Validity of Two Psychological Screening Measures in Family Practice: Personal Inventory and Family APGAR

Ronald Hilliard, PhD, Craig Gjerde, PhD, and Loran Parker, MD
Des Moines and Iowa City, Iowa

To determine the level of accuracy with which the Personal Inventory and Family APGAR identify patients with psychological distress, the two instruments were administered to patients new to a family practice clinic. Eighteen months later, the following clinical variables were recorded by chart audit: number of physician visits, number of chronic and acute illnesses or conditions diagnosed, and presence of psychological symptoms. A high frequency of psychological symptoms was observed in the clinical sample; depression, anxiety, marital problems, and chemical dependency were most frequently seen.

Statistically significant differences were observed between the mean scores for symptomatic and nonsymptomatic patients on both the Personal Inventory and Family APGAR. Cutting scores established for each instrument allowed for the accurate classification of 83 percent of symptomatic patients by the Personal Inventory and 68 percent of symptomatic patients by the Family APGAR. Substantial gains in screening accuracy occurred when both measures were administered and when a "symptomatic" score on either instrument was considered suggestive of psychological distress. Although individuals with "symptomatic" scores attended the clinic more frequently than those nonsymptomatic by test, differences were not statistically significant. The results support the use of the Personal Inventory and the adjunctive use of the Family APGAR.

There is a high frequency of psychological distress among individuals seeking primary medical care.[1,2] The family physician seeks to evaluate biomedical and psychological bases for a patient's complaints and devise a treatment plan responsive to the patient's needs. Several studies have shown that physicians often fail to recognize emotional distress in their patients,[3,4] tending to limit diagnostic efforts to the biomedical domain. Salutary effects of early identification of emotional distress among primary care patients have been documented.[5,6] The potential value of psychological screening instruments that might alert the physician to the presence and nature of emotional distress is obvious. Two instruments of this sort have been developed and discussed in the family practice literature: the Personal Inventory[7] and the Family APGAR.[8,9]

The Personal Inventory is a self-report measure providing information about the patient's current concerns, emotional status, life stresses, and personal functioning. The psychometric qualities of the Personal Inventory have already been described in some detail[10]; the 21-item instrument provides information on five aspects of individual psychological functioning: (1) quality of intimate relationships, (2) emotional distress, (3) concerns about employment and finances, (4) personal energy, and (5) coping. Clearly these aspects of personal functioning are of particular interest to the family physician, as they may relate either directly or indirectly to the patient's presenting concerns and overall health status.

While the Personal Inventory focuses on the patient's individual adjustment and self-perception, the Family APGAR measures the patient's satisfaction with his or her family's responsiveness to need. This

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From the Family Practice Residency Program, Broadlawns Family Health Center, Des Moines, and the Department of Family Practice, University of Iowa, Iowa City, Iowa. Requests for reprints should be addressed to Dr. Ronald Hilliard, Broadlawns Family Health Center, 1800 Hickman Road, Des Moines, IA 50314.

five-item questionnaire assesses an individual's level of satisfaction with five parameters of family functioning: adaptation, partnership, growth, affection, and resolve. The Family APGAR has been shown to be a reliable and valid instrument even when used with diverse populations,[9,11] but its predictive accuracy in the family practice clinic has not been systematically assessed in a prospective fashion.

A necessary step in evaluating these two screening measures was the determination of their predictive validity in the family practice clinic; in other words, how does an individual's pattern of responses on the instruments relate to his or her subsequent patterns of health behavior? A related issue is whether anything is to be gained by administering both instruments to a patient.

The present study addresses these issues, using a prospective "follow-through" design, in which new patient's scores on the two instruments were compared with subsequent utilization of health care services.

METHODS

The Broadlawns Family Health Center is a family practice clinic in which some 6,000 primarily lower socioeconomic status patients are served by 30 family practice residents. Patients aged 16 years or older and new to the clinic were asked by the nurse to complete the Personal Inventory and the Family APGAR. Participants were also told that the questionnaires were being given as part of a study and that refusal to complete the instruments would in no way affect the quality of their health care. Refusals to complete the surveys occurred only twice, and in both instances the patient had primary visual impairment that precluded participation.

The completed surveys were filed in the patients' medical charts so that physicians would have access to them during the course of ongoing care. While this availability of surveys to physicians may have contaminated the study by increasing physician awareness of patients' psychological status, it seemed ethically more justifiable to disclose these data than to withhold them. Outcome data were recorded 18 months after the individuals entered the clinic system as new patients. Follow-up information was obtained by reviewing the patients' charts.

The two instruments were administered to 193 patients, of whom 43 dropped out of the clinic system before the 18-month study period (July 1980 to December 1981) had elapsed. The resulting sample of 150 patients included three subgroups: 40 male, 56 female, and 54 obstetric patients. All patients were classified by age, sex, and ethnic origin.

The study focused on Part 1 of the Personal Inventory, which includes 21 items. The measure is structured so that, generally, higher scores on the items convey greater distress or dissatisfaction. Patients respond on a nine-point scale, with 1 indicating a lack of concern or worry, and 9 indicating marked concern or distress. In analyzing the data, scores on the two items relating to degree of emotional support and ability to handle stress were transformed so that a higher score would signal relatively more distress (eg, an 8 would be changed to a 2). Reversing these items in scoring made their direction consistent with the remaining set of items.

Although the Family APGAR contains three sections, space limitations permit consideration of only the first section, which contains five items. An additional modification in the study involved increasing the number of response options on the Family APGAR from 3 to 9, to make the format more similar to that of the Personal Inventory. Slightly improved precision in the Family APGAR has been noted[9] when five response choices are offered rather than the original three. With this modification, the highest score on the Family APGAR becomes 45 rather than 10. A high score on the Family APGAR reflects a high level of family satisfaction and happiness.

At the end of the 18-month period, the following outcome variables were recorded: number of physician visits per individual, number of chronic diseases or conditions diagnosed, number of temporary problems or conditions diagnosed, and the presence of psychological symptoms or problems.

Two different levels of psychological symptoms were delineated—clear psychological symptoms and suggestive psychological symptoms. Clear psychological symptoms included such diagnoses as anxiety disorder, depression, suicide attempt, marital dysfunction, parent-child problem, and alcohol and drug abuse. Suggestive psychological symptoms included somatic complaints for which definitive physical bases could not be established (eg, abdominal pain of uncertain etiology, neck pain for which there is no clear physical basis), psychophysiological reactions associated with stress (eg, tension headache, urticaria, irritable bowel syndrome, peptic ulcer disease) and obesity. Stressful life situations and events were also included among suggestive symptoms if they were listed as problems by the physician in the medical chart. Among these were "recent widow," "unwanted pregnancy," and "stillbirth at term."

The psychologist on the study team reviewed the charts. The director of the residency program independently reviewed the same charts so that the accuracy of the ratings could be assessed. Two series of 20 charts were jointly reviewed, with raters discussing sources of disagreement following the first series. The major source of disagreement in the first series was one rater's failure to include "health maintenance," "Papanicolaou smear and pelvic examination," and

"complete physical examination" as problems, even though they were listed on the problem list of the medical chart. Agreement was assessed in terms of percentage of all variables (rather than charts) sampled. Agreement was achieved in 81 percent of the observations for the first series and in 96 percent of observations for the second series.

RESULTS

CHARACTERISTICS OF STUDY SAMPLE

The ages of the 40 male patients ranged from 22 to 68 years, with a mean of 36 years. There were 36 white and four black patients. The majority were married, with five divorced or widowed and the remaining three patients single. Nineteen of these men were high school graduates, and three had completed college. Modal yearly family income was $6,000. The majority of the men were either unemployed or worked sporadically in unskilled jobs.

Among the 56 female patients were 50 white and six black women. Ages ranged from 23 to 73 years, with a mean of 43 years. Twenty-five of these women were married, 16 were separated or divorced, 10 were widowed, and 5 had never married. None of the women had graduated from college, although roughly one half reported completing high school. Like the male patients, the majority of these patients were unemployed or worked in unskilled jobs.

In contrast to these two subgroups of patients, the 54 obstetric patients were younger (mean age 25 years) and relatively better off financially—the mean yearly family income was $7,282. Ethnic distribution of this group was predominantly white, similar to the other two groups. Family size tended to be smaller, the modal household being two for this group and three for the other two subgroups. The majority (36/54) had completed high school, although none had graduated from college. While most of these women were unemployed, 12 worked in unskilled jobs and three held semi-skilled positions.

Female patients had the highest mean number of total problems diagnosed (6.5; SD = 3.7), compared with male patients (4.3; SD = 3.0) and obstetric patients (5.0; SD = 2.1). The three groups differed significantly in the mean number of total problems diagnosed ($F = 6.49$; $P < .01$). The three groups also differed significantly in number of chronic health problems ($F = 7.75$; $P < .01$). Individual female patients had a mean of 3.1 chronic problems, while male patients had a mean of 1.7 problems, and obstetric patients had a mean of 2.4 problems. Analyses of variance were performed to determine whether symptom frequency was systematically related to age. Although there was a tendency for older patients to have more symptoms, differences did not achieve statistical significance for clear ($F = 1.56$) or suggestive ($F = 0.39$) symptoms or for either type of symptom ($F = 2.2$).

TABLE 1. FREQUENCY RATES OF CLEAR AND SUGGESTIVE PSYCHOLOGICAL SYMPTOMS FOR THREE SUBGROUPS OF PATIENTS

	Group Showing Symptoms* %	Clear Psychological Symptoms %	Suggestive Psychological Symptoms %
Male patients (n = 40)	60	43	35
Female patients (n = 56)	66	38	48
Obstetric patients (n = 54)	48	26	30

**Total is less than sum of clear and suggestive symptoms because some patients had both*

INCIDENCE AND NATURE OF PSYCHOLOGICAL SYMPTOMS

The rates of clear or suggestive psychological symptoms for subgroups of patients in the sample are shown in Table 1. These data indicate that psychological problems are encountered with great frequency among these patients. Indeed, 60 percent of male patients, 66 percent of female patients, and 48 percent of obstetric patients showed evidence of psychological distress.

The five most frequent symptoms encountered in the sample were depression, anxiety, alcohol or drug dependency problems, marital problems, and gastrointestinal and musculoskeletal complaints without clear organic bases.

PREDICTIVE ACCURACY OF THE TWO INSTRUMENTS

On the Personal Inventory, patients with no clear or suggestive psychological symptoms achieved a mean score of 67 and symptomatic individuals a mean of 90. The difference between these means was statistically significant ($P < .01$; $F = 25.7$). The mean Family APGAR score for nonsymptomatic patients was 38, while the mean for patients with suggestive or clear symptoms was 32. Analysis of variance indicates that this difference was also statistically significant ($P < .01$; $F = 11.96$). Analyses of variance carried out to determine whether age might relate systematically to scores on the two instruments suggest that age is not a significant source of variance for either the Personal Inventory ($F = 0.16$) or for the Family APGAR ($F = 0.65$).

A clinical decision rule was devised that established a "cutting" score of 64 on the Personal Inventory.

TABLE 2. CLASSIFICATION ACCURACY OF PERSONAL INVENTORY AND FAMILY APGAR

	Chart Evidence of Clear or Suggestive Psychological Symptoms No. (%)	No Chart Evidence of Psychological Symptoms No. (%)
Personal Inventory*		
+ Symptomatic (score > 64)	72 (48)	27 (18)
− Nonsymptomatic (score ≤ 64)	15 (10)	36 (24)
Family APGAR**		
+ Symptomatic (score < 39)	59 (39)	24 (16)
− Nonsymptomatic (score ≥ 39)	28 (19)	39 (26)
Combined Tests***		
+ Symptomatic on either test	78 (52)	38 (25)
− Nonsymptomatic on both tests	9 (6)	25 (17)

*Sensitivity: 72/(72 + 15) = 83%
Specificity: 36/(27 + 36) = 57%
**Sensitivity: 59/(59 + 28) = 68%
Specificity: 39/(24 + 39) = 62%
***Sensitivity: 78/(78 + 9) = 90%
Specificity: 25/(38 + 25) = 40%

This score permitted the greatest number of accurate classifications of patients as symptomatic or nonsymptomatic when Personal Inventory scores were compared with clinical judgments of psychological distress. Table 2 shows the comparison between the test prediction and the clinical outcome.

The Personal Inventory accurately predicted psychological symptoms in 83 percent of those affected; it correctly identified as nonsymptomatic 57 percent of those not diagnosed with symptoms. The rate of false-positive identification (ie, test classification as "sick" without clinical confirmation) was 18 percent; false-negative rate was 10 percent. Consideration of the mean number of medical conditions (excluding psychological conditions) suggested that individuals scoring above 64 on the Personal Inventory experienced significantly more physical health problems than did those scoring 64 or below ($F = 9.13$; $P < .01$). The mean number of physical health problems for high scorers was 5.9, while that for low scorers was 4.3. While the mean number of chronic health problems was not significantly different for high and low scorers (2.6 and 2.1, respectively), the differences were significant ($F = 7.2$; $P < .01$) for mean number of acute health problems (3.2 and 2.2). These findings suggest that the Personal Inventory may be more sensitive to emotional distress accompanying acute rather than chronic health problems.

A clinical decision rule established a cutting score of 39 on the Family APGAR, since this score permitted maximum accuracy of patient classification into symptomatic or nonsymptomatic categories. Accuracy of classification was independently determined by retrospective clinical record review. Comparison of test predictions and clinical outcomes is shown in Table 2.

In 68 percent of the cases, the Family APGAR correctly classified patients as symptomatic. Of those showing no evidence of psychological distress, 62 percent were correctly classified. The incidence of false negatives was 19 percent, the incidence of false positives, 16 percent.

An assessment was made of the association between a high or low Family APGAR score (ie, >39 or ≤39) and number of medical problems recorded. Patients who scored below the cutoff score on the instrument tended to have slightly more total problems than those scoring above the cutoff score (5.6 vs 5.1, respectively), but these differences did not achieve statistical significance. Nor did comparisons for either chronic or acute problems.

Although there was a tendency for individuals with "symptomatic" scores on either instrument to attend the clinic more frequently than those with "healthy" scores, these differences did not achieve statistical significance.

CLINICAL UTILITY OF BOTH INSTRUMENTS TOGETHER

To evaluate the relative benefits of administering both the Personal Inventory and Family APGAR to patients, the predictive value of each instrument was compared with their combined predictive accuracy. The results shown in Table 2 suggest that tandem use of the instruments increases diagnostic screening accuracy over what can be achieved using either instrument alone. When both instruments were administered and a "symptomatic" score on either one was considered indicative of psychological distress, the authors were able to identify 90 percent of patients with psychological problems. This finding implies that a physician could accurately detect emotional distress in his or her patients the majority of the time by using the questionnaires in tandem and reviewing with the patient areas of distress disclosed in the surveys.

DISCUSSION

These results generally suggest that both screening instruments enhance the physician's ability to recognize emotional distress among primary care patients, particularly when used in tandem. This finding is especially meaningful in view of the efficiency and nonthreatening nature of these two instruments.

Research has shown higher rates of psychological distress among lower socioeconomic groups.[12] It seems reasonable that response patterns on the Personal Inventory and Family APGAR may vary in relation to socioeconomic status. Practice setting and philosophy affect the types of patients seen as well. Cutoff scores in this study were based on indigent patients living in a predominantly urban setting. Many patients expressed concern over their living situations and lack of employment, concerns that would not be so pressing for patients in higher income groups. Before the cutoff scores derived empirically in this study can be generalized to patients in other income groups or to other groups of physicians, it will be necessary to replicate this study. The validity of the screening procedures and associated cutoff scores suggested by this study will be substantiated if similar classification accuracy is found in other settings.

In this study of psychometric validity, a high false-negative rate is troublesome because it suggests instrument insensitivity to psychological problems. This false-negative rate was more of a problem for the Family APGAR (19 percent) than for the Personal Inventory (10 percent). The comparatively high false-positive rates for both instruments may relate, at least in part, to the use of residents' clinical judgment as the criterion for psychological distress. It may well be that patients who disclosed distress on the screening measures were not recognized as symptomatic by the examining physician. The physician may or may not have reviewed the survey with the patient, so it is not possible to assess the extent to which symptomatic patients were missed.

Overall, the Personal Inventory performed relatively better than the Family APGAR in detecting emotional distress, possibly because of its greater number of items (21 vs 5). The practical implication is that, if only one instrument is to be given, the Personal Inventory is preferable to the Family APGAR. However, one's predictive ability is increased somewhat by giving both measures and interpreting a symptomatic score on either as reflecting emotional distress, although such interpretation does increase the risk of labeling as "symptomatic" some patients who may not otherwise present evidence of psychological symptoms.

Obviously, the decision to use a screening measure like the Personal Inventory or Family APGAR rests upon individual physician interest in psychological aspects of care and in characteristics of the practice setting. Experience with these measures in both family practice clinic and emergency room settings has suggested that they can be incorporated nicely into routine health care visits. Best of all, review of the content of these surveys does not substantially increase the length of time spent by the physician with a patient.

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