

Learning Environment and Resident Achievement

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Objective: To evaluate the effect of program training atmosphere on the academic performance among internal medicine residents.

Material and Method: Data of satisfaction survey among internal medicine residents in academic year 2012, conducted by the Royal College of Physicians of Thailand, were retrieved. Association between training environment rating scores in three major aspects (program training structure, faculty nurturance, and support system) and board certifying examination scores, were then assessed.

Results: There were 12 training centers with 535 residents in that academic year. The mean satisfaction score for second-year residents was 77.1 ± 6.1 , and the mean written examination score was 56.4 ± 4.6 , with the modest correlation ($r = 0.515$, $p = 0.087$). For the third-year residents, the mean satisfaction score was 78.5 ± 6.5 and the mean clinical examination score was 71.1 ± 1.6 , with no correlation ($r = -0.004$, $p = 0.991$). In the subgroup analysis in second-year residents, program training structure had strongest influence ($r = 0.569$, $p = 0.053$), as compared to faculty nurturance ($r = 0.425$, $p = 0.169$), and support system ($r = 0.492$, $p = 0.104$).

Conclusion: Perception of positive training environment, especially the program training structure, may influence the performance of internal medicine residents in term of knowledge achievement as determined by written examination score. However, it has no effect in terms of clinical skill accomplishments, as determined by clinical examination scores.

Keywords: Internal medicine, Resident performance, Training environment

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Internal medicine residency training in Thailand has been formally established in 1969. After the foundation of The Royal College of Physicians of Thailand (RCPT) 15 years later, the making a competent internist in terms of medical knowledge, clinical performance, and professional manners, is continuing to evolve. During the past decade, the process of accreditation, re-accreditation, and quality control for internal medicine training programs in Thailand were gradually standardized and strengthened. Currently, there are 13 main training programs with nearly 40 training centers where around 300 internists are graduated annually.

The concept of climate in higher education among medical schools has been raised with concern for nearly half a century⁽¹⁾. Perception of environment in terms of style of life, atmosphere with encouragement, emphasizing, and rewarding, which visibly expressed can easily be felt, and may contribute to the medical student's behavior and academic achievement^(2,3).

Only a few studies had mentioned how perception of learning environment influences the outcome of residency training, higher level of health professional education which were committed to becoming a specific identity. An interaction between individual resident state such as learning style and the educational structure of program training, determines the development of competent physicians. Both educational and organizational climates in the training center have an equal role in producing a high quality professional legacy.

The present study aims to evaluate the relationship between environment of program training and academic performance of internal medicine residents, as determined by the results of board certifying examination.

Material and Method

The RCPT board certifying examination consists of two parts. The written examination aimed at assessing the competence in medical knowledge and held at the end of second-year training. Competence in clinical performance is assessed by clinical examination, which is held after finishing the third year.

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Satisfaction survey among internal medicine residents in academic year 2012, was conducted by the RCPT using a 35-item, self-administrated questionnaire, modified from the Postgraduate Hospital Educational Environment Measure (PHEEM) for accommodation with Thai culture and the system of residency training in Thailand⁽⁴⁾. The first component of questionnaire concerns the program training structure, such as working atmosphere, evaluation process, and academic activity, etc. The second component is about faculty nurturance, such as attitude, supervision, and availability, etc. The last component addresses support systems, such as information technology, working and recreation area, and advisors, etc. The survey was administered 6 months before the board certifying examination.

Association between training environment rating scores of satisfaction (as a whole and also in 3 major aspects) and board certifying examination scores, were then examined using Pearson's or Spearman's rank correlation where appropriate. The

Table 1. Mean with standard deviation of satisfaction and examination scores from 12 training centers as percentage

Attribute	Scores
Second-year residents	
Written examination	56.4±4.6
Overall satisfaction	77.1±6.1
Program training structure satisfaction	76.1±5.9
Faculty nurturance satisfaction	81.6±6.1
Support system satisfaction	73.8±6.6
Third-year residents	
Clinical examination	71.1±1.1
Overall satisfaction	78.5±6.5
Program training structure satisfaction	76.0±7.0
Faculty nurturance satisfaction	82.4±6.4
Support system satisfaction	77.0±6.3

Table 2. Intraclass correlation (ICC) of satisfaction scores and examination scores from each training center

Correlation	r	p-value
Written examination and overall satisfaction	0.515	0.087
Written examination and program training structure satisfaction	0.569	0.053
Written examination and faculty nurturance satisfaction	0.425	0.169
Written examination and support system satisfaction	0.492	0.104
Clinical examination and overall satisfaction	-0.004	0.991
Clinical examination and program training structure satisfaction	0.012	0.971
Clinical examination and faculty nurturance satisfaction	0.001	0.997
Clinical examination and support system satisfaction	0.025	0.939

r value of 0.4-0.6 is considered modest and any value above 0.6 is considered good correlation. A p-value < 0.05 was considered statistical significant. All statistical analyses were carried out by statistical software SPSS version 16.0 (SPSS Inc., Chicago, USA).

Results

There were 12 training centers with 535 residents in the 2012 academic year. The characteristics of scores from each part are shown in Table 1; the association determination of scores in each training center is shown in Table 2.

Discussion

According to situational theory, knowledge, thinking, and learning, are situated in experience that includes physical environment where thinking and learning occur⁽⁵⁾. Interaction between learners, teachers, patients, and environment influence resident performance and should be emphasized based on direct perception and action. Learning environment provides functional value, every effort to let it be more affordable and efficient to the students should be encouraged. Effective nurturance of an internist as a professional inheritance, must adhere to the principles of cognitive apprenticeship, communities of practice, and legitimate peripheral participation⁽⁶⁾.

The relationship between training environment and knowledge acquisition among physicians entering postgraduate training, was the main interest in the present study. Significant association between the three major aspects of training environment and the academic performance, as assessed by written part of board certifying examination, was clearly established. However, clinical skills acquisition, as evaluated by clinical examination, was not shown to receive the same influence and left room for an explanation. At

present, program setting and infrastructure, educator values, teaching perspectives, and methods for content delivery, are major components for consideration in an accreditation/re-accreditation process for program training by the RCPT.

Some may argue that, higher capability students tend to rate the learning environment better than those in a lower group. Wayne et al have demonstrated the relationship between medical student perception of learning environment and academic performance, was independent of their previous academic ability⁽³⁾. However, the influence of background undergraduate achievement was not taken into account in the present study.

There was ample evidence supporting the validity with high reliability of the PHEEM in different postgraduate settings⁽⁷⁾. Some authors have applied another favorite undergraduate instrument, the Dundee Ready Educational Environment measure (DREEM), for measuring resident perception⁽⁸⁾. However, the concept of independence from the teacher, in an appropriate time and place for postgraduate training, could create a different culture of learning between residents and medical students.

In a recent multicenter study in Japan, hospital educational environment has been shown to associate significantly with knowledge performance in general medicine of postgraduate year 2 (PGY-2) physicians, although those PGY-2 were not in a full environment of residency training⁽⁹⁾. The result of this study do support the idea that learning and teaching atmosphere in the hospital can motivate and engage residents into clinical training and process preparedness for practice in the future.

In the USA, where internal medicine training programs were under strict quality assurance, no association between residents' well-being and achievement as assessed by formative medical knowledge and clinical performance assessments was noted⁽¹⁰⁾. Nevertheless, in countries such as India, the high burden of workload, insufficient facilities, and more extra-duty work, have shown to cause work-related stress in residents⁽¹¹⁾. With an environment in between USA and India as in Thailand, effect of structure and support systems may contribute to resident performance, which is the result of the present study.

The personal characteristics of residents might have a recognizable relationship with clinical performance⁽¹²⁾. In the national survey for quality of life among internal medicine residents in the USA,

emotional exhaustion and educational debt have shown to associate with lower, medical, knowledge achievement⁽¹³⁾. High prevalence of burnout symptoms and depersonalization found in the USA study, raises the vital question of how much this influences the clinical performance of the residents, both during and after the training.

Although faculty nurturance was the weakest factor to determine success, it rated higher scores as compared to program training structure and support systems. This may result from an appreciation of seniority and good teacher-student relationship in Thai educational culture. Working under direct observation, appropriate supervision, and timely and effectively feedback, are the backbones of competency-based resident training. Brief educational intervention for improving faculty feedback has been shown their feasibility⁽¹⁴⁾ and could be compensated for overcoming an excuse of working under time pressure which claimed by clinician faculty.

Potential limitations of the present study should be mentioned. First, the time of the satisfaction survey and the board examination were 6 months apart, thus adjustment of training environment in some training programs might happen after receiving the survey results. Second, the demographic data were not recorded, so other factors such as gender, academic background, and nature of future work, were not included in the analysis. Lastly, clinical performance as evaluated by final clinical examination may not reflect the whole picture as it develops routinely in the workplace.

High workload, shortage of downtime, working and training hierarchy, and tremendous quality improvement activities, are common barriers for effective learning among our current residents. Understanding and paying attention to the residency culture is a prerequisite for creating a meaningful learning environment to produce competent graduates⁽¹⁵⁾. The task of making future medical specialists develop in close alignment with contemporary healthcare systems is not only the central quest of our professional society, but also for the public, the ultimate target that we all serve.

Conclusion

Knowledge acquisition among internal medicine residents as determined by board certifying written examination scores was associated with a perception of positive training environment, especially the satisfaction for program training structure.

What is already known on this topic?

In undergraduate medical education, interaction between learners, teachers, and educational environment influences the performance of medical students.

What this study adds?

The perception and experience of a positive training environment may influence the knowledge achievement of internal medicine residents.

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Potential conflict of interest

None.

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ความสัมพันธ์ระหว่างสภาพแวดล้อมการฝึกอบรมกับผลสัมฤทธิ์ทางการศึกษาของแพทย์ประจำบ้าน

ยิ่งยง ชินธรรมมิตร, นิธิพัฒน์ เจียรกุล

วัตถุประสงค์: เพื่อประเมินผลของสภาพแวดล้อมของโครงการฝึกอบรมต่อการบรรลุผลสัมฤทธิ์ทางการศึกษาของแพทย์ประจำบ้านอายุรศาสตร์

วัสดุและวิธีการ: รวบรวมข้อมูลการสำรวจความพึงพอใจต่อสถาบันฝึกอบรมของแพทย์ประจำบ้านที่ดำเนินการโดยราชวิทยาลัยอายุรแพทย์แห่งประเทศไทย ในปีการศึกษา พ.ศ. 2555 ศึกษาความสัมพันธ์กับคะแนนสอบเพื่อวุฒิบัตร โดยพิจารณาจาก 3 องค์ประกอบ คือ โครงสร้างการฝึกอบรม การเอาใจใส่จากอาจารย์ และระบบสนับสนุน

ผลการศึกษา: ในปีการศึกษานั้นมีแพทย์ประจำบ้านทั้งหมด 535 คน จากสถาบันฝึกอบรม 12 แห่ง คะแนนความพึงพอใจเฉลี่ยของแพทย์ประจำบ้านปีที่ 2 คือ 77.1 ± 6.1 คะแนนสอบภาคทฤษฎีเฉลี่ย 56.4 ± 4.6 โดยมีความสัมพันธ์กันปานกลาง ($r = 0.515$, $p = 0.087$) สำหรับแพทย์ประจำบ้านปีที่ 3 มีค่าคะแนนความพึงพอใจเฉลี่ย 78.5 ± 6.5 และมีคะแนนสอบภาคปฏิบัติเฉลี่ย 71.1 ± 1.6 ซึ่งไม่มีความสัมพันธ์กัน ($r = -0.004$, $p = 0.991$) เมื่อพิจารณาแยกในแต่ละองค์ประกอบสำหรับแพทย์ประจำบ้านปีที่ 2 พบว่า ปัจจัยด้านโครงสร้างการฝึกอบรมมีอิทธิพลต่อคะแนนสอบมากที่สุด ($r = 0.569$, $p = 0.053$) เมื่อเปรียบเทียบกับ การเอาใจใส่จากอาจารย์ ($r = 0.425$, $p = 0.169$) และระบบสนับสนุน ($r = 0.492$, $p = 0.104$)

สรุป: ทัศนคติเชิงบวกต่อสภาพแวดล้อมของสถาบันฝึกอบรมแพทย์ประจำบ้านอายุรศาสตร์โดยเฉพาะโครงสร้างการฝึกอบรมและปัจจัยเกื้อหนุน ส่งผลให้เกิดผลสัมฤทธิ์ทางการศึกษาที่ดีในความรู้ด้านทฤษฎี แต่ไม่มีผลต่อความรู้ความสามารถภาคปฏิบัติ
