

Procedural Skills Training in the Internal Medicine Residency in Iran: A National Survey of Recent Graduates of Residency Programs

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Abstract

Background: Procedural skills training is an important part of internal medicine residency and knowing which procedures residents are performing and the quality of their training is a necessary step to ensure sufficient training opportunities.

Purpose: To obtain the opinions of recent graduates of residency programs of internal medicine in Iran about the quality of training in procedural skills.

Method: A questionnaire was given by hand to the all 187 general internists who had graduated from 22 universities of medical sciences in 2003. Thirty-three ambulatory and inpatient procedures were included in the questionnaire. For each skill the newly graduated internists were asked to answer questions about: the number of procedure they have done during their residency, level of supervision they received during performing the procedure, level of confidence to performing it independently, quality of training and level of importance for a general internist to do it independently. They also were asked to rate the overall quality of procedural skills training and their overall competency to perform these skills. Finally they were asked to answer open questions regarding: Assessment of their procedural skills competency during residency training, Introducing useful references and materials by residency programs, the most important problems in their training and suggestions for improving the quality of procedural skills training.

Three postal and an email (for those who have email addresses) reminders were sent for nonresponders.

Results: 57/187 (30%) questionnaires were analyzed. More than 50% of respondents said that the quality of teaching procedural skills were not adequate. Meanwhile only 32% of respondents believe that their competencies in performing procedures are well or more. Statistical difference has been observed between male and female regarding their ideas about competencies to performing procedures ($p < 0.001$). Only 36% of respondents recall that their performance on procedures had been evaluated, which nearly all of them in only 1 procedure. Eleven procedures were indicated by 90% or more of the respondents as those should be learned by all the graduates.

Conclusion: Current residency training in internal medicine does not assure the minimum competency of graduates in most of the more important procedural skills. Residency programs must pay more attention to teaching procedural skills to the residents and assessing their competence.

Key words: General Internal Medicine, procedural skills, Iran, residency training

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Introduction

Internal medicine provides medical services to both genders and all ages, frequently work in underserved communities, and deliver care to more people than any other medical specialty. Most patients occasionally require a medical procedure during their regular care and many of them expect their general internist to perform the most common procedures. Patients appreciate continuity and many may resist referral to another physician for reasons of cost and having to encounter an unfamiliar provider. On the other hand many students and residents have exhibited marked interest in learning procedures (1, 2) and many physicians enjoy "using their hands" to perform diagnostic and therapeutic procedures. One study suggests that residency programs emphasizing procedural training have been more sought by resident applicants than those not prioritizing procedures. (2) The procedures have usually resulted in higher physician compensation for a given period of time than cognitive care activities for a similar period of time. (3) Typically a 5:1 payment ratio of procedural: cognitive activities per hour are seen by primary care physicians. Thus, patient expectation, physician interest, and economic reward all serve as incentives for generalist physicians to perform procedures. In addition, in some countries such as United States, recent decisions by the American Board of Internal Medicine mandate certification by residency programs of core procedural competence of their graduating residents. (4) Therefore the issue of procedural skills training for internal medicine residents is receiving increasing attention.

Knowing which procedures residents are performing, the quality of their training and the competency that they feel in performing core procedures is a necessary step to ensure sufficient training opportunities.

This survey of graduating internal medicine residents, as the first of a series of studies relating to procedural skills training of internal medicine residents in Iran, describes their attitudes toward and training experiences in 33 common ambulatory and inpatient procedures in General

Internal Medicine.

Materials & Methods

A questionnaire developed including personal information (age, sex, university of graduation and the mark of final examination) and 33 ambulatory and inpatient procedures all common to the practice of adult primary care. For selecting these procedures we reviewed the literature for list of procedures which should be learned by generalists. Although no formal list of universally endorsed procedures exists, we base the list of procedures on a review of literature and consultation with other physicians. (6) We also reviewed recommendations of American Board of Internal Medicine. (7) We did not intend the list to be comprehensive. Rather, we selected most procedures because of their importance and frequency of performance.

For each skill we asked questions about the number of procedures done by responders during the residency training period, level of supervision they have received, level of confidence to performing it independently, quality of training, and level of importance for a general internist to be able to do it. We also asked them to rate the overall quality of procedural skills training and overall competency to perform these skills in a 5-point Likert scale. Furthermore there were open questions regarding assessment of responders procedural skills competency during residency training, introducing useful references and materials by residency program, the most important problems in their procedural skills training, and any suggestions for improving the quality of training in this field. The initial draft of the questionnaire was given to 10 persons of last year internal medicine residents in 2 rounds as a pilot study and some modifications were made according to their feedback.

The final questionnaire was given by hand to the all 187 general internists who had graduated from 22 Universities of Medical Sciences in Iran in 2003. Two postal and one email (for those who have email addresses) reminders were sent

for the nonresponders. Data were analyzed using the SPSS database and program. Statistical significance was calculated using X^2 Mann-Whitney tests. Level of statistical significance was $P < 0.05$. Also content analysis was performed and recurring themes extracted for open ended questions of the questionnaire.

Results

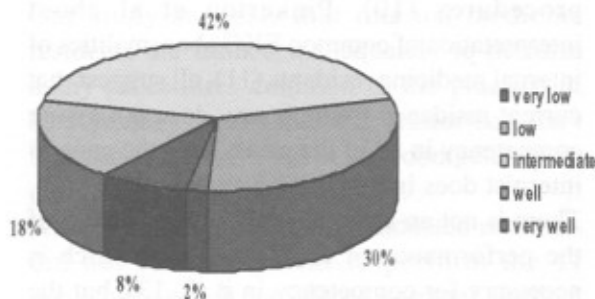
A total of 57 residents completed the questionnaire for a final response rate of 30%. 43 residents were male and 14 female. 43 residents were from large university and 14 from small university. The distinction between large and small universities was based on the classification of the Universities of Medical sciences by the Ministry of Health & Medical Education. No significant difference was found in the response rates concerning gender or university of residency training and mark in final graduating exam. (Table 1)

Table 1. Comparison of respondents and non respondents

	No.	Female	Large Univ	Exam>105
respondents	57	24.6%	43(75.44%)	47.36%
Non respondents	112	15.2%	82(73.2%)	55.4%

More than 50% of respondents said that the quality of teaching procedural skills were not adequate (Figure 1).

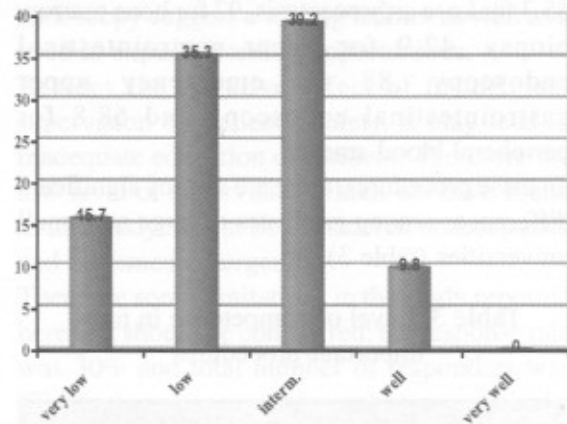
Figure 1: overall competency level



Only 32% of respondents believe that their overall competencies in performing procedures

are well or more (Figure 2).

Figure 2: overall quality of procedural training



Statistical difference has been observed between male and female regarding their ideas about competencies to performing procedures ($p < 0.001$). 11 procedures were indicated by 90% or more of the respondents as those should be learned by all the graduates (Table 2).

Table 2. Level of competence in most important procedures

procedure	Level of importance*	More than 10 times
Lumbar puncture	100%	58.8%
Endotracheal Intubation	98.2%	76.8%
Thoracentesis	98.1%	92.9%
Paracentesis	98.1%	90.9%
Bone marrow aspiration	98.1%	83.6%
DC cardioversion	98%	75.5%
Knee arthrocentesis	96.3%	40%
Bone marrow biopsy	96.2%	81.5%
UGI endoscopy	96.2%	54.4%
Emergency UGI endoscopy	95.9%	1.9%
Peripheral blood smear	94.4%	74.5%

Level of competency for these 11 procedures were (in percent): 69.6 for lumbar puncture, 59.6

for endotracheal intubation, 89.6 for thoracentesis, 90 for paracentesis, 94.2 for bone marrow aspiration, 80 for DC cardioversion, 65.3 for knee arthrocentesis, 92 for bone marrow biopsy, 42.9 for upper gastrointestinal endoscopy, 88 for emergency upper gastrointestinal endoscopy and 68.8 for peripheral blood smear.

In these procedures, there are not any significant differences among graduates of large and small universities (table 3).

Table 3. Level of competence in most important procedures

procedure	Level of competency (%)		
	Total	Large univ.	Small univ.
Lumbar puncture	69.6	67.6	75.0
Endotracheal Intubation	59.6	51.3	59.6
Thoracentesis	89.6	85.7	100
Paracentesis	90.0	89.1	92.3
Bone marrow aspiration	94.2	92.0	100
DC cardioversion	80.0	75.6	92.3
Knee arthrocentesis	65.3	58.0	84.6
Bone marrow biopsy	92.0	92.3	90.6
UGI endoscopy	42.9	40.0	50.0
Emergency UGI endoscopy	8.8	8.3	10.0
PBS	68.6	68.4	69.3

In 2 procedures (liver biopsy (p value=0.023) and temporary hemodialysis catheter placement (p value=0.046)), there are significant differences between graduates of large and small universities.

Only in two procedures, colonoscopy and cardiac exercise test, more than 90% of respondents perceive that they have received at least some degree of supervision.

Competencies to performing upper GI endoscopy were significantly more with supervision of faculties.

There are significant differences in quality of education in rectosigmoidoscopy and knee arthrocentesis in the absence of subspecialty residents.

Only 36% of respondents recall that their performance on procedures had been evaluated, which nearly all of them in only 1 procedure.

82% and 73% of respondents noted that educational materials (including film or CD) and references have not been provided by their residency programs, respectively.

The most frequent problems in procedural skills training which responders mentioned were lack of motivation for teaching procedural skills by faculty members (50%) and dilution of training by presence of subspecialty residents (14%).

The most frequent suggestions for improving the quality of procedural skills training were including the procedural skills training in residency program standards (46%) and evaluation of procedural skills competencies as a certification requirement (28%).

Discussion

Based on current literature it seems that in many educational health centers teaching procedural skills are facing major challenges. For example the results of Wigton and his colleagues about the procedural skills training of internal medicine (4, 8, 9), Wickstrom and his colleagues about the confidence of graduating internal medicine residents to perform ambulatory procedures (10), Pinkerton et al about interpretation of common EKG abnormalities of internal medicine residents (11), all suggest that current residency training may does not assure competency in all of the procedures the general internist does in practice.

There is not an agreement about the number of the performance of each procedure which is necessary for competency in it (9, 13), but the obvious difference between the responders (for example from 0 to more than 100 times for upper gastrointestinal endoscopy) may indicate that

is not a coordinated program in teaching procedural skills. Responders have pointed out this issue in their response to our open questions. In large universities the presence of subspecialty fellowships as another group of trainees in procedural skills may have an effect on teaching the residents. On the other hand the number of performed procedures may be different in small and large universities. In this study only in two procedures {liver biopsy (p value=0.023) and temporary hemodialysis catheter placement (p value=0.046)}, there were significant difference between graduates of small and large universities but in answer to open questions it is reported that presence of subspecialty fellowships limit training of residents in procedural skills.

Although there are significant differences in quality of education in only two of 33 procedures in the absence of subspecialty residents-rectosigmoidoscopy and knee arthrocentesis-, respondents mentioned the possibility of negative effect of presence of subspecialty residents on their education in procedural skills when they have been asked about this issue as an open question.

There are some studies that show the women perform fewer procedures in their postgraduating practice (14, 15). We found a gender difference in level of competency for performing procedures. It may be due to female's underestimation of their capabilities or true fewer competencies. It is possible that training, practice, professional culture, and socialization factors may be operating to produce gender differences in the performance of procedures.

Our study suggests that internal medicine residents are trained inadequately to perform many procedures common to the practice of adult primary care medicine or at least they don't feel that they have sufficient competency in performing them independently.

A large number of recently graduated residents did not feel competent to perform the 11 procedures which considered essential. Further, many of them indicated that their performance of these procedures had not been evaluated during their training.

High importance scores along with low confidence scores for performing some of these procedures such as upper gastrointestinal endoscopy suggest a willing learner as well as a need to expand learning opportunities.

Besides the negative effect of insufficient supervision on patient's safety, it may lead to inadequate education of resident. Therefore the low level of supervision which we have found in this study should be considered unacceptable and be remedied urgently.

There are some limitations in the study reported here that should be considered; the response rate was 30% and total number of responders was 57. The low response rate could have masked a significant difference where one did exist.

Interpretation of our study must be done cautiously, because the conclusions are based on self report from the survey and not on actual observations. There was no objective confirmation of the resident's self reporting on competency. Competency could have been either underestimated or overestimated due to variation in self-confidence and in each resident's standards of competence. It may be the reason for the observed difference between male and female residents about their overall competency level in performing procedures. Also the residents' recall of performing the procedures and especially the number of performing them may have been inaccurate; but it seems that internal medicine residents are trained inadequately to perform many procedures or at least current residency training in internal medicine does not assure the minimum competency of graduates in most of the more important procedural skills.

Residency programs must pay more attention to teaching procedural skills to the residents and assessing their competence.

Development of a set of procedural skills necessary for all resident to be acquired during residency training, and incorporating these procedures in program requirements of internal medicine residency programs and certification prerequisite for all residents for board certification may be very helpful in this regard (16).

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