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An evaluation of rational use of drug learning by problem-based approach

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Itthipanichpong C, Thamaree S, Nantawan P, Chompootaweep S, Wittayalertpanya S, Limpanasithikul W,Tangphao O, Israsena N, Wangsaturaka D, Chongtrakul P. An evaluation of rational use of drug learning by problem-based approach. Chula Med J 2001 Aug;45(8): 649 - 59

Objective : *1. To assess the student's achievement on rational use of drug by problem-based approach.*

2. To evaluate the student's attitude toward learning method.

Settings : *Department of Pharmacology, Faculty of Medicine, Chulalongkorn University*

Design : *Descriptive study.*

Subject : *Third year medical students, academic year 1999.*

Method : *1. A learning module for rational use of drugs was created using the case of diabetes mellitus as the trigger for the learning activity.*

2. The students were divided into 10 groups, each group contained 20-21 students. There were 2 tutors in each group.

3. The learning experience was organized in problem-based approach. The students were evaluated for the schorlaspic acheivement in 2 components: 20 % for the process of learning in the small group and 80 % for the report on rational use of antidiabetic drugs.

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4. *The student's attitude toward learning activity was assessed by the open-ended questionnaires.*

Results : *95 % of the total students obtained high score for the learning process in the tutorial group. Only 4.65 % of them had fair score and non of the students had low scores. The assessment of the students' reports on rational use of antidiabetic drugs demonstrated that 73.84 % of the students were classified as satisfaction and 26.52 % of them were classified as unsatisfaction. 97 % of the students revealed positive attitude toward the learning method and activity. They believed they had acquired adequate knowledge skill and attitude on rational use of antidiabetic drugs, however 3 % of them showed negative attitude to the learning course.*

Conclusion : *Although most of the students (97 %) showed positive attitude toward learning of rational use of drug, we still found that there was 26 % of them didn't acheive the objective of the course since their report score were classified as unsatisfaction. There was a need to incoporate rational use of drug concept to the medical students repeatedly throughout the curriculum to promote rational use of drug practice in their profession.*

Key words : *Problem-based learning, Rational use of drug.*

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วัตถุประสงค์ : *1. เพื่อประเมินสัมฤทธิผลทางการเรียนรู้ของนิสิตเรื่องการใช้ยาอย่างสมเหตุผลโดยใช้การเรียนแบบใช้ปัญหาเป็นหลัก*
2. เพื่อประเมินทัศนคติของนิสิตต่อวิธีการจัดการเรียนรู้

สถานที่ : *ภาควิชาเภสัชวิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย*

รูปแบบ : *การศึกษาเชิงพรรณา*

กลุ่มตัวอย่าง : *นักศึกษาแพทย์ชั้นปีที่ 3 ปีการศึกษา 2542*

วิธีการ : *1. จัดทำคู่มือการใช้ยาอย่างสมเหตุผลโดยใช้ปัญหาเรื่องโรคเบาหวานเป็นสิ่งกระตุ้นการเรียนรู้*
2. แบ่งนิสิตเป็นกลุ่มย่อยกลุ่มละ 20 คน โดยมี tutor ประจำกลุ่มกลุ่มละ 2 คน
3. จัดการเรียนการสอนแบบใช้ปัญหาเป็นหลักและประเมินสัมฤทธิผลทางการเรียนของนิสิต 2 ด้าน คือกระบวนการเรียนของนิสิตในกลุ่มย่อย โดยให้น้ำหนักเป็นร้อยละ 20 และการ เขียนรายงานเรื่องการใช้ยารักษาโรคเบาหวานอย่างสมเหตุผล คิดน้ำหนักร้อยละ 80
4. ประเมินทัศนคติการเรียนของนิสิต โดยใช้แบบสอบถามปลายเปิด

ผลการศึกษา : *ร้อยละ 95 ของนิสิต ได้คะแนนกระบวนการเรียนในกลุ่มย่อยอยู่ในระดับสูง มีเพียงร้อยละ 4.65 ที่ได้คะแนนอยู่ในระดับปานกลาง และไม่มีนิสิตได้คะแนนต่ำ การประเมินรายงานการใช้ยารักษาโรคเบาหวานอย่างสมเหตุผล พบว่า ร้อยละ 73.84 ของนิสิตได้รับการประเมินอยู่ในเกณฑ์ที่น่าพึงพอใจ ในขณะที่นิสิตร้อยละ 26.52 ได้รับการประเมินอยู่ในเกณฑ์ไม่น่า พอใจ สำหรับการประเมินทัศนคติของนิสิตต่อการเรียนรู้นั้น นิสิตร้อยละ 97 มีทัศนคติเชิงบวก ต่อการจัดการเรียนการสอนและเชื่อมั่นว่าตนเองบรรลุวัตถุประสงค์ในการเรียนโดยมีความรู้ ทักษะ และเจตคติที่ดีต่อการใช้ยาอย่างสมเหตุผล และมีนิสิตเพียง ร้อยละ 3 ที่ไม่พึงพอใจต่อกิจกรรมการเรียนการสอนเรื่องการใช้ยาอย่างสมเหตุผล และมีทัศนคติในเชิงลบ*

สรุป : *แม้ว่านิสิตจำนวนมากถึงร้อยละ 97 มีทัศนคติเชิงบวกต่อการเรียนการสอนเรื่องใช้ยาอย่าง สมเหตุผล แต่การประเมินผลนิสิตจากการตรวจรายงาน พบว่ามีนิสิตจำนวนกว่า ร้อยละ 26 มีสัมฤทธิผลต่อการเรียนไม่บรรลุตามวัตถุประสงค์ ดังนั้นการจัดการเรียนการสอนให้ นิสิตมีความรู้ ทักษะ และเจตคติที่ดีต่อการสั่งใช้ยาอย่างสมเหตุผลอย่างแท้จริง ต้องมีการดำเนินการอย่างต่อเนื่องเป็นระยะ ๆ ตลอดหลักสูตร*

The medical curriculum in Chulalongkorn University has a long history of development. The present curriculum was established in 1993 and has been used up to now. The philosophy of the curriculum is to make a student be a lifelong learner since it is the knowledge explosion era and it isn't able to teach everything at school. Thus the present curriculum is emphasized on [1] :

- inquiry learning
- self-directed learning
- problem solving ability
- critical thinking ability

(critical appraisal of evidence)

Concerning with Pharmacological science, the department aims at the development of a student in rational use of drug concept. Almost all countries in the world are facing with the significant problem of irrational use of drugs. In Thailand, nearly 60 % of the health budget is spent on drugs. Since there are too many categories of drug formulation available in the market and some of the physicians are lacking of rational use of drug in their minds. Another important contributing factor is the influence of the pharmaceutical companies.

Many evidences of irrational use of drug are demonstrated all around the world. [2,3] Great effort has been developed to cope with this problem using several strategies such as the implementation of National Drug Policy and the essential drug lists[4] by the Food and Drug Administration of Thailand. The medical school also has an important role in create the critical mass of knowledgeble prescribers who have perceptual knowledge, skill and attitude on rational use of drugs.[5]

For the achievement of the curriculum philosophy and the department's objective, a model of rational use of drug using problem-based approach was developed for third year medical students in academic year 1999.

The aim of this study is to evaluate the students' achievement on rational use of drug and their attitude towards learning activity.

Material and Methods

1. A learning module for rational use of drugs was created by using the problem of diabetes mellitus as the trigger for the learning activity. The students learning concepts were existing in the learning module including physiology, biochemistry, pathology,pharmacology and medical approach to DM. as demonstrated in table 1.

2. Two hundred and fifteen students enrolled in this study were third year medical students who attended pharmacology course at Department of Pharmacology, Faculty of Medicine, Chulalongkorn University in the academic Year 1999. They were instructed about the learning contents, activity and the evaluation process. Then they were divided into 10 groups, each group contained 20-21 students.Both groups was similar in distribution of the student grade. Two tutors were assigned to facilitate the student's learning process in the group.

3. After the students were presented with the case, they developed a series of learning objectives then they go outside the classroom to seek their own knowledge or meet the resource person. They came back in the classroom after they acquired the knowledge and skills required in the learning objective and presented the information they had gathered to the group. Finally the conceptual knowledge was

Table 1. Learning module for rational use of antidiabetic drugs.

Triggers	Discussion guide	Learning issues/topics
SCENARIO I		
A 62 years old woman came to the out patient clinic with complaints of passing and drinking a lot of water for 3 months. Her past history was unremarkable. Her elder sister is diabetic.	- What are the definition and causes of polyuria ? - What is the body built of this patient ? (Is she obese ?)	- Definition of polyuria - The method for assessing body weight. - Minimal investigation in the patient
Physical examination : B.W 64 kgs. Height 155 cms. The vital sings and physical examination were all normal including fundoscopic Examination.		
Laboratory finding	- What is the interpretation of laboratory results ?	
Urinalysis : Specific gravity 1.030.		
Urine glucose 3+, no cells	- What are the causes of abnormal results ?	- Interpretation of laboratory results, urinalysis and blood chemistry
Blood chemistry :	- What is the diagnosis ?	- Cause of hyperglycemia and glycosuria
fasting plasma glucose 240 mg/dl,	- What is the type of DM in this patient ?	
BUN 24 mg/dl,	- What is the significance of heredity in DM ?	- Criteria and method for diagnosis of DM
creatinine 1 mg/dl, total cholesterol 280 mg/dl, triglyceride 300 mg/dl, HDL 30 mg/dl.		- Heredity in DM
Overnight serum slightly turbid		
SCENARIO II		
The patient was prescribed on diabetic diet, exercise, oral	- What is diabetic diet ? - What is the significance of exercise in DM	- Plan for management and follow up.

Table 1. Continuous.

Triggers	Discussion guide	Learning issues/topics
hypoglycemic agents. The patient and her daughter were sent to diabetic educators for diabetic education. Her diabetes is under good control, she has been well without symptoms and no complications found during follow up for 2 years.	- Which oral hypoglycemic agents has been ordered ? Why? - What are the mechanisms of action of oral hypoglycemic agents ? - What is the diabetic education ? - What are the complications of diabetes to be looking for ? - How do you follow up this patient ?	- Significant of dietary therapy in DM - Role of exercise in treatment of DM - Mechanisms of action of oral hypoglycemic agents - Indication, contraindication and complication of hypoglycemic agents - Diabetic education - Follow up of diabetic control - Complications of diabetes to be looking for. - Rational use of antidiabetic drugs

summarized at the end of the tutorial hour.

4. Once the students reached the diagnosis of the patient. They had to write a prescription for the patient using 24 steps of rational use of drug concepts proposed by Dr. Pisonthi Chongtrakul. The outline of the concepts consisted of indication, efficacy, risk, cost, prescription writing patient compliance, patient education, patient acceptance, patient appointment for follow up, result of treatment as shown in table 2. Finally they were asked to write the report on rational use of drugs including 24 steps of rational uses of drug concept.

5. The student evaluation consisted of two components, the learning process (tutorial) 20 % and 80% was the report on rational use of antidiabetic drug. The students were also asked to fill the open-ended questionnaires for evaluation of their attitude toward the whole learning activity.

Statistical analysis

Data was presented using descriptive statistic, including percentage and range.

Results

The assessment of the tutorial process was demonstrated in table 3 and figure 1. The score exceeded 16 was classified as high score. (equivalent to 80 % of the total score 20). Fair score was the score between 14-15.9 and low score was below 14. There was 95.35 % of the total students obtained high score while 4.65% had fair score. None of them got low score.

Criteria for assessment of the students' reports was specified and the grade was awarded as demonstrated in table 3 and figure 2,3.

grade A was awarded to the student whose score exceeded 85 %

grade B^+ was awarded to the student whose score was between 85.0-77.5 %

grade B was awarded to the student whose score was between 77.4-70.0 %

grade C^+ was awarded to the student whose score was between 69.5-65.0 %

Table 2. Concept of rational use of drugs proposed by Dr. Pisonthi Chongtrakul MD.

ก. พิจารณาข้อบ่งชี้	A. INDICATION
1. ระบุปัญหาของผู้ป่วย	1. DEFINE PATIENT'S PROBLEMS
2. วินิจฉัยโรคได้อย่างถูกต้อง	2. ENSURE CORRECT DIAGNOSIS
3. ตั้งเป้าหมายในการรักษาโรค	3. SET GOALS OF THERAPY
ข. เลือกยาที่จะใช้	**B.DRUG SELECTION PROCESS**
4. พิจารณาประสิทธิภาพของยา	4. EFFICACY
5. พิจารณาความเสี่ยงจากการใช้ยา	5. RISK
6. พิจารณาค่าใช้จ่าย	6 COST
7. พิจารณาองค์ประกอบอื่น ๆ ที่เกี่ยวข้องกับยานั้น	7. OTHER CONSIDERATIONS
8. พิจารณาขนาดยา	8. DOSAGE
9. พิจารณาวิธีการให้ยา	9. METHOD OF ADMINISTRATION
10. พิจารณาความถี่ในการใช้ยา	10. FREQUENCY
11. พิจารณาระยะเวลาในการรักษา	11. DURATION OF TREATMENT
12. พิจารณาการยอมรับของผู้ป่วย	12. PATIENT COMPLIANCE
ค. สั่งการรักษาและการให้ความรู้ผู้ป่วย	**C. PRESCRIPTION & PATIENT EDUCATION**
13. อธิบายเกี่ยวกับโรคที่ผู้ป่วยเป็น	13. EXPLAIN ABOUT THE DISEASE
14. อธิบายการออกฤทธิ์ของยาที่ใช้	14. EXPLAIN DRUG EFFECTS
15. อธิบายผลข้างเคียงที่อาจเกิดขึ้น	15. EXPLAIN POSSIBLE ADR
16. อธิบายวิธีใช้ยาให้ถูกต้อง	16. EXPLAIN PROPER USE OF DRUG
17. ประเมินการยอมรับของผู้ป่วย	17. EVALUATE PATIENT ACCEPTANCE
18. นัดผู้ป่วยเพื่อติดตามผลการรักษา	18. APPOINTMENT FOR FOLLOW UP
ง. ติดตามผลการรักษา	**D.RESULT OF TREATMENT**
19. ปัญหาของผู้ป่วยได้รับการแก้ไขหรือไม่	19. PROBLEMS SOLVED?
20. มีปัญหาเกิดขึ้นจากการใช้ยาหรือไม่	20. ANY PROBLEMS FROM TREATMENT
21. ผู้ป่วยใช้ยาที่ได้รับไปอย่างถูกต้องหรือไม่	21. DRUG USE CORRECTLY TREATMENT
22. ควรเปลี่ยนแปลงวิธีการรักษาอย่างไรหรือไม่	22. NEED ANY MODIFICATION OF TREATMENT
23. ระยะเวลาในการรักษาครบถ้วนแล้วหรือไม่	23. ADEQUATE DURATION OF TREATMENT
จ. สรุปผลการรักษา	**E. CONCLUSION OF TREATMENT**

Table 3. Evaluation of the learning process of the third year medical students in the tutorial group (n = 215)

score range	number of the students	% of the students	score classification
< 14	0	-	low
14 - 15.9	10	4.65	fair
16 - 17.9	31	14.42	high
18 - 20	174	80.93	high
Total	215	100	

grade C was awarded to the student whose score was between 64.5-60.0 %

grade D^+ was awarded to the student whose score was between 59.5-55.0 %

grade D was awarded to the student whose score was between 54.5-50 %

grade F was awarded to the student whose score was lower than 50 %

Only students who received grade A,B^+,B, C^+,C were considered satisfaction which meant they acheived the learning objective in rational drug use concept. It was found that 73.84 % of the total students fulfilled the criteria of satisfaction and the left of them were unsatisfied. (26.52 %)

As shown in figure 4 there were 97 % of the students revealed positive attitude toward the learning course and perceived the achievement of the learning objective. Only 3 % of them felt unacheivement of the course objective and they didn't like the learning activity.

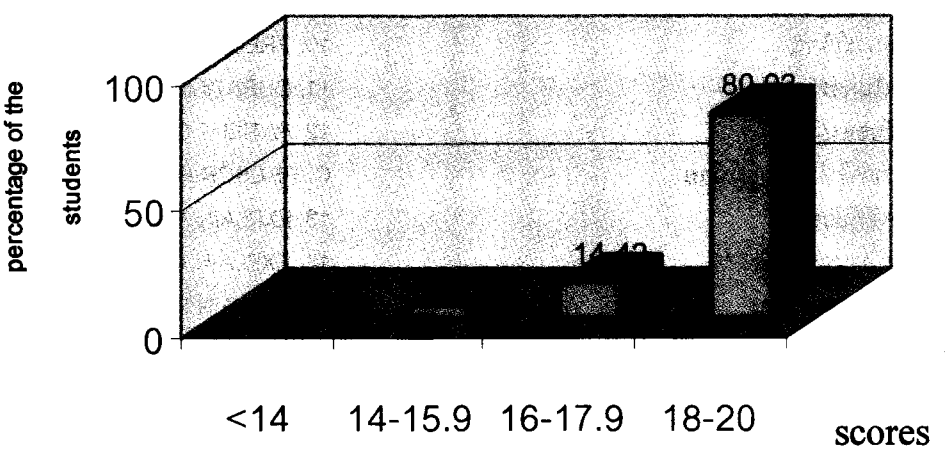

Figure 1. Frequency and scores of third year medical students on the assessment of their performance in tutoiral group. (n = 215)

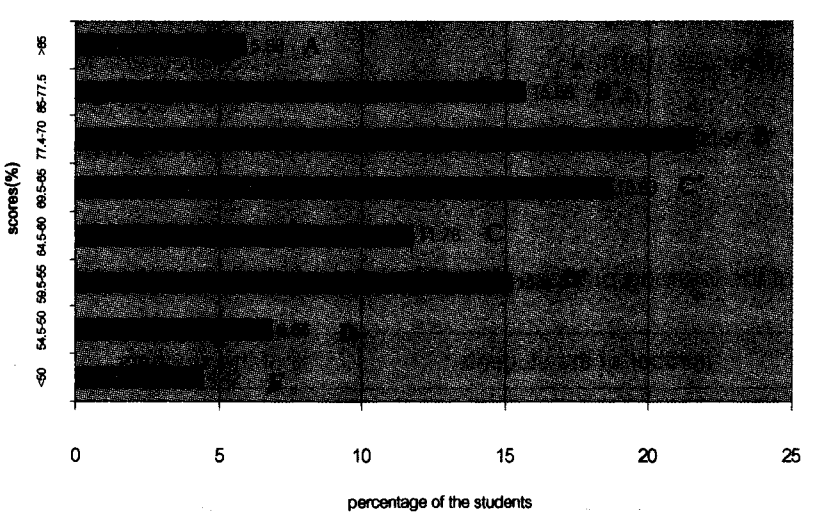

Figure 2. Frequency, scores and grade of third year medical students on the assessment of the report on rational use of antidiabetic drugs. (n = 215)

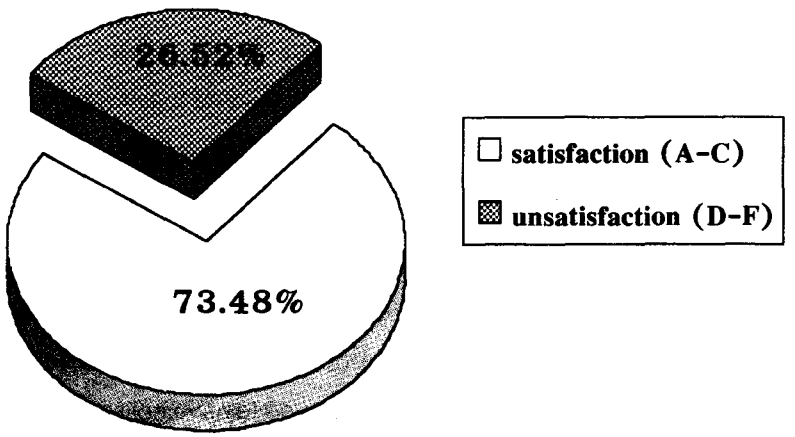

Figure 3. Percentage of third year medical students whose reports on rational use of antidiabetic drugs were satisfied and unsatisfied. (n = 215)

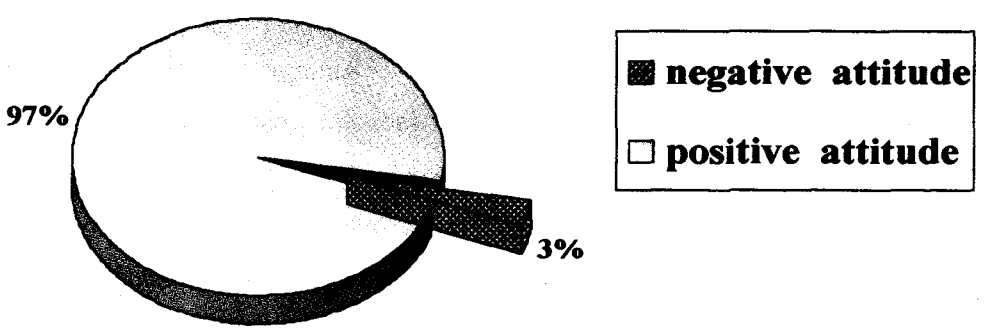

Figure 4. The attitude of third year medical students toward rational use of drug learning. (n = 215)

Table 4. The student assessment on rational use of drug report. (n = 215)

score rang	grade awarded	no of students	% frequency	% satisfaction or unsatisfaction
> 85	A	13	6.04	
85.0 - 77.5	B+	34	15.81	
77.4 - 70	B	46	21.40	satisfaction
69.5 - 65.0	C+	40	18.60	73.48
64.5 - 60.0	C	25	11.63	
59.5 - 55.0	D+	33	15.35	
54.5 - 50.0	D	15	6.98	unsatisfaction
<50	F	9	4.19	26.52
Total number		215	100	100

Discussion

Educational activity is an essential tool for promotion of rational and effective drug use in the medical students. PBL is the selected approach for the rational drug use model in this study since it enabled the student to learn all compentencies required for lifelong learner including self-directed learning skill, critical appraisal skill, information technology searching skill etc. Apart from learning activity, the evaluation method is also crucial to determine the student learning behavior.[6] The evaluation method should be valid and able to measure the student compentencies. For many students, passing the examination at the end of the course is their primary motivation. If the purpose of the course emphasizes on learning process but the measurement focussed only on the learning element, it will not bring out the aim of the course. Since the students will spend excessive amount of time study the theoretical aspect of the course in preference to self-directed learning skill, critical appraisal skill and information searching skill. Thus direct observation method was employed for an evaluation of the student performance in the tutorial group and writing a report on rational use of antidiabetic drugs was used for assessment of the student competencies in this study. With the maximum score 20 for the tutorial group process, 95.3 % of the total students got high score. (the score above 16) only 4.65 % of them obtained fair score and no one received low score. Since the students were eager to learn as a team. They were highly cooperative and played appropriate role in the group.They also acquired their own knowledge and presented what they had been assigned to their friends in the group.

From the students' reports, 78.48% of the total students met the criteria of satisfaction. It meant that they completed their report in 24 steps of rational use of drug concept (Pisonthi is model). They also cited the reference supporting evidence for the efficacy and toxicity of the drug they chose. This reflected the information searching skill and also self-directed learning skill of the students. The students also deserved to have holistic approach for rational use of drug concept since they had to educate the patient, follow up them, conclude the result of drug treatment besides they precribed the drugs. However 26.52 % of them obtained low score and were classified as unsatisfaction. They didn't complete their report suggested by Pisonthi's model.

Among 97 % of the total students who possessed positive attitude toward the learning course, they felt that the course provided them to work as a team. They played the appropriate role in the group. They became a self-learner by searching the information conformed to learning objective. They also appraised the literature from the various source of origin. Finally they recognized the significance of the concept of rational use of drug. They were confident to acquired knowledge, skill and attitude on rational use of drugs. However a few student (3 %) possessed negative attitude toward the course. They were afraid that they didn't catch up the same content as the other group did. They were not sure about the learning process in each group. They also complained of the insufficient supply of the learning resoures (computors, textbooks) and the number of the students in each group was too many.

Although most of the students (97 %) revealed good attitude toward the course and they felt they

got through the concept of rational use of drug. We still found that 26.52 % of them obtained poor score from the report on rational use of drug and they were classified as unsatisfaction. The students' performance on practice of rational use of drug and their attitude didn't go together. They need to have more educational intervention on rational use of drug. The more the students learn and practice on rational use of drug, the more they gain their experience on their professional skill. It should be implied that to develope the medical student's knowledge, skill and attitude on the rational use of drug is an essential task for the medical school. The learning activity has to be repeated and continued throughout the whole curriculum to ensure the effectiveness of rational use of drug for the patients.[8]

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