Use of Fellow as Clinical Teacher (FACT) Curriculum for Teaching During Consultation: Effect on Subspecialty Fellow Teaching Skills

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ABSTRACT

Background Subspecialty consultation in inpatient care is increasing. Teaching by subspecialty fellows in a consultation setting may be an important source of work-based learning for students and residents. However, teaching and evaluation of learners in this context may be challenging due to personal and systems-based barriers.

Objective We developed and evaluated a framework designed to overcome barriers to teaching and to improve fellow teaching skills during inpatient consultation.

Methods The PARTNER (**P**artner with resident, **A**ssess the learner, **R**einforce positives, **T**eaching objectives, **N**ew knowledge, **E**xecute recommendations, **R**eview) framework was delivered to rheumatology and pulmonary and critical care medicine fellows at 3 academic medical centers as part of a 2-session Fellow as Clinical Teacher (FACT) curriculum. Fellows' teaching skills were evaluated using an objective structured teaching exercise (OSTE) pre- and postcurriculum, and at the end of the academic year. Self-assessment surveys were used to evaluate fellows' self-perception of teaching skills.

Results Twelve of 16 eligible fellows (75%) participated in the program and completed 73 OSTE cases. Teaching skills measured by OSTEs and self-assessment surveys improved after administration of the FACT curriculum. There was no significant skill decay at the end-of-year evaluation. The curriculum was rated highly, and 73% (8 of 11) of fellows stated they would teach more frequently as a result of the intervention.

Conclusions The FACT curriculum was practical and feasible, and significantly improved fellows' teaching skills teaching during inpatient consultation.

Introduction

Achieving an appropriate balance between service and education is a major challenge in residency education.[1] Because the role of consultation in inpatient care is increasing,[2,3] expanding work-based learning opportunities in this setting may be an important mechanism for maximizing resident education in the inpatient setting.[4] In academic medical centers, consultation-related communication generally occurs between trainees. Therefore, addressing the effectiveness of resident-fellow teaching interactions is an important step in improving resident work-based learning.[5] Teaching during consultation also may have a broader impact on patient care through increased collaboration and relationship building.[6,7]

Centered on a consult question, the resident-fellow interaction creates a unique learning opportunity that engages many adult learning principles.[8] However, fellows and residents face challenges to effective teaching and learning in the hospital setting, including time constraints, dissimilar team schedules and priorities, lack of a personal relationship, and different expectations for teaching.[4,9,10] We previously conducted a pilot study of a curriculum focused on improving fellows' teaching skills.[11] Here we describe a framework for improving fellows' teaching during inpatient consultation.

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Editor's Note: The online version of this article contains the objective structured teaching exercise (OSTE) scoring instrument, self-assessment surveys, and OSTE scripts.

Methods

PARTNER Framework

The PARTNER (**P**artner with resident, **A**ssess the learner, **R**einforce positives, **T**eaching objectives, **N**ew knowledge, **E**xecute recommendations, **R**eview) framework for teaching during consultation was developed by the investigators with input from content experts (TABLE 1). The framework combines elements from existing teaching models,[12,13] adjusted to the challenges facing the resident-fellow interaction.[4,10,11,14]

Fellow as Clinical Teacher Curriculum

The PARTNER framework was included in the Fellow as Clinical Teacher (FACT) curriculum, which consists of two 60-minute sessions. The first focuses on identifying and overcoming barriers to teaching residents in the inpatient consult setting, with suggestions elicited from participants and supplemented by findings from the literature.[4,14,15] The second session is devoted to skills relevant to teaching during consultation. Utilizing video examples, a discussion format, and role play, fellows were introduced to adult learning principles and the PARTNER framework.[8]

What is known and gap
Teaching by fellows in the context of requested consultation could be a source of work-based learning for residents.

What is new
Evaluation of the impact of a 2-session Fellow as Clinical Teacher (FACT) curriculum using an objective structured teaching exercise.

Limitations
Small sample; assessment limited to teaching exercise, not on impact of actual clinical teaching.

Bottom line
The FACT curriculum was practical and feasible, and significantly improved fellows' teaching skills.

Setting and Participants

The FACT curriculum was administered to first- and second-year fellows in Massachusetts General Hospital (MGH) and Brigham and Women's Hospital rheumatology fellowship programs and first-year fellows in the MGH/Beth Israel Deaconess Medical Center pulmonary and critical care medicine program. Sessions were administered between August and October 2014, separated by 2 to 6 weeks. All fellows were invited to participate in the study.

Outcome Measures and Procedures

The primary outcome measure was fellows' performance on an objective structured teaching exercise (OSTE),[16] a simulated encounter in which a teacher interacts with a standardized learner acting in a scripted role. Three investigators acted in the role of the standardized learner (E.M.M., K.D., J.I.M.). Standardized learners had no supervisory responsibility for participants. Fellows were given a scenario describing a consultation they were asked to perform by an intern on the primary medical team, and were instructed to deliver their recommendations and engage with the intern in a teaching interaction lasting up to 7 minutes (scenarios are available as online supplemental material). Fellows received the clinical topic 1 day before the OSTE to ensure medical knowledge was not a barrier to effective teaching. The OSTE scripts were composed by the authors, pilot tested with fellows not participating in the study, and revised from their input.

Fellows completed OSTEs prior to participating in the FACT curriculum, 2 to 6 weeks after completion of the curriculum, and at the end of the academic year. Precurriculum and postcurriculum OSTEs consisted of 3 stations completed in the same order, with the same clinical case, but using a different standardized learner: (1) an intern who admitted the patient and had good medical knowledge; (2) an intern who did not admit the patient (cross-covering intern), but with excellent medical knowledge; and (3) an intern who admitted the patient and had poor medical knowledge. We varied the standardized learner rather than the teaching format or clinical case, because we wanted to assess fellows' ability to teach in the setting where learner assessment and tailoring teaching to the learner were critical to an effective interaction. We limited the end-of-year OSTE to a single station (an intern who admitted the patient and had good medical knowledge), because interim analysis demonstrated scores on the 3 OSTE stations were highly correlated. The clinical scenarios differed for the 3 OSTE administrations to minimize testing effect of prior OSTEs on performance. Fellows received feedback after completing the postcurriculum OSTE, but not prior to that, to limit the effect of feedback on future performance.

OSTEs were video recorded and independently rated by 3 investigators. The standardized learner and an observer rated each OSTE in real time. A reviewer blinded to the timing of the OSTEs rated them using the video recordings. The rating instrument was adapted from a previous OSTE scale with some evidence of validity (provided as online supplemental material).[16] All investigators underwent two 90-minute rater training sessions. Interrater reliability between pairs of raters (reviewer 1 versus reviewer 2) was moderate to high as measured by the Spearman correlation coefficient (0.74, $P < .001$; for blinded reviewer versus reviewer 1 [0.46, $P < .001$]; and blinded reviewer versus reviewer 2 [0.38, $P < .001$]).

Secondary outcomes included fellows' self-assessment of teaching skills and attitudes toward teaching measured by precurriculum, postcurriculum, and end-of-year surveys, and satisfaction with the curriculum (provided as online supplemental material). Surveys were adapted from a previously published instrument,[17] and were previously utilized in the pilot study of the curriculum.[11]

The study was approved by the Partners Institutional Review Board.

TABLE 1
The PARTNER Framework

Action	Description/Example	Rationale
Partner with resident	Create expectations for the encounter (eg, "We saw Mr. A and have our recommendations, but first I wanted to discuss the case with you and do some teaching. Do you have 5 minutes to talk?")	Creating a learning contract is an important component of every educational encounter. Within consultative medicine, it is particularly significant, as learner expectations for the encounter (teaching versus receiving recommendations) and time available for the encounter may vary among learners. Therefore, stating intentions and determining the amount of time that the interaction will take is a central first step.
Assess the learner	Determine what the learner knows about the patient and the disease (eg, "What does your team think is going on?" "What were the factors that led you to that conclusion?")	Learner assessment is a critical component of effective teaching. Given the limited time available for teaching during consultation, resident work schedules, and the scope of the consult question, it is critical to determine how well the learner knows the patient (eg, did they admit them?) and what the learner knows about the condition in question in order to determine objectives for teaching.
Reinforce positives	Reinforce the aspects of learners' assessments that are correct	The consult interaction can be hindered by negative perceptions of fellows by the learners and the discomfort that can be caused asking learners questions in this setting. Positive feedback promotes the setting of a positive tone for the interaction that is critical to its success.
Teaching objectives	Determine teaching objectives for the encounter	Given the limited amount of time available for teaching during consultation, determining realistic teaching objectives for the available time is an important step.
New knowledge	Deliver feedback and teaching based on the determined objectives	Aspects of successful teaching and feedback during consultation include the following: ▪ Teaching points are brief ▪ Teaching focuses on how to approach diagnosis or treatment rather than data from the literature ▪ Addresses learner's knowledge or reasoning gaps ▪ Focuses on general concepts when possible ▪ Gives the learner tools for critical reassessment of the patient ▪ Sets up future teaching interactions
Execute recommendations	Review specific recommendations	While recommendations may have been covered earlier in the interaction, reviewing them, using closed-loop communication, is important for patient care and safety.
Review	Allow time for questions and invite further collaboration	Effective teaching often leads to additional learner questions. It is important to allocate time for these as well as clarification of consult recommendations and planning for future collaboration.

Statistical Analysis

OSTE scores and survey responses were linked to individual subjects and compared using matched pairs analysis with the Wilcoxon signed rank test and the Student's *t* test where appropriate. The mean score of all 3 raters was used in the primary outcome analysis. Interrater reliability was measured using the Spearman correlation coefficient.

Results

OSTE Performance

Twelve of 16 eligible fellows (75%) participated in the study (8 first- and 4 second-year fellows), and completed a total of 73 cases (FIGURE). All 12 fellows completed the precurriculum OSTE, and either the postcurriculum OSTE or the end-of-year OSTE. Fellows' OSTE performance improved after participating in the FACT

TABLE 2
Fellow Performance on the Objective Structured Teaching Exercise

Item[a]	Pre Curriculum	Post Curriculum	End of Year	*P* Value (Pre Versus Post)	*P* Value (Post Versus End)
Oriented learner to expectations	3.01	3.76	3.90	.001	.87
Expressed respect for learner	4.60	4.95	5.00	< .001	.35
Evaluated learner's knowledge of factual medical information	3.35	4.10	4.46	.001	.18
Evaluated learner's ability to analyze or synthesize knowledge	3.31	4.05	4.27	.002	.84
Determined effective objectives for discussion	3.79	4.29	4.84	< .001	.012
Presented well-organized material	3.94	4.66	4.77	< .001	.15
Effectively managed time during session	3.90	4.53	4.48	< .001	.38
Provided positive feedback	3.97	4.72	4.88	< .001	.05
Provided corrective feedback	3.64	4.68	4.50	< .001	.14
Relayed recommendations and closed the loop	3.88	4.52	4.67	< .001	.25
Overall teaching effectiveness	3.45	4.33	4.29	< .001	.73

[a] Rating scale: 1 (did not demonstrate any aspects of item) to 5 (demonstrated all aspects of item effectively).

curriculum (TABLE 2). Most significant gains were noted in assessing residents' learning needs and giving feedback to learners. End-of-year OSTE scores were similar to postcurriculum performance, suggesting that there was no significant skill decay. OSTE scores for second-year fellows were higher at baseline for 9 of 11 items, compared to first-year fellows, but were not significantly different after completion of the curriculum or at the end of the year for most measures. The exceptions were "evaluating synthesis" ($P = .018$), "managing time" ($P = .035$), and "relaying recommendation" ($P = .024$), which were higher for second-year fellows at the end of the year.

Self-Assessment Survey

Following completion of the FACT curriculum, fellows reported more confidence in their teaching skills during consultation on 4 of 5 survey items (TABLE 3). There was no decay in teaching skills confidence at the end of the year. Fellows rated the curriculum highly (80% [8 of 10] as *very good* or *excellent* on a 5-point Likert scale), and 73% (8 of 11) stated that they would teach more frequently during consultation after participating in the FACT curriculum.

Discussion

Our study demonstrated that the FACT curriculum, utilizing the PARTNER framework, improved fellows' teaching skills in the setting of inpatient consultation as evaluated by OSTEs. In addition, the curriculum was highly rated by participants, and fellows reported that they would be more likely to teach following this intervention.

Our intervention differs from previously described "fellow as teacher" curricula[18–22] because it focuses

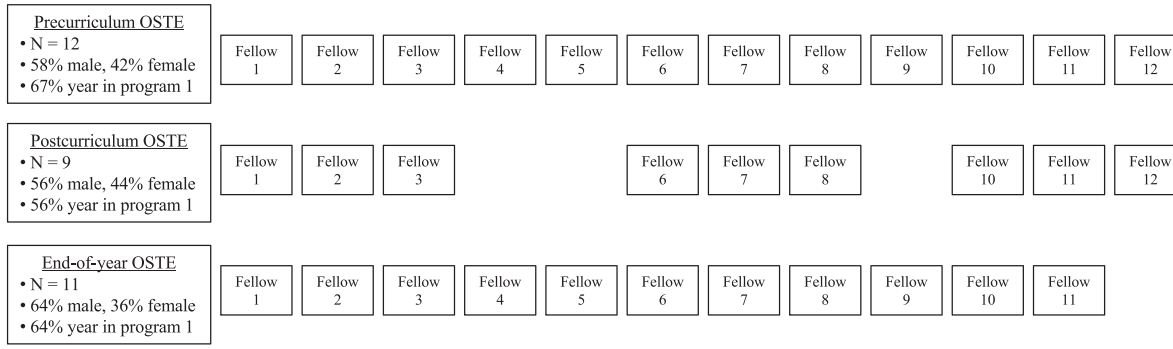

FIGURE
Fellow Objective Structured Teaching Exercise (OSTE) Participation

TABLE 3
Fellow Self-Assessment of Teaching Skills

Item[a]	Pre Curriculum	Post Curriculum	End of Year	*P* Value (Pre Versus Post)	*P* Value (Post Versus End)
Confidence teaching	3.00	3.90	3.60	.001	.19
Ability to assess the learner	4.00	4.40	4.10	.10	.19
Ability to determine teaching objectives	3.80	4.50	4.20	.001	.08
Ability to teach within time constraints	3.80	4.50	4.00	.001	.18
Ability to give feedback	3.40	4.20	4.10	.011	.68

[a] Rating scale (as it relates to ability items): 1 (definitely cannot) to 5 (definitely can).

specifically on skills important for teaching during inpatient consultation. Teaching in this setting differs from teaching experiences fellows may have had previously and carries several challenges. The hospital environment can make it difficult for residents and fellows to have in-person interactions; residents and fellows may have inaccurate perceptions of each others' goals and expectations; fellows often do not know the residents, making learner assessment challenging; and these teaching encounters must be conducted efficiently due to time constraints facing trainees on the wards.[4] The FACT curriculum attempts to address these challenges. The first session focuses on overcoming barriers to setting up an in-person teaching interaction, and the second introduces the PARTNER framework, which is a structured approach for creating a learning contract, developing a positive learning environment, facilitating rapid learner assessment, and relaying recommendations in a time-efficient manner.

Improvement in fellows' skills, confidence, their likelihood of teaching, and the high ratings of the curriculum suggest that the FACT curriculum and the PARTNER framework may be effective. The greatest gains in OSTE scores were seen in aspects of teaching that are particularly challenging during consultations, such as assessing the learner and providing feedback. Fellows' self-assessment also improved, except their ability to assess the learner. One possible explanation for this finding is that learners may overestimate their skills prior to training programs.[23] This study builds on our pilot study by addressing the immediate impact of training, as well as retention of skills. The OSTEs included multiple stations, simulating learners of different ability and engagement, thereby increasing study validity.

The FACT curriculum is adaptable to other settings. It is time efficient, encompassing two 1-hour sessions, which were inserted without replacing other didactics. While we have not conducted faculty training previously, we anticipate that the curriculum could be administered by core faculty with approximately 1 hour of preparation, using a detailed faculty guide. Our materials and documents are transferrable to other specialties with an inpatient component. While some of the challenges addressed in this curriculum may be present in the outpatient setting as well, the resident-fellow interaction in this domain has not been explored and may be different.

Our study has several limitations. The sample size was small. However, the large effect size for this study and for our pilot[11] suggests that the intervention is effective. Utilizing investigators as OSTE raters may have introduced bias. We attempted to minimize bias by using 3 raters, including a blinded rater. The study lacked a control group, raising the possibility that the improvement in teaching skills may have been due to maturation effects. However, there were no significant differences between first- and second-year fellows on postcurriculum OSTEs, and our pilot study did not reveal differences in teaching skills between first- and second-year fellows at any time point. Finally, the study was not designed to assess the impact of the curriculum on resident-fellow interactions in actual inpatient settings or the effect on patient outcomes. These areas should be the focus of future study.

Conclusion

The FACT curriculum improved fellows' teaching skills as measured by OSTEs and was well received by the learners. This focused and time-efficient program is easily integrated into training programs and generalizable to any specialty that provides inpatient consultation.

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