The Effect of a Continuity of Care Clinic Curriculum on Cardiovascular Risk Management Skills of Medical School Graduates

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Background: *The continuity of care clinic (CCC) curriculum has been added to final-year medical students, class of 2008. The goals were to improve cardiovascular risk management skills for medical students and to develop competent doctors to serve the public.*
Objective: *To study the effectiveness of the curriculum by directly comparing postgraduate patient care performance between CCC participants (class of 2008) and non-CCC participants (class of 2006 and 2007).*
Material and Method: *We collected information about both groups of graduates, when they started their doctor careers. With hospitals' permission, medical charts audits were performed and scored with a 12-task checklist of cardiovascular risk management. The scores from both groups were compared with statistical analyses.*
Results: *Among 266 charts from 17 hospitals, there were 123 charts from 38 CCC participants and 143 charts from 52 non-CCC participants. On 9 of 12 tasks of the checklist, proportionately more CCC participants carried out the tasks than non-CCC participants. Statistical significance was shown on 5 tasks. These were ability to properly adjust antihypertensive medication (13.4% more; $p = 0.002$); requesting for urine protein screening (12.1% more; $p = 0.006$); recommending life-style modification (24.9% more; $p < 0.001$); requesting for serum lipid profile (25.5% more; $p < 0.001$); prescribing aspirin as primary prevention for cardiovascular disease (13.1% more; $p = 0.007$). There was no statistically significant difference for the other 7 tasks.*
Conclusion: *Cardiovascular risk management performance of CCC participants was better than non-CCC participants in the same period after graduations. The curriculum helped improve the cardiovascular risks management skill of postgraduates. In the public interest, this study recommends further implementation of such a program in the future.*

Keywords: *Clinical competence, Continuity of patient care, Curriculum, Education, Medical, Graduate, Educational measurement, Program evaluation*

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In Thailand, doctors spend six years in medical schools, before serving the country in community hospitals as governmental general practitioners (GPs). The usual daily work as a GP in a typical primary care center is approximately 80% outpatient: 20% inpatient. However, the training students received from medical schools does not reflect this postgraduate work situation.

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The continuity of care clinic (CCC) curriculum was implemented for the first time for a class of final-year medical students at the Faculty of Medicine Siriraj Hospital, Mahidol University. The main purpose was to improve longitudinal care skills of chronic diseases for medical students including cardiovascular risk management. These ambulatory skills are necessary for doctors as Hypertension, Diabetes and Dyslipidemia, are among the most prevalent public health problem[1-4]. The curriculum developing team strongly hopes that CCC curriculum could improve MD graduates'

competency and consequently contribute to better public health care.

This training program assigned each medical student three sessions of monthly clinic schedule during the Internal Medicine rotation. The students were then able to follow up their own patients at the same time practicing longitudinal cardiovascular risk management skills in outpatient setting under supervision of attending physicians.

To prove that the curriculum goals have been achieved, we chose to measure the graduates' performance as the main quantitative educational outcome in this study[5].

Research Design

This study investigates the effectiveness of the CCC curriculum by using direct post-graduation performance assessment by correlating with standard quality of care for Hypertension, Diabetes and Dyslipidemia.

Medical chart audits were performed to compare patient care performance of Siriraj MD graduates between CCC participants (class of 2008) and non-CCC participants (class of 2006-2007).

The inclusion criteria for the charts were:

(1) Had at least one medical encounter on longitudinal care for Diabetes Mellitus, Hypertension or Dyslipidemia performed by Siriraj MD graduates class of 2006, 2007 or 2008.

(2) That particular encounter took place within the first three months of each doctor's graduation.

(3) No more than four charts per doctor allowed to be submitted in the study.

Material and Method

We followed medical students from both groups to locations where they started their doctor career. Those hospitals that employed the graduates were then requested to participate in the study. After receiving hospital agreement, the investigator assigned the hospital to randomly submit medical charts of targeted doctors in the project. The charts were scored using a 12-task checklist for Diabetes, Hypertension and Dyslipidemia standards of care[6-8] by two independent reviewers. The checklist never been introduced to any of CCC participants. It is a summarized tool that designed for the study scoring purpose. The scores from CCC participant group and non-CCC participant group were then compared.

Two sets of questionnaires were sent for detailed curriculum evaluation. The first set was sent to Siriraj MD graduates class of 2008 for curriculum satisfaction survey. The second set was sent to their doctor colleagues for written opinion about the graduates.

Statistic analysis

A minimum of 206 charts were required in the study to achieve 80% power with alpha 0.05. This is for detecting 20% score difference between the two groups on each of the 12-task checklist. We used Chi-square test to detect differences between the patient characteristic distributions of the two groups. The difference of % completion on each task of the checklist was assessed by Chi-square or Fisher's exact test (distribution of completion vs. non-completion between the two groups). All statistical tests were interpreted at the 5% significant level.

Results

Among 385 charts which were randomly submitted from 21community hospitals, we found 266 charts from 17 hospitals that met with all inclusion criteria. There were 123 charts from 38 CCC participants, and 143 charts from 52 non-CCC participants.

On 9 of 12 tasks, proportionately more CCC participants carried out the tasks of the checklist than non-CCC participants. Statistical significance was shown on five tasks. These were ability to properly adjust antihypertensive medication (13.4% more; $p = 0.002$); requesting for urine protein screening (12.1% more; $p = 0.006$); recommending life style modification (24.9% more; $p < 0.001$); requesting for serum lipid profile (25.5% more; $p < 0.001$); prescribing aspirin as primary prevention for cardiovascular disease (13.1% more; $p = 0.007$). There was no statistically significant difference for the other seven tasks as shown in Table 1.

We received 100%-response rate from CCC participants on satisfaction survey as shown in Table 2. Questions were of the Likert-type with 5 response categories ranging from "strongly agree" to "strongly disagree" Overall; they believed that the CCC training is beneficial and satisfactory.

Among 108 returned questionnaires from doctor colleagues, 22 colleagues who rated themselves having very close supervision with the graduates admitted that they see improvement on cardiovascular risk management performance of CCC participants over non-CCC participants as shown in Table 3.

Table1. Postgraduate performance score on the 12-task checklist

Task	%			
	Completeness score of CCC participant (n = 123)	Completeness score of non-CCC participant (n = 143)	Score different	p-value (2-sided)
1. Properly adjust antihypertensive medication	93.0	79.6	+13.4	0.002
2. Requesting for urine protein screening	20.9	8.8	+12.1	0.006
3. Properly adjust lipid lowering agents	96.1	90.4	+5.7	0.088
4. Recommending life style modification	38.0	13.1	+24.9	<0.001
5. Requesting a check for blood lipid profile	66.7	41.2	+25.5	<0.001
6. Requesting a check for HbA1c in diabetic patient	59.7	50.4	+9.3	0.14
7. Properly adjust glucose lowering agents	97.7	92.7	+5.0	0.086
8. Prescribing aspirin as primary prevention for cardiovascular disease	88.3	75.2	+13.1	0.007
9. Perform diabetic foot screening exam	49.6	58.4	-8.8	0.176
10. Consult for retinopathy screening exam	53.5	62.0	-8.5	0.173
11. Proper usage of ACE inhibitors	93.0	97.1	-4.1	0.159
12. Recommendation to quit smoking	0	0	0	-

Table 2. Summary of 192 CCC participant-questionnaire responses

Questions	%				
	Strongly agree	Agree	No comment	Disagree	Strongly disagree
1. CCC has increased your confidence on managing DM, HTN and Dyslipidemia	27.5	59.3	12.7	0.5	-
2. CCC helped you understand better practical longitudinal care for DM, HTN and Dyslipidemia	35.5	58.2	6.3	-	-
3. You could adapt knowledge you gained from CCC to your real-life practice	19.6	64.0	16.4	-	-
4. CCC helped you to pay more attention on side effects of prescribing DM, HTN and Dyslipidemia medications	17.5	58.7	23.8	-	-
5. CCC has increased your cardiovascular risk prevention attitude	39.7	51.9	7.9	0.5	-
6. You have better attitude as primary care physician from CCC	31.2	48.2	20.1	0.5	-
7. You see better the value of a life style modification prescription from CCC	42.3	40.7	15.9	1.1	-
8. Your performance evaluations done by patients under your care result in proper constructive feedback	24.3	52.9	21.8	0.5	0.5

Discussion

We chose to use multi-source assessment, including post-graduation performance, peer assessment and alumni satisfaction in order to achieve the most accuracy in measuring curriculum effectiveness since no one tool would be best[9].

Even though the study could not show an ideal comparison as the performance of the two groups were not from the same period of time, there was no report of significant adjustment in other parts of the Siriraj MD curriculum during 2006-2008. The selected 12 tasks in the scoring checklist have been well accepted as parts of a general standard of care for cardiovascular risk management and there have been no substantial change of recommendation related to utilizing these tasks within this common period.

Table 3. Summary of comments of alumni colleagues who indicated conducting very close supervision to Siriraj graduates

	%				
	Strongly agree	Agree	No comment	Disagree	Strongly disagree
1. 2008 graduates seemed to have more confident on cardiovascular risk care comparing to 2006 & 2007 graduates	5	59	28	8	-
2. 2008 graduates seemed to be more competent on managing patients with cardiovascular risk better than 2006 & 2007 graduates	5	59	29	7	-
3. 2008 graduates seemed to have better attitude on managing patients with cardiovascular risk than 2006 & 2007 graduates	9	63	18	10	-
4. 2008 graduates seemed to be more competent on doing longitudinal care	14	37	40	9	-

We decided to evaluate the first 3-month postgraduate performance in order to see as much as possible the effectiveness of the curriculum without environmental factors. As physician performance depends considerably on each particular hospital facility[10]; for example, some laboratory investigations which indicated in the 12-task checklist were not available in primary care setting. Consequently, this could prohibit doctors to complete the standard of care.

From the study, we found slightly differences between the workplace characteristics of the two groups (Table 4). Interestingly, even there were more CCC participants from primary care centers, the group still perform better in the overall outcomes. The charts from the two groups were also comparable regarding patients' established diagnosis (Table 5).

As a result, the improvement of post-graduation performance in CCC participant group is most likely an effect of CCC curriculum. The results from both alumni and colleague questionnaires have also conveyed the same message.

CCC curriculum is a brief "on the job training" program which allows medical students to practice ambulatory skills in longitudinal care for patients who have cardiovascular risk.

The effectiveness of the curriculum could be another example of how an education evolution could provide an impact on public medical quality-"with a good curriculum design a short intensive program can be as efficient as years of clinic training"[11].

The improvement of the post-graduation performance of the CCC group over the non-CCC

Table 4. Workplace characteristics

Level of hospital	Of 123 patients under CCC participants (%)	Of 143 patients under non-CCC participants (%)	p-value
Primary care center	12 (10)	3 (2)	0.015
Secondary care center	76 (62)	81 (57)	0.468
Tertiary care center	35 (28)	59 (41)	0.040

Table 5. Patients characteristic

Established diagnosis	Of 123 patients under CCC participants (%)	Of 143 patients under non-CCC participants (%)	p-value
DM	64 (52)	61 (43)	0.160
Hypertension	93 (76)	117 (82)	0.277
Dyslipidemia	60 (49)	55 (38)	0.116

group is an ample reward to the curriculum developing team. Medical educators need to recognize and be aware of this potentially powerful influence of training programs. Accordingly, they should be responsible not only to provide standards of care for patients under services, but also be obligated to effectively transfer necessary and updated skills to trainee.

Nevertheless, doctors from both groups still achieved a fairly low percentage of completeness on several tasks of the 12-task checklist. This may be explained by the poor medical documentation system and the underserved medical situation in rural hospitals. Policy makers together with medical school councils should pay very close attention to and take strong action concerning these challenging problems.

Conclusion

Cardiovascular risk management performance of CCC participants was better than non-CCC participants in the same period after graduations. The CCC curriculum helped improve the standards of care for cardiovascular risks management of Siriraj graduates. The survey results indicated high level of satisfaction with the CCC curriculum from both CCC participants and their colleagues. In the public interest, this study recommends further implementation of such a program in the future.

Medical schools should encourage medical educators to design innovative curricula since scientific and technological contents have changed substantially while the basic course structure remains more or less the same. The school support should also extend to every curriculum management aspects.

For Thai medical schools to obtain training accreditation, a longitudinal ambulatory training program should also be part of the compulsory curriculums.

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ประสิทธิผลการเรียนการสอนหลักสูตรคลินิกดูแลสุขภาพต่อเนื่องที่มีต่อนักศึกษาแพทย์ศิริราช ชั้นปีที่ 6 ปีการศึกษา 2550 เมื่อไปปฏิบัติงานเป็นแพทย์ใช้ทุน

เด่นหล้า ปาลเดชพงศ์, เชิดชัย นพมณีจำรัสเลิศ, เจริญ ฉั่วริยะกุล

***ภูมิหลัง**: หลักสูตรคลินิกดูแลสุขภาพต่อเนื่อง (Continuity Care Clinic) ที่ได้จัดขึ้นสำหรับนักศึกษาแพทย์ปี 6 คณะแพทยศาสตร์ศิริราชพยาบาล เป็นครั้งแรกใน ปีการศึกษา 2550 มีจุดประสงค์เพื่อเสริมสร้างทักษะการดูแลผู้ป่วยนอกต่อเนื่อง โดยเปิดโอกาสให้นักศึกษาแพทย์ปีที่ 6 ได้มีโอกาสตรวจติดตามผู้ป่วยต่อเนื่อง รวม 3 ครั้ง ในช่วงเวลา 3 เดือนที่ฝึกปฏิบัติงานกับภาควิชาอายุรศาสตร์ ทั้งนี้จะได้ฝึกทักษะเชิงปฏิบัติที่จำเป็นทั้งหมดในการดูแลผู้ป่วยนอกโดยเฉพาะผู้ป่วยกลุ่มเสี่ยงโรคหัวใจและหลอดเลือด ได้แก่ ผู้ป่วยโรคความดันโลหิตสูง โรคเบาหวาน และโรคไขมันในโลหิตสูง ให้นักศึกษาแพทย์มีความรู้ความเข้าใจในการเลือกใช้และปรับยา ฝึกให้ระมัดระวังในผลข้างเคียงของยาชนิดต่าง ๆ และสามารถเลือกสั่งการตรวจทางห้องปฏิบัติการที่จำเป็นในเวลาที่เหมาะสม เพื่อตรวจคัดกรองภาวะแทรกซ้อน รวมถึงปลูกฝัง ทัศนคติที่จะดูแลรักษาผู้ป่วยกลุ่มนี้ ให้ได้มาตรฐานดียิ่งขึ้น หวังประโยชน์ลักษณะ สาธารณสุขมวลชนว่าหลักสูตรนี้น่าจะมีส่วนช่วยพัฒนาทักษะแพทย์ใช้ทุน ในการดูแลผู้ป่วยกลุ่มเสี่ยงดังกล่าว อย่างมีนัยสำคัญ*

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***วัสดุและวิธีการ**: เปรียบเทียบทักษะการดูแลผู้ป่วยนอกเรื้อรังต่อเนื่องของแพทย์ใช้ทุนปีที่ 1 จากคณะแพทยศาสตร์ศิริราชพยาบาล ซึ่งผ่านหลักสูตรคลินิกดูแลสุขภาพต่อเนื่อง กับแพทย์ใช้ทุนศิริราชรุ่นพี่ ซึ่งไม่เคยมีการเรียนการสอนหลักสูตรนี้ โดยติดตามตรวจเวชระเบียนผู้ป่วย กลุ่มเสี่ยงโรคหัวใจ และหลอดเลือด ในความดูแลของแพทย์ทั้งสองกลุ่ม เพื่อประเมินคุณภาพการปฏิบัติงานเฉพาะในช่วง 3 เดือนแรกหลังสำเร็จการศึกษาของแพทย์แต่ละรุ่น โดยใช้แบบประเมิน 12 ทักษะสำคัญในการดูแลผู้โรคเบาหวาน ความดันเลือดสูงและโรคไขมันในเลือดสูง*

***ผลการศึกษา**: ทักษะการดูแลผู้ป่วยกลุ่มเสี่ยงโรคหัวใจและหลอดเลือดของแพทย์ซึ่งได้รับการเรียนการสอนหลักสูตรคลินิกดูแลสุขภาพต่อเนื่องเหนือกว่ากลุ่มที่ไม่ได้รับการเรียนการสอนใน 9 จาก 12 ทักษะตามแบบประเมิน ทั้งนี้มี 5 ทักษะที่เหนือกว่าอย่างมีนัยสำคัญทางสถิติ*

***สรุป**: หลักสูตรคลินิกดูแลสุขภาพต่อเนื่องช่วยเสริมสร้างทักษะการดูแลผู้ป่วยกลุ่มเสี่ยงโรคหัวใจและหลอดเลือดของแพทย์อย่างมีนัยสำคัญ ซึ่งโดยปริยายช่วยเสริมคุณภาพการดูแลรักษาผู้ป่วยกลุ่มนี้ซึ่งเป็นปัญหาสาธารณสุขที่สำคัญของประเทศไทยโดยรวมเมื่อบัณฑิตแพทย์จบการศึกษาและออกปฏิบัติงานเป็นแพทย์ใช้ทุน ทุกโรงเรียนแพทย์ควรพิจารณาบรรจุหลักสูตรการดูแลผู้ป่วยนอกต่อเนื่องลักษณะนี้โดยถือเป็นหลักสูตรบังคับ เพื่อประโยชน์ตรงต่อนักศึกษาแพทย์และประชาชนทั่วประเทศต่อไป*