Chronic Care Model Implementation and Outcomes among Patients with COPD in Care Teams with and without Advanced Practice Nurses

*Sumolchat Duangbubpha, Somchit Hanucharurnkul, Renu Pookboonmee, Pisamai Orathai,
Charn Kiatboonsri*

Abstract: The aims of this study were to: explore the level of implementation of a care model in chronic obstructive pulmonary disease care programs provided by healthcare teams with and without advanced practice nurses in community hospitals in northern and eastern Thailand; and, compare the difference of outcomes between the healthcare teams with and the healthcare teams without advanced practice nurses. The sample consisted of 210 Thais (105 for each type of care team) with chronic obstructive pulmonary disease who were receiving care from six selected community hospitals in northern and eastern Thailand. Data were analyzed via descriptive statistics, Chi-square, t-test, PERMANOVA and the Mann-Whitney U test.

The results revealed that all of the chronic care model components, except self-management support within the care team without advanced practice nurses, were implemented, at an acceptable level, within the chronic obstructive pulmonary disease care programs of both types of care teams. With respect to outcomes, those receiving care from the care teams with advanced practice nurses exhibited higher self-care behaviors and pulmonary function scores, shorter lengths of stay, and lower costs of care services, than those receiving care from care teams without advanced practice nurses. However, those receiving care from care teams without advanced practice nurses, compared to those receiving care from care teams with advanced practice nurses, were found to have higher physical functioning scores, and lower scores on impacts of coughing/breathlessness and chest problems, regarding health-related quality of life, as well as higher overall health-related quality of life. No other statistically significant differences were found, between individuals receiving care from the two types of care teams, regarding other parts of their health-related quality of life or the remaining outcomes.

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Introduction

Chronic obstructive pulmonary disease (COPD) has placed a large burden on the healthcare systems of many countries, including Thailand.[1, 2] Thus, there appears to be a need to improve healthcare systems so as to lessen this burden. Presently, use of the Chronic Care Model (CCM) and advanced practice nurses (APNs) are recognized as important strategies for dealing with comprehensive chronic illness care. The

Correspondence to: Sumolchat Duangbubpha, *RN, PhD (Candidate), Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, 270 Rama 6 Road, Phayathai, Bangkok 10400, Thailand.*
E-mail: sumolchat.pua@mahidol.ac.th
Somchit Hanucharurnkul, *RN, PhD. Professor Emeritus, Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.*
Renu Pookboonmee, *RN, DNS. Assistant Professor, Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.*
Pisamai Orathai, *RN, PhD. Assistant Professor, Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.*
Charn Kiatboonsri, *MD. Associate Professor, Department of Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.*

CCM is a broad model composed of core aspects of chronic care that support primary care practice and guide healthcare organization development.[3] While the Chronic Care Model (CCM) provides a guide for helping healthcare systems improve the quality of chronic care provided,[4] advanced practice nurses (APNs) have been shown to provide continuity of care and structure for the care team, as the care team members collaborate to achieve optimal healthcare outcomes.[5]

In Thailand, the National Health Security Office (NHSO) requires community hospitals to implement the CCM as a framework for chronic care.[6] In addition, since 2003, APNs have been recognized providers of quality chronic care.[7] In accord with their licensed roles, APNs provide both direct and collaborative quality care, as evidenced by the positive outcomes they have achieved, in a variety of settings.[8-10] However, the contributions of APNs and utilization of the CCM, as means for improving the Thai healthcare delivery system, rarely have been discussed. Therefore, there appears to be a need for empirical evidence regarding the ability of APNs to implement the CCM and improve the outcomes of chronic care.

Literature Review

To meet the eminent demands of chronic illnesses, especially COPD, a primary care approach that focuses on chronic illness care, home and community care services, integration of care processes, and a proactive care team has been recognized as suitable for use.[11, 12] The CCM was formulated by Wagner and colleagues[3] to provide a guideline for improvement of a healthcare system. The model addresses six essential components for providing optimal chronic illness care, including the: healthcare organization (ORG), focusing on the culture of the organization that promotes quality of chronic care; community resources (CR), focusing on partnership with other organizations; self-management support (SMS), focusing on patient and family encouragement and support for effective self-management; delivery system design (DSD), focusing on effective team work; decision support (DS), focusing on embedding evidence based practice; and, clinical information systems (CIS), focusing on sharing information between patients and care providers.[3]

The model fosters productive interactions between informed patients and prepared, proactive care providers, resulting in a higher quality of care and cost effectiveness.[3] Systematic reviews have demonstrated that interventions, based on the CCM components, were associated with significantly improved quality of outcomes in patients with various chronic health problems (i.e., diabetes mellitus, asthma, congestive heart failure, depression, hypertension, and osteoarthritis).[3, 13] Systematic reviews of the use of the CCM, with patients who with COPD, have illustrated that when such individuals receive interventions, based on two or more CCM components, they have, compared to patients in control groups, lower rates of hospitalization,[14, 15] fewer emergency room visits,[14] and shorter lengths of hospital stay.[14] The most commonly combined CCM components used in prior studies have been: nurse supported patients for self-management education and skills enhancement; clinical decision support through evidence-based guidelines and provider educational programs; and, case management.[14, 15]

Although the evidence indicates that the CCM is effective as a model for improving care for chronically-ill persons, it requires the innovative role of the healthcare team to achieve the goals. In order to implement the CCM, care providers should have the necessary capacities to support patient care, including: leadership; coordination of care; inter-professional collaboration; communication; self-management support; and, evidence-based practice.[11] APNs are well prepared to assume this role, because they are prepared to address the complexities of patients'

healthcare demands. According to the nature of the education and roles of APNs, they have specific competencies that correspond to the CCM components.[16] Previous studies of the implementation of the CCM, by healthcare teams with APNs, have demonstrated the effectiveness of the implementation of the CCM components.[17, 18]

Like other countries, the Thai healthcare system faces the burden of caring for persons with chronic illnesses, including diabetes and hypertension.[19] The Thai government has brought about needed reforms in this area by increasing the coverage of the healthcare infrastructure unit and strengthening primary care which is aimed at improving the accessibility, efficiency, and quality of the healthcare system.[20] Community and home-based healthcare are integrated into the primary care structure by having community hospitals provide medical services and support community participation. Since 2006, the CCM, throughout Thailand, has been used for improving access and equity in care services, with respect to chronic disease management.[6] In addition, APNs have been trained to serve the complex healthcare needs of patients with chronic illness. Thus, via use of the CCM as a framework, the objectives of this study were to: explore the level of each CCM implementation in COPD care programs in community hospitals provided by care teams with and without APNs; and, compare the differences of outcomes of care for patients with COPD between care teams with and without APNs, as measured by clinical outcomes (i.e., self-care behaviors, pulmonary function, physical function, and health-related quality of life) and organization outcomes (i.e., satisfaction with care, hospital admissions, length of stay, emergency room visits and cost of care services).

Method

Design: A comparative descriptive design was used in this study.

Ethical Considerations: The Institutional Review Board of the primary investigator's (PI) academic institution and the directors of the six community hospitals, used as study sites, approved conduct of the study. All potential participants were informed about: the purpose of the study; what participation in the study involved; confidentiality and anonymity issues; and, the right to withdraw without repercussions. All those involved in the study were asked to sign a consent form prior to inclusion.

Setting and Sample: The sample consisted of healthcare teams and patients with COPD. The healthcare teams were composed of care teams, with and without APNs, in the study site community hospitals. The inclusion criteria for the community hospitals were having a COPD clinic with > 100 registered patients with COPD. The care teams with APNs were selected prior to the care teams without APNs, in the same provinces, by matching the size of the community hospitals. Three pairs of matched community hospitals were created: one pair from the eastern region and two pairs from the northern region of Thailand. All six community hospitals: used the same health policies; had a similar organizational structure; had physicians as hospital directors; incorporated quality improvement of chronic illness into organization goals and management plans; and, used multidisciplinary care teams. In addition to healthcare services, all of the community hospitals: provided primary and secondary care; were connected to the hospital network for patient referral; used clinical practice guidelines; had a computer-based information system; and, had a disease registry system in their care services.

With respect to the care teams with APNs, the APNs were the head nurses of inpatient units and took responsibility for improving COPD care services. As a result, they established COPD care programs and asked for collaboration with other healthcare professionals. The APNs served as leaders, managers, secretaries, and facilitators of the care teams and made

sure that the care team members followed through on commitments, while the physicians were the chiefs of the patient care teams (PCTs) and were named as the heads of the COPD care programs. For the care teams without APNs, the physicians were chiefs of the PCTs, as well as the heads, leaders, and managers of each program. Healthcare professionals from several health care sectors participated as members of each care team. A senior head nurse, who was a member of the PCT, usually served as the secretary of each PCT and program, while an out-patient department nurse served as facilitator for each program in care team without APNs.

Generally, members of each team included a physician, a pharmacist, a physiotherapist, a nutritionist, and two or three registered nurses. Most of the team members had practiced for more than 10 years and held a bachelor's degree. The role of each team member was different depending on the discipline. However, the area of responsibility and role expectations, for each team member, were defined by APNs for care teams with APNs and by physicians for care teams without APNs.

The inclusion criteria for patients with COPD were: being diagnosed with COPD, as reflected in their respective medical records at the community hospitals; keeping at least 80% of the COPD clinic appointments within 12 months before participating in the study; understanding Thai; being able to communicate; and, being willing to participate in the study. Patients who demonstrated an unstable condition during the study (i.e., respiratory failure or unstable angina) were excluded. The names of potential subjects were obtained via review of the medical records at each of the community hospitals used as a study site.

Sample size was based on a yielded effect size of 0.48 for the exercise tolerance test of the community based care program for patients with COPD.[21] By using an α of 0.05, a medium effect size, and eight dependent variables, an n = 50 was necessary to meet a power of 0.82.[22] Hence, 50 patients with COPD,

who met the inclusion criteria, were expected to be included in each group. However, review of the patients' medical records revealed approximately 40 to 50 patients, in each selected hospital, met the inclusion criteria. Thus, the number of participants was increased so as to obtain a greater power for the test.

A total of 215 patients with COPD were approached. However, five refused to take part in the study because of inconvenience, leaving 210 patients who consented to participate. Of those 210 patients, 105 patients received care services from the care teams with APNs and 105 received care services from the care teams without APNs.

The demographic characteristic of the 210 patients with COPD, revealed they primarily: were male (n = 149; 71%); had an average age of 68.47 years (range = 35 – 90 years), with 81% being more than 60 years of age; had an average body mass index (BMI) of 19.74 (range = 12.37 – 31.78 kg/m^2), with 42.4% being underweight, 39% being of normal weight, 9.6% being overweight, and 9% being obese; were married (n = 137; 65.20 %); were Buddhists (n = 210; 100%); had an elementary level education (n = 163; 77.60%); were retired (n = 126; 60%); had a monthly income of less than 5,000 baht [30 baht = 1USD] (n = 179; 85.20%); had economical sufficiency (n = 177; 84.30%); were covered under the Universal Healthcare Coverage Scheme (n = 197; 93.80%); and, were cared for by their offspring (n = 96; 45.70%).

With respect to their clinical characteristics, related to COPD, they: had an average number of 1.28 co-morbidities (range = 0 – 5), with hypertension being the most common co-morbidity (n = 122; 58.10%); had an average duration of 6.95 years for having COPD (range = 0.40 – 35 years); smoked an average of 9.81 cigarettes/day (range = 0.50 – 40); were primarily ex-smokers (n = 179; 85.20%); were primarily smokers of banana leaves (n = 102; 52.00%); were without an exacerbation over the last

12 months (n = 117; 55.70%); and, had a dyspnea level of 1 (n = 87; 41.40%). No statistically significant differences were found, between the patients in the care teams with the APNs and those in the care teams without the APNs regarding their: age; gender; marital status; education; occupation; income level; health care services payment; caregiver; number and common types of co-morbidity; smoking status; number and type of cigarettes smoked; duration of COPD; exacerbation frequency; or dyspnea level. However, patients who received care from the care teams with APNs had significantly higher BMIs (median =19.72) and lower economic sufficiency (n = 81; 77.10%) than those who received care from the care teams without APNs ([median = 18.37] and [n =96; 91.40%], respectively).

Instruments: Data were obtained through use of five questionnaires, and physical and pulmonary function tests. Permission to use the instruments was obtained prior to use. To determine if the translated instruments were clear and understandable, a pilot test was conducted with 30 patients with COPD, who had received similar care services as the study subjects, at an out-patient unit in a community hospital. As a result of the pilot test, no changes were made to the instruments.

The *Personal Information Questionnaire (PIQ)* was developed for obtaining patients' data in two parts. Part-one addressed basic personal information, including each subject's: gender, age, BMI, marital status, religion, education, income, occupation, economic sufficiency, healthcare services payment, and caregiver. Part-two addressed each subject's clinical characteristics related to COPD, including: number and type of co-morbidities; duration of COPD diagnosis; smoking status; and, exacerbation history.

The *Self-Care Behaviors Questionnaire (SCBQ)* was an 18-item, self-report instrument, developed by Hanucharurnkul and colleagues,[8] that assessed self-care behaviors. Examples of the items were: *"You seek information and knowledge about*

COPD and its treatments" and *"You use proper medication doses and techniques."* The patients were asked to rate the intensity of the COPD self-care practice, they performed, on a three-point scale ("always practice" = 2; "practice sometimes" = 1; and "do not practice" = 0). The total score, which could range from 0 to 36, was calculated by summing the scores across all 18 items. A high score indicated high self-care behaviors. In this study, Cronbach's alpha coefficient for the instrument was found to be 0.73.

The *Health-Related Quality of Life Questionnaire (HRQOLQ)* was a 29-item self-report instrument, adapted from Saint George's Respiratory Questionnaire (SGRQ)[23] by Hanucharurnkul and colleagues,[8] for use within the Thai culture. The purpose of this five part questionnaire was to assess the respondents' health-related quality of life. Part I of the instrument consisted of eight items that requested information about the frequency of respiratory symptoms. Participants were asked to rate their symptoms, over the last three months. Items one through four (i.e. *"Over the past 3 months, I have coughed."*) had possible responses of: "most days during the week" = 4; "several days during the week" = 3; "a few days a month" = 2; "only with chest infection" = 1; and "not at all" = 0. Item five (*"During the past 3 months how many severe attacks of chest trouble have you had?"*) had possible responses of: "more than three attacks" = 4; "three attacks" = 3; "two attacks" = 2; "one attack" = 1; and, "no attacks" = 0. Item six (*"How long did the worst attack of chest trouble last?"*) had possible responses of: "a week or more" = 3; "three or more days" = 2; "one or two days" = 1; and, "less than a day." = 0. Item 7 (*"Over the past three months, in an average week, how many good days [with little chest trouble] have you had?"*) had possible responses of: "no good days" = 4; "one or two good days" = 3; "three or four good days" = 2; "nearly every day is good" = 1; and, "every day is good" = 0. Item 8 (*"If you have a wheeze, is it worse*

in the morning?") had possible responses of "yes" = 1 or "no" = 0. The score for Part I, which could range from 0 to 28, was obtained by summing the response values across all items. In this study, the Cronbach's alpha coefficient, for this part of the instrument, was 0.70. Part II of the instrument consisted of six items and requested information about the impacts of coughing and breathlessness. An example of an item was *"My cough makes me tired."* Possible responses to each item were: "true" = 1 or "false" = 0. The score for Part II of the instrument, which could range from 0 to 6, was obtained by summing the response values across all items. In this study, the Kuder-Richardson 20 coefficient, for this part of the instrument, was 0.72. Part III of the instrument consisted of 13 items and requested information regarding the impact of chest problems, at the present time, and the impact of chest problems on daily life. Examples of items were: *"I get afraid when I can't get my breath"* and *"I can't move far from my bed or chair."* Possible responses to each item were: "true" = 1; and "false" = 0. The score, for Part III of the instrument, which could range from 0 to 13, was obtained by summing response values across all items. In this study, the Kuder-Richardson 20 coefficient, for this part of the instrument, was 0.70. Part IV of the instrument consisted of one item (*"Please choose one sentence which you think best describes how your chest problems affects you ."*) that assessed the extent to which the respondent's perceived chest problems had an impact on him/her. Possible responses were: 0 = "I can do anything I would like to do"; 1 = "Chest problems stop me from doing one or two things I would like to do"; 2 = "Chest problems stop me from doing most of the things I would like to do"; and, 3 = "Chest problems stop me from doing everything I would like to do." The score for Part IV of the instrument was the numerical value of the one response given. The total score, for Part I through Part IV of the instrument, which could range from 0 to 50, was obtained by summing the response values across

all 28 items, with a high score suggesting a lower quality of life. Finally, Part V of the instrument consisted of one item (*"How would you rate your overall quality of life?"*) that asked the respondents to rate, at the present time, their quality of life on a scale of 0 = "lowest possible quality of life" to 100 = "highest possible quality of life." A score, which was calculated and used separately from the other four parts of the instrument, was the value between 0 and 100 that the respondents indicated. A high score indicated a high quality of life.

The *Satisfaction with Care Questionnaire (SCQ)* was a self-report instrument, developed by Suwisith and Hanucharurnkul,[24] used for the purpose of evaluating patients' perceptions of nursing care provided. In this study, the wording of the instrument was modified so that it evaluated patients' perceptions of COPD care services provided by APNs and healthcare teams. The 15-item instrument consisted of three dimensions: humanization of the care team (six items, i.e., *"The care team had an interest in and gave attention to your health problems."*); professional competency (two items, i.e., *"You received care from an expert care team."*); and, accessibility to COPD care service (seven items, i.e., *"You could easily and conveniently access the COPD care services."*). Respondents were asked to rate their satisfaction with COPD care services as either: 5 = "very strongly agree;" 4 = "strongly agree;" 3 = "moderately agree;" 2 = "somewhat agree;" or, "disagree" = 1. The total score, which could range from 15 to 75, was calculated by summing the response values across all items. A high score indicated high satisfaction with the care services received. In this study, Cronbach's alpha coefficient for the instrument was found to be 0.94.

Assessment of Chronic Illness Care (ACIC) -version 3.5[25] was a self-report instrument developed, by the MacColl Institute for Healthcare Innovation, for the purpose of assessing the level of improvement made in the care service system by the healthcare team.

In this study, the instrument was used to evaluate the perception of the care teams regarding the level that each CCM component implemented in the COPD care program. The Thai version of the instrument, translated by Gomutbutra and colleagues, was used in this study.[26] The 32-item instrument contained seven sections: healthcare organization (four items, i.e., *"The overall organizational leadership in COPD care"*); community linkage and policies (three items, i.e., *"Linking patients to outside resources"*); self-management support (four items, i.e., *"Assessment and documentation of self-management needs and activities"*); decision support (four items, i.e., *"Evidence-based guidelines"*); delivery system design (six items, i.e., *"Practice team functioning"*); clinical information system (five items, i.e., *"Patient treatment plans"*); and, integration (six items, i.e., *"Informing patients about guidelines"*).[26] The members of each team were asked to work together to complete the ACIC by rating, on a scale of 0 = "limited implementation" to 11 = "optimal implementation," the level at which each CCM component was utilized in their respective COPD care program. The score for each section was obtained by summing the values for all items within the respective section (i.e., healthcare organization) and dividing that value by the number of items within the section. The overall score for the instrument, which could range from 0 to 11, was obtained by summing the average scores of each section and dividing by 7 (the number of sections). Interpretation of the range of scores was: "0 to 2" = limited CCM implementation; "3 to 5" = basic CCM implementation; "6 to 8" = good CCM implementation; and, "9 to 11" = full CCM implementation.

The *Physical and Pulmonary Function Test Form (PPFT)* was used to record the walked distance and maximum flow rate generated, by each patient, during a forceful exhalation or peak expiratory flow rate (PEFR). In this study, the six-minute walk test (6MWT) was used to assess functional performance and exercise capacity by measuring the distance walked, in meters, within six minutes. The 6MWT has good sensitivity and specificity for predicting and differentiating the survival of patients with COPD (73% and 80% respectively).[27] A mini peak expiratory flow meter was used to evaluate the pulmonary function of patients by measuring the PEFR in liters. This instrument has exhibited good sensitivity and specificity for use as a screening test for COPD with Thai people (72.2% and 81.1% respectively).[28]

Procedure: Following approval to conduct the study, data were collected between October 2011 and April 2012. After potential patient participants for each care teams were identified, they were approached during their next appointment at their respective COPD clinic. Questionnaires were administered to all patient participants, via interview by the PI, in the following order: PIQ, SCBQ, HRQOLQ, and SCQ. It took 30 to 45 minutes to complete the interview with each patient. The interviews were performed at the COPD clinic while the patients were waiting for or after they had finished their follow-up appointments. After the interview, the 6MWT and PEFR were performed. The number of ER visits, hospital admissions, length of hospital stay, and cost of care service, which were recorded in the medical records of the participants, were reviewed one year, retrospectively, and recorded. During the process of the patients' data collection, members of all of the teams were asked to complete, together, the ACIC.

Data Analysis: Descriptive statistics were used to analyze the patients' characteristics. Chi-square, t-test, and Mann-Whitney U tests were used to compare the differences between the patients receiving care from the teams with an APN and the teams without an APN. Nine of the outcome variables (self-care behaviors, pulmonary function, physical function, HRQOL, satisfaction with care, hospital admissions, length of hospital stay, emergency room visits, and cost of care) were analyzed via non-parametric multivariate analysis of variance (PERMANOVA) and the Mann-Whitney U test.

Results

CCM Implementation Scores: As shown in **Figure 1**, the average score of the healthcare organization component of the assessment of chronic illness care (ACIC) instrument, for the care teams with APNs and the care teams without APNs, were similar. However, the care teams with APNs had higher scores than the care teams without APNs in the remaining components of the ACIC: delivery system design; self-management support; decision support; clinical information system; community resources; integration; and overall ACIC. The score on the self-management support component of the ACIC was the lowest score reflected, for both care teams, whereas the score on the delivery system design component was the highest.
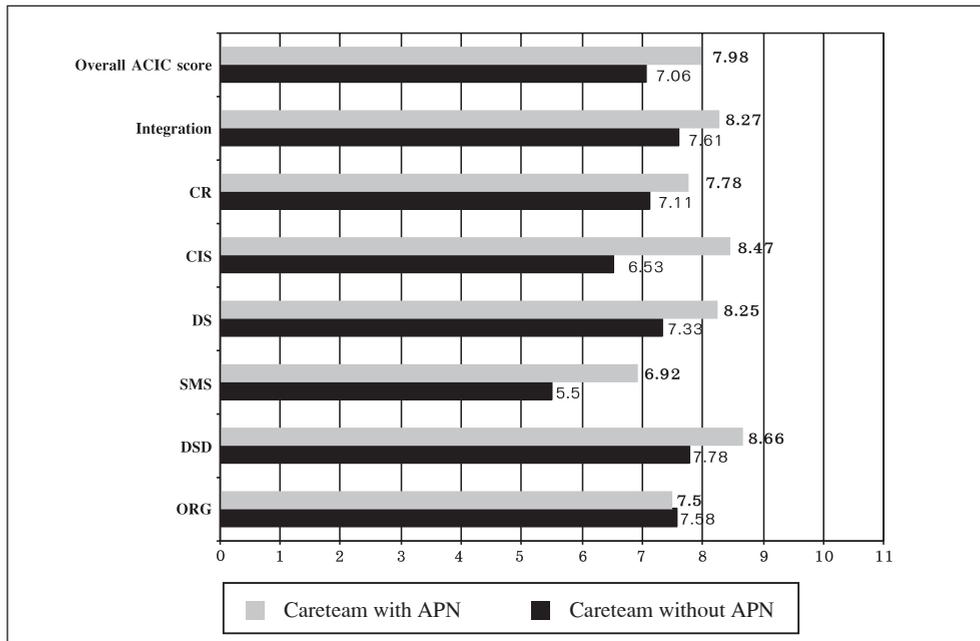

Figure 1 Average Assessment of Chronic Illness Care (ACIC) Scores of Care Teams with APNs and Care Teams without APNs

Note: ORG = health care organization; DSD = delivery system design; SMS = self-management support; DS = decision support; CIS = clinical information system; CR = community resources.

Targeted Outcomes: As shown in **Table 1** and **Table 2**, patients receiving services from the care teams with APNs, compared to those receiving services from care teams without APNs, had significantly higher self-care behaviors and pulmonary function scores, and significantly lower lengths of hospital stays and cost of care services. On the other hand, patients receiving services from care teams without APNs had significantly higher physical function scores, and significantly lower scores on the impacts, at the present time, of cough and breathlessness, as well as chest problems. No significant differences were found in patients' scores, between those receiving services from the care teams with APNs and those receiving services from the care teams without APNs, regarding satisfaction with care, hospital admissions, emergency room visits, and the other components of health-related quality of life.

Table 1 Comparison of Clinical Outcomes and Organizational Outcomes between Care Teams with APNs and Care Teams without APNs

Variables	Total n = 210	Teams with APNs n = 105	Teams without APNs n = 105	Z	p
Self−care behaviors (total scores = 36)				−2.06	.020
Mean rank		114.04	96.96		
Median (scores)	32.00	32.00	32.00		
Max (scores)	36.00	36.00	35.00		
Min (scores)	17.00	17.00	20.00		
Physical function				−2.70	.003
Mean rank		94.21	116.79		
Median (milliliters)	324.50	312.00	358.00		
Max (milliliters)	518.00	489.00	518.00		
Min (milliliters)	104.00	169.00	104.00		
Pulmonary function				−2.39	.008
Mean rank		115.50	95.50		
Median (milliliters)	195.00	200.00	180.00		
Max (milliliters)	580.00	500.00	580.00		
Min (milliliters)	60.00	90.00	60.00		
Satisfaction with care (total scores = 75)				−0.20	.419
Mean rank		104.75	106.25		
Median (scores)	75.00	75.00	75.00		
Max (scores)	75.00	75.00	75.00		
Min (scores)	35.00	61.00	35.00		
Hospital admissions	n = 26	n = 14	n = 12	−0.51	.352
Mean rank		12.93	14.17		
Median (times)	1.00	1.00	1.00		
Max (times)	5.00	2.00	5.00		
Min (times)	1.00	1.00	1.00		
LOS	n = 26	n = 14	n = 12	−1.78	.038
Mean rank		11.04	16.38		
Median (days)	5.00	4.00	8.50		
Max (days)	18.00	13.00	18.00		
Min (days)	1.00	2.00	1.00		
ER visits	n = 39	n = 25	n = 14	−0.02	.494
Mean rank		19.98	20.04		
Median (times)	1.00	1.00	1.00		
Max (times)	12.00	9.00	12.00		
Min (times)	1.00	1.00	1.00		
Cost of care services	n = 56	n = 35	n = 21	−2.19	.014
Mean rank		24.80	34.67		
Median (baht)	1573.50	1144.00	3760.00		
Max (baht)	87042.00	21366.00	87042.00		
Min (baht)	140.00	170.00	140.00		

Note: LOS = length of hospital stay; ER = emergency room

Table 2   Comparison of Health Care Quality of Life between Care Teams with APNs and Care Teams without APNs

HRQL	Total n = 210	Teams with APNs n = 105	Teams without APNs n = 105	Z	p
Symptoms over last 3 months (total scores = 28)				−0.78	.217
Mean rank		108.76	102.24		
Median (scores)	6.00	7.00	6.00		
Max (scores)	23.00	23.00	19.00		
Min (scores)	0.00	0.00	0.00		
Impacts of cough and breathlessness, at present (total scores = 6)				−2.27	.011
Mean rank		114.75	96.25		
Median (scores)	1.00	2.00	1.00		
Max (scores)	6.00	6.00	6.00		
Min (scores)	0.00	0.00	0.00		
Impacts of chest problems, at present (total scores = 8)				−2.33	.010
Mean rank		115.13	95.87		
Median (scores)	4.00	4.00	4.00		
Max (scores)	7.00	6.00	7.00		
Min (scores)	0.00	0.00	0.00		
Impact on daily life (total scores = 5)				−2.07	.019
Mean rank		111.67	99.33		
Median (scores)	0.00	0.00	0.00		
Max (scores)	5.00	4.00	5.00		
Min (scores)	0.00	0.00	0.00		
Perception of whole impact (total scores = 3)				−1.60	.055
Mean rank		111.51	99.48		
Median (scores)	0.00	0.00	0.00		
Max (scores)	3.00	3.00	3.00		
Min (scores)	0.00	0.00	0.00		
Total HRQL (total scores = 50)				−2.23	.013
Mean rank		114.84	96.16		
Median (scores)	13.00	13.00	10.00		
Max (scores)	33.00	33.00	32.00		
Min (scores)	2.00	2.00	3.00		
Quality of life rating (total scores = 100)				−0.55	.292
Mean rank		103.38	107.62		
Median (scores)	100.00	90.00	100.00		
Max (scores)	100.00	100.00	100.00		
Min (scores)	30.00	50.00	30.00		

Note: HRQL = health-related quality of life

Discussion

CCM Implementation: The COPD care programs provided by the care teams with APNs had a higher level of CCM implementation than the care teams without APNs. The administrative position and roles of the APNs appeared to influence the level of CCM implementation. As members of hospital committees, holding head nurse positions, and being leaders of the care teams, the APNs had the responsibility and authority to improve quality of COPD care by integrating their advanced knowledge, clinical expertise, competencies, and unique skills into the COPD care programs. However, for both types of care teams, the health care organization scores and overall ACIC scores indicated good support (score 6-8), from the organization leaders, and good CCM implementation. This could have been due to the National Health Policy on Chronic Illness Improvement that required community hospitals to implement the CCM in order to improve the quality of their chronic care services.[19] As a result of the policy, directors of all community hospitals had to provide support for all components of the CCM. However, similar to the findings of a prior study in northern Thailand,[29] both types of care teams had the lowest scores on the self-management support component of the ACIC. This may have been be due to the increase of care service accessibility brought about by the universal healthcare coverage scheme, resulting in a 12.24% increase in out-patient care services and a 22.22% increase in in-patient care services between 2003 and 2008.[30] In addition, manpower shortages and high workloads (i.e. lack of time)[31] were noted to be present, among the team members in the organizations used as study sites, which also could have served as significant barriers to the implementation of self-management support.

Targeted Outcomes: Patients in the COPD care programs who received services from care teams with APNs, compared to those who received services from care teams without APNs, had higher self-care behaviors and pulmonary function, and lower lengths of hospital stay and cost of care services. The high level of CCM implementation among the care teams with the APNs could have affected various outcomes in this study. For example, self-management support is a major component of the CCM[32] and is important for COPD care management. The goals of self-management support are to empower and prepare patients to be active and informed participants regarding their healthcare. With advanced education, clinical expertise, competencies, and skills (i.e., coordination, collaboration, and communication), the APNs could lead and support multidisciplinary teams to provide education and skills training that empowered patients to perform appropriate self-care (i.e., accurate use of inhaler medications, promotion of breathing and physical exercise, smoking cessation, early recognition and treatment, and prevention of exacerbation).[33] In addition, APNs integrated other CCM components by using clinical practice guidelines and performing an effective care delivery design (i.e., planned care, appointments, home visits, and case management). As case managers, the APNs used behavioral change interventions, associated with improved health behaviors,[34] by collaborating with patients to identify health problems, develop specific behavioral goals, and make decisions regarding their health. Moreover, the APNs coordinated with community resources and collaborated with team members. This collaborative care was able to create productive interactions among the APNs, team members, and patients for the purpose of improving patients' confidence in their ability to manage and maintain specific self-care behaviors, a crucial process of self-management. Additionally, one APN developed innovative care such as "blow bottles" in order to assist patients in performing pulmonary exercises. Thus, the integration of these effective interventions facilitated improvement in the patients' disease specific knowledge

and self-care skills, which, in turn, most likely enhanced their good self-care behaviors and pulmonary function.

Integrating multiple interventions of the CCM components[35] and using case management[36, 37] affected the length of hospital stays and cost of care services in patients receiving services from the care teams with APNs. As members of quality improvement committees and as case managers, the APNs collaborated with team members to use discharge planning for assessing and preparing patients, regarding their capacities to manage their own health. The APNs also accessed patient information in order to identify patients' specific healthcare needs, as well as identify those who may be at a high risk of hospitalization. Such actions could have reduced re-hospitalizations, increased appropriate hospital discharges, and decreased both length of hospital stays and cost of care services.

Patients receiving services from care teams without advanced practice nurses, compared to those receiving care from care teams with advanced practice nurses, were found to have higher physical functioning scores, and lower scores on impacts of coughing/breathlessness and chest problems, regarding health-related quality of life, as well as higher overall health-related quality of life. This may have been due to the influence patient characteristics had on physical function and HRQL.[38, 39] There were more females and patients with cardiovascular disease, high BMIs, and lower economic sufficiency in the care teams with APNs. The presence of cardiovascular disease and high BMIs, as well as being female, could have been important factors influencing the ability to carry out some aspects of physical functioning,[38] and the impact that coughing/breathlessness and chest problems imposed.[39] In addition, dealing with problems in physical and pulmonary functioning, and economic insufficiency could have influenced overall health-related quality of life in patients cared for by the teams with APNs.[39, 40]

Limitations

When applying the findings of this study, the study's limitations need to be taken into consideration. First, problems were encountered in administering some parts of the Self-Care Behavior Questionnaire. Patients from northern Thailand are multi-ethnic and use multiple languages. Although they can understand Thai, some of the items in the questionnaires were too difficult for them to comprehend. This may have affected the outcome of the measurements. Secondly, generalizability of the findings is limited because the community hospitals, used as study sites, were from specific areas in Thailand. Thus, generalizability to all parts of Thailand is not possible. However, the findings do provided a general picture of the level of CCM implementation in COPD care programs in some community hospitals.

Conclusions and Recommendations

The results indicated a good level of CCM implementation in certain COPD care programs, especially those with care team with APNs. The role of the APNs, in implementing the CCM in their respective COPD care programs, resulted in positive outcomes: improved pulmonary function, improved self-care behaviors, reduction in cost of care services, and reduction in length of hospital stay. However, in order to compare the process/level of CCM implementation and care outcomes, the study of CCM implementation should be replicated using: patients with various chronic conditions; a variety of healthcare organizations; and various types of multidisciplinary teams.

Acknowledgement

References

1. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data. Lancet. 2006; 367(9524): 1747-57.

2. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. 2009. [Update 2009; cited 2010 Apr 20]. Available from: www.goldcopd.com.

3. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. JAMA. 2002; 9(14): 1775-9.

4. Glasgow RE, Orleans CT, Wagner EH. Does the chronic care model serve also as a template for improving prevention? Milbank Q. 2001; 79: 579-612.

5. Watts S, Gee J, O'Day M, Schaub K, Lawrence R, Aron D, et al. Nurse practitioner-led multidisciplinary teams to improve chronic illness care: The unique strengths of nurse practitioners applied to shared medical appointments/group visits. J Am Acad Nurse Pract. 2009; 21(3): 167-72.

6. National Health Security Office. The development of patient care and chronic disease with high costs [Internet]. 2007 [cited 2010 Jan 20]. Available from: http://www.nhso.go.th/NHSOFront/SelectViewItemAction.do?folder_id=000000000003828&item_id=000000000010441.

7. Hanucharurnkul S. Development of advanced practice nursing. In: Hanucharurnkul S, Panpakdee O, editors. Development of advanced practice nursing: Integration into practice. Bangkok: Joodthong; 2010. p. 13-38. [Thai]

8. Hanucharurnkul S, Panpakdee O, Intrasombat P, Nantachaipan P, Partiprajak S, Namjuntra R, et al. Research report: Cost effectiveness of advanced practice nurses (APNs) in the Thai healthcare system. Bangkok, Thailand: Joodthong; 2011. [Thai]

9. Hanprasitkam K, Namjantra R, Hanucharurnkul S, Supametaporn P, Nateetanasombat K, Soivong P. Advanced practice nurses' efficiency in caring for breast cancer patients. Thai J Nurs. 2012; 27(3): 45-62. [Thai]

10. Partiprajak S, Hanucharurnkul S, Piaseu N, Brooten D, Nityasuddhi D. Outcomes of an advanced practice nurse-led type-2 diabetes support group. Pacific Rim Int J Nurs Res. 2011; 15(4): 288-304.

11. Rothman AA, Wagner EH. Chronic illness management: What is the role of primary care? Ann Intern Med. 2003; 138(3): 256-61.

12. Hefford B. Future delivery of community based health and care service. Report for Margot Mains, Chief Executive, Capital & Coast District Health Board [Internet]. 2003 [cited 2010 Jan 13]. Available from: http://www.ccdhb.org.nz/planning/homecommunity/Community%20based%20services%20CCDHB%20final.pdf.

13. Tsai AC, Morton SC, Mangione CM, Keeler EB. A meta-analysis of interventions to improve care for chronic illnesses. Am J Manag Care. 2005; 11(8): 478-88.

14. Adams SG, Smith PK, Allan PF, Anzueto A, Pugh JA, Cornell JE. Systematic review of the chronic care model in chronic obstructive pulmonary disease prevention and management. Arch Intern Med. 2007; 167: 551-61.

15. Lemmens KM, Nieboer AP, Huijsman RA. Systematic review of integrated use of disease-management interventions in asthma and COPD. Respir Med. 2009; 103(5): 670-91.

16. Bodenheimer T, MacGregor K, Stothart N. Nurses as leaders in chronic care. BMJ. 2005; 330(7492): 612-13.

17. McCauley KM, Bixby M, Naylor MD. Advanced practice nurse strategies to improve outcomes and reduce cost in elders with heart failure. Disease Manag. 2006; 9: 302-10.

18. Nuovo J. The impact of planned visits on patients with type 2 diabetes mellitus. Clin Med Insights Endocrinol Diabetes. 2009; 2: 7-14.

19. National Health Security Office. Management of chronic disease: Prevention and control of diabetes and hypertension [Internet]. 2010 [cited 2010, Jan 20]. Available from: http://www.nhso.go.th/downloadfile/fund/%E0%B8%84%E0%B8%B9%E0%B9%88%E0%B8%A1%E0%B8%B7%E0%B8%AD%E0%B9%80%E0%B8%A5%E0%B9%88%E0%B8%A14DM_HT.pdf .

20. Jongudomsuk P. The third wave of health care reform in Thailand. J Health Syst Res. 2009; 3(4): 482-88. [Thai]

21. Noonill N. The effectiveness of a community-based care program on health outcomes and satisfaction with care in patients with chronic obstructive pulmonary disease [dissertation]. Bangkok, Thailand: Mahidol Univ; 2006.

22. Stevens JP. Applied multivariate statistic for the social science. 5th ed. New York (NY): Routledge; 2009.

23. Jones PW, Quirk FH, Baveystock, CM. The St George's Respiratory Questionnaire. Resp Med. 1991; 85(Suppl B): 25-31.

24. Suwisith N, Hanucharurnkul S. Development of an assessment tool for patient satisfaction with nursing care. Rama Nurs J. 2011; 17(2): 264-77. [Thai]

25. Bonomi ME, Wagner EH, Glasgow RE, VonKorff M. Assessment of chronic illness care (ACIC): A practical tool to measure quality improvement. Health Serv Res. 2002; 37(3): 791-820.

26. Gomutbutra P, Aramrat A, Sattapansri W, Chutima S, Tooprakai D, Sakarinkul P, *et al.* Reliability and validity of a Thai version of assessment of chronic illness care (ACIC). J Med Assoc Thai. 2012; 95(8): 105-13.

27. De Torres JP, Casanova C, Cote CG, López MV, Díaz O, María Marin J, *et al.* Six-minute walking distance in women with COPD. COPD. 2011; 8(4): 300-5.

28. Maranetra N, Chuaychoo B, Naruman C, Lertakyamanee J, Dejsomritrutai W, Chierakul N, *et al.* The cost-effectiveness of mini peak expiratory flow as a screening test for chronic obstructive pulmonary disease among the Bangkok elderly. J Med Assoc Thai. 2003; 86(12): 1133-9.

29. Gomutbutra P, Sukkarinkul P, Tuprakai D. The study of pattern and quality of home health care service in the upper northern part of Thailand. Thai Prim Care Family Med. 2009; 1(3): 7-15. [Thai]

30. National Health Security Office. NHSO Annual Report 2008 [Internet]. 2008 [Cited 2010 Jan 20]. Available from: http://www.nhso.go.th/eng/Files/content/255503/ d0bf51c2-1121-4d35-aeae-691c1fdc1fb4- 129775552736772500.pdf.

31. Jordan JE, Briggs AM, Brand CA, Osborne RH. Enhancing patient engagement in chronic disease self-management support initiatives in Australia: The need for an integrated approach. Med J Aust. 2008; 189(10): 9-13.

32. Wagner EH, Austin B, Von Korff M. Organizing care for patients with chronic illness. Millbank Q. 1996; 74(4): 511-44.

33. Casas A, Troosters T, Garcia-Aymerich J, Roca J, Hernández C, Alonso A, *et al.* Integrated care prevents hospitalisations for exacerbations in COPD patients. Eur Respi J. 2006; 28(1): 123-30.

34. Handley M, MacGregor K, Schillinger D, Sharifi C, Wong S, Bodenheimer T. Using action plans to help primary care patients adopt healthy behaviors: A descriptive study. J Am Board Fam Med. 2006; 19: 224-31.

35. Adams SG, Smith PK, Allan PF, Anzueto A, Pugh JA, Cornell JE. Systematic review of the chronic care model in chronic obstructive pulmonary disease prevention and management. Arch Intern Med. 2007; 167: 551-61.

36. Purdy S. Avoiding Hospital Admissions: What does the research say? London: The King's Fund [Internet]. 2010 [cited 2012 Oct 15]. Available from: http://www. kingsfund.org.uk/publications/avoiding_hospital.html .

37. Singh D. Transforming chronic care: Evidence about improving care for people with long-term conditions. Birmingham: Health Services Management Centre, University of Birmingham [Internet]. 2005 [cited 2012 Oct 14]. Available from: http://www.download.bham.ac.uk/hsmc/pdf/ transforming_chronic_care.pdf.

38. American Thoracic Society. ATS statement: Guidelines for the six-minute walk test. Am J Respi Crit Care Med. 2002; 166: 111-7.

39. Tsiligianni I, Kocks J, Tzanakis N, Siafakas N, Van der Molen T. Factors that influence disease-specific quality of life or health status in patients with COPD: A review and meta-analysis of Pearson correlations. Prim Care Respi J. 2011; 20(3): 257-68.

40. Tavallaii SA, Einollahi B, Azizabadi Farahani M, Namdari M. Socioeconomic links to health-related quality of life, anxiety, and depression in kidney transplant recipients. Ira J Kidney Dis. 2009; 3(1): 40-44.

การปฏิบัติตามรูปแบบการดูแลผู้ป่วยเรื้อรังและผลลัพธ์ในผู้ป่วยโรคปอดอุดกั้นเรื้อรังโดยทีมผู้ดูแลที่มีและไม่มีผู้ปฏิบัติการพยาบาลขั้นสูง

สุมลชาติ ดวงบุบผา, สมจิต หนุเจริญกุล, เรณู พุกบุญมี, พิศสมัย อรทัย, ชาญ เกียรติบุญศรี

บทคัดย่อ: การศึกษานี้มีวัตถุประสงค์เพื่อ ศึกษาระดับการนำรูปแบบการดูแลผู้ป่วยเรื้อรังไปปฏิบัติในโปรแกรมการดูแลผู้ป่วยโรคปอดอุดกั้นเรื้อรังโดยทีมผู้ดูแลที่มีและไม่มีผู้ปฏิบัติการพยาบาลขั้นสูงในโรงพยาบาลชุมชนทางภาคเหนือ และภาคตะวันออกของประเทศไทย และเปรียบเทียบความแตกต่างของผลลัพธ์ระหว่างทีมผู้ดูแลทั้งสองทีม กลุ่มตัวอย่างเป็นผู้ป่วยโรคปอดอุดกั้นเรื้อรังชาวไทย จำนวน 210 คน (ผู้ป่วย 105 คนต่อทีม) ที่ได้รับการดูแลจากโรงพยาบาลชุมชนที่ได้รับการคัดเลือก 6 แห่งทางภาคเหนือและภาคตะวันออกของประเทศไทย วิเคราะห์ข้อมูลโดยใช้สถิติ Chi-square, t-test, PERMANOVA และ Mann-Whitney U tests

ผลการศึกษาพบว่าทีมผู้ดูแลที่มีและไม่มีผู้ปฏิบัติการพยาบาลขั้นสูงนำทุกองค์ประกอบของรูปแบบการดูแลผู้ป่วยเรื้อรังไปปฏิบัติในโปรแกรมการดูแลผู้ป่วยโรคปอดอุดกั้นในระดับที่ยอมรับได้ทั้งสองทีม ยกเว้นองค์ประกอบด้านการสนับสนุนการจัดการตนเองในทีมผู้ดูแลที่ไม่มีผู้ปฏิบัติการพยาบาลขั้นสูง ในส่วนผลลัพธ์พบว่า กลุ่มผู้ป่วยที่รับการดูแลจากทีมผู้ดูแลที่มีผู้ปฏิบัติการพยาบาลขั้นสูงมีคะแนนพฤติกรรมการดูแลตนเองและสมรรถภาพปอดสูงกว่า รวมทั้งมีจำนวนวันนอนโรงพยาบาล และค่าใช้จ่ายในการรักษาน้อยกว่ากลุ่มผู้ป่วยที่ได้รับการดูแลจากทีมผู้ดูแลที่ไม่มีผู้ปฏิบัติการพยาบาลขั้นสูง อย่างไรก็ตามพบว่า กลุ่มผู้ป่วยที่ได้รับการดูแลจากทีมผู้ดูแลที่ไม่มีผู้ปฏิบัติการพยาบาลขั้นสูงมีสมรรถภาพร่างกายสูงกว่า มีคะแนนคุณภาพชีวิตด้านผลกระทบจากการไอ/การหายใจไม่สะดวกและผลกระทบจากปัญหาการหายใจต่ำกว่า รวมทั้งมีคุณภาพชีวิตโดยรวมสูงกว่ากลุ่มผู้ป่วยที่ได้รับการดูแลจากทีมผู้ดูแลที่มีผู้ปฏิบัติการพยาบาลขั้นสูง สำหรับคะแนนคุณภาพชีวิตด้านอื่นๆ และผลลัพธ์ที่เหลือพบว่าไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติระหว่างผู้ป่วยทั้งสองกลุ่ม

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คำสำคัญ: รูปแบบการดูแลผู้ป่วยเรื้อรัง/ ผู้ป่วยโรคปอดอุดกั้นเรื้อรัง/ ผู้ปฏิบัติการพยาบาลขั้นสูง/ ผลลัพธ์

ติดต่อที่: สุมลชาติ ดวงบุบผา, *RN, PhD (Candidate), นักศึกษาปริญญาเอก โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพมหานคร ประเทศไทย* ***E−mail:*** *sumolchat.pua@mahidol.ac.th*
สมจิต หนุเจริญกุล, *RN, PhD. ศาสตราจารย์เกียรติคุณ โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพมหานคร ประเทศไทย*
เรณู พุกบุญมี, *RN, DNS. ผู้ช่วยศาสตราจารย์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพมหานคร ประเทศไทย*
พิศสมัย อรทัย, *RN, PhD. ผู้ช่วยศาสตราจารย์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพมหานคร ประเทศไทย*
ชาญ เกียรติบุญศรี, *MD. ผู้ช่วยศาสตราจารย์, หน่วยโรคระบบการหายใจและเวชบำบัดวิกฤต คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพมหานคร ประเทศไทย*