Integration of the Biopsychosocial Model: Perspectives of Medical Students and Residents

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Abstract

Purpose
To examine residents' and medical students' attitudes toward the incorporation of psychosocial factors in diagnosis and treatment and to identify barriers to the integration of evidence-based, mind–body methods.

Method
A random sample of third- and fourth-year medical students and residents was drawn from the Masterfiles of the American Medical Association. A total of 661 medical students and 550 residents completed a survey, assessing attitudes toward the role of psychosocial factors and the clinical application of behavioral/mind–body methods.

Results
The response rate was 40%. Whereas a majority of students and residents seem to recognize the need to address psychosocial factors, 30%–40% believe that addressing such factors leads to minimal or no improvements in outcomes. The majority of students and residents reports that their training in these areas was ineffective, yet relatively few indicate interest in receiving further training.

Females are more likely to believe in the need to address psychosocial factors. Additional factors associated with greater openness to addressing psychosocial factors include (1) the perception that training in these areas was helpful, and (2) personal use of behavioral/mind–body methods to care for one's own health.

Conclusions
There is a need for more comprehensive training during medical school and residency regarding both the role of psychosocial factors in health and the application of evidence-based, behavioral/mind–body methods. The current health care structure—particularly insufficient time and inadequate reimbursement for addressing psychosocial factors—may be undermining efforts to improve patient care through inconsistent or nonexistent application of the biopsychosocial model.

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In 2004, the Institute of Medicine issued a report on the status of medical training in the areas of behavioral and social sciences and concluded that "no physician's education would be complete without an understanding of the role played by behavioral and social factors in human health and disease, knowledge of the ways in which these factors can be modified, and an appreciation of how personal life experiences influence physician–patient relationships."[1] In response to this report, in 2005 the National Institutes of Health issued a request for applications (RFA) focused on "strengthening behavioral and social science curricula in medical school."[2]

The need for enhanced training in these areas was also highlighted by a national survey carried out by Waldstein and colleagues[3] that examined the extent to which psychosomatic/biopsychosocial topics were being covered in the curriculum of U.S. medical schools. On the basis of responses from 54 schools, they estimated that only 10% of the total curriculum was focused on such topics. In what the authors referred to as a "striking finding," approximately 50% of those schools surveyed indicated that fewer than 40 hours of total instruction time (out of the typical 7,000–8,000 hours of undergraduate medical education) were devoted to biopsychosocial topics.

In an era of so-called evidence-based medicine, these findings are particularly alarming, given both the growing body of research pointing to the important role that factors such as psychosocial stress can play in health and illness,[4–6] and the clinical evidence pointing to the role that behavioral/mind–body interventions (e.g., cognitive–behavioral therapy, relaxation, stress management) can play in the treatment of a number of common medical conditions.[7]

Despite the well-accepted, contemporary value that medical practice should be grounded in solid scientific evidence, it is also unfortunately the case that evidence of a given therapy's effectiveness is frequently insufficient to change clinical practice.[8] Given this, if medical training and practice are to move toward a model that gives adequate attention to psychosocial—rather than exclusively, or even predominantly, biological—concerns, the varied and complex barriers to integration of psychosocial factors must be identified and addressed.[8–10] Toward this end, this study reports the results of a national survey of residents and medical students that was designed (1) to examine their attitudes toward the role of psychosocial factors (e.g., stress, emotional states) in health, and (2) to identify factors, including educational experiences, that might account for differences in the extent to which students and residents recognize the

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need to address psychosocial factors and are open to using behavioral/mind–body approaches (such as relaxation, stress management, meditation, and behavioral counseling) in clinical practice.[7,11] More specifically, the study aimed not only to identify personal, attitudinal, and social–environmental factors that facilitate or inhibit students' and residents' openness to considering psychosocial factors in diagnosis and treatment, but also to seek a better understanding of the role that medical education plays in shaping attitudes and practice patterns relative to these areas.

Method

In May of 2002, we conducted a series of focus groups with physicians, medical students, and residents to explore their perceptions regarding possible barriers to the integration of psychosocial factors and the clinical use of behavioral/mind–body methods. The focus-group results[12] subsequently informed item development for two surveys, one of practicing physicians[13] and the other of medical students and residents, the findings of which are reported here.

In collaboration with researchers at the Center for Survey Research (CSR) at the University of Massachusetts, we edited and formatted the resident and medical student questionnaires to improve usability. Once we had a mature draft, CSR conducted cognitive interviews (via telephone) with a small sample of students and residents. As they went about the task of completing the questionnaire, respondents were probed as to their understanding of the questions and the adequacy of the response options. The feedback from respondents resulted in several revisions that both clarified wording and reduced response burden. Along with obtaining basic demographic information (e.g., gender, age, specialty), the questionnaire asked both students and residents about their attitudes toward the role of psychosocial factors in health, their perceptions of training in these areas, and their perspectives on factors that might serve as barriers to the integration of such methods in medicine. The residents' questionnaire also asked about their use of behavioral/mind–body methods in clinical practice. A Web-based version of the survey was also developed, giving respondents the option (offered in the mailed cover letter) to take the survey online at a designated, password-protected URL.

In an effort to orient respondents to the study's overall context and purpose, the 12-page questionnaire began as follows:

> This survey asks for your views on the psychosocial aspects of patient care. The information you provide will help us clarify the current status of mind–body medicine among practicing physicians. *The terms 'psychosocial' and 'mind–body' refer to those approaches that emphasize the role of nonphysical factors such as stress, emotions, attitudes, and beliefs in the diagnosis and treatment of physical illness.* [Emphasis in original.]

Below, we summarize the key questionnaire items and response categories that were used. Most of the questionnaire response choices were points on a four- or five-point visual analog scale.

1. Knowledge ("don't know much," "know a little," "know a lot") and both clinical and personal use ("never," "sometimes," "often") of several behavioral/mind–body therapies, such as psychological counseling, biofeedback, guided imagery, hypnosis, meditation, relaxation techniques, and yoga.
2. Assessment of health behaviors, such as smoking, alcohol consumption, exercise, measured on five-point scale from "not at all" to "more than once a day".
3. Assessment of the value-added (five-point scale from "little" to "large") when behavioral/mind–body approaches are used in concert with other therapies for preventing/treating the following: hypertension, cardiovascular disease, insomnia, headache disorders, low-back pain, and arthritis.
4. Degree of improvement in diagnostic accuracy and treatment outcomes if physicians paid more attention to the psychosocial aspects of the conditions they treat (four-point scale from "almost no improvement" to "a big improvement").
5. Rating of "usefulness of formal training" during medical school, internships, and residency in (1) using mental–behavioral cues in arriving at diagnosis, and (2) including behavioral/mind–body methods in treatment (five-point scale from "not helpful" to "very helpful").
6. Degree of commitment to adopting behavioral/mind–body approaches (four-point scale from "not at all" to "very" committed).
7. Level of interest in obtaining further training in behavioral/mind–body methods (four-point scale from "low" to "very high").
8. Extent to which factors such as lack of expertise, insufficient time, and absence of demonstrably effective therapies each limit respondents' interest in using behavioral/mind–body methods (five-point scale from "does not limit" to "limits greatly").
9. Degree of satisfaction when engaging patients about psychosocial issues (five-point scale from "not satisfying at all" to "very satisfying").
10. Extent to which religious/spiritual beliefs are seen as important in day-to-day work activities (three-point scale from "unimportant" to "very important").

A random sample of third- and fourth-year medical students and residents (including interns) was drawn from the Masterfiles of the American Medical Association. A total of 3,042 surveys were initially mailed out in February of 2003. The study design called for a mailing of the initial questionnaire packet, including a cover letter, the questionnaire, a fact sheet (describing the study, its purpose, source of funding, and institutional affiliation of the investigators), and a self-addressed, stamped return envelope for the completed questionnaire. Reminder telephone calls were begun approximately 14 days after the initial mailing, and a second questionnaire packet was sent to all nonresponders, followed by another series of follow-up calls.

We examined the extent to which selected variables predicted attitudes toward addressing psychosocial factors in medicine. For medical students, we examined age and year in medical school (third or fourth), and, for residents, we examined year graduated from medical school as a possible predictor. On the basis of results from our initial focus groups[12] and the analysis of our physician survey data,[13] we hypothesized that the following would be significant predictors: gender, personal use of behavioral/mind–body approaches, perceived quality of

Table 1

Residents' and Students' Attitudes Toward the Role of Psychosocial Factors: Comparison of Responses by Gender, 2003*

Variable	No. (%)† students		No. (%)† residents	
	Males	Females	Males	Females
Believe addition of psychosocial methods would markedly improve treatment and diagnosis	187 (60)	250 (72)‡	176 (53)	152 (74)‡
Use or refer to psychological counseling			214 (63)	151 (73)§
Use or refer to relaxation therapies			148 (44)	113 (54)
Believe there would be large value-added if mind–body methods were included in treatment of hypertension¶	129 (41)	158 (47)§	116 (35)	92 (46)§
Believe there would be large value-added if mind–body methods were included in treatment of headache disorders¶	156 (49)	239 (71)‡	182 (54)	150 (74)‡
Report formal training in addressing psychosocial issues in treatment was helpful	72 (23)	97 (29)	57 (17)	68 (32)‡
Are interested in receiving additional mind–body training	73 (23)	144 (42)‡	72 (21)	77 (37)‡
Say they are committed to adopting mind–body methods clinically	186 (58)	266 (78)‡	170 (50)	144 (69)‡
Find engaging with patients about psychosocial issues very satisfying	62 (51)	118 (73)‡	55 (49)	61 (55)§
Have used mind–body methods to manage own health	196 (61)	262 (77)‡	199 (59)	140 (67)

* Responses are from a survey completed in collaboration with Center of Survey Research at the University of Massachusetts. A total of 661 third- and fourth-year medical students and 550 residents responded; however, not all respondents answered all questions.
† A small number of respondents opted not to report gender. For this reason, the values and percentages shown in Table 1 do not always match the attitudes and practice patterns reported for the sample as a whole.
‡ Gender differences significant at $P < .001$.
§ Gender differences significant at $P < .05$.
¶ These specific conditions have been chosen to highlight areas in which the differences between male and female respondents were particularly evident.

training in psychosocial factors, and importance of religious/spiritual beliefs.

For all analyses, the dependent variable (belief in the importance of addressing psychosocial factors) was operationalized by combining responses on the item examining students' and residents' perceptions of the "value-added" if psychosocial methods were included as part of treatment for six common medical conditions. Only those variables that had significant bivariate correlations ($P < .05$) with the dependent variable were entered into the linear regression model.

For residents, we also examined the same set of hypothesized predictors to determine which, if any, might be associated with frequency of use of, and/or referral to, two representative behavioral/mind–body approaches: psychological counseling and relaxation techniques.

SPSS 11.0 statistical software was used for all analyses (SPSS Inc., Chicago, IL). For both descriptive statistics and multivariate analyses, no missing values were imputed for any items. All study procedures were approved by the institutional review board at the University of Maryland School of Medicine.

Results

Response rate

Of the original questionnaires that were mailed, a total of 1,211 completed surveys were received: 550 from residents and 661 from medical students, for a combined response rate of 40%. A total of 173 respondents (14%) opted to use the Web-based version of the survey. Female medical students (n = 340) were significantly more likely than male medical students (n = 320) (44% compared with 37%; $P = .002$) to participate. There were no statistically significant differences in response rates between male and female residents.

Demographic characteristics

Among students, 52% of respondents (n = 340) were female compared with 38% (n = 210) among residents.* Mean age for students was 27, for residents, 32. The most commonly listed residency specialties were internal medicine (20%), family medicine (18%), pediatrics (9%), psychiatry (6%), emergency medicine (6%), surgery (6%), and anesthesiology (4%).

Attitudes toward the role of psychosocial factors†

The majority of medical students and residents seem to recognize the need to address psychosocial factors in clinical practice, with 67% of students (n = 443) and 60% of residents (n = 330) indicating that the addition of behavioral/mind–body methods would lead to moderate or big improvements in medical diagnosis and treatment (score of three or four on a four-point scale) (See Table 1). Residents were given a list of representative behavioral/mind–body interventions (e.g., psychological counseling, relaxation, meditation, imagery, hypnosis) (see Table 2) and asked to comment on the extent to which they used and/or referred to each of these as part of their clinical practice.

*A small number of respondents opted not to report gender. For this reason, the values and percentages shown in Table 1 (which compares and contrasts attitudes by gender) do not always match the attitudes and practice patterns reported for the sample as a whole.

†In reporting these frequencies throughout this section, percentages are based on the number of respondents who answered each particular questionnaire item.

Table 2

The Reported Frequency of 550 Residents' Use of and/or Referral to Mind–Body Therapies, 2003*

	No. (%)† of responses		
Mind–body therapy	Often	Sometimes	Never
Psychological counseling	110 (20.0)	258 (46.9)	155 (28.2)
Relaxation techniques	40 (7.3)	221 (40.2)	262 (47.6)
Meditation	6 (1.1)	88 (16.0)	418 (76.0)
Yoga	3 (0.5)	53 (9.6)	448 (81.5)
Biofeedback	7 (1.3)	106 (19.3)	397 (72.2)
Guided imagery	3 (0.5)	69 (12.5)	432 (78.5)
Hypnosis	1 (0.2)	18 (3.3)	485 (88.2)

* Survey completed in collaboration with the Center for Survey Research at the University of Massachusetts.
† Numbers may not equal 550, and percentages may not equal 100 because not all respondents answered all questions.

Psychological counseling and relaxation techniques were the most commonly employed therapies with a total of 368 residents (67%) reporting use of and/or referral to counseling (20% often; 47% sometimes) and 261 residents (47%) reporting use of relaxation therapies (7% often; 40% sometimes).

Both students and residents were asked about six specific conditions—hypertension, cardiovascular disease, insomnia, headache disorders, low-back pain, and arthritis—and their perceptions regarding the value-added if behavioral/mind–body methods were included as part of the overall treatment for these conditions. The majority of both students (465, or 70%) and residents (380, or 69%) stated that there would be large value added (four or five on a five-point scale) if behavioral/mind–body methods were included as part of the treatment for insomnia, whereas 395 students (60%) and 333 residents (62%) stated that the use of such methods would add large value to the treatment of headache disorders (See Table 1). The number indicating that there would be large value added was considerably lower for the remaining conditions:

- low-back pain (240 residents [45%], 282 students [43%]);
- hypertension (210 residents [39%], 287 students [44%]);
- cardiovascular disease (149 residents [28%], 198 students [30%]);
- arthritis (128 residents [24%], 167 students [26%]).

Perceptions about training

A minority of both students (171, or 26%) and residents (125, or 23%) indicated that their *formal training was helpful* (score of four or five on a five-point scale) in learning how to address psychosocial factors in treatment, whereas 284 students (43%) and 267 residents (49%) rated the quality of their training in these areas as not helpful (score of one or two on the five-point scale) (see Table 1). When specifically asked about the quality of *mentoring* they had received, a majority of medical students (421, or 64%) and a smaller majority of residents (294, or 54%) indicated that mentors did a good job with respect to training them in *diagnosing* psychosocial factors, whereas a significantly smaller percentage of students (249, or 38%) and residents (162, or 30%) stated that mentors did a good job with respect to training them in *treating* psychosocial factors.

Behavioral intentions

To assess students' and residents' future intentions with respect to incorporating behavioral/mind–body methods, we asked them to comment on their level of interest in receiving further training in these areas, and the extent to which they felt committed to adopting behavioral/mind–body approaches in their future clinical practice. A minority of both students (217 or 33%) and residents (150 or 27%) expressed high or very high interest (three or four on a four-point scale) in obtaining additional training (see Table 1). The remaining reported either moderate (two on the four-point scale) (294 or 45% students; 233 or 42% residents) or low (one on the four-point scale) (150 or 23% students; 166 or 30% residents) interest in receiving further behavioral/mind–body training. There was also considerable variability regarding how committed students and residents were to adopting behavioral/mind–body approaches clinically. Approximately one third (207 or 31%) of students and two fifths (233 or 42%) of residents indicated that they were either "not very committed" or "not at all committed" to the clinical adoption of behavioral/mind–body methods.

Perceptions of barriers

Respondents were also asked about factors that might be serving as obstacles to the further integration of psychosocial factors and behavioral/mind–body methods in medicine. Among respondents, the most frequently cited barrier was lack of training with 444 residents (81%) and 554 students (84%) indicating that this was contributing greatly to the failure of medicine to address psychosocial factors and behavioral/mind–body methods. The second most frequently cited item was lack of time, with 429 residents (84%) and 482 students (74%) stating that this was serving as a significant barrier. Additional barriers were

- physician discomfort with the feelings of uncertainty that can arise when addressing psychosocial factors (356 residents [65%], 437 students [67%]);
- appeal of the "quick fix" (355 residents [65%], 455 students [69%]);
- inadequate reimbursement for these methods (339 residents [62%], 415 students [63%]);
- physicians' lack of expertise in behavioral/mind–body approaches (317 residents [60%], 382 students [58%]);
- lack of evidence for behavioral/mind–body methods (208 residents [40%], 265 students [42%]);
- reluctance of physicians to examine the role of psychosocial factors in their own health (211 residents [38%], 212 students [32%]);
- physicians' need to maintain a sense of control (180 residents [33%], 197 students [30%]);

- lack of patient willingness to address psychosocial factors (187 residents [34%], 178 students [27%]); and
- lack of support from peers (198 residents [38%], 132 students [21%]).

We also examined whether there were any significant differences in what male and female residents considered to be the most significant barriers to the integration of psychosocial factors and behavioral/mind–body methods. Male residents were more likely ($P < .05$) to state that the following were barriers: absence of evidence of these therapies' effectiveness; the belief that when drug therapies are used alone they are just as effective; lack of acceptance by professional peers; and, feeling that owing to the nature of their practice, it would not be appropriate to address psychosocial factors. Female residents, on the other hand, were more likely to say that insufficient clinical time to address psychosocial factors issues was serving as a significant barrier.

Multivariate results

As shown in Table 3, for both students and residents, the following factors emerged as significant predictors of attitude ($P < .05$): (1) being female, (2) use of behavioral/mind–body methods to manage their own health, and (3) perception that medical school training in these areas had been helpful. Students' and residents' health-related behaviors (i.e., smoking, alcohol consumption, and exercise) were not correlated with either attitude toward or practice of behavioral/mind–body methods.

Together, these factors accounted for 36% of the variability in student and 40% in resident attitudes regarding the need to address psychosocial factors.

To better understand the nature of the relationships among the above predictors and respondents' attitudes toward the role of psychosocial factors, we examined cross-tabulations. Averaging across the 550 female students and residents, 402 respondents (73%) indicated that the addition of psychosocial factors and behavioral/mind–body methods would lead to marked (moderate to large) improvements in treatment and diagnosis compared with 363 (55%) of the 657 male respondents. A significantly higher percentage of female students and residents (179, 64%) of the 280 who reported using behavioral/mind–body methods in practice also indicated that they find engaging with patients about psychosocial factors very satisfying compared with 117 (50%) of the 334 male students and residents who answered the question (see Table 1). Female students and residents were also nearly twice as likely as male students and residents—40% versus 22%—to express interest in receiving further training in behavioral/mind–body methods (see Table 1).

Among 339 residents who indicated that they used one or more behavioral/mind–body methods to manage their own health, 252 (75%) stated that such methods would lead to moderate or large improvements in treatment outcomes, whereas among those 209 residents who did not use behavioral/mind–body methods for their own personal health, 120 (57%) felt that such methods would result in improved outcomes. A similar pattern emerged for medical students. Among those 458 students who used behavioral/mind–body methods to manage their own health, 372 (81%) stated that such methods would lead to moderate or large improvements in treatment outcomes, whereas among 201 students who did not personally use behavioral/mind–body methods, 130 (65%) felt that such methods would result in improved medical outcomes.

Among those 277 residents who rated their formal training as not helpful, 166 (60%) stated that the inclusion of behavioral/mind–body methods would lead to either moderate or large improvements in treatment outcomes, whereas for those 125 residents who felt their training in addressing psychosocial factors was helpful, 109 (87%) felt that behavioral/mind–body methods would lead to improved treatment outcomes. A similar pattern emerged for medical students. Of those 284 students who indicated that their training was ineffective, 185 (65%) stated that the addition of psychosocial factors and behavioral/mind–body methods would significantly improve treatment outcomes, whereas among the 169 students who said their training was beneficial, 150 (89%) said that such methods would lead to improvements in treatment.

We examined whether year graduated from medical school was related to residents' perceptions of the quality of training they had received with respect to addressing the impact of psychosocial factors in health. Somewhat surprisingly, there was a negative, albeit small, correlation ($r = -0.10$; $P = .02$) between these variables, suggesting that residents graduating more recently experienced their medical school and residency training in these areas to have been less, rather than more, helpful.

Predictors of practice

Similar to those factors that predicted attitude, the following variables were associated with frequency of use of, and/or referral to, both psychological counseling and relaxation techniques among residents (n = 550): (1) perception that formal training in these areas, during both medical school and residency, had been helpful, (2) use of behavioral/mind–body methods to manage their own health, and (3) indication that their religious/spiritual beliefs were important to them in their work. As was the case with attitude

Table 3

Predicting Residents' and Students' Belief in the Need to Address Psychosocial Issues, 2003*

	β coefficient†	
Significant predictors	**Residents**	**Students**
Gender	.23	.13
Use of behavioral/mind–body methods to manage their own health	.18	.22
Perceptions regarding quality of formal training to address psychosocial factors	.29	.22

* Responses are from a survey completed in collaboration with the Center of Survey Research at the University of Massachusetts. A total of 661 third- and fourth-year medical students and 550 residents responded.
† All variables significant at $P < .001$.

toward addressing psychosocial issues, gender (being female) was significantly correlated ($P = .03$) with more frequent use of psychological counseling. However, the effects of this variable became statistically nonsignificant when perceived quality of training was entered into the regression equation (see discussion section for a potential explanation of this finding).

Among the 277 residents who indicated that their training in addressing psychosocial issues was poor, 110 (40%) stated that they never use or refer patients for psychological counseling, whereas only 24 of these residents (8%) indicated that they often use or refer to counseling. In contrast, among 125 residents who indicated their training in these areas was helpful, 14 (11%) stated that they never use or refer patients for counseling, whereas 57 (46%) indicated that they often do. Similarly, the 125 residents who rated their educational training in psychosocial factors more favorably were considerably more likely (15% compared with 4%) to say that they often use or refer patients to relaxation therapies.

Among the 146 residents who reported that religious/spiritual beliefs were very important to them in their work, 36 (25%) indicated they often use or refer to counseling, and 16 (11%) to relaxation. In contrast, the 185 residents who stated their spiritual beliefs were unimportant were significantly less likely to use such methods (29 [16%] for counseling, and 7 [4%] for relaxation).

Discussion

This study sought to examine medical students' and residents' attitudes toward the role of psychosocial factors and behavioral/mind–body methods in medicine. Several themes emerged.

In this sample, a substantial number of both students and residents appear to recognize the need to address psychosocial factors and the potential value of incorporating behavioral/mind–body methods in the treatment of common medical conditions. For example, 40% to 60% of respondents indicated that there would be large value-added if approaches such as psychological counseling and other behavioral/mind–body therapies (e.g., relaxation, meditation, guided imagery) were included as part of the treatment of insomnia, headache, low-back pain, and hypertension.

However, despite this fairly widespread recognition of the benefits when psychosocial factors are addressed, many students and residents expressed skepticism regarding the benefit of integrating psychosocial factors into medical diagnoses and treatment. For example, approximately one in three students and two in five residents stated that the inclusion of psychosocial factors and behavioral/mind–body methods would result in either small or no improvement in medical diagnoses and treatment. Similarly, when asked about their level of commitment to adopting behavioral/mind–body approaches, approximately one-third of students and two in five residents indicated that they were either not very, or not at all, committed to such adoption.

Our multivariate analyses identified several factors that were associated with both medical student and resident attitudes and practice patterns. First, women were considerably more likely to recognize the need to address psychosocial factors. Compared with male respondents, female students and residents were not only more likely to say that they enjoyed engaging patients in discussions about psychosocial factors but also appeared more interested in receiving further training in these areas (see Table 1). Second, both students and residents who reported using behavioral/mind–body methods to manage their own health were significantly more likely to believe that such methods would be useful in the treatment of patients.

Similar to our previously reported findings with physicians,[9,12,13] students' and residents' perceptions of the quality of their formal training in behavioral/mind–body methods and the role of psychosocial factors in health also emerged as a significant predictor of attitude. Those who reported that the training and mentoring they received in these areas were subpar were significantly less open to the need to address psychosocial factors. Not surprisingly, residents' perception of the quality of training was also predictive of their actual use of psychosocial factors and behavioral/mind–body methods in clinical practice. For example, those who felt more positive about the psychosocial training they had received were almost four times as likely to report frequent use of, or referral of patients to, psychological counseling as were those residents who felt their training was less effective.

Along with being more likely to indicate that addressing psychosocial factors is necessary in medical diagnosis and treatment, female residents also tended to be more knowledgeable about behavioral/mind–body therapies and, to a lesser extent, more likely to report using or referring patients to these approaches. However, in our multivariate analyses, the effects of gender on practice became nonsignificant in the presence of the variable *quality of training*, suggesting that female residents' greater tendency to use psychosocial factors and behavioral/mind–body approaches may be explained in part by their more favorable impressions of the training they had received in these areas.

In an effort to identify additional barriers, we asked both students and residents to indicate the extent to which they felt that certain factors were serving as obstacles to medicine's incorporating psychosocial factors and behavioral/mind–body approaches. Lack of training and insufficient time emerged as the most frequently cited obstacles. Additional factors included the appeal of the "quick fix," physicians' personal discomfort with addressing psychosocial factors, inadequate reimbursement for these methods, and to a lesser extent, lack of evidence for behavioral/mind–body methods, reluctance of physicians to examine the role of psychosocial factors in their own health, physicians' need to maintain a sense of control, patient unwillingness to address these factors, and lack of support from peers.

The findings that females are more likely to recognize the need to address psychosocial factors, are more committed to adopting behavioral/mind–body approaches in clinical practice, and express greater interest in receiving additional training in these areas are intriguing. Although speculative, the fact that there was a higher response rate among female students may be reflective of woman's greater interest in the subject matter of the survey. In the follow-up, in-depth interviews we are currently conducting (as part of the same study

reported here), physicians and physicians-in-training have hypothesized about these findings. Although only speculative at this point, it is possible that women may be socialized and/or biologically more predisposed to value relationships, emotional nurturance, interpersonal communication, and the importance of subjective experience, and may therefore be more likely to believe in the need to address the interior (psychosocial) dimension of patients' lives. In addition, it is possible that women are more likely to pursue specialties (e.g., family practice) that afford them the opportunity and require them to engage more frequently in relationship-based interactions with their patients.

Study limitations

First, it is difficult to determine the extent to which the attitude and practice patterns we identified can be generalized to the larger population of medical students and residents in the United States. For example, it is possible that our lower-than-anticipated response rate (40%) may have reflected some general lack of interest in or enthusiasm for the topic among the sample of students and residents we initially contacted. Although we cannot be certain, given this response rate, it is possible that students and residents in the general population may actually be less likely to address psychosocial factors than the group who responded to our survey, and that our findings therefore represent an overestimate of the degree of interest in and openness to these factors.

Second, the cross-sectional nature of the study precludes our ability to draw definitive conclusions regarding the direction of causation between study variables. For example, as noted, a central finding was that negative perceptions regarding the quality of training in addressing psychosocial issues was predictive of residents and students being less open to the need to address such factors in clinical care. However, it may be the case that, rather than quality of training influencing attitude and practice patterns, believers (in addressing psychosocial factors) may simply rate their training in these areas as more effective as a result of already holding positive attitudes toward this area. Although certainly possible, it also seems equally, if not more, plausible that those who are more interested in and open to the role of psychosocial factors in health would, in turn, have higher, rather than lower, expectations regarding the quality of their medical training in these areas. This latter interpretation would argue for our initial supposition: namely, that education is a likely driver of both attitude and behavior relative to addressing psychosocial factors in medicine.

Policy implications

Our finding that students as well as residents tend to rate their training in psychosocial factors (both in terms of diagnosis and treatment) as inadequate lends strong support to the recent Institute of Medicine report,[1] which, as noted, emphasized the need to improve the quality of medical school and residency training to address the complex interplay of biological, psychological, and social factors and their influence on human physiology and health.[14,15]

The importance of the improvement of medical education in these areas is further supported by our finding that quality of training predicted both attitude and practice such that those students and residents who indicated that the psychosocial training and mentoring they had received was helpful were significantly more likely both to acknowledge the need to address psychosocial factors and to use behavioral/mind–body methods in clinical practice. The need to improve training and education in addressing psychosocial factors was further highlighted by our finding that for both students and residents, lack of physician training was the most frequently cited obstacle to the appropriate integration of psychosocial factors and behavioral/mind–body methods in medicine. Finally, the fact that residents who graduated from medical school more recently tended not to rate their training in psychosocial factors and behavioral/mind–body methods as more effective than those who had graduated before them raises questions about the effectiveness of recent efforts to improve training in these areas. Given these findings, we believe it may be very useful for the Association of American Medical Colleges to convene a Medical School Objectives Projects focused on training in behavioral/mind–body methods.

As noted earlier, a significant predictor of both attitude toward the role of psychosocial factors and the likelihood that residents would actually use behavioral/mind–body approaches in clinical practice was the use of such methods to care for their own health. This finding suggests that as part of educating students and residents about the potential value of addressing psychosocial factors and incorporating evidence-based, behavioral/mind–body methods, it may be important to make the training in these areas experiential as well as didactic, providing physicians-in-training opportunities to experiment with such methods in the "laboratory" of their own personal lives as a precursor to introducing patients to them. This idea is supported by studies suggesting that interventions designed to change physician behavior are most effective when they are not merely didactic in nature but also include both active participation and direct experience.[16] Several U.S. medical schools have begun incorporating behavioral/mind–body practices into the curriculum. For example, since 2002, Georgetown University has been offering an elective to first- and second-year students that introduces them experientially to various behavioral/mind–body methods (e.g., relaxation, imagery, meditation) to increase self-awareness and self-care. Their initial findings suggest that this 22-contact-hour course is effective in increasing students' empathy, self awareness, ability to cope with stress, and regard for addressing the mental–emotional well-being of patients as part of clinical care.[17,18]

Finally, the finding that lack of time as well as inadequate reimbursement were cited by the vast majority of students and residents as significant barriers to the incorporation of psychosocial factors and behavioral/mind–body methods suggests that our current health care delivery system may, in many respects, be antithetical to the biopsychosocial model. As we noted in our previous report summarizing physicians' attitudes toward the role of psychosocial factors,[13] medicine as it is currently practiced, particularly within a managed care context, may, at best, be suboptimal

precisely because the very way in which care is structured limits the extent to which practitioners are actually able to adequately address the psychosocial dimension of patients' lives, either diagnostically, or in terms of the actual treatment strategies they employ.

Although it has been some 30 years since Engel[19] first published his seminal paper on the importance of expanding the model of medicine to encompass not just biological but psychological and social factors as well, our findings suggest that medical training and practice have a considerable way to go before the biopsychosocial model moves from the realm of the theoretical to the actual. On the basis of our findings and those of other researchers (e.g., Waldstein et al[3]), we believe it is incumbent on medical educators and health care policy makers to ensure that the training and practice of medicine continue to reflect the ever-growing body of scientific evidence that points to the significant influence of psychosocial factors on human health and well-being.

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