Effect of Ambulatory Medicine Tutorial on Clinical Performance of 5th year Medical Students

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Background and Objective: *The present study provided a group learning activity called "Ambulatory Medicine Tutorial-AMT" for 5th year medical students in order to facilitatelearning experience at ambulatory setting and to improve medical students' clinical performance. This research aimed specifically to study the effect of AMT.*

Material and Method: *Two groups of twenty 5th-year medical students were enrolled during their ambulatory medicine blocks. Each medical student was assigned to have 8 ambulatory sessions. AMT was assigned to one group while the other group only used conventional learning activity. At the end of the present study, total internal medicine scores, patient satisfaction surveys, and data on average time spent on each clinical encounter were collected and compared.*

Results: *The AMT group received ahigher total internal medicine score as compared to the conventional group (76.2 $\pm$ 3.6 vs. 72.9 $\pm$ 2.8, p = 0.003). The AMT group could reduce average time spent on each clinical encounter within their first-6 ambulatory sessions while the conventional group could acquire the same skill later in their last 2 ambulatory sessions. There was no significant difference found on comparing patient satisfaction scores between the 2 groups.*

Conclusion: *AMT helped improving medical students' outcomes as shown from higher total internal medicine score as well as quicker improvement during real-life clinical encounters, AMT could be a good alternative learning activity for medical students at ambulatory setting.*

Keywords: *Ambulatory Medicine Tutorial (AMT), Clinical performance, Medical students*

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Clinical education has been provided mainly in hospital and not until recently has ambulatory learning been emphasized; its distinctive context is provisionally perfect for helping medical students to develop communication skills, proper attitudes to patients as well as ambulatory medicine knowledge from "fresh"/undifferentiated patients[1-3]. In general, ambulatory teaching remains in process as there is still limited understanding of what constitutes effective education in ambulatory care[4-6]. Consequently, outpatient teaching is usually under-utilised and not yet well-received in several countries despite of its enriched learning experience[6].

In Thailand, medical students spend 6 years in medical school in order to graduate as MDs and become eligible for the medical license examination. The curriculum consists of 3 pre-clinical years followed by 3 clinical years. The Department of Internal Medicine, Faculty of Medicine Siriraj Hospital provided almost the sole in-patient clinical experience for 4th-year medical students. Not until they became 5th-year medical students did they get a 4-week ambulatory medicine block (AMB) as part of the 8-week internal medicine block.

AMB was designed to provide medical students out-patient clinical experience. Each medical students assigned to have 8 fixed ambulatory sessions and responsible for 2 patients from 8.30-12.00 am in each session. As it is an early year of their clinical experience, medical students usually face with several challenges. Most of them spent lengthy time on taking history and on performing physical examination as their clinical reasoning skills still not well developed. Although closed supervision from medical instructors (1:3 medical students) was always available, the conventional learning activity in AMB largely depended on individual medical instructors.

Similar to many countries, our AMB is faced

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with the common limitations: "lack of time, staff and space". Moreover, students identified passivity and being in a purely observational role in the lecture class that aims to build up ambulatory medicine knowledge prior to the real out-patient encounter[7]. It is clear that students learn better and more when they are involved actively in learning than when they are passive recipients of instruction[8]. It has also been found that the components of a prosperous learning environment are stimulation by classmates, a knowledgeable and creative faculty and a large amount of personal contact between students and instructors[9-14].

Accordingly, the authors decided to follow the Learner Centered Education practice and shift the instructor's role from lecturer to facilitator in order to engage students in activities that produce deeper under-standing of course content through skill development. In the present study, the authors proposed a group learning activity called "Ambulatory Medicine Tutorial-AMT" for 5th year medical students in order to facilitate the group learning experience within an ambulatory setting as an added-on curriculum. This research aimed to study the effect of AMT by comparing the outcomes of medical students at the end of the internal medicine block: the group using AMT vs. the group using conventional learning activity.

Material and Method

Two groups of twenty 5th-year medical students were enrolled as per their AMBs from December 5, 2011 to January 29, 2011. Each medical student was assigned to have 8 ambulatory sessions and to be responsible for 2 patients in each session. While the former group (December 5-January 1) only used conventional learning activity, AMT was added on for the later group (January 2-29).

AMT was our research intervention for this controlled trial. The authors assigned each medical student in the later group to lead a 6-minute discussion on common ambulatory problems. The discussion topics and a suggested short-note readings were also provided by the researcher. The activity was scheduled at the beginning of AMB, the first 2 ambulatory sessions, under Ambulatory Medicine staff super-vision.

In each clinical encounter, medical students and their patients received separated satisfaction questionnaires. The patients who refused to complete the questionnaire were excluded. Time spending on each encounter was recorded by research assistants. At the end of internal medicine rotation, all 40 medical students were evaluated with the same written examination to which our researcher, as well as all Ambulatory Medicine staff, had no access.

At the end of the study, total internal medicine scores, patient satisfaction surveys, and average time spending on each clinical encounter of both groups were analyzed. This research protocol was approved by Faculty of Medicine Siriraj Hospital IRB (EC No. 033/2554).

Statistical analysis

All data was analysed using the statistical package SPSS (version 12.0; SPSS Inc., Chicago, IL, USA). The comparison of continuous data was used Independent t-test and was presented as mean $\pm$ standard deviation (SD) and percent as appropriate. Demographic data were analyzed using descriptive statistical tests. Chi-squared test and Fisher's exact test were used for comparison of categorical data. P-value of < 0.05 was set as the statistically significant level.

Results

Each 4-week AMB consisted of 20 medical students. Within the 8-week study period there were 48 and 47 independent medical instructors who rotatedly served for AMT group and conventional group, respectively. There were a total of 588 patients who were under medical students' care and who had completed the questionnaire (310 for AMT group and 278 for conventional group).

The characteristics of all clinical encounters of both groups were comparable (Table 1). The means of patient waiting time for conventional group and AMT group were 149 $\pm$ 69 minutes and 157 $\pm$ 69 minutes, respectively (p-value = 0.881). The means of total time of all hospital processes on each patient were 278 $\pm$ 72 minutes for conventional group and 282 $\pm$ 69 minutes for AMT group (p-value = 0.902).

As Siriraj hospital has been well-recognized in Thailand as "hospital of the land", patients from all over the country attempt to assess them selves at the hospital facility. This unique setting forces patients to queue up very early in the morning as shown in Table 2. The authors found one third of enrolled patients arrived before 6 am and another one third arrived between 6-7 am in order to be eligible for morning clinic.

The AMT group could reduce average time spending on each clinical encounter within their first-6 ambulatory sessions while the conventional group could pick up the same skill later in their last 2 ambulatory

Table 1. Characteristic of clinical encounters

Characteristics	Conventional group, n (%)	AMT group, n (%)	p-value
Medical student	20	20	
Medical instructor	47	48	
Patients	278	310	
Diagnoses			
Abdominal pain	56 (20)	68 (22)	
Dyspepsia	36 (13)	37 (12)	
Gastroesophageal reflux disease	8 (3)	19 (6)	
Irritable bowel syndrome	6 (2)	3 (1)	
Nonspecific	6 (2)	9 (3)	
Headache	30 (11)	12 (4)	
Tension headache	22 (8)	9 (3)	
Migraine	8 (3)	3 (1)	
Musculoskeletal pain	22 (8)	28 (9)	
Hepatitis/Cirrhosis/Hepatoma	19 (7)	9 (3)	
Respiratory tract infection	14 (5)	28 (9)	
Thyroid diseases	14 (5)	19 (6)	
Hypertension	4 (5)	28 (9)	
Diabetes mellitus	14 (5)	9 (3)	
Dizziness/vertigo	8 (3)	9 (3)	
Tuberculosis	8 (3)	3 (1)	
Chronic stable angina	6 (2)	9 (3)	
Cardiac arrhythmia	6 (2)	9 (3)	
Urinary tract infection	6 (2)	3 (1)	
Anemia	6 (2)	3 (1)	
Asthma/COPD	3 (1)	9 (3)	
Other diseases	52 (19)	64 (20)	
Waiting time (min)	149 $\pm$ 69 (10, 360)	157 $\pm$ 69 (10, 390)	0.881
Total time (min)	278 $\pm$ 72 (100, 580)	282 $\pm$ 69 (90, 515)	0.902

sessions (Table 3 and Fig. 1).

There was no significant different on comparing patient satisfaction scores of the 2 groups as shown in Table 4. More than 90% of patients of both groups agreed that medical students exhibited overall good clinical performance, including communication skills, physical examination skills, as well as having a good attitude about taking care of them. The percentage of patients who gave 5/5 satisfaction scores were 52% and 53%; 4/5 satisfaction scores were 43% and 43%; 3/5 satisfaction scores were 3% and 3% for AMT and conventional group, respectively (p-value = 0.753).

However, a substantial number of patients felt that medical students still did not pay enough attention to their concerns (25% for AMT and 29% for conventional group, p-value = 0.858); it was "wasting of time" dedicated for medical student practicing clinic (38% for AMT and 34% for conventional group, p-value = 0.289); and patients were worried about being guinea pigs (24% for AMT and 22% for conventional group, p-value = 0.439).

The medical student satisfaction scores of the AMB of both groups were indistinguishable. The percentages of medical students who gave 5/5 satisfaction scores were 66% and 68%; 4/5 satisfaction scores were 31% and 31%; 3/5 satisfaction scores were 3% and 1%, for AMT and conventional group, respectively (p-value = 0.340).

The authors also found the total internal medicine score of AMT group at the end of the present study was significantly higher than the conventional group (76.2 $\pm$ 3.6 vs. 72.9 $\pm$ 2.8, p = 0.003) while the average baseline internal medicine scores of the 2 groups were not different (71.4 $\pm$ 4.4 vs. 70.2 $\pm$ 3.6%, p = 0.362)

Discussion

During clinical training years in medical

Table 2. Hospital arrival time

Arrival Time	Conventional group (n = 278) (%)	AMT group (n = 310) (%)
3.01-4.00 am	3 (1)	2 (1)
4.01-5.00 am	4 (5)	19 (6)
5.01-6.00 am	51 (19)	70 (23)
6.01-7.00 am	86 (31)	101 (33)
7.01-8.00 am	65 (23)	75 (24)
8.01-9.00 am	31 (11)	20 (6)
9.01-10.00 am	2 (1)	0
No data	26 (9)	23 (7)

Table 3. The average time spent on each clinical encounter

Sessions	Conventional group (n = 278) (minutes)	AMT group (n = 310) (minutes)	p-value
1-2	131 ± 37	129 ± 51	0.778
3-4	141 ± 42	118 ± 47	0.004
5-6	148 ± 52	125 ± 58	0.028
7-8	101 ± 53	122 ± 50	0.026

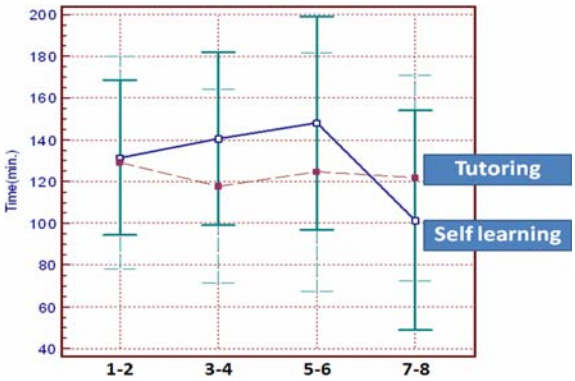

Fig. 1 Average time spent on one patient (8 sessions)

schools, medical students as well as their patients areusually faced with awkward situations at various medical training sites. The ambulatory setting seemed to be a weak point as this medical teaching technique was still in developing process comparing to a well-established in-hospital teaching method.

In the present study, the authors proposed a group learning activity called "Ambulatory Medicine Tutorial-AMT" for 5th year medical students in order to facilitate the ambulatory group learning experience as an added-on curriculum. The hypothesis was that AMT should help in guiding medical students through extensive internal medicine content as they would be responsible for assigned pre-class readings in order to alternately lead a peer-group discussion for their own clinic preparation.

The authors found that although the conventional group could later pick up the skill of the AMB, clinical performance of medical students in AMT group steped up quicker than that for those in the conventional group. Also, AMT group performed better on achieving higher total internal medicine score when compared to the conventional group at the end of the rotation.

Even though both clinical performance as well as total internal medicine scores seemed to be better in AMT group when compared to conventional group; there were a few limitations of the present study. Firstly, the time spent on each clinical encounter might not be an accurate indicator for clinical performance. However, after taking the similarity of medical students' baseline scores, clinical encounter characteristics as well as the averaging out effect of a large number of medical instructors of both groups into account, the validity level of the present study outcomes was considerable. Secondly, using total internal medicine score as another study outcome could only be partially reflected through medical students' performance. As researchers had no access to the question paper, the authors did not know the proportion of ambulatory medicine questions in this examination. In spite of this, the authors believed that overall internal medicine

Table 4. Patient satisfaction questionnaire

Questionnaire	Conventional group (%)	AMT group (%)	p-value
1. Your medical student had good communication skills.			0.685
1	0	0	
2	1	1	
3	5	2	
4	51	53	
5	43	44	
2. Your medical student gave you good advice.			0.133
1	0	0	
2	1	0	
3	9	6	
4	53	53	
5	37	41	
3. Your medical student was very careful with you.			0.206
1	0	0	
2	0	0	
3	3	2	
4	47	44	
5	50	54	
4. Your medical student exhibited good physical examination skills.			0.674
1	0	0	
2	1	1	
3	1	2	
4	43	38	
5	55	59	
5. Your medical student told you everything about choices of treatment.			0.239
1	0	0	
2	1	1	
3	1	2	
4	43	38	
5	55	59	
6. Your medical student looked for the best thing for your condition.			0.050
1	0	1	
2	2	1	
3	10	5	
4	54	52	
5	34	41	
7. Your medical student did not seem to pay enough attention about your concern.			0.858
1	20	17	
2	44	48	
3	7	10	
4	17	14	
5	12	11	

knowledge either acquired in-hospital or from ambulatory setting should support each other in improving medical students' outcomes. Lastly, it was very possible that patient satisfaction scores were overrated as Thai culture usually consider upfront criticisms as being rude.

Table 4. Cont.

Questionnaire	Conventional group (%)	AMT group (%)	p-value
8. You were worried about being evaluated by medical students.			0.439
1	14	13	
2	33	30	
3	31	33	
4	15	16	
5	7	8	
9. You thought it was a waste of time dedicated for medical students.			0.289
1	11	8	
2	21	22	
3	34	32	
4	22	26	
5	12	12	
10. You felt satisfied with this visit.			0.753
1	0	1	
2	1	1	
3	3	3	
4	43	43	
5	53	52	

1 = very disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = very agree

Conclusion

AMT helped improving medical students' outcomes as shown from higher total internal medicine score as well as quicker improvement during real-life clinical encounters when compared to the conventional group. AMT could be a good alternative learning activity for medical students within an ambulatory setting.

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Potential conflicts of interest

None.

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ผลลัพธ์ของการติวกันเป็นกลุ่มที่ตึกผู้ป่วยนอกที่มีต่อความรู้และความสามารถในการดูแลผู้ป่วยสำหรับนักศึกษาแพทย์ชั้นปีที่ 5

พจมาน พิศาลประภา, เด่นหล้า ปาลเดชพงศ์

วัตถุประสงค์*: เพื่อศึกษาผลของการจัดให้มีการติวกันเองเป็นกลุ่มที่ตึกผู้ป่วยนอกสำหรับนักศึกษาแพทย์ชั้นปีที่ 5 ที่มีต่อความรู้และความสามารถในการดูแลผู้ป่วย*

วัสดุและวิธีการ*: ได้แบ่งนักศึกษาแพทย์ชั้นปีที่ 5 ที่ผ่านภาควิชาอายุรศาสตร์และออกตรวจผู้ป่วยนอกเดือนละ 20 คน จำนวน 2 กลุ่ม นักศึกษาแพทย์ทุกคนจะได้ออกตรวจผู้ป่วยคนละ 8 ครั้งในเวลา 1 เดือน โดยในนักศึกษาแพทย์กลุ่มแรกจะไม่มีการติวกันเองก่อนการออกตรวจผู้ป่วยนอก ส่วนนักศึกษาแพทย์กลุ่มที่ 2 ได้มีการจัดให้มีการติวกันเองเป็นกลุ่ม เกี่ยวกับโรคที่พบบ่อยในการตรวจผู้ป่วยนอก เป็นเวลา 30 นาทีต่อครั้ง จำนวน 2 ครั้งก่อนออกตรวจผู้ป่วย โดยมีอาจารย์ช่วยชี้แนะ หลังจากจบการศึกษาได้นำคะแนนจากแบบสอบถามความพึงพอใจของผู้ป่วย ระยะเวลาที่นักศึกษาแพทย์ใช้ในการตรวจผู้ป่วยแต่ละราย และคะแนนสอบปลายภาคของอายุรศาสตร์มาประเมินเทียบกันระหว่าง 2 กลุ่ม*

ผลการศึกษา*: นักศึกษาแพทย์กลุ่มที่ 2 ที่มีการจัดให้มีการติวกันเองเป็นกลุ่มได้คะแนนสอบปลายภาคของอายุรศาสตร์สูงกว่ากลุ่มที่ไม่มีการติวกันเอง (คะแนนเท่ากับ 76.2 $\pm$ 3.6 กับ 72.9 $\pm$ 2.8 ตามลำดับ, p = 0.003) และนักศึกษาแพทย์กลุ่มที่ 2 ใช้เวลาเฉลี่ยในการตรวจผู้ป่วย 1 ราย น้อยกว่านักศึกษาแพทย์กลุ่มที่ 1 ในการออกตรวจผู้ป่วยนอก 6 ครั้งแรก แต่นักศึกษาแพทย์กลุ่มที่ 1 สามารถตรวจผู้ป่วยได้เร็วขึ้นโดยใช้เวลาเฉลี่ยเท่ากับนักศึกษาแพทย์กลุ่มที่ 2 เมื่อออกตรวจผู้ป่วยครั้งที่ 7 และ 8 โดยค่าความพึงพอใจเฉลี่ยของผู้ป่วยที่มีต่อนักศึกษาแพทย์ทั้ง 2 กลุ่มไม่แตกต่างกัน*

สรุป*: การจัดให้มีการติวกันเองเป็นกลุ่มที่ตึกผู้ป่วยนอกสำหรับนักศึกษาแพทย์ชั้นปีที่ 5 ทำให้นักศึกษาแพทย์สามารถตรวจผู้ป่วยต่อรายได้เร็วขึ้นตั้งแต่ครั้งแรกที่ออกตรวจ และทำคะแนนสอบปลายภาคของอายุรศาสตร์ได้สูงกว่า ดังนั้นการจัดให้มีการติวกันเองเป็นกลุ่ม อาจจะเป็นวิธีการเรียนการสอนที่ดีทางหนึ่งสำหรับนักศึกษาแพทย์ที่ตึกผู้ป่วยนอก*