gender, age, race, and years of education completed. Respondents who reported their race as black or white were retained for the current analyses. There were insufficient data to compare other racial or ethnic groups, as only 6% of the sample reported some other race or ethnicity. Self-reported height and weight (both estimated without shoes) were used to calculate body mass index (BMI). Items from the Behavioral Risk Factor Surveillance System (BRFSS) identified current tobacco smokers.

Depressive Symptoms

Respondents' depressive symptoms were assessed with three items from the Brief Symptom Inventory 18 (BSI-18) depression subscale asking how often respondents felt lonely, blue, or sad and were having no interest in things (Cronbach's $\alpha = 0.77$, average item-total correlation = 0.82).

Perceived Stress

Respondents' perceived stress levels were assessed with three items from the stress scale of Cohen et al. asking how often respondents felt upset because of something unexpected happening, nervous and stressed out, and they had so many problems that they could not deal with them (Cronbach's $\alpha = 0.73$, average item-total correlation = 0.86).

Social Support

Three items from Vinokur and Vinokur-Kaplan (17) assessed social support. Respondents reported how often people important to them provided them with encouragement and reassurance when they needed it, gave them useful information or advice when they needed it, and listened to them when they needed to talk about things that were important to them.

Neighborhood Variables

Neighborhood social capital was assessed with two items used in previous studies (18, 19) where respondents indicated the degree to which people in their neighborhood could be trusted and were willing to help their neighbors (Cronbach's $\alpha = 0.76$). Perceptions of neighborhood crime and safety were assessed with a four-item scale (from Smith et al.); the items were "How fearful are you about crime in your neighborhood?" "How safe is it to walk around alone in your neighborhood during the daytime?" "How safe is it to walk around alone in your neighborhood after dark?" and "Compared to other neighborhoods, the crime rate in your neighborhood is. . . (Very High to Very Low)". This scale had a Cronbach's α of 0.83. Respondents also reported whether they had ever been diagnosed with asthma.

Statistical Analysis

Data analyses were conducted using SPSS 15.0. We examined the univariate relationships between asthma status and each predictor with independent samples *t* tests for continu-

TABLE 1.—Variable descriptive by asthma status.

	Asthma		<i>t</i> (1230)
	Yes (<i>n</i> = 185) Mean (SD)	No (<i>n</i> = 1047) Mean (SD)	
Age	52.2 (16.4)	53.4 (16.6)	0.86
BMI	31.2 (8.2)	28.4 (6.6)	5.23***
Education	13.0 (2.0)	13.3 (2.0)	1.98*
Smoker (BRFSS)	25.9%	26.5%	<i>Z</i> = .172
Social capital	0.74 (0.16)	0.76 (0.16)	2.29*
Fear of crime	0.50 (0.18)	0.47 (0.17)	1.99*
Social support	0.80 (0.20)	0.76 (0.22)	2.13*
Stress	0.60 (0.20)	0.53 (0.17)	5.02***
Depressive symptoms	0.45 (0.21)	0.40 (0.19)	3.40***

* $p < 0.05$, *** $p < 0.05$.

ous variables and a non-parametric *Z*-score for smoking status (Table 1). We used a forward logistic regression to identify unique predictors of asthma status (Table 2). Variables examined included age, BMI, years of education completed, smoker status as defined by the BRFSS, social capital, fear of crime, social support, stress, and depressive symptoms. Asthma status was indicated as a binary variable.

RESULTS

Demographic Characteristics of Respondents

Of the 1,688 survey respondents, 1,232 had completed data on the variables of interest and were included in this analysis. Of the survey respondents with complete data, 67.8% were white, 25.1% were black or African American, 1.4% were Latino/a or Hispanic, 1% were American Indian or Alaska Native, 2.9% were multiracial, and 1.8% were some other race or ethnicity; 69.4% were female, 51.7% were married, and 77.6% owned their home. Mean age was 53 years (*SD* = 17), with a range from 18 to 93. Respondents reported their educational backgrounds as 9.4% less than high school, 31.8% high school graduate, 26.9% some college but no degree completed, 1.5% technical school, 10.1% Associate's degree, 12.6% Bachelor's degree, and 7.8% Master's degree or higher. Residents were in Flint (44.7%) or the suburban and rural areas of Genesee County (55.3%). Of the 1,232 respondents with full data, 185 (15%) reported being diagnosed with asthma, the same proportion as the entire sample of respondents.

Univariate Predictors of Asthma Status

Results of the univariate analyses are presented in Table 1. Those with a higher BMI, lower level of education completed, lower perception of neighborhood social capital, higher fear of neighborhood crime and lower perceptions of neighborhood safety, higher social support, higher levels of stress, and higher levels of depressive symptoms were more likely to report being diagnosed with asthma. There were no significant relationships between age or tobacco smoking status with asthma diagnosis.

TABLE 2.—Predictors of asthma in a forward logistic regression.

Predictor	B (SE)	Wald	Exp(B)	<i>p</i>
BMI	0.05 (0.01)	23.1	1.05	0.001
Stress	2.08 (0.44)	22.7	8.03	0.001
Social support	0.83 (0.39)	4.6	2.30	0.032

Unique Predictors of Asthma Status

When other significant predictors were accounted for, BMI, stress, and social support accounted for unique portions of the variance in the likelihood of asthma diagnosis. Respondents with asthma had a higher BMI, higher degree of stress, and higher degree of social support.

DISCUSSION

These data suggest that adults with asthma are more likely to be overweight, have lower levels of educational attainment and lower levels of social capital than those without asthma in the study population. Additionally, those with asthma reported a greater fear of crime in their community, a need for higher levels of social support, experienced higher stress, and have more depressive symptoms than those without asthma. Our findings are similar to those of other studies that have found greater asthma-related risk in populations that are overweight or obese (16, 20–24).

Being overweight with higher BMI is a topic increasingly discussed due to the rise of obesity in the United States (25). The impact of weight on asthma is not fully understood (26), it is however recognized that the two conditions pose significant public health problems. As found in this study, research has shown that higher BMI is more evident in those with asthma compared to those who have never had the condition (20, 27). Overweight individuals are likely to have more severe (persistent) asthma and potentially need to manage multiple chronic conditions and limitations. Programs and counseling that enhance management when there are more frequent symptoms and more psychosocial needs may be complicated and require specific communication between the provider and patient.

The relationship between psychosocial factors and asthma has shown that depression, social isolation, and stress are correlated with mortality and near fatal asthma (28, 29). The current study findings suggest that a number of demographic and psychosocial factors must be considered when aiming, through clinical counseling or intervention programs, to help adults with asthma manage asthma more effectively. Given the number of additional factors (i.e., need for more social support, higher stress, and depression) affecting adults, it is important that educational interventions be tailored to not only address the patient's needs but to increase patient understanding of the relationship between psychosocial factors and asthma morbidity.

The need for more social support in those with asthma suggests that individuals with asthma may rely heavily on family and friends to provide substantial support in the management of their illness (16, 30). If those with asthma rely heavily on family and friends it may be that community-level interventions that initiate the assistance of community support systems such as religious and community organizations in the management of asthma in at-risk adult populations may be most appropriate and afford an opportunity for success. Community-based participatory research (CBPR) methods lend themselves to address and implement appropriate educational interventions to address specific phenomena in communities (31). Successful CBPR interventions have been able to address social support needs in at-risk populations (32–34). A community-level intervention approach

also lends itself to the integration of community health workers (CHWs) in the delivery of the educational interventions. These intervention initiatives may be most appropriate for addressing issues related to social capital and fear of crime in urban neighborhoods and communities. Those from within the community may be able to facilitate and identify the most appropriate mechanisms for addressing the needs of the adult populations with asthma.

There are limitations to the research reported here. The data are based on self-reports in a telephone interview, so it is possible that there is some error due to social desirability or inaccurate knowledge (e.g., respondent's weight). The data are also cross-sectional, so the direction of causality cannot be determined. Those who are overweight may be more likely to contract asthma, but those with asthma may also find exercise to be more difficult and thus would exercise less and increase their BMI. It seems unlikely that social support is a risk factor for asthma, so it is possible that those with asthma obtain more attention and support from those around them as a result of their condition.

CONCLUSIONS

Findings from this research suggest that adults with asthma may be more likely to be overweight, experience higher levels of stress, and have a greater need for social support. These indicators may affect asthma management and result in poor asthma control. Specific and tailored communication strategies for adult patients with asthma are necessary to appropriately identify their daily management needs. Community-level educational interventions and campaigns may provide an innovative alternative for addressing the psychosocial needs of urban adults with asthma.

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