

Medical Student's Learning Outcomes of Medical Resources Integration and Optimization in Family Medicine

Sudarat Wijitsetthakul, M.D.*, Apichai Wattanapisit, M.D.**

*Medical Education Center, Ratchaburi Hospital, Ratchaburi 70000, **School of Medicine, Walailak University, Thailand.

ABSTRACT

Objective: Medical Resources Integration and Optimization (MRIO) is a teaching method, for integration and optimization of the knowledge and experience of both learners and teachers to promote active learning by using a set of several learning activities, beneficial for institutions with limited instructors. This study aims to evaluate the effectiveness of this program.

Methods: This is a mixed-method study design to determine medical student's learning outcomes regarding three domains of knowledge, attitudes and skills including comments of students and teacher team staffing toward MRIO. It was operated by family medicine for fourth year medical students in January 2016 at Medical Education Center, Ratchaburi Hospital.

Results: A total of 33 medical students participated in the MRIO. All students passed the minimum passing level of knowledge and skills with the scores of $74.5 \pm 8.6\%$ and $94.1 \pm 1.9\%$, respectively. Attitudes toward understanding patients and care improvement of patients were identified. The strengths of this program were inter-professional education and effective learning.

Conclusion: MRIO was an effective teaching program to integrate and optimize with limited resources in undergraduate family medicine practice. The implementation of this program in different settings may need collaborative teams to maximize the effectiveness of the program.

Keywords: Active learning; family medicine; learning outcomes; Medical Resources Integration and Optimization (MRIO); limited instructor (Siriraj Med J 2017;69: 330-335)

INTRODUCTION

Medical students need to acquire the appropriate competencies to be doctors in the next few years.^{1,2} The competencies require knowledge, attitudes, and skills.³ Those three domains are the substantial elements, considered as learning outcomes for students which not only achieve high scores in exams or have adequate knowledge of training, but they are indexes to evaluate students and reflect the effectiveness of teaching processes.⁴

The goal of clinical teaching is to improve both cognitions (knows and knows how) and behaviors (shows and does) of students.⁵ For example, remembering or understanding may not be enough for medical students

to take care of their patients, but creativity is also needed for the clinical practice.⁶ Many teaching methods are developed to reach higher-order learning and are currently focused on active learning methods.^{7,8} This is especially so, by integrated curriculum that includes horizontal (interdisciplinary), vertical (problem-based) and spiral (theme-based or combination of both horizontal and vertical) integration, with collaboration from all participants to optimize their knowledge and experience to the class.^{4,9} Active learning is an effective educational tool, although another evidence shows medical students' reluctance to engage in class activities.¹⁰

Medical Resources Integration and Optimization

Correspondence to: Sudarat Wijitsetthakul

E-mail: sudarat.wi@cpird.in.th

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(MRIO) is a teaching method, for integration and optimization of the knowledge and experience of both learners and teachers to promote active learning by using the set of several learning activities. This study aimed to evaluate the effectiveness of the MRIO in family medicine throughout the student's learning outcomes and explore the comments of medical students and teacher team staffing towards the MRIO.

MATERIALS AND METHODS

Study design

This was a mixed-method study design: quantitative and qualitative study, determining medical student's learning outcomes regarding three domains of knowledge, attitudes and skills of MRIO in January 2016. The qualitative data was collected via interviews by medical students and teacher team staff towards this program. Knowledge and skills were analyzed retrospectively by the summative score in academic year 2015. Attitudes of students were analyzed by thematic analysis; daily self-reflection on the Facebook chat room. The comments of medical students and teacher team staff toward the program were analyzed by thematic analysis; Facebook chat room and two focus group discussions.

Participants

The participants were (i) a total of 33 fourth year medical students at Medical Education Center, Ratchaburi Hospital, who were selected regardless of their gender, age and grade point average, and (ii) 13 teaching staff including three nurse practitioners, nine village health volunteers, and one public health technical officer.

Teaching methods and procedures

MRIO was established in January 2016 at Medical Education Center, Ratchaburi Hospital, a primary care unit (PCU), and catchment communities. Thirty-three students were separated into 2 rotations when they were in Family Medicine. Sixteen and seventeen medical students in total of each rotation participated in this 10-day course.

In the first two days before the MRIO began, the orientation session was provided by the course instructor. The session included introduction of the course and core concepts of family medicine. Patient-centered medicine and communication skills emphasized on the essential aspects of learning and discussion.

The other eight days of MRIO, the rotation groups were divided into three small groups. Each group followed six organized activities: (i) PCU practice, (ii) community survey and home visit, (iii) topic assignment, (iv) peer

teaching, (v) feedback and (vi) self-reflection.

The morning activities: PCU practice, community survey, home visit and topic assignment were assigned for all students. Subsequently, peer teaching and feedback were conducted by them in the afternoon.

The PCU practice focused on learning about common diseases in primary care, patient-centered medicine, and communication skills. Each student was assigned to take care of two patients under direct observation and video recording by family physician who was a course instructor. After history taking, physical examination, provisional diagnosis, and management discussion by the student, the instructor met the patient again. The instructor provided the standard care of patients, while the student was observing. The video set out was recording thoroughly the session for review of the feedback.

The community survey was supervised by nurse practitioners and village health volunteers. The seven community tools; geo-social mapping, genogram, community organizations chart, local health system, community calendar, local history and life stories, were used as a tool for community study.

After community survey, the students selected the interesting patient for intensive home visit to assess and heal the problems by using various tools including home visit assessment, geriatric depression scale and mini-mental state examination.

Topic assignments for general problems in practice, included diabetes mellitus, hypertension, appropriate antibiotics use, and elderly health promotion.

When peer teaching started in the afternoon, all students came back to the classroom to provide their particular activities lessons. The students, who attended PCU practice; and community survey or home visit, described their morning activities with peers. The students also shared their feelings and experiences. The presentation of topic assignments was another activity for the students to present to their peers by their techniques such as role plays, games, storytelling or case presentations. The instructors were not required to give any traditional lectures, on the contrary, the students needed to demonstrate the point of views to their peers. Eventually any feedbacks and lessons were compiled and summarized by the instructor and the teacher team staff including the instructor, a preventive physician, an orthopedist, a general practitioner, a pharmacist, a physical therapist, six nurse practitioners, a public health technical officer and 14 public health volunteers. The teacher team staff attended the session when they were available.

At the end of each day, each student put his/her self-

reflection into Facebook chat room, where the instructor and their peers enabled to participate and provide feedbacks. However, all students were also requested to provide their comments for MRIO in the last day (Fig 1).

Assessment tools and data analysis

Learning outcomes

The Student's knowledge was evaluated by 27 multiple choice questions, five modified essay questions,

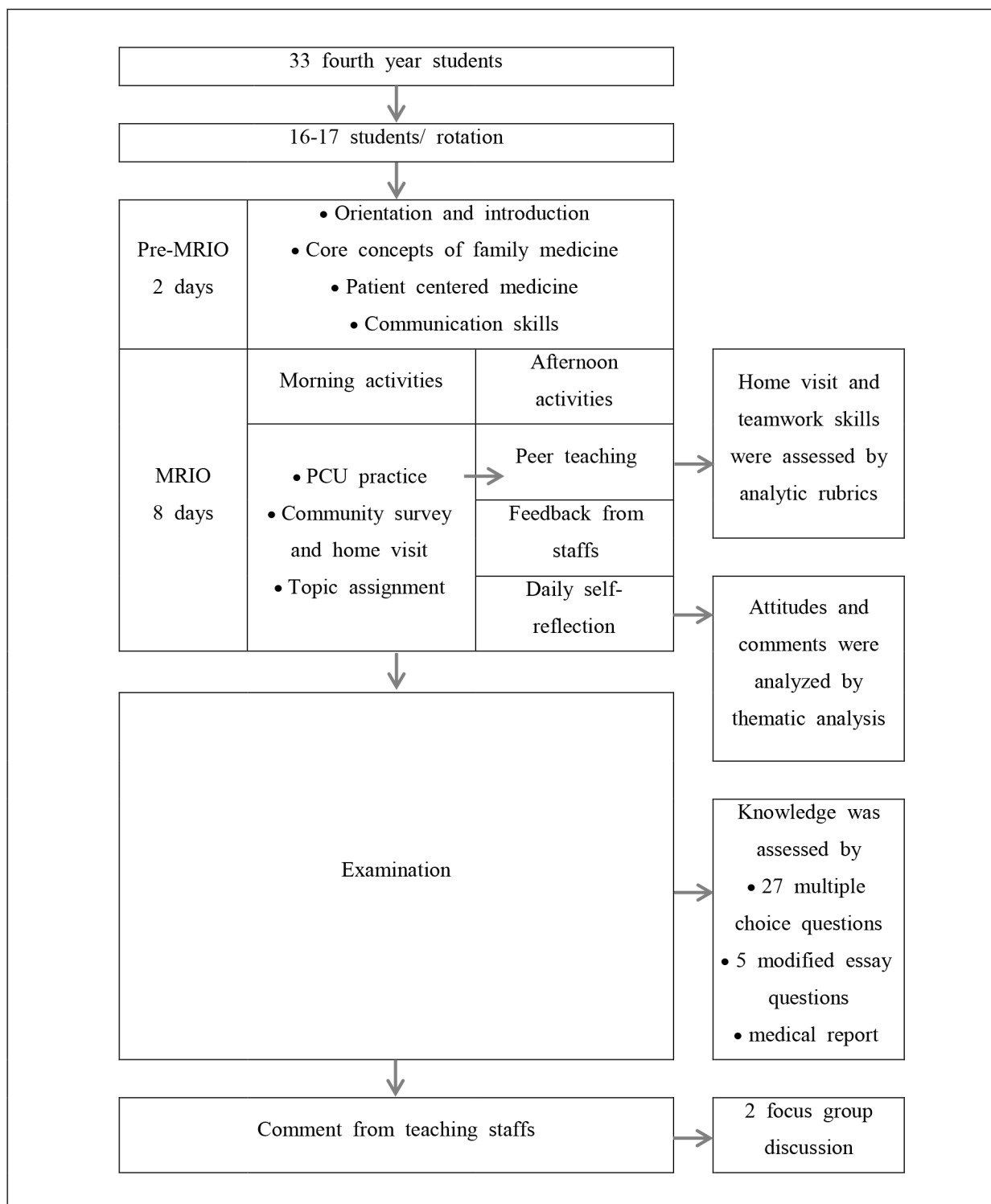


Fig 1. Teaching methods and data analysis.

MRIO was implemented to total of 33 fourth year medical students. They were divided into 2 rotations for 10 days; pre-MRIO for 2 days and MRIO for 8 days. Analytic rubrics for Home visit and teamwork skills assessments were appraised in the course. Multiple choice questions, modified essay questions and medical report for knowledge assessment were evaluated at the end of the course. Thematic analysis for attitudes and comment from both students and teacher team staffing were analyzed at the end of the course.

and medical report. Their reliabilities were calculated with Cronbach's Alpha, were 0.784, 0.813 and 0.889, respectively.

The students' home visit and teamwork skills were analytic rubrics used for skills assessment, and their reliabilities by Intra and Inter Observer Reliability were 0.876 and 0.912.

All the above tools were verified for their content by three family physicians and three nurse practitioners in Ratchaburi Hospital, that were analyzed by descriptive analysis.

Attitudes were analyzed by thematic analysis, and self-reflections on the Facebook chat room. The relevant data was coded and categorized into themes.

Comments from students and teachers

The scripts on Facebook chat room were also analyzed by thematic analysis to explore the students' comments on the MRIO in the family medicine rotations.

The scripts of group discussions were focused on the related issues regarding strengths and weaknesses of the MRIO. The relevant data was coded and analyzed by thematic analysis (Fig 1).

Ethical approval

Ethical approval was acquired from Ratchaburi Hospital (Protocol number: COA-RBHEC 013/2016).

RESULTS

A total of 33 fourth year medical students were included in the analysis. In total 54.5% of students were female at median age of 22.9 with fair grade point average (Table 1).

TABLE 1. Characteristics of the students (N = 33).

Characteristic	Value
Female: sex (%)	54.5
Age (yr)	
Median	21.9
Interquartile range	21.6-22.3
Grade point average	3.1 (0.3)

Learning outcomes

For their learning outcomes, knowledge and skills assessments showed that all students passed minimal passing level at 60%. The mean score of knowledge and skills assessments were at 74.5±8.6% and 94.1±1.9% (Table 2).

TABLE 2. Learning outcomes.

	Score; Mean (SD)%
Knowledge	74.5 (8.6)
Multiple choice questions	67 (7.3)
Modified essay questions	79.2 (8.2)
Medical report	78.5 (15.2)
Skills	94.1 (1.9)
Home visit	92.9 (4.5)
Teamwork	94.4 (1.4)

The attitudes emphasized on medical professionalism and family medicine practice. The results of thematic analysis showed the students' attitudes by 2 categories: understanding patients and improving attitudes towards quality of care.

Understanding patients

Communication plays as a key component

Listening and speaking were the essential skills to understand patients. Asking patients with open ended questions, and let patients speak out freely, enabled more information to be gathered. Active listening with empathy helped students to get in-depth information from patients' views.

I have never tried something like this before. Let patient feel free to tell her story. By the way, I asked her some questions to discover her thinking and feelings. I think I really understand her. (Student 7)

An illness is not only a disease

The words "disease" and "illness" were interchangeable in plain language. To understanding patients, those two words were different. Disease was described as abnormality or pathology within the body. On the other hand, illness involved patients' lives, which also depended on individuals' perspective.

The diagnosis is migraine. Anyway, the patient is not sure whether she has "it" or not. In her point of view, it may be a symptom of diabetes and hypertension. It makes her worry. It also affects her work which causes absenteeism and loss of daily wage. Therefore, I get her points. (Student 19)

Improving attitudes towards quality of care

Doctor-patient relationship increases the quality of care

A relationship between doctor and patient emphasises on health care. It might be built any time during consultation. The students perceived that a good doctor-patient relationship would improve preferable care.

It is not easy to ask some sensitive issues and conduct any psychological tests without a good relationship with the patient. (Student 23)

Patient is at the center of care

As a doctor, agenda for health care was providing the best care for patients. Nevertheless, different agendas among patients needed to be explored. The students' views showed the patient centered medicine was a way to improve care of patients.

If we focus on patients as a center of care, we will contribute to better care and also have a good relationship with patients. (Student 26)

Students and teachers' comments

According to comments of the students and teacher team staff, the process of MRIO was analyzed. It returned two categories; strengths and weaknesses.

Strengths of the MRIO

Interprofessional education

The implementation of this method was based on organized schedule facilitated by multidisciplinary team staff. Students played roles as learner and teacher to supervise staff for learning together.

I learn about care of family when I do home visit with warm welcome. I do diabetes screening for family members. I feel happiness when I see their smiles. In the afternoon, I learn more about diabetes mellitus from peers and staff. (Student 24)

The students can learn from the multidisciplinary conference. We actually learn from each other. For example, what we learn from a pharmacist is dispensation of medicine. (Staff 2)

Effective learning

Among limitation of instructor, the MRIO enabled us to provide effective and concise lessons. The learners could share knowledge, and different experiences throughout peers' teaching and various activities to others.

The contents of this course enable changing a difficult topic to easier, such as patient-centered medicine to a touchable topic. (Student 23)

Although the study time is too short, but I am sure what I learned is very useful for my career as a doctor in the future. (Student 26)

Weaknesses of the MRIO

Need a hard-working team staff

This program required plenty of manpower. All staff had their permanent jobs, and there were not enough number of staff to teach students. However, they were willing to support this program as long as they were available.

We have the routine job. Therefore, we need to prepare and use good management to cope with the additional job as medical students' teachers. (Staff 1)

DISCUSSION

The MRIO encouraged the students to achieve learning objectives by knowledge, attitudes and skills. Attitudes toward communication and understanding illness from patients' perspective were identified as the key components to understand patients. According to attitudes toward improvement of patient care, the learners needed to emphasize on doctor-patient relationship and patient-centered medicine. The strengths of the MRIO included inter-professional and effective learning of limited resource program. Excessive workload of teacher team staff was mentioned as a weakness of this program.

Knowledge and skills evaluations in this study were analyzed descriptively. Although the outcomes of knowledge and skills were positive which showed the quality of teaching program, the findings could not represent any obvious differences of knowledge and skill results comparing with other teaching methods.^{11,12}

Attitudes toward professionalism during family medicine rotations were clarified through care of patients based on family medicine concepts: communication, doctor-patient relationship, and patient-centered medicine.¹³⁻¹⁵

Consequently, this teaching method might be considered as a transformative method which initiated or boosted the learners' attitudes.¹⁶

According to the comments on strengths of the program, inter-professional learning and learning in limited resource settings were the consequence of the objectives of MRIO, including effective integration and optimization of resources. The effectiveness, in terms of knowledge and skills achievements, of several teaching and learning methods in the MRIO might be comparable with other teaching methods such as peer teaching and problem-based learning.¹⁷⁻¹⁹

There were several strengths of this study. The qualitative data on the Facebook chat room was rich in terms of completeness. This study included knowledge, attitudes, and skills as learning outcomes and the evaluation of these outcomes consisted of both quantitative and qualitative methods. Limitations of the study were identified, which were this study was a retrospective study which could not control some processes such as constructive data collection and recall bias of teaching staff.

The MRIO might be implemented in different settings under administrative plan. Even though this program was an approach for limited resource settings, substitutional staff were needed to compromise burden of workload.

CONCLUSION

The MRIO is an effective teaching program to integrate and optimize limited resource in undergraduate family medicine practice. This approach can achieve required competencies of learners and also build positive attitudes toward medical professionalism among medical students. To implement this program in different settings may need collaborative and substitutional teams to maximize the effectiveness of the program and to reduce workload burden of teacher team staff.

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