Pressure Ulcers in Adults: Family Physicians' Knowledge, Attitudes, Practice Preferences, and Awareness of AHCPR Guidelines

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BACKGROUND. Little is known about physicians' knowledge, attitudes, and practice preferences with regard to pressure ulcers. Clinical practice guidelines on pressure ulcers from the Agency for Health Care Policy and Research (AHCPR) have been publicized, but their impact on family physicians has not been assessed.

METHODS. A questionnaire was sent to a random sample of active members of the Minnesota Academy of Family Physicians. Information was collected on respondent demographics, practice characteristics, training, and awareness of AHCPR guidelines. Knowledge about pressure ulcers was assessed with a 43-item test. Attitudes about pressure ulcer treatment were measured on a Likert-type scale. Four case scenarios were used to explore preferences.

RESULTS. Of 292 potential respondents after exclusion, 155 (53.1%) returned questionnaires. Regression analysis revealed that taking care of more elderly patients, completing a residency, being board-certified, and being aware of the AHCPR guidelines were independently associated with higher knowledge scores. Virtually all (99%) the respondents felt that it was the family physician's role to provide pressure ulcer care, whereas 70% felt that they had not been adequately trained to do so. There was a wide variety of practice preferences. Approximately 70% of physicians were not aware of the AHCPR guidelines.

CONCLUSIONS. Most family physicians feel ill-prepared to manage pressure ulcers, suggesting a need to increase educational efforts for this important problem. Knowledge about pressure ulcers could possibly be enhanced by more clinical exposure to older patients, rigorous residency training, and review of AHCPR guidelines.

KEY WORDS. Decubitus ulcer; attitude of health personnel; practice guidelines; United States Agency for Health Care Policy and Research. *(J Fam Pract 1997; 44:361-368)*

Pressure ulcers are a commonly encountered condition in primary care. There is an ever increasing body of knowledge about pressure ulcers; a MEDLINE search revealed publication of at least seven comprehensive review articles in the past 5 years alone.[1-7] Despite this attention in the literature, little is known about physicians' knowledge, attitudes, and practice preferences with regard to pressure ulcers. A single survey, performed in the Netherlands, documented providers' opinions on pressure ulcer treatments,[8] but to date there have been no systematic surveys of primary care physicians' knowledge and management of this important clinical problem.

Recently, efforts have been made to heighten physicians' knowledge about pressure ulcers. In particular, two clinical practice guidelines on pressure ulcers have been developed by multidisciplinary expert panels for the Agency for Health Care Policy and Research (AHCPR) to help physicians make decisions about pressure ulcer prevention and treatment.[9-12] The first guideline on predicting and preventing pressure ulcers was published in May 1992, and the second, which focuses on treatment, was issued in December 1994. Synopses of the guidelines have been published in medical jour-

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nals as well.[13-15] There are no data on the extent of the guidelines' readership or their influence on the clinical practice of primary care physicians.

We conducted a survey of family physicians to determine their knowledge, attitudes, and practice preferences with regard to the prevention and treatment of pressure ulcers. In addition, we sought to assess the impact of the AHCPR guidelines on the physicians' knowledge and management of pressure ulcers.

METHODS

QUESTIONNAIRE

The 8-page, 34-question survey questionnaire consisted of four parts. Part 1 was designed to test the respondent's knowledge about pressure ulcers. Eleven multiple-choice questions had either single or multiple answers, constituting 43 scorable items. The items were based on the clinical practice guidelines from AHCPR.[13,15] The questions covered topics of general knowledge (staging, pathogenesis, and sites; 17 items), prevention (10 items), and treatment (16 items). Respondents were given a point for each correct answer, producing a possible score range of 0 to 43. Part 2 consisted of four questions focusing on (1) respondents' attitudes about adequacy of their training for managing pressure ulcers; (2) perceived effectiveness in treating pressure ulcers; (3) importance of pressure ulcers in primary care practice; and (4) the role of family physicians in managing pressure ulcers. Subjects rated their attitudes on a 4-point Likert-type scale. Part 3 of the questionnaire posed four hypothetical case histories, one each for an elderly patient with a stage 1 pressure ulcer, a stage 2 pressure ulcer, a stage 3 pressure ulcer, and multiple pressure ulcers (stage not revealed). To assess practice preferences, respondents were asked to indicate which given interventions they would order for each scenario. The remaining 15 items of the questionnaire collected information about each respondent's demographic characteristics, practice type, continuing medical education activity, clinical experience, training, and awareness of AHCPR guidelines.

SAMPLE

The survey was conducted in collaboration with Data Collection and Support Services, Division of Epidemiology, University of Minnesota School of Public Health. A pilot test was performed on a convenience sample of 30 family physicians in Wisconsin, following which minor revisions were made to the questionnaire.

The goal of the survey protocol was to obtain a 10% sample of the 1556 active members of the Minnesota Academy of Family Physicians (MAFP). The questionnaire was initially mailed to 304 randomly selected active MAFP members in December 1995. Twelve physicians were subsequently excluded for the following reasons: they were retired; were working as an emergency physician or a chronic pain rehabilitation physician; were working for an urgent care center, the state, or an insurance company; or were out of the country. One week after the initial mailing, a reminder postcard was sent to nonrespondents, followed by another mailing of the questionnaire 4 weeks later. After the three mailings, 91 questionnaires had been returned. If a questionnaire had not been returned by 2 weeks after the third mailing, nonrespondents were contacted by telephone and politely asked to send in a completed questionnaire. Response was solicited until the target sample size (N=155) was achieved.

ANALYSIS

Univariate associations between selected variables were tested using the chi-square and one-way ANOVA statistics where appropriate. The independence of correlates of pressure ulcer knowledge was tested by multivariate regression of the knowledge score on variables that had been associated in the univariate analysis at the $P < .05$ level. Two-tailed tests were used and $P < .05$ was adopted for statistical significance. Analyses were performed with SPSS for Microsoft Windows Release 6.1.[16]

RESULTS

A description of the respondents appears in Table 1. The study sample was comparable to the overall MAFP population in terms of age (44.8 vs 44.0 years; t=1.083; $P = .258$). Respondents and the rest of the MAFP population were similar in percentage of men (76.6% vs 76.7%; $\chi^2 = 0.006$; $P = .989$) and frequency of 3-year residency training (74.7% vs 77.0%; $\chi^2 = 0.311$; $P = .558$). Respondents were significantly more likely to be certified by the American Board of Family Practice than the rest of the MAFP membership (95.5% vs 87.2%; $\chi^2 = 8.26$; $P = .004$).

KNOWLEDGE TEST

The mean percent correct score of the knowledge test was 74.4%±8.1% (SD). Test scores ranged from 56% to 100%. Subscore means for general knowledge (staging, pathogenesis, and sites), prevention, and treatment were 84.1%±11.2%, 64.0%±15.0%, and 70.0%±11.9%, respectively.

Univariate testing revealed that serving as a nursing home medical director, having a larger percentage of patients over 65 years of age, completion of a 3-year residency, and being a diplomate of the American Board of Family Practice were significantly associated with higher scores (Table 2). Certification in geriatric medicine (7.2% of the sample) was not significantly associated with a higher score.

For multivariate testing, the percentage of patients over the age of 65 was dichotomized as either 0% to 40% or greater than 40%. Because the two AHCPR guidelines were so highly correlated (Pearson's r = .79), a single dichotomous variable was created for the regression equation, which was coded as follows: 0 = unaware of either guideline; 1 = aware of, browsed, or read one or both guidelines. Regression analysis (Table 3) showed that having over 40% older adults in one's practice, completing a residency, ABFP diplomate status, and being aware of either AHCPR guideline remained independently associated with higher knowledge scores.

ATTITUDES

Over 70% of the respondents did not think that their training had adequately prepared them to provide care to patients with pressure ulcers (Table 4). Three quarters of the respondents, however, considered themselves effective in providing care to patients with pressure ulcers. Moreover, all but two of the respondents felt that it was the family physician's role to provide care to patients with pressure ulcers.

On univariate analysis (chi-square testing, data not shown), physicians who saw more patients with pressure ulcers in training were more likely to feel that they had received adequate preparation to provide care for pressure ulcers ($P < .001$). On the other hand, having had didactics during training or completion of a 3-year residency was not significantly associated with feeling adequately prepared. Feeling that one was effective in providing care to patients with pressure ulcers was significantly associated with the following respondent characteristics: being a nursing home medical director ($P = .017$); having managed more patients with pressure ulcers while in training ($P = .042$); certification in geriatric medicine ($P = .036$); and having read or browsed the AHCPR guideline on prediction and prevention ($P = .001$).

TABLE 1

Characteristics of Respondents in Pressure Ulcer Survey (N=155)

Characteristic	Frequency (%)
Age, y	
<41	32.9
41-50	47.7
51-60	9.0
61+	10.3
Male	76.6
Practice type	
Solo	2.6
Partner/group/multispecialty	80.5
Teaching staff	6.5
Staff model HMO	6.5
Fellow	0.6
Other (unspecified)	3.2
Type of community	
Urban	26.6
Suburban	27.9
Small town	26.6
Rural	18.8
Years since medical school graduation	
<11	24.8
11-20	39.9
21-30	22.9
31+	12.4
Number of nursing homes attended	
0	24.7
1	25.3
2-3	40.9
4+	9.1
Nursing home medical director	20.8
Patients aged >65 y in practice, %	
0-20	42.8
21-40	38.2
41-60	13.8
61+	5.3
Residency-trained	74.7
Diplomate, American Board of Family Practice	95.5
Certification in geriatrics	7.2

TABLE 2

Test Scores of Survey Respondents, by Experience, Training, and Awareness of AHCPR Guidelines

Variable	Mean Test Score (% correct)	F*	*P* Value
Medical experience			
Years in practice		0.916	.435
0-10	75.1		
11-20	75.1		
21-30	73.5		
31+	71.9		
No. of nursing homes attended		0.247	.863
0	74.0		
1	74.9		
2-3	74.0		
4	75.8		
Nursing home medical director		5.096	.026
No	73.7		
Yes	77.4		
Patients aged >65 y in practice, %		4.475	.005
0-20	72.1		
21-40	74.9		
41-60	78.6		
61+	79.3		
Training			
Didactic lectures in training		0.280	.840
None	73.7		
One	75.6		
More than one	73.7		
Do not recall	74.7		
No. of pressure ulcers seen in training		1.640	.184
0	72.1		
1-5	74.7		
6-10	75.6		
11+	78.1		
Completed 3-year residency		5.440	.021
Yes	75.3		
No	71.6		
Diplomate, ABFP		5.292	.023
Yes	74.9		
No	67.0		
Certification in geriatrics		0.566	.453
Yes	76.3		
No	74.2		
AHCPR guideline awareness			
Prevention and prediction guideline†		5.540	.001
Read it	79.1		
Browsed it	81.2		
Aware	74.9		
Not aware	72.8		
Treatment guideline‡		6.572	<.001
Read it	84.9		
Browsed it	80.5		
Aware	75.1		
Not aware	72.8		

*One-way ANOVA test.
† From publication No. AHCPR 92-0047[9] and publication No. AHCPR 92-0050.[10]
‡From publication No. AHCPR 95-0652[11] and publication No. AHCPR 95-0653.[12]

Having read the treatment guideline did not reach statistical significance (P =.073). Physicians practicing in smaller communities (P=.005), attending one or more nursing homes (P=.009), and serving as a nursing home medical director (P=.015) were more likely to feel strongly that it was the family physician's role to provide care for patients with pressure ulcers.

Practice Preferences

Table 5 describes the interventions that were chosen by the respondents. A wide practice variation was noted, especially for stage 2 and stage 3 ulcers. Of note was the finding that a considerable number of respondents chose treatment modalities that are currently not recommended, such as using a donut cushion, massaging a stage 1 ulcer site, or cleaning wounds with antiseptic solution.

Awareness of AHCPR Guidelines

Approximately two thirds of the respondents were unaware of the existence of each guideline (Table 6). Ninety percent of the physicians who had read or browsed the prevention guideline had found it helpful. All who had read the treatment guideline said it was helpful. Having read or browsed either one of AHCPR guidelines was significantly associated with higher knowledge test score (Tables 2 and 3).

DISCUSSION

In this study, we found that family physicians who see higher percentages of older patients are more likely to have greater knowledge about pressure ulcers. Board certification and residency training were also associated with increased knowledge. Almost all respondents felt that it was the family physician's role to take care of patients with pressure ulcers, and yet a majority of them felt they had been inadequately prepared. There was a wide variety of practice preferences observed, with substantial numbers of physicians choosing treatments that are not recommended. Most respondents were not aware of AHCPR guidelines; those who were demonstrated greater knowledge about pressure ulcers.

The observation that respondents with more patients over the age of 65 had higher scores suggests that knowledge may largely depend on the frequency of encountering pressure ulcers. Completing a 3-year residency and diplomate status were signifi-

cantly associated with higher scores; these variables would seem to be markers of family physicians who more actively pursue educational enrichment, or may simply be indicators of clinical competence. Interestingly, didactics during training was not associated with higher score. Perhaps the content of didactics was considerably different from the current knowledge on which the AHCPR guidelines are based; having read or browsed the guidelines had a positive impact on knowledge. More likely, however, the lack of an association between knowledge about pressure ulcers and didactic training would suggest that repeated clinical exposure to a problem, rather than didactic activity, is a more powerful training method.

TABLE 3

Multiple Regression of Knowledge Score on Selected Characteristics of Survey Respondents

Characteristic	β Coefficient	SE*	*t* Test	*P* Value
Nursing home medical director	1.13	.76	1.48	.142
> 40% of patients aged 65+	2.34	.76	3.10	.002
Completed 3-year residency	1.80	.69	2.61	.010
Diplomate, ABFP	3.18	1.45	2.20	.030
Aware of AHCPR guidelines	1.34	.59	2.27	.025

* Standard error of the β coefficient.

One striking finding in this study is the discrepancy between the respondents' attitudes regarding the importance of pressure ulcers in practice and the perceived adequacy of training for this problem. Most family physicians felt responsible but unprepared, which would suggest that they may not be receiving enough training in this disorder. We found a significant correlation between the number of pressure ulcers that the respondent actively managed while in training and how strongly prepared the respondent felt. Increasing the amount of exposure during training could have a positive impact on the sense of preparedness of family physicians when confronted with a pressure ulcer.

The survey showed a wide variety of practice interventions that providers might choose. The variation was probably, at least in part, a reflection of the empiricism that is inherent in the practice of medicine and specifically in this instance of treating pressure ulcers. Pressure ulcer care has owed a great deal to the accumulation of experience by health care professionals such as physicians, nurses, and

TABLE 4

Attitudes of Survey Respondents Concerning Care of Pressure Ulcers

Question	Frequency of Respondents' Answers (%)			
	Strongly Disagree	Disagree	Agree	Strongly Agree
In your training, do you think you received adequate preparation to provide care to patients with pressure ulcers?	13.2	57.6	28.5	0.7
Do you think that you are effective in providing care to patients with pressure ulcers?	0.7	22.7	73.3	3.3
Do you think that preventing and treating pressure ulcers is an important part of your practice?	3.3	15.2	62.3	9.2
Do you think that it is the family physician's role to provide care to patients with pressure ulcers?	0.7	0.7	56.6	42.1

TABLE 5

Interventions Preferred by Respondents in Survey on Pressure Ulcers

Intervention	Frequency (%)
Stage 1 pressure ulcer	
Reposition every hour on wheelchair	86.5
Waffle mattress	77.4
Donut cushion	20.0
Massage the area	14.2
Stage 2 pressure ulcer	
Hydrocolloid dressing	45.2
Saline gauze dressing	36.3
Transparent polyurethane dressing	30.3
Calcium alginate dressing	7.7
Clean wound with antiseptic solution	14.2
Stage 3 pressure ulcer	
Hydrocolloid dressing	29.0
Saline gauze dressing	57.4
Transparent polyurethane dressing	11.0
Calcium alginate dressing	16.1
Clean wound with antiseptic solution	28.4
Multiple pressure ulcers	
Obtain:	
Serum albumin level	95.4
CBC with differential	75.5
Serum transferrin level	20.0
Serum cholesterol level	20.0
Serum zinc level	12.3
Give:	
Nutritional supplements	95.5
Zinc	40.0
Vitamin C	39.4

Note: Treatment choices consistent with current recommendations are highlighted in bold type.
Multiple answers were allowed.

enterostomal therapists. Randomized, blinded, controlled studies on pressure ulcer treatments have been scarce partly because of difficulty in blinding and partly because of manufacturers' lack of initiative to compare their new products with traditional modalities. In particular, the respondents' variation on the workup and treatment of multiple ulcers reflects the lack of hard data on managing this challenging condition.

Many respondents continued to choose modalities that have been scientifically shown to be harmful, underscoring the importance of effective knowledge dissemination in the medical community. Emphasizing practice principles that are well-grounded in research would seem especially useful. These management principles would include: use of waffle mattresses, nonuse of donut cushions, and avoidance of massage for stage 1 ulcers; debridement when necessary, avoidance of antiseptic solutions, and use of transparent polyurethane, hydrocolloid, alginate, or wet-to-dry saline dressings for stage 2 and stage 3 ulcers; and frequent turning of the patient (hourly in the wheelchair, every 2 hours in bed) with an ulcer at *any* stage.

The lack of awareness of AHCPR guidelines among family physicians was notable. AHCPR guidelines have been published on 18 medical topics. These guidelines have been created with a view to helping practitioners make decisions about effective and appropriate health care for specific clinical conditions.[15] They reflect the state-of-the-art knowledge at the time of publication. Dissemination has been enhanced through massive distribution to professional groups[17] as well as making copies available at no extra charge by telephone.* Synopses have appeared in journals. All 18 guidelines are now available on the Internet as well, and can be downloaded easily.†

We were unable to locate any literature about rate of awareness of AHCPR guidelines. There is a body of literature on dissemination of clinical guidelines in general. One mailed questionnaire survey was conducted to determine family physicians' awareness of the US Preventive Services Task Force guidelines. Of the respondents, 37% reported that they had not read any of the recommendations.[18] One survey done in Canada showed that as few as 5% of respondents actually followed the guidelines that had been disseminated 6 to 8 months earlier.[19] In view of this survey result, the current study's finding that approximately two thirds of respondents were unaware of the AHCPR guidelines is not surprising. Serious consideration must be given, however, to enhancing dissemination of valuable knowledge. The authors of one report suggest a variety of formats with an emphasis on short, concise summaries and frequent reminders.[20] Other creative methods, such as academic detailing[21] and use of opinion leaders,[22] have met with some success in implementing guidelines; other investigators have suggested that

*The telephone number for the AHCPR Center for Health Information is 301-594-1364.
†The Internet address on the World Wide Web is http://text.nlm.nih.gov/.

TABLE 6

Survey Respondents' Awarenss of AHCPR Guidelines on Pressure Ulcers

Questionnaire Item	Frequency (%)			
Awareness of guideline	*Read It*	*Browsed It*	*Aware of It*	*Unaware of It*
Prediction and prevention guideline*	5.2	10.4	17.5	66.9
Treatment guideline†	2.6	9.7	17.5	70.1
Impression of those who read guideline	*Very Helpful*	*Helpful*	*Somewhat Helpful*	*Not Helpful*
Prediction and prevention guideline	20.0	45.0	25.0	10.0
Treatment guideline	12.5	50.0	37.5	0

*From publication No. AHCPR 92-0047[9] and publication No. AHCPR 92-0050.[10]
†From publication No. AHCPR 95-0652[11] and publication No. AHCPR 95-0653.[12]

incentives must be changed for physicians to adopt new guidelines.[23]

There are several limitations in this study. First, we detected a response bias; there was a higher percentage of board-certified physicians in the sample compared with the overall MAFP population. Since board certification was shown to correlate with knowledge about pressure ulcers, one could postulate that the nonrespondents had even less knowledge about pressure sores and fewer of them had read the AHCPR guidelines than the study sample. Second, all the respondents were from the same state and presumably had attended one of the same group of medical schools, potentially limiting the generalizability of our findings. Administering the questionnaire in other states would resolve this issue. Third, test scores might not reflect the actual knowledge level if the respondents consulted the AHCPR guidelines or other recent reviews when they answered the questionnaire. Again, if anything, this would serve to overestimate knowledge and guideline awareness. Fourth, the questionnaire's validity and reliability have not been tested. We cannot be certain whether the observed statistically significant differences in test scores reflected clinically significant differences in knowledge. Content validity of the knowledge test and practice preferences, however, was assured by basing those items on the AHCPR guidelines, which are thought to be among the most authoritative and rigorous to date. Fifth, the response to the practice preference portion of the questionnaire may not reflect actual practice. More accurate measures of actual practice could be assessed by medical record review, direct observation, or standardized patient testing.

Our study suggests that more education and training of family physicians on the care of pressure ulcers may be needed. Improving knowledge may best be accomplished by focusing on clinical experience rather than didactic programs. Increasing clinical exposure may also improve the confidence of family practitioners when they encounter pressure ulcers. Further study on practice patterns would serve to delineate the relationship between knowledge and actual practice. The strategy for dissemination of AHCPR guidelines should be reassessed, as the guidelines do not seem to be reaching the majority of family physicians. AHCPR is apparently aware of this, and is adopting a strategy of enhancing the knowledge base while partnering with professional organizations to develop clinically useful guidelines.[24]

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REFERENCES

1. Yarkony GM. Pressure ulcers: a review. Arch Phys Med Rehabil 1994; 75:908-17.
2. Evans JM, Andrews KL, Chutka DS, et al. Pressure ucers: prevention and management. Mayo Clin Proc 1995; 70:789-99.
3. Smith DM. Pressure ulcers in the nursing home. Ann Intern Med 1995; 123:433-42.
4. Patterson JA, Bennet RG. Prevention and treatment of pressure sores. J Am Geriatr Soc 1995; 43:919-27.
5. Young JB, Dobrzanski S. Pressure sores. Epidemiology and current management concepts. Drugs Aging 1992; 2:42-57.
6. Woolsey RM, McGarry JD. The cause, prevention, treatment of pressure sores. Neurol Clin 1991; 9:797-808.

7. Spoelhof GD, Ide K. Pressure ulcers in nursing home patients. Am Fam Physician 1993; 47:1207-15.
8. Ter Riet G, Van Houtem H, Knipschild P. Health-care professionals' views of the effectiveness of pressure ulcer treatments. A survey among nursing-home physicians, dermatologists and nursing staff in the Netherlands. Clin Exp Dermatol 1992; 17:328-31.
9. Panel for the Prediction and Prevention of Pressure Ulcers in Adults. Pressure ulcers in adults: prediction and prevention. Clinical Practice Guideline, No. 3. Rockville, Md: Agency for Health Care Policy and Research, May 1992. Publication No. AHCPR 92-0047.
10. Panel for the Prediction and Prevention of Pressure Ulcers in Adults. Pressure ulcers in adults: prediction and prevention. Quick Reference Guide for Clinicians, No. 3. Rockville, Md: Agency for Health Care Policy and Research, May 1992. Publication No. AHCPR 92-0050.
11. Bergstrom N, Bennett MA, Carlson CE, et al. Treatment of pressure ulcers. Clinical Practice Guideline, No. 15. Rockville, Md: Agency for Health Care Policy and Research, December 1994. Publication No. AHCPR 95-0652.
12. Bergstrom N, Bennett MA, Carlson CE, et al. Treatment of pressure ulcers. Quick Reference Guide for Clinicians, No. 15. Rockville, Md: Agency for Health Care Policy and Research, December 1994. Publication No. AHCPR 95-0653.
13. Agency for Health Care Policy and Research. Pressure ulcers in adults. Prediction and prevention. Am Fam Physician 1992; 46:787-94.
14. Xakellis GC. Guidelines for the prediction and prevention of pressure ulcers. J Am Board Fam Pract 1993; 6:269-78.
15. Pressure Ulcer Guideline Panel. Pressure ulcer treatment. Am Fam Physician 1995; 51:1207-22.
16. SPSS for Microsoft Windows Release 6.1. Chicago, Ill: SPSS Inc, 1993.
17. Colling J. An update on the AHCPR guideline implementation. Nurse Pract Forum 1994; 5(3):34-7.
18. Flocke SA, Stange KC, Fedirko TL. Dissemination of information about the US Preventive Services Task Force guidelines. Arch Fam Med 1994; 3:1006-8.
19. Rosser WW, Palmer WH. Dissemination of guidelines on cholesterol. Effect on patterns of practice of general practitioners and family physicians in Ontario. Ontario Task Force on the Use and Provision of Medical Services. Can Fam Physician 1993; 39:280-4.
20. Gorton TA, Cranford CO, Golden WE, Walls RC, Pawelak JE. Primary care physicians' response to dissemination of practice guidelines. Arch Fam Med 1995; 4:135-42.
21. Soumerai S, Avorn J. Principles of educational outreach ('Academic Detailing') to improve clinical decision making. JAMA 1990; 263:549-56.
22. Lomas J, Enkin M, Anderson GM, Hannah WJ, Vayda E, Singer J. Opinion leaders vs audit and feedback to implement practice guidelines. JAMA 1991; 265:2202-7.
23. Lomas J, Anderson GM, Domnick-Pierre K, Vayda E, Enkin MW, Hannah WJ. Do practice guidelines guide practice? The effect of a consensus statement on the practice of physicians. N Engl J Med 1989; 321:1306-11.
24. Clancy CM, Kamerow DB. Evidence-based medicine meets cost-effective analysis. JAMA 1996; 276:329-30.