Outcomes of an Advanced Practice Nurse-Led Type-2 Diabetes Support Group

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Abstract: The purpose of this mixed methods study was to: a) compare differences in outcomes of diabetes care between patients with type-2 diabetes attending an advanced practice nurse- led support group and patients who did not attend the group; and, b) examine the process of advanced practice nurse care services and care management for support group patients. Outcomes of diabetes care included: body mass index, blood pressure, lipid profile, glycated hemoglobin, hospitalization, self- care abilities, quality of life and satisfaction with care. The subjects, 100 type-2 diabetics receiving care in a tertiary care hospital in southern Thailand, were placed into the support group (n= 44) or the comparison group (n = 56). Quantitative data were collected via a: Personal and Medical Information Questionnaire; Diabetes Self-Care Abilities Assessment; Diabetes Quality of Life Questionnaire; and, Satisfaction with Nursing Care Questionnaire. Qualitative data, regarding advanced practice nurse care services and care management, were obtained via interview and observation. The quantitative data were analyzed using MANOVA, t-tests and Mann-Whitney U test, while the qualitative data were analyzed via content analysis.

The results indicate the advanced practice nurse-led support group members had: lower systolic blood pressures ($p < .05$), as well as higher self-care abilities ($p < .001$), quality of life ($p < .001$) and satisfaction with care ($p < .001$), compared to those in the comparison group. The advanced practice nurse care services and care management of the members of the support group were found to include: monitoring and managing health problems; facilitating group exercises; providing self-management education; collaborating with multidisciplinary team members; establishing continuity of care and holistic care services; and, consulting with patients and healthcare providers.

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Introduction

Measuring outcomes of advanced practice nurses (APNs) has become essential in: identifying APNs contribution to the healthcare system; justifying its institutionalization; and, providing empirical evidence required for policy development.[1] Internationally, there has been evidence regarding the effectiveness of APNs in diverse groups of patients in various settings.[2] Even though the model

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of APNs' care was introduced into the healthcare system in Thailand in 2002,[3] no published evidence could be found regarding APNs' care outcomes among specific groups. If the effectiveness of APNs is not recognized, the career advancement and existence of APNs will suffer. Therefore, data regarding APNs' care outcomes, throughout Thailand, are required for APNs to survive within the discipline nursing and the healthcare system.

To be effective, measurement of APNs' care outcomes needs to focus on target populations in which APNs are directly engaged. The scope of Thai APN practice, set by the Thailand Nursing and Midwifery Council (TNMC), involves providing direct care to patients with complex health problems and effectively managing care for specific groups of patients.[3] Due to their daunting healthcare needs and the intricacy of care management needed to achieve optimal health outcomes, patients with type-2 diabetes are one of the foremost target populations requiring APN care. The incidence and impact of type-2 diabetes is increasing throughout Thailand, as well as internationally.[4] APNs are expected to improve outcomes of care because of their philosophical orientation, educational preparation, roles and scope of practice. Thus, APNs can provide the requisite flexible and individualized care in a holistic way to meet patients' needs within their cultural environment.[5]

Internationally, favorable outcomes of APN direct care of patients with diabetes has been documented.[6,7] However, it is not known if APNs care of patients with diabetes in Thailand will result in desirable outcomes. Thus, the present study was conducted in a tertiary care hospital in Southern Thailand to examine the effects on patient outcomes of an APN-led diabetes support group in collaboration with a multidisciplinary team. The aims of the study were to: a) compare differences in outcomes of diabetes care between patients with type-2 diabetes attending an APN-led support group and patients who did not attend; and b) examine the process of APN care services and care management for patients in an APN-led support group.

Literature Review

Even though there is not an international definition of an APN, there is general agreement that APNs extend the traditional scope of nursing, embrace highly autonomous practice, maximize the use of nursing knowledge and contribute to the development of nursing.[8,9] The primary criteria for APNs, proposed by Hamric,[9] are widely accepted and includes a nurse having: an earned graduate degree with concentration in an advanced practice nursing role and specialty; national certification of practice at an advanced level within a given specialty; and, a practice focused on patients and their families. With these qualifications, APNs can play an important role in complex health care systems and optimize care outcomes.

Outcomes of APNs' practices and care that contribute to optimal outcomes needs to be documented and reported in order for APNs to gain acceptance from health care entities, employers, members of other disciplines and consumers of health care. Fortunately, outcomes research has increased and centers on quality of care. Health care organizations have become actively involved in monitoring patient outcomes as a means of evaluating patient care, as well as to meet requirements for agency accreditation.[2] Thus, measurement of APNs care outcomes has become an essential parameter. Throughout the literature, APNs outcomes of care are reported in regards to their: clinical enhancement; quality of service; functionality and cost savings; and, increasing quality and improving access to healthcare. In addition, APNs' care outcomes have been examined within a variety of patient groups, in various settings, with favorable outcomes being demonstrated.[10,11]

Randomized clinical trials of clinical nurse specialists' effectiveness, using discharge planning, home visits and telephone follow-up, as interventions, have been demonstrated in a study of early discharge of five different populations, including: low birth weight infants; women with unplanned cesarean births, high risk pregnancies and hysterectomies; and, older adults with cardiac diagnoses, using protocols designed to guide APNs in delivery of care.[12] Surveillance and monitoring of patients' signs/ symptoms have been identified as the most frequent components of the APNs' interventions.[13] In many of the studies, the link between outcomes and process of care cannot be determined.[14] Brooten and colleagues found, in mining data from five randomized clinical trials, patient groups, that had greater mean time and per patient contact with an APN, had greater improvements in care outcomes and healthcare cost savings.[12]

In diabetes care, care delivery by nurse specialists has shown successful outcomes.[14] Such outcomes have been hypothesized to be the result of the nurses' ability to provide specific care to meet the clinical, educational, and psychosocial needs of patients with diabetes.[15] However, caution is needed regarding the conceptualization of APNs. Although the term, "nurse specialist," was used, it does not indicate whether the nurses' educational preparation was at the master's level. Studies of APNs' diabetes care outcomes have been limited and mainly attributed to nurse practitioners (NPs). Although one such study suggested positive clinical outcomes, using a model of shared APN care,[16] others have found no differences regarding care outcomes.[17] Thus, the process of care and interventions seem to be equally important in the competence of the care providers.

Self-management is one of the most important interventions needed to improve diabetes care outcomes.[18] However, the effectiveness of self-management education has been found to be short-lived.[19] Such programs, generally, have not been sufficient for diabetics to maintain good health behaviors over a lifetime.[20] Although self-management programs include behavioral strategies that are expected to be effective, the behaviors often cannot be sustained, regardless of ongoing support.[21] Thus, it appears self-management needs to be used along with other strategies.

Peer support intervention is one strategy that, increasingly, has been employed for patients with diabetes and has been found to help patients manage their chronic conditions,[22] especially the elderly.[23] In addition to medical treatment for diabetes, patients also need encouragement from healthcare providers to master and sustain complicated self-care activities needed for maintaining and improving health. Peer support groups can strengthen and empower patients, augment social networks, prevent health concerns, reinforce help-seeking behaviors, decrease barriers to care, encourage effective coping, promote social comparisons, increase self-efficacy and aid one's self-esteem.[22,24]The effectiveness of support group interventions, among type-2 diabetics, in improving glycated hemoglobin (A1C),[25] reducing diabetes medications,26 improving knowledge,[26,27] reducing systolic blood pressure,28 improving self-care abilities,[27,29] and enhancing quality of life[27,29] and satisfaction have been well documented.[25]

Conceptual Framework

The Nursing Role Effectiveness Model (NREM)[30] was used as the framework for this study to identify the contributions of APNs to outcomes achievement in patients with type-2 diabetes. The NREM is based on Donabedian's theory of quality health care and consists of three components: structure, process and outcome.[31] Structure refers to the components of the healthcare service setting, while process refers to provision of services or activities of service providers and service users. Outcomes are the effects of services on the health status of service users.

Structure and process can directly influence outcome, while structure can be indirectly related to outcome through process. Components of structure, for this study, included: APN characteristics, organizational factors and patient characteristics. According to the framework, organizational factors and patient characteristics can directly affect patient outcomes. Process involved the APN care services and care management of type-2 diabetics through the use of a support group. Finally, outcome measurements of diabetes care involved: body mass index (BMI); blood pressure (systolic and diastolic); glycated hemoglobin ($A1_C$); blood lipids; hospitalizations for acute complications of diabetes; self-care abilities; quality of life; and, satisfaction with care. Based upon prior research, and the study's conceptual framework, the following hypotheses and research question were posed:

1. Patients with type-2 diabetes who attended an APN-led diabetes support group, compared to those who did not attend the support group, will have: a) lower mean BMIs, blood pressure (systolic [SBP] and diastolic [DBP]), $A1_C$ values, triglycerides, cholesterol and low density lipo-protein (LDL) levels; and, b) higher mean high density lipo-protein (HDL) levels.

2. Patients with type-2 diabetes who attended an APN-led diabetes support group, compared to those who did not attend the support group, will have higher mean self-care abilities, quality of life and satisfaction with care scores.

3. What are the care services and care management provided by APNs in a diabetic support group?

Method

Design: This study used a mixed methods design to: a) compare differences in outcomes of diabetes care between patients with type-2 diabetes attending an APN-led support group and patients who did not attend the group (quantitative); and b) describe the process of APN care services and care management for patients in a support group (qualitative).

Ethical Considerations: The Institutional Review Boards of the primary investigator's (PI) academic institution and the hospital used as the study site 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 participants involved in the study were asked to sign a consent form prior to inclusion.

Sample and Setting: The research setting was a 640-bed tertiary care hospital, in southern Thailand, wherein approximately 4,000 diabetics received care. In addition to having ample patients to participate in the study, the site had an APN working with diabetic patients and supportive management. Medical administrators at the setting: emphasized improving diabetes care in the system by promoting use of clinical practice guidelines; consistently supported the support group in terms of policy and budget; established a data base of patients with diabetes; and promoted establishment of a multidisciplinary team for comprehensive diabetes care.

Although there were several clinics within the Out-Patient Department (OPD) of the study site hospital that provided diabetes care (i.e. diabetes clinic, general medical clinic, geriatric clinic, general patient clinic and specialized clinic for patients which was paid for by the Social Security Scheme), only the diabetes clinic and medical clinic were selected. The two selected clinics shared resources, including physicians and a diabetes nurse manager, and served the majority of those hospitalized with type-2 diabetes. Routine care in the two clinics involved patients being followed by both the physicians and the diabetes nurse manager, who provided special education for those with poor blood sugar control. Individual patients also could consult, if needed, with the diabetes nurse manager.

The sample consisted of patients, stakeholders and the APN. Inclusion criteria for patients included: being able to understand the Thai language; having physician documented type-2 diabetes; and, attending the OPD two or more times within the last year. In addition, to ensure an adequate dose effect of the APN's care, participants in the support group had to have: received group education for diabetes self-care from the APN at least six times over the last six months (June-December 2008); and, participated in group activities more than three times over the following 12 months (January to December, 2009). Patients in the support group, who met the inclusion criteria, were recruited and enrolled first. Comparison group participants then were purposively selected to match support group participants regarding age (within 5 years), gender, co-morbidities and treatment regimen (oral hypoglycemic agents/ insulin injection/combination of oral hypoglycemic agents and insulin injection).

Sample size of the patient participants was based on a power analysis from an implementation of a diabetes self-management program for Thais with type-2 diabetes that yielded an effect size of quality of life of 0.54.[27] Since the APN also played an important role in providing self-management education to achieve better self-care abilities, glycemic control and quality of life, the effect size of quality of life (0.54) was used. Using an α = 0.05, a medium effect size and seven dependent variables (which could yield up to eight variables), an n = 50 was necessary to meet a power of 0.82.[32] Therefore, 50 participants who met inclusion criteria were expected to be included in each group (APN-led support group and comparison group). Although, 50 patients met the criteria for inclusion for the support group, six of them could not be contacted. Thus, the number in the comparison group was increased to 56, with 44 in the APN-led support group, for a total of 100 study participants.

The patient participants' ranged in age from 44 - 80 years (mean = 66.67), with 81 being more than sixty years old. The majority of them were: female (n = 70; 70%); married (n = 76; 76 %); Buddhist (n = 92; 92%); and, covered under the Universal Healthcare Coverage Scheme (n = 59; 59%). In addition to having type-2 diabetes and requiring use of an oral anti-hyperglycemic agent (n = 82; 82%), most of the patients had hypertension and/or dyslipidemia (n = 95; 95%). No statistically significant differences were found between the support group and comparison group patients regarding age, gender, marital status, religion, occupation, co-morbidities, treatment regimen, and payment.

The five stakeholders, selected to participate in the study, were chosen because of their involvement with the APN in providing direct clinical care. They included: two physicians, who provided care at the diabetes clinic; a nutritionist; a physiotherapist; and a pharmacologist.

Inclusion of the APN was because she: had a master's degree in nursing and was certified as an APN by the Thailand Nursing and Midwifery Council (TNMC); worked full-time as an APN; provided special care for patients with type-2 diabetes; and, was willing to share her experiences in providing care for diabetics. In addition, the selected APN was 45 years old, and had 15 years of clinical experience in a medical ward and six years of experience as a health educator. She also had completed a short training course in diabetes care and an advanced training course in diabetic education.

Instruments: Data were obtained through use of four questionnaires and interviews. The patients were administrated the questionnaires, and the stakeholders and APN were interviewed. Permission to use the copyrighted instruments was obtained prior to use.

The *Personal and Medical Information Questionnaire (PMIQ),* developed the PI, was used

to obtain the patients' demographic and clinical outcomes. The demographic information obtained included each participant's: age; gender, marital status, religion, occupation, co-morbidities, treatment regimen and payment. Their clinical outcomes included: BMI, blood pressure, $A1_C$, cholesterol, triglyceride, HDL, LDL and hospitalizations.

The *Self-care Abilities Questionnaire (SAQ)* was a self-report instrument, developed by the APN Outcomes Research Task Force Group of the TNMC,[33] that was based on self-care requirements of patients with diabetes that were recommended by the Thai Association of Diabetes Educators[34] and a literature review. The questionnaire included 32 items (27 positively stated and 5 negatively stated) in six components of self-care related to diabetes: diet and eating (12 items); activities and exercise (2 items); self-monitoring (3 items); seeking information and follow-up (4 items); hygiene and foot care (8 items); and, medication taking (3 items). Patient participants were asked to choose the intensity of self-care activities actually performed on a 4-point scale. The intensity of self-care activities was measured as frequency of performing a behavior ("always" = 3, "frequently" = 2, "sometimes" = 1, and "rarely to never done" = 0). An example of an item included: *"How often do you ask healthcare providers about your medical problems, treatments and self-care activities?"* Some items were specified as a range of days performing a behavior within a week, categorized as: "always" = 6-7 days per week; "frequently" = 4-5 days per week; "sometimes" = 1-3 days per week; and, "rarely to never done" = 0 day per week or once in a while." An example of a question, involving a range of days performing a behavior, included: *"How often do you exercise until you sweat for at least 30 minutes?"* To calculate a total score, all negatively stated items were reversed score and then the scores for all 32 items were summed. Scores could range from 0 to 96. High scores indicated a higher ability to perform diabetes self-care. Content validity of the questionnaire was reviewed by five experts (two APNs in diabetic care, one diabetic nurse educator and two faculty members who specialized in diabetes care). The content validity index (CVI) was found to be 0.83. The instrument was tested twice with 30 patients who had type-2 diabetes and were in a setting similar to the study site. Internal consistency, by Cronbach's alpha coefficient, on the first test was 0.65, which was not acceptable. Thus, the unclear items were revised and the revised version was reviewed by the same five experts who reviewed the original version of the questionnaire. The final version then was tested, yielding a Cronbach's alpha coefficient of 0.79. The final version was used in the study and demonstrated a reliability of 0.83.

Diabetic Quality of Life Questionnaire (DQoL) was a self-rating instrument developed by Jacobson and the Diabetes Control and Complications Trial Research Group [DCCT].[35] The questionnaire has been published for public use. The *DQoL* was translated into Thai by Keeratiyutawong[27] and consisted of two components: treatment satisfaction (15 items) and impact (20 items). An example of a treatment satisfaction question was: "How satisfied are you with the amount of time it takes to manage your diabetes?" An example of a treatment impact question was: "How often do you suffer from diabetes treatment?" Patient participants were asked to rate their satisfaction with treatment and treatment impact on a 5-point Likert-like scale (5 = very satisfied; 4 = moderately satisfied; 3 = neither; 2 = moderately dissatisfied; and 1 = very dissatisfied). Treatment impact scores also were rated from 5 to 1, with scoring of: 5 = never affect; 4 = very seldom affect; 3 = sometimes affect; 2 = often affect; and, 1 = always affect. Reverse scoring was done for negative items. The raw scale score for

each scale was translated into a 100-point scale, where 0 represented the lowest possible quality of life and 100 represented the highest possible quality of life. The score of the treatment satisfaction component could range from 0 to 75, while the score of the treatment impact component could range from 0 to 100. The total DQoL score, which could range from 9 to 175, was determined by summing the raw scores of the two components. However, due to the fact that one of the treatment satisfaction items and one of the treatment impact items, related to sexual issues, were not applicable to Thais with diabetes and not included in this study, the highest possible score of the instrument used in this study was 165. Higher scores suggest a more positive quality of life. The instrument was pilot-tested with 30 participants similar to the study's patient participants. Cronbach's alpha coefficient was found to be 0.71 and 0.75 for treatment satisfaction and treatment impact, respectively. The overall Cronbach's alpha coefficient was 0.79. Study results indicated a positive significant relationship between treatment satisfaction and treatment impact ($r = .53$, $p < .001$). Cronbach's alpha coefficient, for the actual study, was found to be 0.86 for both treatment satisfaction and treatment impact, with the overall Cronbach's alpha coefficient being 0.90.

Satisfaction with Nursing Care Questionnaire (SNCQ), a 15-item self-rating questionnaire developed by Suwisith and Hanucharurnkul,[36] was used to evaluate patient participants' satisfaction with nursing care. The questionnaire consisted of three dimensions: a) humanism and helpfulness (6 items, such as: *"The nurse understands my problem very well."*); b) professional competence (2 items, such as: *"I received care from the expert nurse."*); and, c) accessibility to care services (7 items, such as: *"The nurse was always available to listen to my problems."*). Construct validity of the instrument had been established prior to use in this study.[36] Patient participants were asked to rate their satisfaction with care provided by the APN or registered nurses on a 5-point Likert-like scale (5 = most strongly agree; 4 = strongly agree; 3 = moderately agree; 2 = less agree; and to 1 = disagree). The total score, which could range from 15 to 75, was calculated by summing the scores across all 15 items. Higher scores indicated higher satisfaction with care. Reliability analysis was performed on the questionnaire, prior to its use in the study, with 30 diabetic patients who were similar to the study's patient participants and receiving care from two APNs at a university hospital. Cronbach's alpha coefficient was found to be 0.89. For the actual study, Cronbach's alpha coefficient was found to be 0.98.

Qualitative data on the APN care services and care management were obtained by six participant observations and one semi-structured interview with the APN. The participant observations involved the PI attending the APN-led support group six times for six months and assisting the APN in monitoring patients' conditions. The interview with the APN was held in her office at her convenience. It lasted approximately one hour and involved the use of such questions as: a) *"Please identify the problems and care needs of patients with type-2 diabetes under your care;"* b) *"How does the organization go about requiring a new model of care/care management?;"* c) *"Please identify stakeholders and describe your work environment when providing care within a multidisciplinary team;"* d) *"Please explain the care services and care management you provide for patients with diabetes in the support group;"* and, e) *"Please explain the positive outcomes of care among patients in the support group."*

Stakeholders' perceptions of the APN's role and benefit to the patients and organization were obtained via semi-structured interviews. The stakeholder interviews were held in their offices at their convenience, lasted 20 to 30 minutes and

involved the use of such questions as: a) *"Please explain the care services and care management of this APN;"* b) *"Please explain the work environment during provision of care for patients with diabetes, as well as during the support group offered by the APN;"* c) *"Please identify the differences in care services/care management offered by this APN compared to other registered nurses;"* and, d) *"Please identify the benefits this APN offers to the health care system for diabetes care."* All interview questions were developed by the PI and reviewed for content validity by the same five experts who validated the self-care abilities questionnaire. All observations and care activities performed, by the APN, were recorded in field notes, and all interviews were tape-recorded, prior to being transcribed verbatim.

Procedure: Following approval to conduct the study, data collection occurred between February and August, 2010. The PI reviewed patients' medical records to identify those who met the inclusion criteria for the support group. Participants' range of age, gender, comorbidities and treatment regimen were listed and used for identifying and matching participants for the comparison group. When potential participants for both groups were identified, they were approached during their next appointment at the OPD. Questionnaires were administered to all patient participants, via interview by the PI, in the following order: PMIQ, SAQ, DQoL and SNCQ. It took 30 to 40 minutes to complete an interview with each patient participant. All the interviews of all but five of the patient participants in the support group were performed at the end of the support group session. Five patient participant interviews were performed at the OPD or in their home because they were not comfortable after completion of the group activities. All of the interviews of those in the comparison group were performed at the OPD while they were waiting for a follow-up appointment.

The clinical outcomes (BMI, SBP, DBP, $A1_C$, cholesterol, triglyceride, HDL, LDL and hospitalization), recorded in the medical records of the participants, were reviewed one year, retrospectively. The yearly averages for the BMI, SBP, DBP, $A1_C$, cholesterol, triglyceride, HDL and LDL were calculated and number of hospitalizations counted.

After the patient participants were identified, the six participant observations of the APN were carried out. The stakeholders were interviewed after all of the quantitative data regarding the patient participants in both groups had been gathered. The APN was interviewed at the completion of the data gathering process.

Data Analysis: Descriptive statistics were used to analyze the patient participants' demographics. Chi-square and Fisher's exact tests were used to compare differences between the support group and the comparison group. Eight of the outcome variables (BMI, SBP, DBP, $A1_C$, triglyceride, LDL, self-care abilities and quality of life) were analyzed using Hotelling's T^2 Multivariate Analysis of Variance (MANOVA). The remaining three outcome variables (cholesterol, HDL and satisfaction with care) did not meet the assumptions of MANOVA and were analyzed using t-test or Mann-Whitney U Test.

Results

Outcomes between groups: As shown in **Table 1**, the support group had significantly lower SBP, and significantly higher self-care abilities, quality of life and satisfaction with care compared to the comparison group. No significant differences were found on BMI, DBP, $A1_C$, triglyceride, HDL and LDL between the two groups. However, when these non-significance outcomes were examined, using clinically important recommended goals for monitoring outcomes in clinical practice,[37] a higher percentage of patients in the support group had values within or near normal limits than those in the comparison group, except for HDL in female patients.

Also, the percentage of patients whose $A1_C$ was greater than 11%, indicating very poor control, was higher in the comparison group than in the support group (see **Table 2**).

Table 1 Comparison of Mean/Median of Outcomes between Two Groups

Outcomes	Support group (n = 44)	Comparison group (n = 56)	F-ratio/df	t/df	Z	p value
$A1_C$ [$\bar{X}$(SD)]	7.78 (1.48)	8.11 (2.04)	.445/ 1			.506
SBP [$\bar{X}$(SD)]	131.31 (12.71)	138.01 (13.20)	6.56/ 1			.012
DBP [$\bar{X}$(SD)]	68.54 (8.57)	70.09 (6.92)	.995/ 1			.321
BMI [$\bar{X}$(SD)]	26.13 (3.57)	26.37 (3.73)	.112/ 1			.739
Chol [$\bar{X}$(SD)]	172.40 (29.36)	181.40 (36.35)		-1.334/ 98		.185
Trig [$\bar{X}$(SD)]	144.28 (39.18)	171.85 (74.59)	2.928/ 1			.090
LDL [$\bar{X}$ (SD)]	91.80 (22.79)	100.88 (32.25)	2.505/ 1			.117
Self Care Abilities [$\bar{X}$(SD)]	80.37 (6.05)	62.38 (10.80)	111.208/ 1			.000
QoL [$\bar{X}$(SD)]	91.30 (5.79)	73.28 (11.10)	103.165/ 1			.000
Satisfaction with care [MD]	4.97	3.36			-8.16	.000
HDL [$\bar{X}$ (SD)]						
- female	45.86 (6.61)	46.45 (9.16)		-.302/ 68		.763
- male	44.59 (5.93)	42.08 (10.22)		.789/ 28		.437

Note: SBP = Systolic blood pressure; DBP = Diastolic blood pressure; BMI = body mass index; Chol = cholesterol; Trig = Triglyceride; LDL = Low density lip-protein; QoL = quality of Life; HDL = high density lip-protein.

Table 2 Number and Percentage of Participants by Clinical Outcomes in Two Groups

Variables	Total n = 100	Support group n = 44 (%)	Comparison group n = 56 (%)
BMI (kg/m^2)			
underweight [< 18.5]	1	0	1 (1.79)
normal [18.5-22.9]*	16	9 (20.45)	7 (12.50)
overweight [23-24.9]	24	10 (22.73)	14 (25.00)
obesity [≥ 25]	29	25 (56.82)	34 (60.71)
DBP (mmHg)			
< 80.00*	90	40 (90.91)	50 (89.29)
80.00-89.99	10	4 (9.09)	6 (10.71)
A1$_C$ (%)			
< 7.00*	31	14 (31.82)	17 (30.36)
7.00-8.99	46	21 (47.73)	25 (44.64)
9.00-10.99	15	7 (15.91)	8 (14.29)
≥ 11.00	8	2 (4.54)	6 (10.71)
Cholesterol (mg/dl)			
≤ 170.00*	43	20 (45.45)	23 (41.07)
170.01-200.00	36	17 (38.64)	19 (33.93)
> 200.00	21	7 (15.91)	14 (25.00)
Triglyceride (mg/dl)			
< 150.00*	48	24 (54.55)	24 (42.86)
≥ 150.00	52	20 (45.45)	32 (57.14)
LDL (mg/dl)			
< 100.00*	56	27 (61.36)	29 (51.79)
≥ 100.00	44	17 (38.64)	27 (48.21)
HDL (mg/dl)			
Female: < 50.00	49	23 (74.19)	26 (66.67)
≥ 50.00*	21	8 (25.81)	13 (33.33)
Male: < 40.00	11	3 (23.08)	8 (48.06)
≥ 40.00*	19	10 (76.92)	9 (52.94)

*Recommended goal for monitoring patients' outcomes following Thai CPG for diabetes care.

Note: BMI = body mass index; DBP = Diastolic blood pressure; LDL = Low density lip-protein; HDL = high density lip-protein.

Only five percent of all participants (n = 5) were hospitalized within the last year; one from the support group and four from the comparison group. However, no significant difference between the two groups was shown ($p > .05$).

APN care services and care management in the support group: Qualitative data from observations and interviews revealed that, in 2006, the APN established a support group specifically for patients with diabetes named *"The less sweetened group,"* which means a group of persons consuming less sugar. The support group consisted of the APN, health care providers at the OPD and group members. Participation was voluntary. The group was: a) developed in response to the large number of diabetic patients; b) valued as an innovation in diabetes care that enhanced accessibility to service; and, c) considered a means for diminishing fragmentation and excessive use of health care services.

The support group met monthly for the purpose of improving diabetes knowledge, self-care and quality of life among patients with diabetes receiving care at the hospital. The support group offered an opportunity for members to tackle problems and cope with crises by providing exposure to others with knowledge and similar experiences. This support group provided participants interaction with others with the same problems, conditions and situations so they could share their experiences and learn from each other under the APN's facilitation.

Generally, there were two healthcare providers, one APN and one health educator, responsible for organizing group activities. The APN played a major role in facilitating group activities. Content analyses of the qualitative data on APN care services and care management resulted in the immergence of 6 categories, including:

1. *Monitoring and managing patients' health problem:* There were two opportunities, during the group process, for monitoring patient outcomes through health assessment. Initially, the APN monitored health outcomes in the support group by measuring weight, BMI, waist circumference and blood pressure. In cases of an abnormally uncontrolled condition, the APN offered patients advice for better self-care. If emergent or urgent conditions were detected, patients were transferred to the emergency unit for management, depending on condition severity. The second assessment opportunity occurred when patients had meals together and postprandial blood glucose was examined. The APN always informed patients of their blood glucose results. When the blood glucose was elevated, the APN and the patient discussed causes of the rising blood glucose and developed a solution. Monitoring of patients' outcomes took approximately 45 minutes.

2. *Facilitating group exercise:* Health assessment, led by two or three volunteer members of the group, was followed by group exercises. Exercises, using elastic rubber bands, focused on increasing muscle strength and joint flexibility. The APN assisted patients in helping each other accurately perform the exercises together. Exercises lasted about 20-30 minutes.

3. *Providing self management education:* The APN, using group education, organized the self-management program. Topics were selected, prepared and scheduled by the APN and focused on patients' needs for diabetes care. The multidisciplinary team members composed of the physicians, nutritionist, pharmacologist, physiotherapist, health educator and APN provided each group education session, consistent with their area of expertise. During group education, whether the APN was teaching or attending, she observed the patients' responses, and raised questions and issues for group discussion and resolution. Group education lasted about 45 minutes.

In addition to group education, patients had a chance to consult with the APN on their health

problems and receive individual tailored education. Consultation by phone also could be made depending on patient's needs. The APN was proficient in providing health education to increase patients' understanding. As one patient stated:

> *"She (APN) taught me in simple words that were easily understood unlike the others that made me feel it was difficult to understand what diabetes is and its consequences"*

4. *Collaborating with the multidisciplinary team:* The APN successfully collaborated with the multidisciplinary team in planning the objectives, content and group activities for the support group. They worked as a team, had a good relationship and helped each other achieve the goals, as noted in the following statements:

> *"We had to plan objectives and content for teaching together with the team. I feel good about working with her (APN) and this team because we did as much as possible for the patients. We are so happy to be on the same team." (Nutritionist)*

> *"Patients cooperated well with her (APN). In regards to use of medication, I did ask patients to bring their medication to me for advice, but they never responded. She (APN) can ask the patients to bring all medications they were to bring to me." (Pharmacist)*

> *"$A1_C$ in diabetic patients, at our hospital, was comparable to the recommended goal proposed by National Health Security Office and to the American Diabetic Association. The most important element to meet the target was the effective interdisciplinary care team of our hospital. She (APN) played a major role as a leader in establishing and collaborating within the care team. One discipline could not provide good care services. A collaborative approach was required." (Physician).*

5. *Established continuity and holistic care services:* The APN was able to establish continuity of care services for patients with diabetes because she worked at the department of health education in the hospital. Personnel in this department had a high level of autonomy for providing care services. The APN could make home visits in complicated cases, especially regarding diabetic patients with strokes, and those who were bedridden and required continuing care at home.

In addition, the APN was trusted by patients in the support group and their families. Some patients maintained contact and consulted her regarding their health problems, while others went to the hospital's department of health education to meet with her. When group members stopped attending, she always made a call to visit, and assessed their problems and needs for care. She also integrated complementary approaches with modern medicine by facilitating productive and enjoyable activities for the group, such as making an herbal inhaler and soap, and cooking macrobiotic diets. Sometimes the APN took patients to a camp where they did meditation. These activities made patients' lives more fruitful. Her practice was reflected on, by the care team members, as follows:

> *"She (APN) was very nice to all patients. She understood all problems and never blamed patients for uncontrolled blood glucose levels. She was sympathetic and trusted by the patients as if she was a family member." (Pharmacist)*

> *"She (APN) had a close relationship with the patients in the support group because she always visited them at home. It might be due to her proactive approach. Since she worked*

as a health educator nurse in the department of education, she could approach and know the patients' backgrounds very well. Moreover, she was observant and sensitive to patients' problems. Her best characteristic is an ability of understand a particular patient's situation." *(Nutritionist)*

The APN encouraged the team to provide holistic care as a physiotherapist stated:

"I learned from her (APN) that it is important to view the patient as a whole person. Before that, I intended to train patients for exercise without concern about their blood pressures and glucose levels. That might have led to a bad condition."

6. *Providing consultation:* Because the APN had skills working with the multidisciplinary team and effectively organized care activities, she was able to act as a consultant for the team in establishing support group learning and activities. This is reflected in the physiotherapist's following statement:

"I consulted her (APN) for the sequence of care activities to gain the attention of members of the support group. She was a professional expert in teaching patients. I learned a lot from her."

Discussion

The effectiveness of the APN-led support group for patients with type-2 diabetes resulted in lower mean systolic BPs, higher mean scores on self-care abilities and quality of life, and higher median scores on satisfaction with care, compared to patients in the comparison group. The characteristics of the APN included: extensive experience in nursing practice on a medical ward; a master's degree in nursing; and, special training in diabetes care. Master's education in nursing tends to emphasize holistic care, collaboration, clinical leadership, evidence-based practice, and outcome management.[9] Special training resulted in advanced and specialized knowledge in diabetes care, as reflected in the qualitative data documenting care management and care services. Additionally, working in the department of health education may have promoted a high level of autonomy and a focus on continuity of care, along with opportunities for sharing knowledge and experience regarding activities about health promotion within the hospital. This knowledge and the activities led to acceptance of the APN by the multidisciplinary team. Moreover, the support group was continuously promoted by the medical administrators in policy and budget.

Care services and care management by the APN appeared to influence favorable outcomes of diabetes care. Additional monitoring of patients' conditions benefited patients by increasing their self-awareness and self-care abilities. They could recognize, maintain and appropriately manage their health status. Moreover, complications and unfavorable outcomes, as a result of diabetes, could be detected early and managed properly by the APN. Prior research has found facilitating group exercises, through the use of elastic rubber bands, provides resistance training that can increase muscle strength and increase the capacity to perform activities of daily living, while reducing disability in elders.[38] Providing group self- management education and individual teaching uses an empowerment approach.[39] This approach emphasizes patients' active participation in their self-care, with collaboration provided by a multidisciplinary team. Communication and interaction between patients and the care team could be seen in the study support group. Further, self-management education has been demonstrated to be effective when used collaboratively with a multidisciplinary team.[40] The APN, in this study, played an important

role in dynamically facilitating and leading the multidisciplinary team in providing comprehensive care for patients in the support group on the basis of her clinical competence, effective communication, and desire to improve patients' outcomes

Likewise, the APN had a deep understanding of each patient as a complex and unique person, and recognized his/her multiple bio-psycho-social and spiritual dimensions, as well as the relationship among these dimensions. She used complementary therapy consistent with a holistic perspective. The latter is expected to benefit improved metabolic control either as a direct effect or as an indirect effect through effective stress management.

The support group could be seen as a social network. As reflected in the literature, this is important to individuals regarding fulfillment of their needs,[41] as well as enjoyment in sharing knowledge, information and experiences about diabetes care and living with their illness.

Increases in self-care abilities, quality of life and satisfaction with care were expected additional outcomes. Many of the clinical outcomes between groups did not reach statistical significance. This could be explained by the fact all participants received treatments from physicians according to their conditions. Some patients had good self-care behaviors and, thus, the effects of differences in self-care abilities might be overcome by the treatments. However, there were clinically significant differences between groups in most outcomes. There were fewer patients who had A1C levels > 11% in the support group compared to those in the comparison group. For BMI, cholesterol, triglyceride and LDL, there were higher numbers of patients whose levels on these parameters were within normal limits in the support group than in the comparison group. For hospitalizations, only one patient in the support group was hospitalized because of kidney problem, while four in the comparison group were hospitalized, with one of those admissions being due to hypoglycemia. The lower HDL level found among females in the support group requires further investigation.

Limitations

Like all studies, this study had limitations. Generalizability is limited due to studying one APN in one setting. Since a random controlled trial was not possible, the outcomes of the APN must be interpreted with caution. Outcomes should be interpreted as team outcomes with an APN compared to team outcomes without an APN.

A problem with the DQoL instrument occurred in patients responding to the items regarding sexual activities. More than half of participants could not attribute sexual decline as a consequence of diabetes or older age. Thus, two items related to sexual issues were excluded in this study.

Conclusions and Recommendations

This study's results documented differences in outcomes of diabetes care for patients attending an APN-led support group compared to patients who did not. It also documented the APN activities that contributed to the improved outcomes of patients in the support group. Measuring outcomes of APN effectiveness in diabetes care in Thailand should be replicated in other settings, as well as in other geographic locations. By examining APN effectiveness, data can be obtained that can assist in documenting: potential improved patient outcomes; reductions in preventable hospitalizations; and, decreased health care expenditures.

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ผลลัพธ์การดูแลผู้ป่วยเบาหวานชนิดที่ 2 ที่เข้าร่วมชมรมที่นำโดยผู้ปฏิบัติการพยาบาลขั้นสูง ณ โรงพยาบาลระดับตติยภูมิแห่งหนึ่งทางภาคใต้ของประเทศไทย

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บทคัดย่อ: การศึกษานี้มีวัตถุประสงค์เพื่อเปรียบเทียบความแตกต่างของผลลัพธ์การดูแลผู้ป่วยเบาหวานระหว่างกลุ่มผู้ป่วยที่เข้าชมรมที่จัดขึ้นเฉพาะสำหรับผู้ป่วยเบาหวานโดยผู้ปฏิบัติการขั้นสูงกับผู้เป็นเบาหวานที่ไม่ได้เข้าชมรม โดยวัดผลลัพธ์การดูแลผู้ป่วยเบาหวานประกอบด้วยดัชนีมวลกาย ความดันโลหิต ไขมันในเลือด ฮีโมโกลบินที่มีน้ำตาลเกาะ การนอนโรงพยาบาล ความสามารถในการดูแลตนเอง คุณภาพชีวิต และความพึงพอใจในบริการที่ได้รับ กลุ่มตัวอย่างเป็นผู้ป่วยเบาหวานชนิดที่ 2 จำนวน 100 คน เป็นผู้ป่วยที่เข้าชมรม 44 คน และผู้ป่วยที่ไม่ได้เข้าชมรม 56 คน โดยเก็บข้อมูลที่โรงพยาบาลตติยภูมิแห่งหนึ่งทางภาคใต้ของประเทศไทย โดยผู้ป่วยทั้งสองกลุ่มได้รับการดูแลที่หน่วยตรวจผู้ป่วยนอกของโรงพยาบาล ผู้ป่วยที่เข้าชมรมจะต้องเข้าร่วมกิจกรรมชมรมอย่างสม่ำเสมอเป็นประจำทุกเดือน เครื่องมือที่ใช้ในการเก็บข้อมูลประกอบด้วย 1) แบบบันทึกข้อมูลทั่วไป ข้อมูลทางด้านสุขภาพและการตรวจรักษา 2) แบบวัดความสามารถในการดูแลตนเอง 3) แบบวัดคุณภาพชีวิต 4) แบบวัดความพึงพอใจในบริการพยาบาล และเก็บข้อมูลเชิงคุณภาพด้วยการสังเกตแบบมีส่วนร่วมและสัมภาษณ์เพื่อประเมินการให้บริการพยาบาลและการจัดการการดูแลโดยผู้ปฏิบัติการพยาบาลขั้นสูง โดยใช้สถิติ MANOVA, t-tests and Mann-Whitney U tests ในการวิเคราะห์ข้อมูลเชิงปริมาณ และวิเคราะห์ข้อมูลเชิงคุณภาพด้วยวิธี Content analysis ผลการศึกษาพบว่าผู้ป่วยเบาหวานที่เข้าชมรม มีระดับความดันซีสโตลิกต่ำกว่ากลุ่มผู้ป่วยที่ไม่ได้เข้าชมรมอย่างมีนัยสำคัญทางสถิติ ($p < .05$) และผู้ป่วยเบาหวานที่เข้าชมรมมีความสามารถในการดูแลตนเอง คุณภาพชีวิต และความพึงพอใจในบริการสูงกว่าผู้ป่วยที่ไม่ได้เข้าชมรมอย่างมีนัยสำคัญทางสถิติ ($p < .001$) การบริการพยาบาลและการจัดการการดูแลโดยผู้ปฏิบัติการพยาบาลขั้นสูงประกอบด้วย 1) การติดตามและจัดการกับปัญหาของผู้ป่วย 2) การช่วยเหลือผู้ป่วยออกกำลังกายแบบเป็นกลุ่ม 3) การสนับสนุนการจัดการตนเอง 4) การทำงานร่วมกับทีมสหสาขาวิชาชีพ 5) การให้การดูแลอย่างต่อเนื่องและองค์รวม และ 6) การให้คำปรึกษาแก่ผู้ป่วยและและบุคลากรในทีมสุขภาพ

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