



Original Article

The Effectiveness of a Training Program for Advanced Practice Nurses in the Philippines on the Care of Patients with Primary Hypertension

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Abstract

Background: The same problems of access to health care due to inadequate and inequitable distribution of human resources for health continue to be present in countries worldwide, including the Philippines. However, these conditions have not stimulated the development of the role on advanced practice nursing (APN) in the country, despite hypertension (HTN) being a prevalent public health problem that can be addressed at the primary care level. Nurses, being the most numerous health professionals, can be trained to fulfill this deficiency. **Objective:** This study aimed to determine the validity and effectiveness of the investigator-designed HTN training program for advanced practice nurses. **Methods and Design:** This was one group, pre-test-post-test design, involving nursing clinics for wellness in a government-subsidized university, located in Manila, the Philippines. Out of the 28 masters-prepared nurses who consented, 24 participants completed the training program and answered the post-training instruments; the majority were females, with a mean age of 32.42 years (standard deviations [SD] = 8.397) and mean the clinical experience of 5.84 years (SD = 3.503). A panel of six experts reviewed and validated the seven modules for the HTN training program. It consisted of lectures, demonstration sessions, small group discussions, oral examination, skill performance evaluation, and clinic visit with a demonstration, totaling 32 h of in-person training. Participants took the written examinations before and after the training program. **Results:** The expert panel determined that the module content covered the learning objectives adequately. After the training program, the total knowledge score of the participants increased from 33.00 points (SD = 5.25) to 43.08 points (SD = 43.08), which was statistically significant ($t = -11.245, P < 0.001$). Furthermore, self-efficacy scores increased significantly ($t = -6.187, P < 0.001$), from 8.08 points (SD = 1.16) to 9.06 (SD = 0.69). **Conclusions:** The validated HTN training program module effectively equipped the masters-prepared nurses with the required knowledge, skills, and attitudes in providing entry-level APN care for patients with primary HTN, addressing the competencies outlined by the National Organization of Nurse Practitioner Faculty in the United States. Since the positive outcomes on the nurse participants translated to the patient outcomes seen in the advanced practice nurse-led HTN Clinic done after this study, the competencies included in the training program modules should be integrated into the country's master's degree curriculum in Adult Health Nursing to provide adequate preparation for entry-level APN care.

Keywords: Adult Health Nursing, advanced practice nursing, hypertension in the Philippines, nursing education research

Introduction

Hypertension (HTN) is a significant public health issue affecting billions of people around the world^[1] and the leading risk factor for global mortality and morbidity.^[2] More than

half or 55% of the 17 million deaths from cardiovascular diseases (CVDs) annually are attributed to HTN. In the Philippines, 33% of the proportional mortality accounted for noncommunicable diseases is due to CVDs, which include

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HTN.^[1] The PRESYON 3 study found a 28% prevalence of HTN among Filipinos aged ≥ 18 years, representing a 150% increase from 11% in 1992 to 28% in 2013 and most prevalent among adults aged 70 years and higher only 57% of people on blood pressure (BP).^[3]

Chronic diseases such as HTN are best addressed at the primary care level to ensure continuity of care. With the inadequate and inequitable distribution of human resources for health, health care for patients with chronic diseases such as HTN becomes too fragmented and the continuity elusive due to the shrinking number of primary care physicians.^[4] In the Philippines, nurses, being the most numerous health-care professionals in the country, can be trained as advanced practice nursing (APN) practitioners to help manage HTN in community primary care settings.^[5] This study aimed to determine the validity and effectiveness of the investigator-developed HTN training program for APNs.

Materials and Methods

Study Design

A one-group pre-test post-test design was used to evaluate the effectiveness of the training program comparing the knowledge and self-efficacy of the APNs before and after the additional training in the management of patients with primary HTN. This pre-experimental design, often used in evaluating educational interventions, was chosen to explore if the training program is feasible and can be used in further investigations.

Study Setting

This study took place in the City of Manila, the Philippines, a highly urbanized city with high population density and reported prevalence of HTN at 21.7%.^[6] Specifically, the nursing clinics for wellness of a government-subsidized university, located in District V in the City of Manila, was the setting of recruitment and conduct of the training program.

Study Participants

The sample size needed for a paired *t*-test, given a moderate effect size of 0.6, an alpha of 0.05, a power of 0.80, was 24 nurses. The sample size and statistical power were computed using the G*Power software (version 3.1.9.2).

Institutions in the City of Manila that offered master's degrees in nursing, with a major in Adult Health Nursing provided a list of prospective participants with their latest contact information. Eligible nurses received letters of invitation by electronic mail, followed with text messages and phone calls as needed. Other recruitment strategies used were done through referrals, and posting of recruitment materials online and in bulletin boards of hospitals and the headquarters of the Philippine Nurses Association in Malate, Manila.

Inclusion criteria were: (1) Graduate of an accredited master's program in nursing, with a major in Adult Health Nursing, or at

least have completed all major and core courses, (2) valid license to practice, (3) minimum of 2 years of hospital experience, preferably in an ICU setting, (4) willingness to undergo a 32-h training, and (5) willingness to conduct clinic consultation with patients who have primary HTN while collaborating with a physician, and (6) signing an informed consent form.

Exclusion criteria were: (1) Graduate of a master's program in nursing, with a major other than Adult Health Nursing track, such as Maternal and Child Nursing, Community Health Nursing, Psychiatric and Mental Health Nursing, nursing education, nursing administration, disaster management, etc., or (2) refusal to sign the informed consent.

A total of 28 nurses consented to undergo training and completed the pre-test. However, four nurses were unable to attend the training due to work schedule and other constraints. Twenty-four participants completed the training and answered the post-intervention instruments.

For the purpose of this study, these nurse participants were called Advanced Practice Nurses, consistent with the definition adopted by the International Council of Nurses (2008): A registered nurse who has acquired the expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A master's degree is recommended for entry level.

Validation of The Training Modules

A panel of six experts reviewed and validated the modules used in the HTN training program. The panel ensured that the learning objectives and content adequately addressed the relevant competencies according to the US-based National Organization of Nurse Practitioner Faculties (NONPF) (2014). Six experts composed the panel: (1) A master's prepared primary care nurse practitioner (NP) in a large federal facility in Washington DC in the US with 16 years of experience managing patients with HTN, (2) a staff RN with 25 years of experience working in a medical-surgical ward of a large teaching hospital in Manila, the Philippines, (3) a nurse educator with more than 20 years of experience teaching cardiovascular nursing at the master's level in Manila, the Philippines, (4) a health professions education expert with 5 years' experience in module development, in Manila, the Philippines, and (5) two primary care physicians in general practice with a total of over 20 years' experience in managing patients with HTN.

The experts reviewed each module and rate whether each competency/learning objective is covered adequately in the module by checking the appropriate column in the 4-point Likert Scale: Four for adequate, three for moderately adequate, two for somewhat adequate, and one for not adequate. They also wrote their recommendations and remarks in a separate column.

Intervention

The seven modules in the HTN training program covered topics in Table 1, addressing the applicable competencies identified by the NONPF (2014). The training lasted for 4 days or 32 h.

After signing the informed consent, the APNs completed the baseline instruments regarding knowledge and self-efficacy on HTN management ($n = 24$). The training program accommodated the different schedules of the participants which included the following modes: Classroom-based training in the nursing clinics for wellness ($n = 7$), and individual or small group training sessions for those with challenging schedule ($n = 17$).

Two other experts facilitated the lectures, demonstration sessions, and small group discussions: A physician with a specialty in CVD discussed the pathophysiology of HTN and pharmacologic therapy. The principal investigator, a board-certified adult NP with over a decade of experience as an independent health-care provider in California, USA, handled the remaining topics.

The physician and the NP/principal investigator prepared an oral examination, focusing on a case study to demonstrate clinical decision-making (assessment, differential diagnosis, and treatment plan) as well as other competencies (practice inquiry, quality improvement, and motivational interviewing).

The skills performance evaluation was an objective, structured, clinical examination on the following: History taking and risk factor assessment, cardiovascular physical assessment, and patient teaching.

The clinic visit and demonstration session introduced the APNs to the collaborative role of managing patients with primary HTN. During the first 4 h, the NP/principal investigator discussed the process of conducting an initial patient consultation and a follow-up visit. Then, the NP/principal investigator conducted the sample patient consultation and demonstrated the application of the skills discussed during the previous sessions of the training program. The next 4 h were dedicated

to the extensive practice of the skills learned during the didactic sessions. The participants did return demonstrations of the simulated clinic consultations. Each APN had an assigned partner to obtain the health history and conduct the physical assessment. The APN discussed his or her findings and treatment plan with the NP/principal investigator and a physician after which, the APN counseled the partner/patient on the pharmacologic and non-pharmacologic interventions that they would prescribe. The NP/principal investigator and the collaborating physician evaluated the consultation done by the APN trainees.

Research Instruments

The investigator-developed instrument that measured knowledge on HTN management was based on the content of the modules in the HTN training program. Test items in this tool were written based on the objectives and content of the training modules, Adult-Gerontology, and Family NP Certification Examination Review Questions and Strategies^[7] and Family NP Certification Intensive Review Fast Facts and Practice Questions.^[8] To ensure the validity of the tool in meeting the objectives of the learning modules, the items were clustered in a test blueprint according to the objectives and the classification of the question (recall, understand, analysis, apply, or synthesis). Another panel of experts reviewed the knowledge instrument to establish the scale's content validity. The panel included the following experts: (1) A board-certified gerontology NP with a PhD in Nursing, practicing in California, USA with an expertise in managing patients with HTN, (2) a registered nurse in Manila, the Philippines with 5 years of experience taking care of patients with high BP, (3) a nurse educator with 14 years of experience teaching cardiovascular nursing at the master's level,

Table 1: List of modules, schedules, and time allotment

Session	Topic	Time allotment
Day 1	Module 1: Pathophysiology of hypertension	1 h lecture/discussion
	Module 2: Clinical decision-making in hypertension – assessment	2 h lecture/discussion 2 h demonstration/validation
	Module 3: Clinical decision-making in hypertension – non-pharmacological treatment	2 h lecture/discussion 1 h demonstration
Day 2	Module 4: Clinical decision-making in hypertension – pharmacological treatment	2 h lecture/discussion 1 h small group discussion
	Module 5: Patient teaching – motivational interviewing, anticipatory guidance, and counseling	1 h lecture 1 h demonstration
	Module 6: Practice inquiry: Identifying clinical practice issues, appraising evidence	1 h lecture/discussion 30 min small group discussion
	Module 7: Quality improvement, patient safety, and collaboration	1 h lecture 30 min small group discussion
Day 3	Clinic visit and demonstration	4 h demonstration 4 h return-demonstration
Day 4	Written examination	2 h
	Oral examination	2 h
	Skill performance evaluation/validation	4 h

(4) an expert in health professions education with an experience in module development, and (5) two practicing physicians with expertise in managing patients with HTN, with 35 and 11 years of experience, respectively. They evaluated the questions in terms of being representative of the objectives of the training, relevant to the concept being measured, and clarity of wording. General recommendations for each item were also asked and classified as “retain,” “revise,” or “drop.” The experts were provided a space wherein they can add their comments and remarks for each item.

Four items were judged unclear, and therefore, were revised for clarity. In addition, the expert panel recommended to drop five items from the initial pool of questions. These were judged as either too basic for APN or not relevant to the construct being measured. After replacing the dropped items, the panel reviewed the questionnaire again. The content validity index for the final scale was 0.9815. The instrument was then administered to the training participants before and after the training. The Cronbach’s alpha for the instrument for pre-test and post-test was 0.718 and 0.820, respectively, indicating acceptable internal consistency.

The shortened 17-item version of the original 51-item East Carolina University NP Self-Efficacy Scale by Leonard and Steele^[9] was used to measure self-efficacy on HTN management. The Cronbach’s alpha of the 17-item instrument was 0.93, indicating excellent internal reliability. To the knowledge of the researcher, no other published work had used this tool.

Data Analysis

The characteristics of the participants were described using frequencies, percentages, means, and standard deviations (SD). The effectiveness of the training program on the pre-test and post-test scores of the nurses in terms of knowledge and self-efficacy was determined using the paired *t*-test. All statistical analyses were done in IBM SPSS Statistics 23. A two-sided *P* = 0.05 is considered statistically significant.

Results

Participant Characteristics

Twenty-eight nurses answered the pre-test, while 24 participants completed the training program and answered the post-test, equivalent to a drop-out rate of 14.29% (*n* = 4). Most of those who completed the training program were females (*n* = 16, 66.7%), with a mean age of 32.42 years (SD = 8.397) and mean the clinical experience of 5.84 years (SD = 3.503).

Validation of HTN Training Modules

The expert panel determined that most of the learning objectives were covered adequately or moderately adequate by the module content. For Module 4 (Pharmacological Treatment), two comments were to include “working knowledge of how specific drugs act, based on the pathophysiology, and potential side effects” and to add “promotion of compliance.” General

comments for the entire module were as follows:

- Utilize varied teaching-learning strategies for the implementation of the program
- Attitudes are best seen in the teaching-learning strategies and not in the modules alone
- Outcomes cannot be evaluated by module alone
- Participants need a lot of practice since this was not the approach in past years
- Provide menu examples of high-salt and high-fat food.

These comments of the expert panel guided the further revision of the modules.

Effectiveness of HTN Training Program

Level of knowledge on HTN management

Before the training program, the total score of the participants on the knowledge instrument was 33.00 points (SD = 5.25). All participants got the correct answer on the following items: DASH diet, data clustering during the interview, smoking cessation and the 8th-Joint National Commission 8 lifestyle modification guidelines, obesity as a risk factor, and limiting the intake of processed foods. The top three items incorrectly answered by the participants were: Bruits, benefits of maintaining normal body mass index (BMI), BMI, quality improvement, and best strategy for BP >170/100.

After the training program, the total score of the participants was 43.08 points (SD = 43.08). This increase of 10.08 points (SD = 4.393) was statistically significant (*t* = -11.245, *P* < 0.001). Aside from the items above, all participants also got the correct answer on the following items: Target organ damage revealed by electrocardiogram (ECG), BMI, and side effect of ACE inhibitor. The top three items incorrectly answered by the participants were: Best strategy for BP >170/100, action for undiagnosed HTN, and health teaching on HTN.

Level of self-efficacy on HTN management

Before the training program, the participants’ mean score on the self-efficacy instrument was 8.08 (SD = 1.16). The participants reported the highest score on the item, “Act ethically at all times,” (*M* = 9.08) while the lowest score was on item, “Draw upon needs strengths and resources of the community to assist practice” (*M* = 6.88).

After the training program, the participants’ mean score on the self-efficacy instrument was 9.06 (SD = 0.69). This increase of 0.98 points (SD = 0.77) was statistically significant (*t* = -6.187, *P* < 0.001). Similar to pre-intervention, the participants still reported the highest and lowest scores on the same items (*M* = 9.54 and *M* = 8.42, respectively).

Discussion

Validation of HTN Training Modules

An important comment on the training modules was regarding Module 4, on pharmacologic treatment of HTN, perhaps

since this competency was new to the APN participants in the Philippines. One of these clinical competencies in which APNs differ from RNs includes the legal privilege and authority to prescribe medicines.

An expanded role of APNs involves diagnostics and medication management. In this study, the APNs were able to prescribe and titrate medications with a goal of achieving target BP for each client using well-defined protocols based on national treatment guidelines in collaboration with the physician. Nurse-led HTN management has been demonstrated to result in greater rates of BP control than those achieved with standard care.^[10] These improved outcomes resulted from APNs placing a greater number of clients on medications, changing drug regimens in response to inadequate BP control, and placing a higher proportion of clients on multiple drug regimens to achieve target BP control.

Effectiveness of HTN Training Program

During the 32-h training program for APNs on HTN management, as previously discussed the improvements in the participants' knowledge and self-efficacy were statistically significant. Item analysis of the participants' performance on the knowledge scale revealed that questions on health education and lifestyle interventions were most frequently answered correctly, while those on therapeutic or medical decisions were frequently answered incorrectly. In contrast, the participants reported the highest self-efficacy scores on "acting ethically," while the lowest scores were on "drawing upon community strengths and resources."

Similar to this study's results, nurses in Ghana, West Africa, underwent a task-shifting strategy for hypertension (TASSH) training to see its effect on their knowledge and practice on HTN control and management.^[11] With a total of 64 nurses who attended TASSH training, there was a significant increase in nurses' knowledge and practice concerning HTN screening and management based on the results from pre- and post-training assessments. Twenty-seven percent (26.9%) of the nurses scored 80% or more on the HTN knowledge test at pre-training assessment. This score improved significantly to 95.7% post-training. In addition, nurses also stated that improvement of interpersonal skills and patient education was considered as positive outcomes of participation in the training.

A retrospective survey conducted in 2004 revealed that new NPs on completion of their initial NP program perceived themselves to be most prepared in the areas of "health assessment," "differential diagnosis," "pathophysiology," "pharmacology," "health teaching," and "management of acute cases."^[12] On the other hand, they reported a feeling of being least prepared for "ECG and radiology interpretation," "microscopy," "mental illness management," "billing and coding," and "simple office procedures." The NPs are better known for their noteworthy nurse-patient relationship and patient-centered care^[13] on top of their safe and effective primary care which have been proven by several studies to be comparable and even superior to physician-led care for some measures.^[14]

A cross-sectional survey^[15] in a state where NPs seek mutual agreement with collaborating physicians revealed that age and years of experience of NPs are not associated with the NPs' perception of the level of autonomy, reflecting self-efficacy for independent practice and promotion of interprofessional collaboration.

Conclusion and Recommendations

The validated HTN training program module was effective in equipping the masters-prepared nurse with the required knowledge, skills, and self-efficacy in providing entry-level APN care for patients with primary HTN. On an expert review of the training program, the seven-part module addressed the learning outcomes adequately, identified from the competencies outlined by the NONPF in the United States. The investigator-developed scale to measure the nurses' knowledge of HTN management had excellent content validity and acceptable reliability.

It is highly recommended that a bigger sample size of nurses undertake the training program and a stronger research design be used to strengthen the research evidence on its validity and outcomes. Furthermore, it is recommended that the competencies included in the training program modules be integrated into the country's master's degree curriculum in Adult Health Nursing, to provide adequate preparation for entry-level APN care.

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