THE ROLE OF DEPRESSION IN HOSPITAL ADMISSIONS AND EMERGENCY TREATMENT OF PATIENTS WITH SICKLE CELL DISEASE

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Depression and demographic variables, ie, age, sex, and income were used to predict emergency treatment and hospital admissions of 46 patients with sickle cell disease. Depression was assessed using the Beck Depression Inventory. The results indicated that depression and age were significantly associated with emergency treatment and hospital admissions. Depression and age accounted for approximately 20% of the variance in explaining emergency treatment and 10% of the variance in explaining hospital admissions. (*J Natl Med Assoc.* 1991;83:777-781.)

Key words • sickle cell disease • depression • Beck Depression Inventory

Sickle cell disease is a genetic disease affecting approximately 1 of every 500 African Americans. Symptoms of the disease are variable and include episodes of severe pain (called crises), involving the extremities, back, abdomen, and chest. Complications of the disease involve many organs and include stroke, splenic involvement, enuresis, congestive heart failure, renal failure, and priapism. The clinical course and severity of the disease is quite variable with persons experiencing from little or no symptoms to life-threatening complications. Persons with sickle cell disease may require frequent medical interventions including hospitalizations. The purpose of this study was to determine the role of depression in hospital admissions and emergency treatment of patients with sickle cell disease.

The literature suggests that a significant number of patients with sickle cell disease experience social and psychiatric impairments[1-3] and that sickle cell patients when compared to controls experience more depression. Morgan and Jackson[4] report significantly higher depression scores in adolescent patients with sickle cell disease than their healthy peers. The results of a study by Barrett et al[1] indicated that the average patient with sickle cell disease has psychosocial distress in the areas of employment and finances, sleeping and eating, and performance of daily activities. These patients also exhibit fear and anxiety regarding body functioning. The authors concluded that depression may be a significant problem with sickle cell patients.

It has been suggested that depression associated with sickle cell disease may be a result of the chronic pain and the other illness-related symptoms sickle cell disease produces. Episodes of chronic pain are often accompanied by many of the symptoms of depression including sleep loss, anorexia, weight loss, and lowered energy.[5] However, a study by Morgan and Jackson[4] showed a higher incidence of depression in sickle cell patients even after accounting for illness-related physical symptoms. They concluded that higher levels of

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depression cannot be attributed merely to somatic symptoms but rather that the patients experienced a variety of psychological and somatic symptoms of depression.

Depression has been found to affect the medical outcomes of patients with sickle cell disease. Leavell and Ford[6] found a relationship between medical complications and psychopathology in patients with sickle cell disease. Nadel[3] found that in 50% of sickle cell patients, the onset of painful crises was preceded by different types of losses and accompanying depressive affect. Patients who were chronically depressed had more frequent crises and other complications of sickle cell disease during depressed periods than during stable periods. Other patients in the study had crises onset following the onset of depression.

In contrast to the aforementioned study, Damlouji and his colleagues[2] found no relationship between impaired social and psychiatric functioning and the presence or absence of physical complications in sickle cell patients.

Crises onset is the most frequent reason for emergency treatment or admission to the hospital for patients with sickle cell disease. If crises onset is preceded by depression, then one would also expect depression to play a role in emergency treatment and hospital admissions.

The present study investigated the role of depression in hospital admissions and emergency treatment of patients with sickle cell disease. Depression was hypothesized to be a factor in the onset of crises and subsequent emergency usage and hospital admissions. Because demographic factors such as age, sex, and socioeconomic status[1,6] also influence medical outcomes, these variables were additionally examined in the study. The purpose of the study was to determine the contributions of depression and demographic variables in explaining hospital admissions and emergency treatment of persons with sickle cell disease.

METHOD

Subjects

Subjects were 46 African-American patients with sickle cell disease. All subjects were patients at the Howard University Center for Sickle Cell Disease (HUCSCD) in Washington, DC during 1987. These patients were attended by staff at HUCSCD or Howard University Hospital for routine care, medical emergencies, and hospitalizations. The age of the subjects ranged from 19 years to 53 years with a mean age of 30 years. Fifty-two percent (24) of the sample were female and 48% (22) were male. The majority of the subjects (83%) were not married. Eighty-five percent of the sample had a high school education or higher. Eighty-five percent reported a household income of less than $20 000. Thirty-two percent of subjects were employed, 41% were unemployed and looking for work, and 27% were neither employed nor looking for work.

Procedures

Questionnaires were administered to patients during outpatient clinic visits. Subjects were asked to participate in a study of "how persons with sickle cell disease coped with life experiences." Participation was not solicited from patients who appeared ill, in discomfort, or in pain. Subjects were assured of confidentiality and told that participation or refusal to participate would not affect any present or future treatment. None of the patients refused participation.

Measures

The predictor variables were depression and demographic variables, ie, age, sex, and income. The Beck Depression Inventory (BDI) was used to measure depression. The BDI is a 21-item test that measures the presence of and degree of depression in adolescents and adults. The BDI, a commonly used scale for measuring depression in medically-ill populations, has demonstrated high internal consistency, concurrent validity with other measures of depression, and construct validity with psychological, behavioral, and attitudinal variable related to depression.[7]

The number of emergency room treatments and the number of hospitalizations were the two criterion variables. Subjects were asked to respond to the question, "How many times during the past 12 months have you been treated in the emergency room for pain crises or other sickle cell-related symptoms?" The response choices were: a) None; b) 1 to 2 times; c) 3 to 5 times; d) 6 to 10 times; e) 11 to 15 times; and f) over 15 times. Using the same scale, subjects were asked to indicate the number of times during the past 12 months they had been admitted to the hospital.

ANALYSIS

Stepwise multiple regression procedures were computed to determine if depression and such demographic variables as age, sex, and income were associated with and could account for emergency room treatment and hospital admissions in patients with sickle cell disease. The criterion or dependent variables were emergency room treatment and number of

hospitalizations in 1 year; the independent or predictor variables were depression, age, sex, and income level. Depression status (0 = not depressed, 1 = depressed), emergency room treatment (0 = five or fewer ER treatments, 1 = six or more ER treatments), and hospitalizations (0 = five or fewer admissions, 1 = six or more admissions) were all dichotomized to make data interpretation clearer. Stepwise regression analysis was chosen because this procedure can determine which variables explain the greatest amount of variance in the criterion variables (eg, emergency room treatment and hospitalizations). Using this procedure, variables are entered into the regression equation only if they contribute significantly over and beyond that of variables that previously have been entered into the regression equation.

RESULTS

The results of the analyses indicate that a surprising 56.5% ($n=26$) of the sample scored within the mild to severe range of depression on the Beck Depression Inventory. Forty-three percent ($n=21$) scored within the normal range on this measure. The results also indicate that a fairly large number of the subjects were frequently hospitalized and had to be treated in the emergency room. Forty-four percent ($n=20$) of the subjects had been treated in the emergency room more than five times in the last year; 56% reported being treated in the emergency room five times or less in the last year. Forty-one percent of the subjects had been admitted to the hospital more than five times in the past year, and 59% had been admitted five times or less.

The results of the stepwise multiple regression analysis indicate that depression and age of the patient were significantly associated with the number of emergency room treatments the patient had received in 1 year; the combination of these two variables accounted for approximately 20% of the variance in emergency room treatments ($r=.45$, $P<.05$). As shown in Table 1, depression was the single best predictor of emergency room treatment ($r=.35$, $P<.02$).

Visual inspection of the data (Table 2) indicates that depressed sickle cell patients were two times more likely to be treated in the emergency room six times or more when compared to their nondepressed counterparts (58% and 25%, respectively). Similarly, nondepressed patients were more likely to report that they had fewer than six emergency room treatments in the last year when compared to depressed patients (75% and 42%, respectively).

Age also contributed significantly to the variance in emergency room visits. The regression coefficient increased (from .35 to .45) with the addition of age. Visual inspection of the data (Table 2) indicated that younger patients were more likely to use the emergency room more frequently than older patients (mean ages = 27.9 years, and 32.4 years, respectively).

TABLE 1. STEPWISE MULTIPLE REGRESSION ANALYSES OF PREDICTORS OF EMERGENCY ROOM TREATMENT AND HOSPITAL ADMISSIONS

Emergency Room Treatment			
Variable entered into equation	β	r	P
Step 1: depression	.34	.35	.02
Step 2: age	−.28	.45	.01
Hospital Admissions			
Variable entered into equation			
Step 1: depression	.31	.31	.05

Depression was the only variable that significantly predicted hospital admissions. As seen in Table 1, there was a small but positive relationship between depression and hospital admissions ($r=.31$, $P<.05$). A closer inspection of the data indicates that 54% of the depressed patients versus 25% of the nondepressed patients were hospitalized six or more times in the last year (Table 2). Nondepressed subjects, when compared to depressed subjects, were more likely to report that they had been hospitalized five times or less in the last year, (75% and 46%, respectively).

Although age was not significantly associated with hospitalizations, the trend was in the predicted direction. The mean age of subjects with six or more admissions was 28.1 years, while the mean age of subjects with five or fewer admissions was 32.1 years.

DISCUSSION

The results of this study indicate that depression—and to a lesser degree, age—are significant factors in emergency room treatment and hospital admissions of patients with sickle cell disease. Approximately 20% of the variance in emergency room treatment and 10% of the variance in hospital admissions can be accounted for by age and depression. Sex and income were not significant predictors of emergency room treatment or hospital admissions.

Although the results of this study have some intriguing implications for the treatment of sickle cell patients, the findings must be interpreted conserva-

TABLE 2. MEAN AGE AND PERCENTAGE OF NONDEPRESSED AND DEPRESSED SUBJECTS BY NUMBER OF EMERGENCY ROOM VISITS AND HOSPITAL ADMISSIONS

		Depression Status	
	Mean Age	Nondepressed	Depressed
Emergency Room Treatment			
Five or less	32.4	75 (15)*	42 (11)
Six or more	27.9	25 (5)	58 (15)
Hospital Admissions			
Five or less	32.1	75 (15)	46 (12)
Six or more	28.1	25 (5)	54 (14)

*Number in parentheses indicates cell size.

tively. The size of the sample is somewhat small, and there is a sampling bias, which limits the generality of the findings. Subjects who did not attend the clinic during the period of data collection were excluded from the study. Nonparticipants may differ from subjects in the study in that they may be physically healthier or have better psychosocial functioning.

Another possible limitation of the study concerns the use of self-report measures for the criterion variables. Subjects were asked to recall the number of times they had been treated in the emergency room or had been hospitalized in the past year. Although the recall was over a relatively short period of time and for a significant event, there was no way to measure the accuracy of the subject's recall. Future studies should address these limitations by including a larger, more representative sample of patients with sickle cell disease and by using more objective measures of emergency room treatments and hospitalizations. There is also a need for prospective studies that will determine the causal relationships between depression, onset of crises, and hospitalizations.

Despite these limitations, the results of the study raise some interesting questions for future research in this area. The finding that age was significantly associated with emergency room treatments was somewhat predictable given that younger people tend to have a more intense, unpredictable disease course and therefore, might have a greater number of crises requiring emergency room treatment.

However, the finding that a relatively large number of people in the sample experienced some depressive symptoms (56.5%) is quite significant and points to the importance of diagnosing and treating depression in patients with sickle cell disease. These findings are consistent with the work of other investigators who have found that persons with sickle cell disease are at risk for depression and other psychosocial impairments that negatively impact on medical outcomes.[1-4] It is unclear if the depression experienced by sickle cell patients is causally related to the sickle cell disease or if patients are depressed because of the concomitant limitations in physical, vocational, and social activities that often occur with sickle cell disease. The causal relationship between sickle cell disease and depression should be systematically addressed in longitudinal studies.

The findings that depression is associated with emergency room treatment and hospital admissions has implications for the treatment of sickle cell patients as well. These findings suggest that sickle cell patients should be evaluated routinely for depressive symptoms in addition to being evaluated for medical problems associated with sickle cell disease. Investigators need to explore the efficacy of using antidepressant medications or cognitive behavioral techniques in the treatment of depressed sickle cell patients. To the authors' knowledge, there are no systematic studies on the effectiveness of cognitive behavioral techniques for depressed sickle cell patients, but these techniques have been found to be quite successful in clinically-depressed populations.[8-10] The use of such interventions might serve to decrease the number of emergency room treatments and hospitalizations in persons with sickle cell disease by helping patients more effectively manage their depression and by helping patients develop more adaptive coping skills in general.

Future studies in this research area also need to address other psychological and social factors that might impact on the patient with sickle cell disease. The types of coping strategies used, perception of severity of chronic illness, and the use of social supports also

should be explored when studying depression in persons with sickle cell disease. The impact of such critical variables on the medical outcome of sickle cell patients warrants further study to better understand the physiological and psychosocial functioning of persons with sickle cell disease and to enhance quality of life for persons with sickle cell disease.

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