ORIGINAL RESEARCH

The Health Status of Patients of a Student-Run Free Medical Clinic in Inner-City Buffalo, NY

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Background: **This study explores the health status and the social and economic correlates of adults 20 years of age and older who presented at an urban free medical clinic in Buffalo, NY, between 2002 and 2005.**

Methods: **Clinic staff asked patients to fill out a Health Risk Assessment questionnaire that addressed their chronic disease and illness history, mental health, social support, substance use, income, education, and housing. Through statistical analysis of 469 anonymous patient questionnaires, we identified prevalent health conditions in this patient population and compared these rates to regional and national data.**

Results: **Of those patients 20 years of age and older, 70% earned less than US $10,000 a year. The rates of obesity, hypertension, asthma, diabetes, anxiety, and depression were higher in this population than in the Buffalo, NY, region and the general United States population.**

Conclusion: **The data reflect the health disparity experienced by low-income minority populations in the United States and emphasize a need to plan additional services that target hypertension, heart disease, obesity, diabetes, and mental health disorders such as anxiety and depression. Findings also serve as an introduction to the patient population for volunteer medical students who have limited exposure to urban, low-income populations. (J Am Board Fam Med 2007;20:572–580.)**

When it comes to health, the United States ranks 24th among 191 nations.[1] The United Kingdom, Canada, and Japan, to name a few, have higher health rankings, higher life expectancies, lower infant mortality rates, and lower health expense per capita.[1,2] These nations provide health care coverage universally, whereas 46.6 million United States residents (15.9%) are without health insurance.[3] This is equivalent to more than 2 times the population of New York state.[4] Among the uninsured, African-Americans are disproportionately represented, with 19.6% lacking health insurance.[5]

Social safety net services such as Medicaid and Medicare provide free or reduced-cost insurance to some people who lack employment, are disabled, or whose jobs do not provide health insurance. There are many other people, though, who exceed the income limits to receive free health care coverage but make an insufficient income to pay out-of-pocket for their health insurance.[6] Among those uninsured, nearly 70% come from a family with at least one full-time worker.[5,7] Twenty-eight percent of the uninsured are part-time workers.[5,7] Free clinics across the United States have functioned to partially patch this hole in the safety net by providing care to the under- and uninsured.[8,9]

Free medical clinics are typically staffed by volunteer physicians, nurse practitioners, and nurses, and often also include a dental care component. Most offer standard triage care and physical exams; some offer services such as screening for sexually transmitted diseases. The importance of free medical clinics as part of the health care safety net was underscored by a survey of 106 free clinics in the Midwestern United States that showed they cared for over 200,000 patients in a single year.[10]

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Recently, free medical clinics have been established by students in medical schools or by the schools themselves. Student-run clinics operate with a variety of underserved populations, including migrant workers, rural Appalachian communities, and the homeless.[11–13] Some student initiatives take place outside of the clinic setting, and include home care visits with geriatric patients, providing health care information to emergency department patients, and conducting behavioral counseling as part of a smoking intervention.[14–16] According to a recent survey, there are at least 111 medical student-run clinics associated with 29 medical schools in 25 states.[17] Most of the publications generated from these endeavors describe the demographics of the patients served, the structure of the programs, and the educational benefit to students (both medical and patient-communication skills).[8–20] To our knowledge, none have described the health status of the patients served by the clinics and the primary health risks that they face. Although there has been considerable recent attention to health disparities experienced by the underserved, it is important (particularly for medical students) to recognize that underserved patients are not all the same; they are a heterogeneous population and care must be adapted to the unique circumstances of local communities. This is a report on one such local community.

The objective of this analysis is to discuss the results of a detailed health risk assessment questionnaire administered to a population of free clinic patients and the utility of such a questionnaire. We will describe the health risks of this particular patient population and discuss the application of this information to improving patient services and preparing new volunteer medical students.

Background

The Lighthouse Free Medical Clinic was founded in 2001 as a collaboration between the pastor of a Lutheran church, a family physician, and a group of 5 medical students. The site was selected because of its location in a Health Professional Shortage Area.[21] In the Census tracts within a 1-mile radius of the clinic, 38% of households live below the poverty level (more than 3 times the national rate) and approximately 17% of the workforce is unemployed. Twenty percent (20%) of the households receive public assistance income (eg, food stamps, housing subsidy, etc). The population is 80.8% African-American and 16% white. Thirty-three percent of the housing stock is vacant,[22] creating a neighborhood environment of boarded up, dilapidated structures with broken windows and debris scattered about.

The clinic operates from 6 to 8 PM on Wednesdays; patients are seen on a drop-in basis and approximately 25 patients are seen per night. Ages range from infancy to elderly, with approximately 48% being 19 years old or younger. Services are limited to screening and triage because of limited hours of the volunteer staff (which includes medical students, nurse practitioners, and physicians). More than 1500 people sought care at the clinic between 2001 and 2005. Medical reasons given by patients for coming to the clinic included physicals for school sports or work (53%), illnesses (35%), and free prescription refills (12%).[23] Other reasons cited by patients included convenience of the location, lack of health insurance, wanting an alternative to the emergency department for care, and a desire to not incur any new medical costs.[24] The clinic does not charge patients or bill the insurance of those who are insured; approximately 55% of the adult patient population is uninsured and 45% have some form of health insurance.

Methods

As part of their visit to the free clinic, starting in 2002 patients were asked to complete a Health Risk Assessment Questionnaire addressing issues such as income, education, employment, self-report of disease, social environment, and housing. Nested within the questionnaire were 2 validated instruments: the Primary Care Evaluation of Mental Disorders form (PRIME-MD) for assessing a mental health disorder and the CAGE questionnaire (named for its 4 questions) for assessing alcohol abuse.[25–29] The PRIME-MD assesses the possible presence of somatoform disorder, eating disorder, depression risk, and anxiety. It asks, In the past month have you been bothered a lot by. . . ?, and then lists a number of different emotions or bodily ailments that may indicate the presence of 1 or more of the 4 aforementioned mental health disorders. The CAGE instrument determines whether someone is at-risk for alcohol problems by asking 4 questions: Have you ever felt you should ***C***ut down on your drinking? Have you ever felt ***A***nnoyed by

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complaints about your drinking? Have you ever felt bad or *G*uilty about your drinking? and Have you ever had a drink first thing in the morning (*E*ye-opener) to steady your nerves or get rid of a hangover? For each item, Never = 0, Occasionally = 1, and Often = 2. The scores of the 4 items are added and a score of 2 or greater qualifies as at-risk for alcohol problems.

One thousand four patients who presented to the clinic during this time period completed at least a portion of the questionnaire. Because many of the questionnaires lacked a response to 1 or more of the questions, a cutoff of 80% completion was established. Those with more than 8 questions unanswered (>20%) were removed from the dataset. Questionnaires that were at least 80% complete (32 of 40 questions answered) were included, leaving a final sample of 986 questionnaires, each representing an individual patient. For this study, most analyses were limited to adults 20 years of age and older, leaving a sample of 469 patients. Patients who were younger than 20 constituted a somewhat different population, not only because of their age, but also because the majority were visiting the clinic for free school sports physicals.

Patient identification was removed from the survey responses, which were then analyzed using SPSS version 14.0 (SPSS Inc., Chicago, IL). Descriptive statistics were used to generate a picture of the population's demographics and their disease frequency, and χ^2 tests determined the significance of relationships between health conditions and the sociodemographic variables. The study was approved by the University at Buffalo Health Sciences Institutional Review Board.

Results

Demographics (Table 1)

Of those patients 20 years of age and older (n = 469), 64% were women and most self-identified as African-American (87%). More than two-thirds (68.6%) of these patients had an annual income of less than $10,000, and 43% earned less than $5,000 a year. Although 29.1% had less than a high school education, 41.5% had some training after high school and 11.8% had a college degree. Nearly half were employed full-time (27.2%) or part-time (20.9%). Of those who did not have paid employment, 33.1% were looking for work, 22.7% were not working because of medical reasons, and 17.2% were students.

Table 1. Demographics of Adult Patients (n = 469) at Student-run Free Clinic*

Characteristic	Patients From LFMC (%)	Western New York (%)
Sex (n = 446)		
Male	35.7	47
Female	64.3	53
Age range (n = 469)		
20–29	29.4	NA
30- 39	27.3	NA
40- 49	26.2	NA
50–59	11.3	NA
≥60	5.8	NA
Race/ethnicity (n = 431)		
African-American	86.8	4
White	9.0	93
Other	1.2	2
Hispanic	3.0	2
Level of education (n = 408)		
≤8th grade	2.9	NA
Some high school	26.2	NA
High school graduate/GED	29.4	NA
Some college/training after high school	29.7	NA
College graduate	8.6	NA
Postgraduate education or degree	3.2	NA
Paid employment status (n = 412)		
Not in paid employment	48.1	NA
Full-time	27.2	NA
Part-time	20.9	NA
Self-employed	3.8	NA
Not in paid employment (n = 163)		
Looking for work	33.1	NA
Disabled/medical reason	22.7	NA
Student	17.2	NA
Homemaker	7.4	NA
Retired	6.7	NA
Laid off	6.7	NA
Other	6.2	NA
Average yearly income (n = 386)		
<$10,000	68.6	19

*Unduplicated self-report data from Health Risk Assessment Questionnaire administered to patients presenting at clinic.
LFMC, Lighthouse Free Medical Clinic; GED, General Education Development; NA, not available.

Fifteen percent of the patients had no working phone in the previous 6 months and 9% reported being homeless at some point in the previous 6 months.

Chronic Disease

Among adults, the most prevalent of the queried physical conditions were obesity, hypertension, ar-

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Table 2. Frequency of Health Conditions Among Adult Patients at a Student-run Clinic (n = 469)

Physical Conditions	Free Clinic (%)	Region (%)	Mental Conditions	Free Clinic (%)	Region (%)
Obesity*	40.2	18.4	PRIME-MD somatoform	33.5	NA
Hypertension†	25.6	16.6	PRIME-MD anxiety	30.1	NA
Asthma†	12.8	7.0	Anxiety†	6.8	4.8
Arthritis†	11.5	18.2	PRIME-MD depression	13.0	NA
High cholesterol†	11.5	12.3	Depression†	9.0	5.2
Diabetes†	8.1	6.1	PRIME-MD eating disorder	6.0	NA

*Percentages based on measurements taken in physical exam. n = 381.
†Response to questionnaire item asking if patient has ever been diagnosed with the conditions by a health professional.
PRIME-MD, Primary Care Evaluation of Mental Disorders; NA, not available. Regional values are from reference 42.

thritis, high cholesterol, diabetes, and asthma (Table 2).

Those with less than a high school education had a higher prevalence of diabetes, hypertension, and history of heart attack ($P < .05$). Compared with men, women had higher rates of obesity, high blood pressure, high cholesterol, and heart conditions ($P < .05$ for all variables).

Mental Health

Patients 30 years of age and older had high rates of mental health conditions. Seven percent (7%) of adults indicated they had been diagnosed with anxiety and 9% with depression. The PRIME-MD instrument indicated that 37.2% may have somatoform disorder, 32% may have anxiety, and 13% may have depression. These rates of anxiety and depression are substantially higher than the self-reported diagnosed rates. Women had higher rates of some mental health disorders than did men. Approximately 40% of adult women in the study population may have somatoform disorder compared with approximately 23% of adult men, and 33% of women may have anxiety compared with 24% of men. Women also had higher rates of depression as indicated by the PRIME-MD, though it was not significant. Interestingly, there were no significant differences between men and women in the self-reported diagnosed rates of mental health disorders.

Substance Use

As one would expect, smoking was associated with both physical and mental health conditions. Approximately 40% of those 20 years of age and older were current smokers and 18% were former smokers. Being a smoker was associated with higher rates of reporting a heart condition and having had a heart attack. In addition, being a smoker was associated with screening positive for somatoform disorder, depression, and anxiety.

Thirteen percent (54 of 410) of CAGE respondents had a positive score. Compared with those respondents not at risk for alcohol problems, those who were at risk had higher rates of depression as scored by the PRIME-MD (25.9% vs 12.9%) and self-reported having been diagnosed with depression and anxiety (14.8% vs 5.3% and 11.1% vs 3.4%, respectively).

Discussion

Higher morbidity and mortality is experienced by people living in poverty.[30–33] When compared with people of higher socioeconomic status, those with low socioeconomic status often have lower educations; poor access to well-paying jobs; sedentary lifestyles; hazardous home environments (eg, lead paint, asbestos, dilapidated structures); poor nutrition; and they are less likely to have comprehensive health insurance.[34–37] In addition, those who are uninsured experience higher rates of premature death than do those who are insured. The uninsured or underinsured poor often seek health care only as a last resort.[38] They then rely on emergency rooms, which are among the most expensive forms of treatment. The cost of injuries, illnesses, births, and prescriptions are prohibitive for a low-income person. Many of these characteristics of poverty populations were found in this free clinic patient population.

The proportion of uninsured patients at the Lighthouse Clinic is high (55%), though considerably lower than in similar studies conducted in free

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medical clinics where the uninsured comprised more than 80% of the patient population.[39] A survey of free clinics in the Midwestern United States found that 93% of free clinic patients had no health insurance.[8] Among the medical student-run clinics, 88% of those responding to a survey provide care to the uninsured, but the percentage of uninsured patients is not provided.[17] One possible explanation for the high numbers of insured presenting at this clinic is the convenience of the clinic compared with other area medical facilities. At the time of the study, it was the only clinic within a 3-mile radius and it was along a bus route. In addition, patients mentioned the cost of co-pays as a deterrent to seeking care at other types of health care facilities.[23]

General trends show that health care facilities have a 70:30 distribution of female to male patients, and a nearby urban family medical center has a patient population that is 67% female. Similarly, 64% of the Lighthouse Free Medical Clinic adult patients were women.

A strong association between education and health has been well-established in research of the last decade. Staying in school seems related to reduced chances of having chronic illness and dying prematurely. In the Lighthouse population this is reflected in the rates of chronic diseases of those with more than a high school education compared with those with less education. Possible reasons for this include more health-related knowledge, access to better jobs, access to health care, and thus, presumably (and evidently), less daily stress.[40,41]

Compared with results from a health risk assessment questionnaire conducted in 2117 households in Western New York in 1999, this free clinic population has higher rates of obesity and medically diagnosed hypertension, asthma, diabetes, anxiety, and depression.[42] The high level of obesity in this population is probably related to the high level of diabetes and heart disease. The trend seems to start in childhood and adolescence, as indicated by one-third of adolescents (32%) in the patient population at-risk for becoming overweight or already overweight (above the 85th and 95th percentiles, respectively). The incidence of adult and adolescent obesity may be associated with a number of issues that are often faced by low-income populations. There is limited access to safe places to play and exercise and to grocery stores that have reasonable prices and fresh foods.[43] People living in poverty also often consume inexpensive foods, which tend to be high in carbohydrates, sugar, and fat.[44] High life stress may trigger overeating as a coping strategy, and the body's stress response may also cause fat to deposit centrally (around the waist) rather than elsewhere, causing a higher strain on the heart.[45,46]

The self-reported, medically diagnosed rates of depression and anxiety were higher than those from the regional study; the rates of depression and anxiety as indicated by the PRIME-MD were substantially higher than both the regional study and the self-reported medically diagnosed rates.[42] The PRIME-MD instrument indicated that 37.2% may have somatoform disorder, 32% may have anxiety, and 13% may have depression. This exceeds the national average, where it was found that depression affects approximately 7% of the United States population and 18% experience some type of anxiety disorder nationwide.[47,48] Interestingly, the rates of self-reported, medically diagnosed anxiety are lower in both samples compared with the United States population (16.4% in the United States have been diagnosed with any anxiety disorder compared with 7% in the Lighthouse population and 5% in the regional study).[48]

The frequency of mental health disorders as indicated by self-report compared with that indicated by the PRIME-MD instrument, and because some of these rates are lower than the national rates, suggests that anxiety and depression may be under-diagnosed in this population. For example, the PRIME-MD indicated that 32.3% of adults may be at risk for anxiety compared with 6.8% who reported they had been told they had anxiety by a health professional. United States data suggest that African-Americans actually experience higher rates of mental health disorders compared with the general population because of higher proportions of African-Americans having low socioeconomic status.[48] African-Americans also have higher rates of untreated mental health disorders and higher rates of emergency department visits for mental health ailments.[48] Because of severe poverty in this primarily African-American free clinic population, this may be an area requiring immediate attention in terms of further research, observation, and intervention.

Similar to national trends, women had higher rates of some mental health disorders than men.[49] Part of the disparity in mental health disorder rates between men and women in this population may be

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because of reporter bias: men tend to report mental health complaints less often than women.[50,51] Research also suggests, though, that there is a real difference between men and women,[52,53] and part of the reason for this may be the different responsibilities and roles held by women in poverty communities and the exposure of low-income people to violence, homelessness, incarceration, and the foster care system.[54,48] Many low-income African-American households are led by single mothers. Maintaining access to food, support, and general control over one's life can take a toll on people in tenuous circumstances. Resource loss and food insufficiency have been connected to poor mental health (eg, depression and anxiety).[55,56] This psychosocial stress and anxiety may cause or exacerbate the physical health problems commonly experienced by women in poverty. Higher daily stress is connected to higher cardiovascular activity (higher blood pressure), overeating, and torso weight gain.[45,57,58] This may, then, be part of the reason for the higher obesity and hypertension rates in women as well.

Approximately 1 in 5 adults (20.9%) and nearly 30% of adults living below the poverty level in the United States were current smokers in 2005.[59] The rate of adults who smoke in this free clinic population (40%) vastly exceeds these rates. Thirteen percent (54 of 410) of this clinic's CAGE respondents had a positive score compared with a rate of 11.3% in the regional sample in which CAGE was also administered. Psychosocial stress may be connected to substance use and abuse in low-income populations. Alcohol and tobacco may be coping strategies for stressful life situations.[60] The association between poor mental health and both smoking and alcohol use in this research seems to support this, although it could be that substance use is causing mental health problems rather than being used to alleviate them.

Finally, not having access to health care, which is one of the defining reasons patients come to a free clinic, is linked to poor physical and mental health. Those who lack adequate access to health care are not able to manage their chronic disease as well as those with consistent access to a regular source of care.[61,62] Because they are under- or uninsured they may not have a regular physician and thus receive inconsistent care with poor follow-up for health concerns and treatments.[38,63] These disadvantages are compounded by the trend that low-income, uninsured people often have less health-related knowledge, which impairs their ability to seek care when necessary and ask appropriate questions.[64]

This study of patients in a student-run, free medical clinic has some limitations. The health risk assessment questionnaire was given to all patients presenting at the clinic, however, this number was not recorded and not all patients returned the form. Thus, it is not possible to calculate a precise response rate (although observations suggest it was high). Second, demographic and some health status data are based on self-report and are subject to bias. In addition, many questionnaires were not completely filled out and it is not possible to determine the impact of missing data on the results, although again, this is thought to be minimal.

Although these data may be immediately relevant only to this particular population, it is useful to compare findings to the regional and national data to help determine what resources are lacking in the community. In this way, the methods in this study serve as a model for other free medical clinics to understand and support their populations. Results from this analysis will help the clinic staff to better address the needs of the population by establishing additional services that target hypertension, heart disease, obesity, diabetes, and mental health disorders. Potential applications also include helping the staff at the clinic establish "red flags" for identifying at-risk patients. For example, among the female patients, the staff may screen more carefully for mental health disorders given the prevalence of disorders indicated by the PRIME-MD and the known disparity in treatment for mental health disorders among African-American patients.

Information from this study will also aid in the orientation of medical student volunteers. Many students have never worked with low-income, urban populations and may be unfamiliar with the types of health problems that are prevalent. In the free clinic setting, they obviously benefit from their opportunity to see and diagnose various pathologies, the acquisition of medical skills, and the personalized attention from the attending physician. They may, however, not be versed in social and cultural norms of populations different from themselves and they may be unaware of how financial issues can have such a broad-reaching effect on health and well-being. Conversely, experienced medical students and physicians may be very well

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versed in these aspects of an underserved population, but it may be entirely different from this one (eg, an Appalachian population). Through information sharing and increased familiarity and awareness, medical students may be able to provide better care to a poorly served sector of our population. This could potentially improve the care that minority and low income patients receive long-term and could perhaps help diminish the vast disparity.

On a broader scale, this study highlights the problems with the health care system in the United States, particularly when compared with countries with universal health coverage. Patients come to this clinic because they lack insurance, they cannot afford co-pays, or they want to avoid the emergency department. They are being underserved by the system. Further, they are a high-risk population with a high rate of unemployment, with nearly 70% earning less than $10,000 per year. In addition to having limited resources, they are more likely to become ill. It is hoped that this analysis promotes an understanding of the health and social problems faced by people who seek care at this study clinic and contributes to the body of data on demographic and social correlates of health risk among uninsured or underinsured African-Americans.

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