Exploring Physician and Staff Perceptions of the Learning Environment in Ambulatory Residency Clinics

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Background and Objectives: *Investigations of teaching quality in ambulatory clinics have generally focused on faculty and medical student perspectives. We investigated the association of learning and organizational environment variables with faculty, resident, and nursing staff perceptions of quality of teaching and with a measure of resident learning in ambulatory residency clinics.* Methods: *Annually over 5 years (1998–2002), we distributed learning and organizational environment surveys to faculty, residents, and staff in three ambulatory clinics of the Wayne State University Department of Family Medicine. We assessed internal reliability of the surveys' 11 scales and then compared responses of employee groups across sites. We then conducted a multiple regression analysis to determine the association of learning and organizational environment variables with faculty, resident, and staff perceptions of quality of teaching. We also compared the mean change in residents' In-training Examination (ITE) scores at our clinic teaching sites over the years of the study.* Results: *Nine of 11 survey scales demonstrated acceptable internal reliability. Staff views were significantly lower than residents' views on all scales and were significantly lower than faculty's on all but one scale. Opinions about availability of learning opportunities for residents explained the most variance (35.2%) in the overall assessment of teaching quality. The addition of job satisfaction brought the explained variance up to 46.4%. The mean change in ITE scores was higher for residents at the site with higher learning and organizational environment assessment scores but not significantly so.* Conclusions: *Nine learning and organizational environment scales were found internally reliable and useful to measure faculty, resident, and staff perspectives on ambulatory teaching sites. Two areas of focus for improvement were found. First, learning opportunities should be structured so that residents are oriented to the ambulatory clinic, have their knowledge assessed regularly, are helped to meet individual goals, are given appropriate levels of responsibility, and see an adequate number, mix, and continuity of patients. Second, prioritizing efforts to improve job satisfaction for all employees is important because of the association between job satisfaction and employee perceptions of quality of teaching. We recommend that research into the educational climate in ambulatory clinics include perspectives of the full range of clinic personnel who can contribute to resident learning.*

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Medical educators who examine ambulatory clinic settings to understand and optimize trainee education rarely include the perspectives of the clinic's entire patient care team. Yet, Bowen and Irby[1] noted that the attitudes of clinic staff toward learners and the ability of learners to participate meaningfully in clinic activities have an influence on learning. These authors recommended that monitoring systems should include assessment of learner, faculty, and staff satisfaction.

Recognizing that ensuring teaching quality requires cooperation of all employees, Probst and colleagues[2] surveyed faculty, residents, and staff in seven South Carolina residency program clinics for the purpose of designing faculty development interventions. Their study investigated the effect of the organizational environment on opinions about teaching quality. They found that all employees' perceptions of teaching quality reflected the degree to which faculty were satisfied

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with their work environments. Also, residents and staff who believed that they were attaining their own goals were more likely to report high teaching quality. Probst et al concluded that organizational development is key to creating a clinical learning environment in which teaching is highly rated.

This study's objective was to investigate the influence of organizational and learning environment characteristics on perceptions of teaching quality and family medicine residents' learning. Using Probst et al's organizational environment assessment (OEA)[2] and our own Learning Environment Assessment (LEA), we determined the relationship of faculty, resident, and staff perspectives on features of each training site to their ratings of faculty teaching quality. We then compared residents' knowledge acquisition between our two training sites as measured by changes in their performance over time on the annual In-training Examination (ITE).

Methods

We distributed the OEA and LEA annually each spring from 1998 to 2002 to faculty, residents, and patient care staff in our three ambulatory clinics. We distributed these confidential surveys at staff meetings and through interoffice mail. The questionnaires took 15–20 minutes to complete. We obtained Human Investigation Committee approval for the study, and each participant signed an informed consent form annually.

Environmental Assessments

The OEA[2] is a six-scale, 36-item instrument. It examines features such as job satisfaction,[3] organizational climate,[4,5] autonomy,[4] organizational commitment,[4,5] stress,[6] and goal attainment.[6]

The Wayne State University LEA is a five-scale, 49-item instrument that elicits respondents' assessment of physical characteristics and personnel arrangements within each clinic site, structure of learning opportunities within the clinic routines, teaching behaviors of faculty, roles of nursing/administrative staff, and "learning organization" characteristics recommended for creating quality clinical teaching environments in ambulatory clinics.[2, 7-11]

All items on both instruments measured responses on a 5-point Likert scale, on which 1=strongly disagree and 5=strongly agree. Higher levels of the scale variable were assumed to be more desirable. Summary scales were created additively and calibrated to the 1–5 scale. Items and scales are shown in Table 1.

Learning Outcome Measure

To measure change in residents' learning, we compared their first and third postgraduate year scores on the American Board of Family Medicine (ABFM) ITE. The ITE is a cognitive examination comparable to the ABFM Certification Examination and is given annually to family medicine residents nationwide. A composite score is derived from the weighted average of the standard scores for the exam, with a mean score of 500 and a standard deviation of 100. Examinees who score well on the ITE are likely to do so on the certification examination.[12,13]

Data Analysis

Cronbach's reliability coefficient (alpha)[14] was used to assess internal reliability of the OEA and LEA scales. We imputed values for cases with missing data if no more than 25% of the scale responses were missing for that particular case, using a subject-specific scale average to impute values into these cases. For example, if subject "X" was missing a response to question "A" in a four-item scale consisting of questions "A," "B," "C," "D," the value ("B" + "C" + "D")/3 was imputed for "A" for subject "X." We imputed no values for the two scales of only three items.

We performed Mann-Whitney tests[15] on the responses of staff versus faculty, staff versus residents, and faculty versus residents to determine if there were any differences between faculty, resident, and staff responses across scales. We defined "perceived quality of teaching" as the summary response to the "faculty teaching" portion of the LEA instrument.

We then used multiple linear regression to assess the influence of organizational environment and learning environment characteristics as measured by the summary totals of the other scales. Using this method, the other scales were conceptualized as independent variables contributing to the quality of teaching. As a first step, we entered independent variables univariately into linear regression models and noted the amount of variance explained by each separate independent variable in the dependent variable. We then built a parsimonious model by the step-wise addition of variables with associated improvement in fit tests. At each step, we assessed all potential two-way interactions between variables, and, if significant, these were incorporated into the baseline model. We further assessed our final model by a goodness-of-fit test with the saturated model.

To explore the relationship between organizational and learning environment measures and resident learning outcomes, we compared OEA and LEA scale summary means for the combined employee group of faculty, residents, and staff at each residency site for the years of our study, 1998–2002, using a post-hoc sign test. We then measured the mean change in ITE score (year 3–year 1) by site for graduating residents, all of whom spent all three training years at their respective sites. Since only two of our three clinics, "Site A" and "Site B," remained as teaching clinics throughout the

Table 1

Scale Composition of Organizational Environment Assessment (OEA) and Learning Environment Assessment (LEA) Scales With Acceptable Internal Reliability

Scales	*Scale Items*	*# of Respondents*	*Cronbach's Alpha*
OEA Scales			
Commitment		319	.76
	Is there a strong sense of teamwork at your site?		
	Do you believe your site is committed to increasing the quality of service to your patients?		
	I am willing to put in effort beyond that normally expected in order to help this site succeed.		
	I am proud to tell others that I am part of this site.		
	I really care about the fate of this site.		
Goal attainment		306	.75
	Does this organization do a good job of meeting your needs as an individual?		
	Are you satisfied with the progress you have made in this organization up to now?		
	Do persons at your site encourage each other to give their best effort?		
Job satisfaction		308	.86
	Satisfaction with: • Co-workers • Supervision • Pay • Administration • Career advancement opportunities • Curriculum • Community support • Physical facility (offices, exam rooms, etc) • Communication with/from management • Communication with/from peers		
Autonomy		307	.78
	Management at this site is receptive to the ideas and suggestions of employees.		
	I feel that I have some input into decisions that affect my work.		
	I feel free to suggest new ways of improving other people's jobs.		
LEA Scales			
Site characteristics		289	.87
	Satisfaction with: • Observation equipment (two-way windows, videotaping equipment) • Number of exam rooms • Space for reading, self-directed learning, chart review • Space for confidential conferring • Space for small-group meetings • Space for large-group meetings • Ratio of preceptors to learners • Continuity of preceptors • Number of staff providing patient care support • Number of staff providing administrative support		
Learning opportunities		268	.78
	New learners are oriented to this site.		
	New learners' knowledge and experience are assessed.		
	Learners are encouraged to set individual goals.		
	Learners are facilitated to meet individual goals.		
	Learners are given appropriate levels of responsibility.		
	Learners receive timely feedback.		
	The mix of patient cases is adequate for learners.		
	Learners have an appropriate number of patient encounters.		
	Learners can provide continuity of care.		

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Table 1

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Scales	*Scale Items*	*# of Respondents*	*Cronbach's Alpha*
Faculty teaching		286	.90
	Faculty have good practice skills.		
	Faculty are committed to lifelong learning.		
	Faculty understand learners' learning objectives.		
	Faculty provide appropriate supervision/autonomy.		
	Faculty are enthusiastic.		
	Faculty promote learners helping each other to learn.		
	Faculty are committed to spending time planning, teaching, and reflecting on their teaching.		
	Faculty teaching focuses on key points of patient care.		
	Faculty accurately assess learners' knowledge/ability/attitudes.		
	Faculty provide an up-to-date curriculum.		
Staff roles		290	.77
	Staff have a positive attitude toward learners.		
	Staff provide adequate patient care support.		
	Staff provide adequate administrative support.		
	Staff have chances to cooperate with staff at other sites.		
	Staff are respected by faculty.		
	Staff are respected by learners.		
	Staff development is available.		
	Staff have a positive attitude toward learners.		
Learning organization characteristics		287	.87
	People treat each other as colleagues.		
	People feel free to experiment.		
	People feel part of the Department of Family Medicine.		
	People feel part of Wayne State University.		
	People feel part of the Detroit Medical Center.		
	This site has clear goals.		
	This site encourages a match between site goals and individual goals.		
	Rewards are aligned with goals.		
	Faculty are involved in site planning.		
	Learners are involved in site planning.		
	Staff are involved in site planning.		
	There are opportunities for communication among employees at this site.		

study period, this analysis was restricted to those two sites.

Results

A total of 323 questionnaires out of a possible 436 were completed (74%): 81 from faculty (94%), 128 from residents (62%), and 114 from staff (80%). All staff respondents were nursing staff, some of whom perform administrative tasks as well. Response rates did not vary significantly from year to year and were averaged across all 5 years.

Reliability of LEA and OEA Scales

Four of six scales of the OEA and all five scales of the LEA demonstrated acceptable internal reliability using Cronbach's alpha (>.70),[16] as shown in Table 1. The OEA scales for stress and organizational climate did not demonstrate sufficient internal reliability (.65 and .52, respectively), and these variables were excluded from further analysis. We stratified each remaining scale by type of respondent and found no significant differences in reliability estimates.

Ability to Identify Differences in Perspectives of Faculty, Residents, and Staff

Mean scores for OEA and LEA scales are shown in Table 2. Mean scores for the four OEA scales ranged from 3.4 (autonomy and job satisfaction) to 3.9 (commitment). All three employee groups rated their commitment to their clinic site higher than any of the other variables. Both staff and residents felt significantly less autonomous and satisfied than did faculty. Staff were significantly less likely to agree that their career goals were being met at work than were faculty.

Table 2

Comparison of Organizational and Learning Environment Assessment Means by Employee Group

Scale	*Employee Level*	*n (%)*	*Mean*	*SD*	*Differences*
Job satisfaction	Faculty	77 (25)	3.6	0.60	>staff, *P*<.001; >resident, *P*<.050
	Staff	106 (34)	3.1	0.88	
	Resident	125 (41)	3.5	0.69	>staff, *P* <.001
	Total	308 (100)	3.4	0.78	
Autonomy	Faculty	78 (25)	3.7	0.91	>staff, *P*<.001; >resident, *P*<.002
	Staff	107 (35)	3.1	1.11	
	Resident	122 (40)	3.3	0.97	
	Total	307 (100)	3.4	1.03	
Commitment	Faculty	79 (25)	4.0	0.68	
	Staff	113 (35)	3.7	0.76	
	Resident	127 (40)	3.9	0.77	
	Total	319 (100)	3.9	0.75	
Goal attainment	Faculty	76 (25)	3.7	0.74	>staff, *P*<.035
	Staff	107 (35)	3.4	0.94	
	Resident	123 (40)	3.6	0.80	
	Total	306 (100)	3.6	0.85	
Site characteristics	Faculty	79 (27)	3.5	0.80	>staff, *P*<.002
	Staff	86 (30)	3.1	0.88	
	Resident	124 (43)	3.5	0.84	>staff, *P*<.001
	Total	289 (100)	3.4	0.86	
Learning opportunities	Faculty	78 (29)	3.7	0.50	>staff, *P*<.001
	Staff	67 (25)	3.3	0.55	
	Resident	123 (46)	3.6	0.84	>staff, *P*<.047
	Total	268 (100)	3.5	0.70	
Faculty teaching	Faculty	80 (28)	3.4	0.38	>staff, *P*<.001
	Staff	81 (28)	3.0	0.54	
	Resident	125 (44)	3.3	0.64	>staff, *P*<.001
	Total	286 (100)	3.2	0.58	
Staff roles	Faculty	78 (27)	3.3	0.53	
	Staff	98 (34)	3.2	0.77	
	Resident	114 (39)	3.4	0.78	>staff, *P*<.012; >faculty, *P*<.050
	Total	290 (100)	3.3	0.72	
Learning organization characteristics	Faculty	81 (28)	3.1	0.55	>staff, *P*<.001
	Staff	88 (31)	2.7	0.76	
	Resident	118 (41)	3.3	0.72	>staff, *P*<.001; >faculty, *P*<.047
	Total	287 (100)	3.1	0.73	

SD—standard deviation

Summary means for the five LEA scales ranged from 3.1 (learning organization characteristics) to 3.5 (learning opportunities). Staff views were significantly lower than residents' views on all five LEA scales. Staff views were significantly lower than faculty perspectives on all but the staff roles scale. On the other hand, the similarities between faculty and residents' responses in the areas of site characteristics, learning opportunities, faculty teaching, and staff roles indicated congruence among the physicians in our clinics.

Relationship Between Learning/Organizational Environment Characteristics and Perceived Teaching Quality

In the univariate linear regression analysis, perceptions of structured learning opportunities for residents by all three employee groups explained the most variance (35.2%) in the overall assessment of teaching quality (Table 3). With perceptions of learning opportunities as the baseline model, the addition of job satisfaction brought the explained variance up to 46.4%. There was no evidence for an interaction effect between job satisfaction and learning opportunities. The addition of further independent variables (including type of respondent) did not substantially increase the explained variance in the dependent variable. The saturated model with all possible interactions included explained 51.1% of the variance.

Relationship Between Organizational and Learning Environment Characteristics and Resident Learning Outcomes

For all OEA and LEA scale measurements, the summary means across all employee groups for Site A were consistently greater than summary means for Site B (post-hoc sign test, P=.02, Table 4), suggesting a better environment for working and learning at Site A. For 35 residents, all 3 years of residency had been completed at one of these sites during 1998–2002. The mean change in ITE score for Site A residents (+96.1) was larger than that for Site B residents (+55.4), although this difference did not reach statistical significance (Wilcoxon rank sum test, P=.24).

Table 3

Factors Associated With Perception of Teaching Quality

	Model One		***Model Two***	
Variable	*Estimate*	P *Value*	*Estimate*	P *Value*
Learning opportunities	.594	<.001	.367	<.001
Job satisfaction	—	—	.410	<.001
R^2 for model	.352	<.001	.464	<.001

Discussion

Providing quality teaching in multifaceted residency ambulatory clinics is a complex endeavor, requiring the cooperation of all clinic faculty, residents, and staff. The OEA and LEA can be used to explore employees' and students' perspectives of employment and learning environments. Four of six OEA scales and all five LEA scales demonstrated acceptable psychometric properties to be useful in assessing factors that relate to employees' perceptions of teaching quality.

These assessments enabled us to define two areas of focus for improvement of teaching in our clinics. First, we learned that ambulatory site employees' judgments of the quality of teaching in their clinics were affected most importantly by the processes in place to structure

Table 4

Mean Organizational Environment Assessment (OEA) and Learning Environment Assessment (LEA) Scale Summary Scores 1998–2002 for Residency Clinics A and B

	Residency Site A*	***Residency Site B***
OEA scales (# of items in scale)	*Mean (SD)*	*Mean (SD)*
Commitment (five items)	21.5 (2.9)	19.4 (3.3)
Goal attainment (three items)	11.4 (2.3)	10.6 (2.7)
Job satisfaction (10 items)	36.7 (6.2)	33.3 (7.1)
Autonomy (three items)	11.2 (2.5)	10.0 (3.0)
LEA scales		
Site characteristics (10 items)	38.0 (6.4)	35.4 (8.1)
Learning opportunities (10 items)	35.9 (5.2)	35.5 (6.2)
Faculty teaching (12 items)	40.6 (5.4)	38.0 (6.9)
Staff roles (seven items)	25.7 (4.3)	23.2 (4.9)
Learning organization characteristics (12 items)	41.2 (6.7)	37.6 (7.7)

* Means for Site A were consistently greater than those for Site B (P=.02)

SD—standard deviation

resident learning opportunities. Residents should be oriented to the site, have their knowledge assessed regularly, set and meet individual goals, assume appropriate levels of responsibility, and see an adequate number and mix of patients, including having opportunities for continuity of care.[8-11]

Second, we found that faculty, resident, and staff evaluation of teaching quality was influenced by the degree to which they were satisfied with their jobs.[5] While in the Probst et al study[2] it was faculty job satisfaction that was related to perceptions of teaching quality, in our study, faculty, resident, and staff job satisfaction was related. We found no other studies that explored the relationship between faculty, resident, and staff job satisfaction and evaluations of clinical teaching and learning. However, we did find two studies showing that staff provided meaningful input to physician training. In an ethnographic study of eight community practices, Zayas et al[17] found that staff members were instrumental in students' learning. In some cases, staff had specific teaching roles in which learners spent a full day with them, while in other cases, staff provided frequent illustrations of teaching points. In a study of inpatient care and teaching, Hoffman and Donaldson[18] found that all members of the team, both physician and nonphysician, learned from one another. In addition to sharing medical knowledge, they shared methods of teaching, operational knowledge, information about resources, and ways to create efficiencies in one's personal and professional life. Such explicit inclusion of staff in the teaching and learning process may have potential to positively affect the clinic's educational environment.

Third, the learning environments in our training sites differed significantly. Based on our measures, Site A had an environment that should have been more conducive to learning than Site B. To explore the effects of this difference, we compared the mean change in ITE scores among residents who completed all of their training at either of these sites. Residents at Site A had a greater mean change in ITE scores than did residents at Site B (+96.1 compared with +55.4), although the difference did not reach statistical significance. It should be noted, however, that the number of residents studied was small, with only 13 of 35 having completed their training at Site A.

Limitations

The work reported here has several limitations. First, because the study explored perspectives within a single institution, it may not be applicable to other institutions.

Second, we experienced a lower response rate among residents (62%) when compared with rates of 80% for staff and 94% for faculty. Although we have no evidence of a systematic difference between respondents and nonrespondents among the residents, the potential for a selection bias needs to be considered.

Third, our surveys were not strictly anonymous. However, they were confidential to the point that no one but the principal investigator, who did not work at any of the clinics, knew the identity of respondents.

Fourth, some of the same individuals responded in multiple years during the study. This was true because faculty and staff may work at a site for many years, and residency training comprises a 3-year employment period. However, the design of our study was to track conditions from the perspective of the employee group working together as a whole at each clinic each year. Thus we did not evaluate responses of individuals longitudinally.

Fifth, while we compared improvement in residents' ITE scores according to their clinic site placement, we did not randomly assign them to a clinic. Rather, they chose a training location during their first year, usually on the basis of desiring an experience that tended to be either somewhat more urban or more rural or because of a clinic's proximity to their home. Finally, our analysis is cross-sectional and can only establish associations, as between structured learning opportunities and perceived quality of teaching.

Conclusions

While further research should explore organizational and learning environment variables more fully, our work sets the stage for future investigations that focus on employee interventions such as facilitating effective teamwork. Such interventions can result in clinic structures and processes designed to improve the quality of both patient care and resident learning. Additionally, our results suggest that focusing on improving employees' job satisfaction has the potential to positively affect residents' learning. We recommend that future investigations of the educational climate in ambulatory clinics include perspectives of the full range of personnel in the clinic who have potential to contribute to learning.

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