

EVALUATING MEDICAL STUDENTS' PATIENT INTERVIEWING SKILLS: A BIOPSYCHOSOCIAL MODEL

JUDITH G. CALHOUN, JAMES O. WOOLLISCROFT, CHARLES BEAUCHAMP, AND FREDRIC M. WOLF

The University of Michigan

INTRODUCTION

The case method for teaching analytical and problem-solving skills has been proven to be quite effective, especially in the professions such as law, business, and medicine. Particularly in medicine, the write-up of the patient's medical history has long served as the cornerstone for developing clinical problem-solving and health care management skills. The patient's physical examination, subsequent laboratory evaluation and treatment strategies are usually directed by the information obtained during the history-taking interaction with the patient (Hampton, Harrison, Mitchell, Pritchard, & Seymour, 1975). Nevertheless, the specific skills associated with the elicitation and documentation of a patient's history for problem formulation and hypothesis testing frequently receive less emphasis in medical education than does the more technologically-based laboratory test approach to human illness (Engel, 1976). Likewise, despite increased understanding of the importance of environmental, social, and behavioral factors in preventing disease and controlling morbidity (Jones, 1979; Cohen & Brody, 1981), medical students are also not adequately instructed as to how the medical history can be utilized to identify such patient problems (Aloia & Jonas, 1976).

Medical schools have been slow to incorporate the above concepts and skills in their teaching primarily due to past dependence on a biomedical or "disease-oriented" model of patient care as contrasted with the newer biopsychosocial "whole person" model (Williamson, Beitman, & Katon, 1981; Breslow, 1978; Nardone, Rueler, & Girard, 1980). Limited understanding of the importance of risk factor identification and preventive medicine has also contributed to the lack of faculty support for this aspect of teaching. In addition, increasing enrollments and demands on faculty's time have also taken their toll in relation to

amount of time and emphasis placed on new orientations and skill development in medical education. Consequently, medical student facility with strategies of preventive medicine, history-taking and problem-solving skills in the clinical setting is highly variable.

In 1981, The University of Michigan Medical School initiated a pilot curriculum project focusing on the importance of the medical history in clinical problem-solving and its role in preventive medicine as an integral part of undergraduate clinical training. Specific objectives included:

1. demonstrating to students the utility of the patient history for hypothesis generation and testing,
2. increasing student understanding of risk factors and the impact of psychosocial factors on disease,
3. reinforcing documentation of pertinent information in the text of the patient write up, and
4. encouraging problem-solving through the translation of documented patient problems to the problem list.

This project was undertaken to design a cost effective, standardized method for assessing the instructional effectiveness of the changes and outcomes associated with the new curriculum. A related but secondary objective of the evaluation design project was to determine if the students who received the revised prevention-oriented curriculum performed differently in relation to the four objectives specified for the project than did the students from the prior year who had experienced a more traditional disease-focused curriculum. The evaluation methodology was designed with consideration given to the following parameters: (1) insufficient faculty time for intensive observation and

evaluation of student skills, (2) lack of standardization among faculty assessments of clinical skills (Breslow, 1978; Nardon et al., 1980), and (3) prior deficiencies in

providing adequate feedback to the large number of students at the institution.

METHOD

Curriculum Intervention

Prior to the initiation of the pilot program in 1981, the former undergraduate clinical skills curriculum had placed major emphasis on documentation of the medical aspects of the history of the present illness and problem identification as it related to disease. In addition,

interviewing techniques and communication skills were included in the instruction. In contrast, the new curriculum focused the student's attention on the medical history as the basis for hypothesis generation and testing, risk factor identification, and the recognition

	RECORDED		PATIENT DATA			NOTED ON PROBLEM LIST			PRECEPTOR COMMENT	
	YES	NO							YES	NO
38. <u>HEALTH HABITS HISTORY</u>	YES	NO							YES	NO
39. <u>IF female, breast self exam noted</u>	YES	NO*							YES	NO
40. Breast self exam not performed			YES	YES	NO	YES	NO		YES	NO
41. Extent of exercise noted	YES	NO							YES	NO
42. <u>DIETARY HISTORY</u>	YES	NO							YES	NO
43. Caffeine intake (specifically quantified)	YES	NO							YES	NO
44. <u>MEDICATION HISTORY</u>	YES	NO							YES	NO
45. Details of Rx drug use noted	YES	NO*							YES	NO
46. Over the counter drug use noted	YES	NO							YES	NO
47. <u>FAMILY HISTORY</u>	YES	NO							YES	NO
48. Cancer family history noted	YES	NO							YES	NO
49. <u>IF female, positive breast cancer family history noted</u>			YES	YES	NO†	YES	NO		YES	NO
50. Details of positive breast cancer history recorded	YES	NO							YES	NO
51. Colon cancer family history noted	YES	NO							YES	NO
52. Details of positive colon cancer history recorded	YES	NO							YES	NO
53. Coronary artery disease/myocardial infarction family history noted	YES	NO							YES	NO
54. If positive, age onset recorded	YES	NO							YES	NO
55. Positive history of coronary artery disease in first degree relative, age < 65			YES	YES	NO	YES	NO		YES	NO
56. Glaucoma family history noted	YES	NO*							YES	NO
57. Positive Glaucoma family history			YES	YES	NO	YES	NO		YES	NO

*Documentation Errors

†Translation Errors

Figure 1. Sample page of the checklist for evaluating medical student patient write-ups noting documentation and translation errors.

of important psychological, social, and environment parameters which should be identified for each patient. A comprehensive core content syllabus was developed to: (1) define the content and purpose of each portion of a medical history database, and (2) explain the significance of the data (content) obtained during a patient history. Interviewing and physical examination skills were also taught in the new curriculum. However, these process skills were not examined for the purposes of this evaluation. Instead, the primary focus for the project was student documentation and translation of the content of the medical history.

Evaluation Methodology

Given the project objectives and the design constraints outlined in the introduction as well as the second-year status of the students, the evaluation strategy was focused on the inclusion or exclusion of important patient data rather than the accuracy of the data. Therefore, it was determined that the most meaningful and relevant outcome behaviors would be the student's ability to: (1) recognize and document clinical problems and associated risk factors on write-ups of a patient history, and (2) initiate clinical problem solving as indicated by the listing of identified problems on an associated problem list.

A seventy-one criterion item checklist for evaluating student write ups was developed after an extensive review of the medical literature was conducted by the authors. The object of this review was to identify and document the rationale for those patient-history variables felt to be of importance for: (1) general clinical problem solving, (2) risk factor identification, (3) patient care management, and (4) preventive medical care. Two types of medical history-taking content skills were subsequently identified for assessment: (1) documentation—inclusion or exclusion of the criterion items, and (2) translation—recording or nonrecording of identified risk factors and clinical problems on the problem list. Of the 71 patient history criterion items identified for evaluating the different sections of student patient write-ups, there were 46 possible documentation errors and 25 possible translation errors. An example of one page of the checklist and actual documentation and translation errors identified on one student write-up are presented in Figure 1.

Feedback responses addressing the nature of the error as well as providing constructive guidance were generated for each of the possible errors. A word processing procedure was developed to generate these responses upon input of the incorrect checklist item number; the goal being to quickly provide standardized feedback to the students regarding their medical history write ups. Figure 2 illustrates the feedback generated for the errors identified in Figure 1.

Before beginning the preliminary evaluation study, the checklist forms and coding procedures were tested.

A random sample of ten student write-ups was scored by three of the authors, two psychometricians, and a medical history analyst. The Cohen's Kappa statistical technique was used to estimate the level of agreement among the six evaluators. Data from this trial (Table 1) indicated a relatively high level of agreement among the raters implying that: (1) the coding procedures were understood by all, (2) the criterion items on the checklist were internally valid, and (3) once trained, evaluators other than physicians could be utilized in future evaluations.

Write-ups from the medical school classes of 1983 and 1984 were used for the preliminary project analysis. The class of 1983 received for former curriculum, whereas the class of 1984 was the first to receive the pilot curriculum. Fifty-six write-ups for the class of 1983 were selected (every fourth student) from those completed at the end of the class' sophomore year. Similarly, 63 were selected from the end of the sophomore year write ups for the class of 1984. These write-ups were subsequently evaluated to identify the specific errors. In addition, statistical comparisons of student performance in the two classes were conducted. Separate error score analyses were performed for 10 separate checklist sections and for total documentation and total translation error scores. These 10 sections included (1) Chief Complaint, (2) Past Medical History (including Childhood Illnesses, Adult Illnesses, Accident History, Allergy History, and Immunization History), (3) Substance Abuse History, (4) Exposure History, (5) Health Habits History, (6) Dietary History, (7) Medication History, (8) Family History, (9) Social History, and (10) Review of Systems.

The significance of differences in the frequency of student errors made on each checklist section was tested using either the Chi square procedure or its median test variation. The median test was used for those sections where expected cell frequencies did not meet the statistical assumptions for Chi square analysis. The significance of differences in the mean number of total errors was tested using the analysts of variance (ANOVA) technique.

End of course evaluations as well as follow-up surveys during the middle of the internal medicine clerk-

TABLE 1
INTERRATER AGREEMENT USING COHEN'S KAPPA

Rater No.	1	2	3	4	5
2	.63				
3	.63	.8			
4	.61	.75	.73		
5	.62	.77	.76	.71	
6	.62	.85	.79	.79	.82

Student Name _____ #500
 Class of _____ 84
 Patient Initials _____ T.M.
 Patient Sex _____ F
 Patient Age _____ 44
 Patient Race _____ white
 Date of Encounter _____ 4/20/82

INTRODUCTION TO CLINICAL SCIENCES
 Patient Interview Feedback

Your work-up on this patient can be improved in the following areas:

WOMEN PATIENT NOT SCREENED FOR BREAST SELF EXAM HABITS

A comment about the breast self examination practices of each woman should be included in the write-up. Evidence is accumulating that monthly breast self examination has value in the early detection of breast cancer, the most common cause of cancer in women. Early detection means that a woman who develops breast cancer might be cured of an otherwise fatal disease. A physician's skills in patient education are tested in working on the solution to this problem.

DETAILS OF RX DRUG USE NOT NOTED

Details of prescription drug use should be documented in the Medication History. The name of the drug, how often it is used, and the dosage should be included. Without this information potential drug side effects or interactions cannot be adequately assessed.

NO FOLLOW-UP OF A FAMILY HISTORY OF BREAST CANCER

Notation of a woman having a family history of breast cancer should be translated into a "Positive Family History of Breast Cancer" on the problem list. Post-menopausal onset of a unilateral breast cancer need not be defined as a problem in the problem list because the patient has a less than two-fold increased risk of having breast cancer. However, if two first degree relatives had breast cancer or if a first degree family member had either premenopausal onset or bilateral breast cancer then "Positive Family History of Breast Cancer" should appear on the problem list.

NO NOTE MADE OF SCREENING FOR A GLAUCOMA FAMILY HISTORY

In the family narrative section a comment about the absence of a family history of glaucoma should be made. Along with cancer and coronary artery disease, every patient should be asked whether or not a family member experienced "early blindness" or "glaucoma." If a patient's mother "went blind" or "had glaucoma," then the patient is at special risk for developing glaucoma. By age 40, a patient with such a history should be referred to an ophthalmologist for evaluation and follow-up. A question about a family history of glaucoma should always be included, and if there is a "positive" response, note it in the pedigree chart and include a "Positive Family History of Glaucoma" problem on the problem list. If there is a negative response, include that in the narrative portion of the writing as "no family history of glaucoma,...etc."

Figure 2. Sample of word processor generated feedback for medical student patient write-ups.

ship during the students' subsequent year of medical school were used to determine student perceptions of

the value of the curriculum and the patient-history evaluative feedback.

RESULTS

Table 2 displays the results of the statistical analyses comparing the number of patient history write-up errors in the two classes. Results of the analysis of variance regarding the total number of errors made by the two classes indicated statistical differences ($p < .01$) favoring the new curriculum. These students made significantly fewer documentation and translation er-

rors on their patient history write-ups than did the students who received the old curriculum.

The Chi square and median test analyses conducted for the individual sections of the write-up revealed that the students in the new curriculum class also tended to make fewer documentation errors ($p < .01$) than the students who received the former curriculum on all

TABLE 2
STUDENT ERRORS BY CHECKLIST SECTION

Section	Number of Items	Possible Errors	Documentation Errors ^a		Possible Errors	Translation Errors ^b	
			Mean (sd)			Mean (sd)	
			1983	1984		1983	1984
1. Chief Complaint	2	2	0.6 (0.5)	0.4 (0.5)			
2. Past Medical History	21	8*	2.8 (1.4)	1.2 (0.9)	14*	3.2 (1.5)	1.2 (1.2)
3. Substance Abuse History	5	3*	0.7 (0.7)	0.5 (0.5)	2	0.5 (0.6)	0.4 (0.6)
4. Exposure History	6	1*	1.0 (0.1)	0.2 (0.4)	5	0.0 (0.2)	0.2 (0.4)
5. Health Habits History	2	2*	1.3 (0.5)	0.3 (0.5)	—		
6. Dietary History	2	2*	1.6 (0.6)	0.6 (0.5)	—		
7. Medication History	2	2*	0.9 (0.6)	0.5 (0.5)	—		
8. Family History	12	6	3.0 (1.0)	1.4 (1.4)	3	0.5 (0.9)	0.3 (0.5)
9. Social History	9	9	4.4 (2.2)	2.3 (1.7)	—		
10. Review of systems	10	10	1.4 (1.7)	2.0 (2.3)	—		
TOTAL	71	45*	17.7 (4.1)	9.3 (5.0)	24*	3.6 (1.7)	1.8 (1.4)

^aComparisons 1, 3-7 made using χ^2 ; 2, 8-10 using median test; Total using ANOVA.

^bComparisons 3 and 4 made using χ^2 ; 2 and 8 median test; Total using ANOVA.

* $p < 0.01$

sections of the write-up except for the Chief Complaint, Family History, Social History, and Review of Systems sections. However, only one difference was found between the two classes in relation to their translation

skills. The new curriculum students made significantly fewer translation errors on the Past Medical History section ($p < .01$).

DISCUSSION AND SUMMARY

The results of the statistical comparisons of student performance in the two classes revealed that the students in the revised curriculum appear to be significantly more facile in identifying and documenting patient data, predisposing risk factors and psychosocial information. In addition, they were more advanced in their abilities to generate hypotheses regarding the identified risk factors for future intervention or treatment as compared to those students who received the former disease-oriented curriculum.

Although the students' ratings of the value of the course and the associated instructional methods and materials have been quite high, their initial ratings regarding the word processor feedback system were somewhat negative. Student resistance to a system whereby their write-ups were evaluated by a standardized means as well as system implementation difficulties related to providing feedback to the students in a timely manner were identified as the primary reasons for the more negative reactions. Subsequent clerkship

surveys, however, revealed that with time and increased understanding of the importance of the medical history in clinical decision-making, all items addressing the value of the course and the feedback options were rated more favorably. In addition, recent end-of-course evaluations regarding the checklist feedback system from the second class to have received the revised curriculum were strongly favorable ($\bar{X} = 1.2$ on a (1) Strongly Agree to (4) Strongly Disagree scale).

The major goals for the evaluation project, which included testing the usefulness and efficiency of the write-up checklist and identifying initial curriculum effects, have been accomplished. However, the affective impact of the curricular changes as well as the longevity of the effects will continue to be assessed. In addition, the checklist and word processor feedback system will be further analyzed and refined for future applications. Nevertheless, the initial implementation of this curriculum development project indicates that the use of

the checklist by adequately trained nonphysicians can provide the specific, consistent and continued feedback that frequently is lacking in faculty evaluation of student write-ups. Likewise, large numbers of student write-ups can be efficiently evaluated by a standardized methodology which requires minimal faculty involvement.

The major value of this educational program is that it has resulted in the development of curriculum materials and an evaluation methodology which appear to be promising for future implementation and research. Furthermore, a review of the literature reveals that this project represents one of the few descriptions of innovative curriculum projects in undergraduate medical education which has focused on the utility of the medical history for teaching clinical problem solving, preventive medicine concepts and the biopsychosocial model of illness.

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