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SUSTAINABLE HEALTHCARE

The New Paradigm

OUR COVER

By Nelson C. Borrero, UP Law '73
Editorial Consultant

"Healthcare" simply defined is an awareness of one's health and the maintenance of physical, mental and emotional well-being to ensure and enhance the quality of life.

The cover of this year's issue of the International Forum for Nursing and Healthcare (UPINHF Official Journal) reflects the many facets of healthcare correlated with the theme: "Sustainable Healthcare: The New Paradigm." "Sustainability" is the concept, an idea and objective by which healthcare providers and certainly UPINHF as an organization are challenged to find and arrive at a desired level of quality. This includes searches for solutions, exploration of resources through lectures, seminars, fora, and perhaps experimentation of known models even to the extent of setting aside widely accepted norms---paradigm shift---in favor of new assumptions and measurable values needed to build an avenue towards sustainable healthcare. The acceptance, responsibility and commitment to the established conclusions including sets of durable systems and activities, the new paradigm. NCB

ACKNOWLEDGMENT

The International Forum for Nursing and Healthcare (IFNAH) profoundly acknowledges this edition's writers of thought-provoking research and studies. We also acknowledge the tireless and hardworking cooperation of the editorial staff and the wisdom and support of peer reviewers and IFNAH advisors who shared their valuable time in order to produce a very professional publication.

To our typist, layout artists, and printers from The Little Copy Shop and many others who contributed to this valuable publication, our deep appreciation.

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FEATURES

6

11

21

32

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About the Journal

The International Forum for Nursing and Healthcare (IFNAH) is the official publication for nursing and healthcare practice, education and research of the University of the Philippines International Nursing and Healthcare Forum (UPINHF, Inc.). This peer-reviewed publication, formerly called "The Nursing Journal" is published annually. Recently, the journal was officially assigned ISSN 2637-4161 by the U.S. ISSN Center at the Library of Congress.

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EDITORIAL

Welcome to our 2019 edition of the International Forum for Nursing and Healthcare – our 3rd issue.

The IFNAH's Editorial Board, Editors, Advisors and Editorial Consultant would like to congratulate the leaders of UPINHF for their continued mission to actively improve and maintain the highest standards of healthcare practice by sharing ideas and promoting advanced professional services, education and research, with the fitting theme: Sustainable Healthcare: The New Paradigm.

The term sustainability is broadly used to indicate programs, initiatives and actions aimed at the preservation of a particular resource. However, it actually refers to four distinct areas: human, social, economic and environmental – known as the four pillars of sustainability (RMIT University, 2017).

As healthcare professionals, this issue will focus on human sustainability. Human sustainability aims to maintain and improve the human capital in society. Sustainability is important to have healthy communities. Sustainable prevention for health promotion is the process of enabling people to increase control over and to improve their health. Healthcare sustainability, the capacity to deliver affordable and cost-effective care over time is a complex problem. Is our healthcare built to last?

We would like to thank our alumni for sharing their strategies and expertise with the increasing challenge and demands of our current health care system in maintaining sustainable healthcare.

We would like to congratulate Dr. Josefina A. Tuazon, DrPH, MN, BSN77, RN, 2019 International Nurse Award

for her engagement in advocacy for health promotion to reduce cost of non-communicable diseases in low-and -middle income countries.

We look forward to getting more research manuscripts from our UP nursing and healthcare professionals and continued annual support from donors and sponsors to sustain this international publication which is a resource of evidence-based studies as well as a medium to showcase the UP nursing and healthcare professional endeavors.

Sincerely,

Magdalena Laparan Ongkiko
BSN, MSN, RN/CCRN
Chairman, Editorial Board

Josephine F. Villanueva
BSN, MA, RN-BC, NE-BC
Editor-In-Chief, Editorial Board

Be a valuable resource and contributor by sharing your knowledge, love, blessing, fortune, and friendship. Honor the past, treasure the present and plan for the future.

Call For Manuscripts

Submission Deadline: May 15, 2020

The INTERNATIONAL FORUM FOR NURSING AND HEALTHCARE (IFNAH), a peer-reviewed publication, is the official journal for nursing and healthcare practice, education, and research of the UNIVERSITY OF THE PHILIPPINES INTERNATIONAL NURSING AND HEALTHCARE FORUM (UPINHF INC). The IFNAH Editorial Board is currently accepting manuscript submissions. All submitted articles must be original, not under consideration for publication elsewhere, and have not been published before.

Please e-mail your queries regarding the manuscript submission guidelines to ifnahjournal@upinhf.org and please cc chairman.ifnahjournal@upinhf.org); include your full name in the subject line and your phone number in the body of your e-mail.

Manuscripts MUST be submitted electronically as an e-mail attached MS-Word compatible document to the Editor-in-Chief (E-mail Address: ifnahjournal@upinhf.org) and the Chairman, Editorial Board (E-mail Address: chairman.ifnahjournal@upinhf.org)

Is Lack of Insight and Judgement of Persons with Psychosis Influenced by Catechol-O-methyltransferase (COMT) Gene Polymorphism?

Maria Theresa Liboro-Abad, MSN, RN
Nathan Kline Institute, New York, USA

Anzalee Khan Rhodes, PhD
Manhattan Psychiatric Center, New York, USA

Please send correspondence to : **Theresa.Abad@nki.rfmh.org**

Background

Many hospitalized patients with psychosis believe that their admission in the ward is not warranted, they deny having psychiatric problems, do not think they need to take medication, and will emphatically say they are ready for discharge when clearly they still are experiencing many symptoms and exhibiting behaviors which affect their ability to function independently. These behaviors and beliefs comprise how a psychiatric person's "Lack of insight" is assessed and is known to be the main predictor of relapse in individuals with schizophrenia.

For this study, we have defined lack of insight and judgement as to one's difficulty in appraising the presence of psychiatric illness, acceptance of a prescribed course of treatment, or anticipating outcomes when resorting to specific behaviors which are scored using the Positive and Negative Syndrome Scale (PANSS). This study used responses provided by 145 individuals diagnosed with schizophrenia or schizoaffective disorder who consented to take part in this genetic study. We have further explored the range of the participants' symptomatology through ratings at the five PANSS Marder factor scores or five dimensions of schizophrenia: negative symptoms, positive symptoms, disorganized thought, uncontrolled hostility/excitement, and anxiety/depression. Many of the subjects were moderately ill laden with multiple psychiatric symptoms and behavioral problems.

The gene of interest is the COMT Val 158 allele which was examined on the distribution of COMT genetic markers. COMT Val 158 Met allele is a widely studied genetic polymorphism and has had some findings of being associated with poorer cognitive performance and increased susceptibility to develop psychiatric disorders. It is generally assumed that this increase in COMT activity influences cognitive function and psychiatric disease risk by increasing dopamine turnover in

cortical synapses, though such activity cannot be directly measured in humans.

Since the role of COMT in schizophrenia remains questionable, it is important to determine whether any association exists between COMT genotypes and clinical symptomatology (specifically Lack of Insight and Judgment) in a large cohort of schizophrenia subjects.

Objective

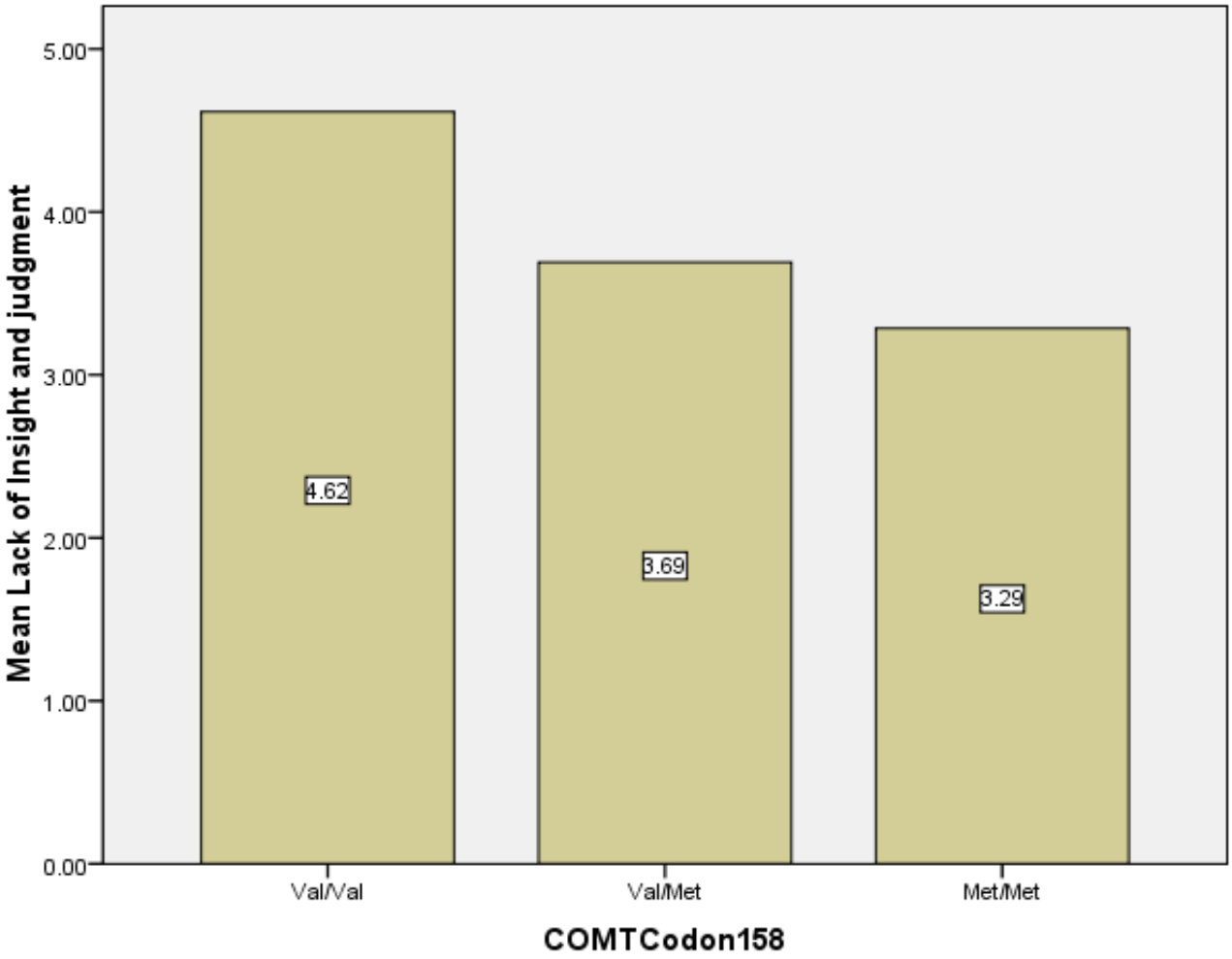
The aim of this study was to investigate the influence of the COMT Val158Met genotype on Lack of Insight and Judgment as assessed in the Positive and Negative Syndrome Scale, as well as the 5 PANSS Marder factor scores.

Methods

The study was conducted at a 260-bed, tertiary care, state psychiatric inpatient facility in Manhattan, New York. A few miles from this hospital is the other investigative site, an out-patient clinic which provides psychiatric care for 600 registered clients. The target population may be considered diverse in ethnicity: 50% African-Americans, 25% Hispanics, 22% Caucasians, and 3% Asians. Among them, 80% are male and 20% are female. Inpatients and outpatient subjects with DSM-IV-TR schizophrenia or schizoaffective disorder were consecutively enrolled from the parent study assessing the effectiveness of cognitive remediation and were genotyped. All subjects were on stable antipsychotic medications at enrollment. All participants voluntarily consented to be in this study and signed the consent form approved by the Nathan Kline Institute /Rockland Psychiatric Center Institutional Review Board. Upon ascertaining agreement to undergo study procedures, subjects were interviewed by certified raters using a standard psychiatric interview tool to measure symptomatology, called Positive and Negative Syndrome

	Genotype				
	Met/Met (n = 28)	**Met/Val (n = 61)**	**Val/Val (n = 49)**	**F/Fisher's Exact/X^2**	***p* value**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**		
Age (years)	42.235 (9.200)	40.468 (8.278)	42.136 (7.457)	F (1, 137) = 0.639	0.523
Education (years)	9.569 (5.236)	13.124 (2.459)	12.189 (3.758)	F (1, 137) = 0.968	0.422
Length of Stay for inpatients (mths)	13.231 (2.345) Range: 7, 18	15.239 (3.457) Range: 7, 21	13.468 (4.002) Range: 6, 18	F (1, 104) = 0.906	0.411
Length of Stay for outpatients (mths)	5.123 (1.230) Range: 2, 6	4.123 (1.323) Range: 1, 5	3.456 (1.478) Range: 2, 6	F (1, 32) = 0.979	0.430
Chronicity of Illness (yrs)	14.231 (3.461)	13.36 (2.364)	15.239 (3.005)	F (1, 137) = 0.909	0.389
	%	%	%		
Gender					
Male	96.429%	85.246%	93.878%	Fisher's = 32.088	< 0.001
Female	3.571%	14.754%	6.122%		
Antipsychotic Treatment					
Oral antipsychotics	61.234%	59.436%	57.362%	Chi Square (6) = 7.426	0.794
Intramuscular depot	38.766%	40.564%	42.638%		
Ethnicity					
African American	75.000%	59.016%	55.102%	Fisher's = 66.431	< 0.001
Asian	0.000%	3.279%	2.041%		
Caucasian	10.714%	18.033%	16.327%		
Hispanic	14.286%	19.672%	24.490%		
Primary Diagnosis					
Schizophrenia	64.286%	80.328%	77.551%	Chi Square (6) = 23.124	< 0.001
Schizoaffective	35.714%	19.672%	22.449%		
Hospitalization Status					
Inpatients	100.00%	90.164%	81.633%	Chi Square (6) = 25.365	< 0.001
Outpatients	0.00%	9.836%	18.367%		
	Mean (SD)	Mean (SD)	Mean (SD)		
PANSS Positive	17.285 (5.460)	18.257 (5.152)	18.112 (4.785)	F (1, 137) = 1.234	0.201
PANSS Negative	21.286 (4.076)	20.458 (4.639)	22.127 (3.598)		
PANSS Total	76.053 (13.011)	78.001 (12.489)	79.596 (11.286)		

Results



Patients with the COMT Val/Val genotype had significantly higher total score on the PANSS Item Lack of Insight than those with the Val/Met or Met/Met genotypes (p < 0.001).

Scale.

All enrolled subjects were involved in rehabilitation programs at the time the study was taking place. They would have been attending treatment groups on understanding mental illness, coping skills, nutrition, and understanding medications and symptoms.

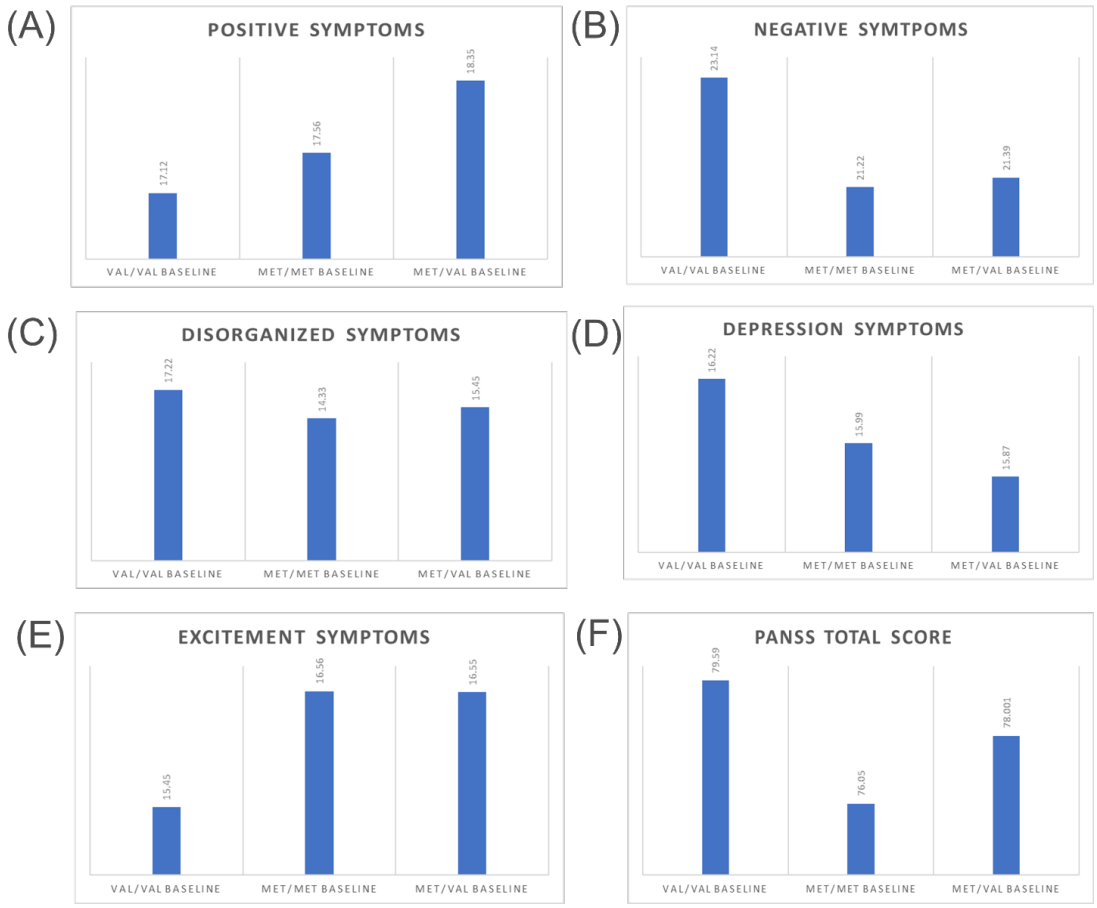
Subjects having agreed to have genetic testing done, COMT codon 158 genotyping was carried out by collecting saliva samples in Oragene DNA collection kits (DNA Genotek) and batch processed. DNA was extracted using a PureGene DNA isolation kit (Gentra systems, Minneapolis, MN). The COMT codon 158 polymorphism (rs4680) was analyzed using a Taqman assay, which is based on the 5'-exonuclease activity of AmpliTaq Gold DNA Polymerase, according to the manufacturer's protocol (reviewed by De La Vega et al (De la Vega et al., 2005) (Life Technologies). PCR reactions were performed and analyzed in 384 well plates on an ABI Prism 7900HT Sequence Detection System. Three patterns of fluorescence are generated and captured by the instrument: homozygotes to both allele and heterozygotes. Genotype calls are made using the SNP auto-caller feature and the data are displayed in one of several convenient formats.

At the completion of the study period, data from 145 participants have been collected. We analyzed demographic characteristics, PANSS scores for group differences between the three genotype groups (Met/Met, Val/Met, Val/Val) using Analysis of Variance (ANOVA) for continuous variables.

Sample Characteristics

The following are highlights of the study sample:

145 subjects were consented and enrolled. These were 130 inpatients and a small number of outpatient subjects. It should be noted, of the 15 outpatient subjects enrolled in the study, 8 (53.3%) were hospitalized as inpatients $\leq$ 3 months prior to enrollment in the study, thereby having a similar patient profile as enrolled inpatients. All outpatients enrolled in



(A) Genotype × group interaction on PANSS Positive (F=1.441; p=0.200)
(B) Genotype × group interaction on PANSS Negative (F=4.369; p=0.040)
(C) Genotype × group interaction on PANSS Disorganized (F=4.125; p=0.045)*
(D) Genotype × group interaction on PANSS Depression (F=1.211; p=0.205)
(E) Genotype × group interaction on PANSS Excitement (F=1.296; p=0.199)
(F) Genotype × group interaction on PANSS Total (F=1.233; p=0.201)

the study were directly discharged from the same inpatient facility. The length of stay ranged from 6 months to 21 months for inpatients and 1 month to 6 months for outpatients. Additionally, the number of hospitalizations per subject for the entire sample ranged from 5 inpatient hospitalizations to 18 inpatient hospitalizations (including current) over the course of their illness with an overall chronicity of illness of 14.24 (SD = 3.1) years. All 145 subjects completed the study visit which included psychiatric interview and collection of saliva samples for the genetic test. 7 saliva samples were excluded due to technical difficulties in the sample preparation, resulting in analyzable data of a total of 138 subjects.

The mean age was 41.50 (SD = 9.35) years with a predominance of males (91.8%).

63.0% of the sample was African-American.

Mean total PANSS score was 77.8 (SD = 12.45).

Distribution of COMT genetic markers for the population was as follows:

Met/Met: 28 (20.29%)
Val/Met: 61 (44.20%)
Val/Val: 49 (35.51%).

This genotype frequency distribution is consistent with the one expected in a predominantly African American sample (Wonodi et al., 2003).

Conclusions:

Our findings support hypotheses regarding associations between COMT polymorphisms and lack of insight and judgment in schizophrenia.

Val/Val showed significant association with the overall score of negative symptom factor score and disorganized factor score.

Our finding suggests that COMT gene polymorphism may etiologically contribute to the severity of lack of insight, negative symptoms and disorganized symptoms in schizophrenia, but its precise mechanism needs further investigations.

It is important that the exact mechanisms of genetic contribution to insight are delineated to aid the

development of effective treatments and identify strategies regarding intensity and regularity of treatment.

Role of the funding source

This manuscript describes the results of an NIMH funded study (Federal identifier:1R03MH078098-01) and is an original unpublished work which has not been submitted to any other journals for reviews.

Conflict of interest

Maria Theresa Liboro-Abad, MSN, RN, currently working as a Research Scientist, would like to declare that I have no conflicts of interest in relation to the subject of this study. I am the corresponding author and can be reached at Theresa.Abad@nki.rfmh.org or 646-672 6188.

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Aging-In-Place: Navigating the Transition to Assisted Living

Marilyn Pattillo, PhD, RN, ACNS, GNP, FAAN
Formerly Associate Professor Clinical Nuring
University of Texas at Austin School of Nursing
Private Practice, Internal Medicine Geriatrics

1700 Jackson Hole Cove
Austin, Texas 78746
pattillomarilyn@gmail.com

Abstract:

Providers need a working knowledge the concept of "aging-in-place," placement issues, geriatric assessment and resources. Philosophical insights, practical tips, necessary skills are outlined to assist advanced practice nurses, in particular, provide sensitive and competent care to older adults who are considering transitioning to other levels of care.

Placement discussions often occur when the older adults realize changes require them to rethink their life and situation. Some of these changes are subtle such as less energy, some are more drastic, like a fall. Safety becomes paramount as the number one goal.

Key Words

Aging-in-Place, Comprehensive Geriatric Assessment, placement options

Introduction

When the status quo is no longer sustainable….it is time to talk about how to best age in place.

What could be more helpful to sustainable health care than to have providers who are educated in geriatrics and can care equally for the adult children who feel responsible for their parents as they do for their elder client? What could lead to happiness more than being in the right place, at the right time, in the right way, with the right people?

The situation is almost a crisis. Compared to a century ago, our patients are much older, with longer problem and medication lists and greater functional disability. As baby boomers age, the number of household with people age 80 and over will more than double by 2037 according to Harvard's Joint Center for Housing Studies in its "Housing America's Older Adults" project. Families may live in other cities and offer little ability or willingness to provide care at home. Many providers themselves have specialized, compartmentalizing much of the care.

The role of the nurse, specifically the gerontological nurse, is so important. Being nurse trained and a believer in the holistic practice, the geriatric nurse, treats the whole person. The "whole"

patient must include the family and others in a comprehensive assessment, diagnosing and management of geriatric care. Anticipation, planning, information, and prevention of conditions that would otherwise worsen the situation are hallmarks to good practice.

Background

According to the US Census Bureau, for the next 20 years, about 10,000 people will turn 65 each day. The demand for both in-home care and residential care will grow. By 2060, about 20 million Americans will be 85 years or older, the oldest old, the most rapidly growing elderly group. Only 3% live in nursing homes, down from 6% in 1990, due mostly to better health and increased options, assisted living being one.

Case Study

"My kids think I have to move but I'm doing fine."

Bill is 87 year old retired accountant who has hypertension, coronary heart disease, coronary artery bypass grafts, and osteoarthritis. He has poor vision but does the cooking, driving, and is having more problems walking.

Carol is 81 year old retired nurse. She has osteoarthritis and a history of congestive heart failure, falls and hip fracture repair with pinning. She is mostly sedentary but can walk 15 feet without stopping.

One son is worried. He wants to talk to you—his provider—about whether they should continue to live in their own home. Another son thinks that they should move to assisted living. Bill and Carol, however, want to be independent and they do not want to move into their children's homes.

What does your gut say? They can stay at home until a personal disaster happens. They can bring in home health services or other caregivers. Or they can move into a higher level of care like assisted living.

Providers need a working knowledge the concept of "aging-in-place," placement issues, comprehensive geriatric assessment and resources. Philosophical insights, practical tips, necessary skills are outlined to assist advanced practice nurses, in particular, provide sensitive and competent care to older adults who are considering transitioning to other levels of care.

Comprehensive Geriatric Assessment

The Comprehensive Geriatric Assessment (CGA) https://www.mna-elderly.com/geriatric_assessment.htmlis a multidimensional, multidisciplinary diagnostic process used to determine medical, functional, and psychosocial problems and capabilities in an elderly patient who may be at risk for functional decline. The CGA is designed to

- Evaluate the multiple problems of older persons
- Assess their personal resources and strengths
- Determine service needs
- Develop coordinated care plans to focus interventions on individual problems

Overall Elements of Comprehensive Geriatric Assessment

Physical Health

The medical history focuses special attention on individual elder's health and safety risks. One way to assess the elder's capacity is to have the family spend a day with the their parents and watch. Have them smell and observe: escalating care needs, aggression/ wandering (beginning cognitive problems), weight loss, home safety (trash), mail not answered/sorted, plants and pets untended, kitchen signs (spoiled food), alcohol, medications disorganized, bills not being paid, home hazards, ability to do activities of daily living, and their own caregiver stress (anxiety, guilt, avoidance behaviors) levels.

The physical examination seeks to identify specific diseases or conditions for which curative, restorative, palliative, or preventive treatment may be available. Special attention is directed toward visual or hearing impairment, nutritional status, and conditions that may contribute to frailty and falling or difficulty in ambulation.

Since Bill still insists on driving, taking away car privileges can be devastating because it would be a reflection of their mobility, independence and control. During the physical assessment, evaluate the elder's motor abilities such as:

- Muscle strength and endurance
- Range of motion of the extremities, trunk and neck
- Sensation & Proprioception
- Vision
- Quick, precise and coordinated movements
- Cognitive Status - MiniCog

Mental Health

Cognitive, behavioral, and emotional statuses are evaluated, with particular emphasis on detecting dementia, delirium, and depression. Tools such as PHQ9 for psychosocial risks and mood and the reliable MiniCog or the Montreal Cognitive Assessment (MoCA) are helpful.

Social and Economic Status

The social support network includes availability and competence of caregivers, the elderly person's economic resources, and other sources of support such as cultural, ethnic, and spiritual resources. A discussion on medical directives and power of attorney is important to declare who can speak for them if they are not able to do. In terms of caregiver competence, frequent medication reconciliation and teaching family members to do so is important. As a sign of respect and consideration, after going over what everybody else is concerned about, Carol and Bill should be asked what they gives them pleasure and what makes them happy.

Functional Status

Functional status is measured by the ability to accomplish basic activities of daily living (ADLs) and to participate in behavioral and social activities referred to as instrumental activities

of daily living (IADLs). ADLs include bathing, dressing, toileting, transferring, continence, and feeding. IADLs require a higher level of cognition and judgment than physical activities and include preparation of meals, shopping, light housework, financial management, medication management, use of transportation, and use of the telephone.

Environmental Characteristics

Evaluating the patient's physical environment determines the safety of the living environment. It also assesses the patient's access to essential services, such as shopping, pharmacy, and transportation.

The CGA not only identifies problems and deficits, but it can also discover assets and strengths. It can give a more accurate picture of the condition, what areas they need help in and what areas remain strong and meaningful. Knowing where they are in the continuum of life, individuals can plan more proactively how they will spend the rest of it. It can allay fears and wrong assumptions and can empower elders and their families to make decisions. The assessment tool can share the burden of difficult decisions to relieve and support the family who often worry without focus.

Aging-in-Place

The U.S. Centers for Disease Control and Prevention defines aging in place as "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level." Decisions usually become necessary when there are changes in motor and cognitive functioning that impact safety, independence and comfort.

The CDC further defines aging in place depending on needs:

1. Aging in place without urgent needs: This group includes individuals who can stay in their current home and are not experiencing immediate health/mobility issues. They are fairly healthy and want o remain independent as long as possible. They have the most options as many are actively engaged in activities that please them. They tend to see their personal trainer as just as important as they financial advisor. As they age, they see fitness as helping them maintain functional ability to do what they desire. Many could be enrolled in Silver Sneakers, a lower-cost exercise program that is available at 16,000 locations nationwide—-and is included with many Medicare plans. Most likely, their medication list is relatively short.

New technology is helping this group stay at home as long as possible. AI technologies can turn any home into a platform of services to keep connected, provide convenience and deliver care we age. Many of these products are well-known: the internet-enabled refrigerator, smart televisions, home-monitoring systems, AI-based smart speakers such as Amazon's Alexa and Google Home. Given the widespread desire among older adults to age in place, many people will consider the expense to be worth it. The internet has transformed the home into a service platform and a more livable place.

In addition, baby boomers are demanding more from their assisted living options. Think of searches spanning Uber or Lyft rides to in-home wellness programming. Transportation-on-demand, dining-on-demand and on-line learning are all trends that play well with this group.

Many say they prefer "aging-in-place" to moving in with family or packing up for multistage assisted living. But there is consensus that social isolation is a serious health danger and that "aging-in-community" could be important. Aging-in-place could mean choosing the right place for the right reasons…to grow old, preferably surrounded by people who care about you. Aging-in-place does not mean living in isolation; it means living in a place where it is safe and realistic and not putting people at risk because of stubbornness and denial.

2. Aging in place with progressive condition-based needs: These individuals include the old-old, the frail elderly or the older adult with chronic and progressive medical conditions (dementia, strokes, macular degeneration, chronic pain, complex medication management). They are especially vulnerable to safety issues. Many of these older adults deny that their condition has progressed to a point that they are unsafe. They can be most frustrating to deal with, because many don't realize that their health is getting worse. They resist the fact that status quo is no longer sustainable. Many elders know that they are "losing it" but will react negatively making it difficult when others try to help.

There can be difficult and contentious discussions of moving out and the need for help for activities of daily living, paying bills, entering into contracts, transportation and setting up medications. Helping aging adults with complex medical and psychological problems requires a team effort of geriatric specialists in the legal, financial, social work, medicine fields because of the bio-psycho-social factors of aging that must be considered. Could care and supportive services be brought in? Do they need medication reminders? Do they need medical care? Could a home health agency provide oversight?

The following community based housing alternatives are for elders who are fairly stable and those with progressive medical conditions:

1. Residential facilities/retirement communities - independent living and similar age groups clustered together, surrounding a common hobby, e.g. golf.

2. Continuing Care Retirement Communities - residents can move from one level to another based on their individual needs from individual homes or apartments (for residents who still live on their own), to an assisted living facility (for people who need help with daily care), and finally to a skilled facility (for people who require

higher levels of care).

3. Assisted living facilities - room and board, safety, daily fitness, opportunities for socialization, healthy dining and help with activities of daily living are provided. Most rooms are small studio or 1 bedroom apartments that encourage residents to mingle, partake in activities, and enjoy the amenities that are offered in the community. Many assisted living facilities have tiers of service which costs more. For example, medication management and laundry are extra. In addition, home health services can be called in when necessary. Assisted living provides a wide spectrum of care with scant regulation. Care is private pay.

A number of good websites are available to assist in the decision and planning a move when the family realize that medical conditions are progressing and the elder is becoming more vulnerable. A Place for Mom and similar companies may help in the the conversation and implementation of a plan.

https://www.aplaceformom.com/planning-and-advice/articles/assisted-living-in-home-care-compared

3. Aging in place with traumatic change needs: This last group includes those who experienced an abrupt or major change of condition, often requiring hospitalization. Post discharge may require skilled care and long term nursing home care. Also may include those frail chronically ill, unable to take care of daily living needs and who have no or little social support. Skilled nursing facilities provide more complex types of types of medical assistance, therapies, activities and offer 24 hour monitoring and direct care. The nursing home industry is heavily regulated. See http://www.medicare.gov/nursinghomecompare.

Can We Do Better?

Back to our case study of Carol and Bill: based on relatively high scores of their comprehensive medical assessment despite they fall in the second category of having progressive needs, they admitted that they enjoy traveling and have heard they there were older adults who have made cruise ships their assisted living facilities.

Admittedly, elders who decide to live aboard on a cruise ship are more likely to have relatively good functional abilities, a simple medication list, a culture of travel and resources. Cruise ships have a network of services similar to land-based independent or assisted living facilities. Cruise ships offer almost 24 hour buffet meals, housekeeping, exercise classes, a fitness spa, entertainment, lectures, room service, fresh towels and sheets daily, basic medical care transportation to different parts of the world and varied social activities. All the creature comforts, and none of the work. TV broken, faucet leaking? Call maintenance. Cruisers can be linked electronically to their providers at home and their families.

Dr. Lee Lindquist from Northwestern University Feinberg School of Medicine,found that over a 20-year span, a cost-effectiveness analysis showed that cruises were priced similarly to assisted living centers and were more efficacious. The cost of assisted living on land can vary greatly by facility, location and need. The price of an interior cabin for a month on a cruise ship is approximately $7000 similar to many assisted living facilities. Retirement on the water is an intriguing possibility to consider. See https://money.usnews.com/money/blogs/on-retirement/2015/08/07/all-aboard-retire-on-a-ship

In Summary

The realization that aging in place is part of normal aging and can take place in many different venues and be modified in many different ways allowed for a more open and honest conversation. Navigation to a different level of care begins with an accurate medical summary of health status, accepting reality, honoring the usually anxiety and fear that accompanies the unknown and continues by respecting the older adults by asking them what they would like. Patience is required.

Many adult children who have ailing parents need just as much help than the older adults. They have fears and their own limitations and may feel burdened by time and money. Their relationship with parents may have been strained when growing up so when the roles are reversed, it causes great anxiety. A family assessment and referral may be part of the navigation.

Finally, being happy, content and at peace are key. Erik Erickson's development theory postulated eight stages of psychological development, recognizing that growth continues throughout an individual's life. Each stage has two alternatives: one an opportunity for growth, the other, likely to result in unhappiness. For older adults, the challenge is "integrity versus despair." Integrity can be attained by reflecting on one's life experiences, finding no regrets, peace and accomplishment. Despair occurs when there are unresolved regrets, unresolved grief, and a life meaningless.

The comprehensive assessment provided objective data to help Carol and Bill understand their capabilities and options. Carol and Bill decided they would try out a live aboard a cruise ship for a month to see if they would like it. While they were on board for that month, they allowed their sons to look around. Carol and Bill have softened their stance and are now willing to think of how they can spend the rest of their lives happily and safely.

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U.S. Census Bureau. ***https://www.census.gov/newsroom/releases/archives/miscellaneous/cb12-134.html***

National Association of Area Agency on Aging (n4a) -health insurance assistance, care transitions, elder justice, home and community based services. Visit ***eldercare.acl.gov***

Aging and Disability Resource Center - provides a range of services to help ensure well-being, dignity and choice. Programs also are in place to support family caregivers.

The Validity and Effectiveness of an Investigator-designed Hypertension Training Program for Advanced Practice Nurses in the Philippines

Sarla F. Duller, MSN, PhD
College of Nursing, University of the Philippines
Manila, Philippines
Email: sfduller@gmail.com

Dan Louie Renz P. Tating, BSN, MS, Clinical Epidemiology
Department of Clinical Epidemiology
College of Medicine
University of the Philippines Manila, Philippines

Lourdes Marie S. Tejero, BSN, PhD
College of Nursing, University of the Philippines Manila
Pedro Gil Street, Manila, Philippines

Abstract

Background:

Access to healthcare is a pressing problem plaguing the Philippines today. The dearth of human resources for health in far flung places particularly physicians and job mismatch among nurses are notable major contributors to the problem. Governments of other countries who were also grappling with the lack of human resources for health, spiraling costs of healthcare, and need for healthcare reform, have resolved that adequate coverage and access to health services were more important than who provided them, such that skills previously performed by physicians were shared as common practice with advanced practice nurses. However, these similar conditions have not stimulated the development of the advanced practice nursing role in the country to manage prevalent public health problems especially hypertension that can be addressed at the primary care level. Nurses, being the most numerous health professionals in the country can be trained to fulfill this deficiency.

Objective:

This study aimed to determine the validity and effectiveness of the investigator-designed hypertension training program for advanced practice nurses in the Philippines

Design:

One group, pretest-posttest design

Setting:

Nursing Clinics for Wellness in a government-subsidized university located in Manila, Philippines

Participants:

Out of the 28 masters-prepared nurses who consented, 24 participants completed the training program and answered the post-training instruments; majority were females, with a mean age of 32.42 years (SD=8.397) and mean clinical experience of 5.84 years (SD=3.503)

Methods:

A panel of six experts reviewed and validated the seven modules of the investigator-designed Hypertension Training Program consisting of lectures, demonstration sessions, small group discussions, oral examination, skill performance evaluation, and clinic visit with a demonstration, totaling 32 hours of in-person training. Participants took the written examinations before and after the training program.

Results:

The panel of experts determined that the module contents 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<. 001). Also, self-efficacy scores increased significantly (t=-6.187, p<.001), from 8.08 points (SD=1.16) to 9.06 (SD=0.69).

Discussion:

The validated hypertension training program module effectively equipped the master's-prepared nurses with the required knowledge, skills, and attitudes in providing entry-level advanced practice nursing for patients with primary hypertension, addressing the competencies outlined in the National Organization of Nurse Practitioner Faculty in the United States. 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 advanced practice nursing.

Keywords:

Advanced practice nursing; Hypertension; Nursing education research; Philippines

1. Introduction

Access to healthcare is a pressing problem plaguing the Philippines today. The dearth of human resources for health, particularly physicians and nurses, is a notable major contributor to the problem. Comparing with other Asian countries, from 1995 to 2005, the Philippines has bested China, Korea, Malaysia, Thailand, and Indonesia regarding the ratio of nurses per 1000 population. However, these numbers were due to the increase in nursing graduates and licensed individuals who sought employment in other countries (WHO, 2011) and not necessarily the number of nurses available to cater to the healthcare needs of Filipinos. In 2006, in government and private health workers in hospitals, the nurse-to-physician ratio was 3:1/1000 people. The rate has drastically decreased to 2 MDs and 3.3 RNs/10,000 population in both private and public sectors in 2011 (WHO, 2011).

In addition to the provider-to-population mismatch, the WHO Health Systems in Transition Report (2011) noted inequities in the distribution of health facilities and human resources for health. For example, according to the WHO most Barangay Health Centers (BHCs) are concentrated in the National Capital Region (NCR) and Luzon areas, while southern Mindanao has the least. Further, the 2011 data of the National Database on Human

Resources for Health Information System (NDHRHIS in WHO, 2013), showed that out of the 18,395 doctors and 30,172 nurses registered in the integrated database of health workers maintained by the Department of Health (DOH), majority (70%) of these professionals work in urban areas (DOH, 2005, in WHO, 2013). Finally, the undue hardship experienced in the rural communities was intensified by the difficulty in attracting and retaining healthcare professionals.

This problem of access due to inadequate human resource for health and job mismatch was similar to what the United States was confronted with in the early 1900s. For example, during the turn of the 20th century, the demands for immediate treatment in the battlefield during World War I, prevalence of infectious diseases, and high maternal and infant mortality rate gave rise to a new role for nurses, the advanced practice nurse (APN) (Hamric, Spross and Hampton, 2009). While the Philippines may not have the same context, however, the problem of access is universal, and other countries have struggled to find new solutions through the development of new roles.

Other countries were also experiencing inadequate supply of primary care providers. During the mid-1960's, in the US, Loretta Ford, RN, and Henry Silver, MD, to alleviate the lack of access to primary care, introduced the first formal education program for Nurse Practitioners (NPs) in the state of Colorado, USA (Ford & Silver, 1967). The program was based on the principles of the expanded role of specialist nurses incorporating medical diagnostic skills (Marchione & Garland, 1997). Decades later, the National Organization of Nurse Practitioner Faculties (NONPF), a US-based organization of NP Faculties was formed to offer guidance to curriculum and entry level competencies development. These competencies include advanced scientific foundations to practice, advanced pathophysiology, pharmacology, physiology, motivational techniques and other communication skills, which are offered over and above the BSN level curriculum.

Hypertension (HTN) is a major public health issue affecting billions of people around the world (WHO, 2014). The Global Burden of Disease Study (Lim, Vos, Flaxman, Danaei, Shibuya, Adair-Rohani, et al., 2013) highlights on hypertension as the leading risk factor for global mortality and morbidity. More than half (55%) of the 17 million deaths from cardiovascular diseases annually are attributed to hypertension.

In the Philippines, 33% of the proportional mortality accounted for noncommunicable diseases (NCDs) are due to cardiovascular diseases (CVD), which include hypertension (WHO, 2014). The PRESYON 3 study (Sison, et. al, 2013) found a 28% prevalence of hypertension among Filipinos aged ≥ 18 years, representing an increase of 150 % from 11% in 1992 to 28% and most prevalent among adults aged 70 years and higher. Awareness of the disease was found to be only 19% among those affected. These findings were similar to those of PRESYON 1 (1997-1998) and 2 (2007) studies. Fifty-seven percent (57%) of people on medication for hypertension were compliant with their treatment; only 20% of those with or without treatment had blood pressure within the target goal compared to 73% with uncontrolled blood pressure (Sison, 2013).

Chronic diseases like hypertension are best addressed at the primary care level to ensure continuity of care. However, with the ratio of two (2) physicians and 3.3 nurses per 10,000 people (NDHRHIS, 2011 in WHO, 2013) the healthcare for patients with chronic diseases like hypertension becomes too fragmented and the continuity elusive due to the shrinking number of primary care physicians (Fairman, 2010). Further, there is evidence that chronic care requires a different set of skills than acute care, which is the basis of current nursing preparation (Borromeo, 2013).

Nurses, being the most numerous health professionals in the Philippines can be trained as APNs to help manage hypertension in community primary care settings (Geesta, et al., 2008). The extant literature is replete with evidence that the care provided by APNs are equal to if not better than the usual care given by physicians and other primary care providers. Patient satisfaction, quality outcomes, cost containment, were some documented results of APN role reenactment (Mundinger and Kane 2000, Duller, 2008, Budzi, Singh K, Hooker, 2010, Barton and Bevan, 2012).

In the Philippines, there are master's prepared registered nurses with substantial clinical experience who would prefer to work in an expanded or specialty nursing role. However, currently, the Philippines lack opportunities for these RNs to practice in these roles to actualize their advanced education and experience. Because of their graduate-level education and substantial clinical experience, APNs are well positioned as the alternative primary care provider that can mitigate the increasing burden of non-communicable diseases and a shortage of primary care physicians especially in the rural and remote barangays. Governments of other countries who were also grappling with the lack of human resources for health, spiraling costs of healthcare, and need for healthcare reform, have come to the realization that adequate coverage and access to health services were more important than who provided them (Schober, 2006). New and innovative approaches to staffing mix were required that skills previously performed by physicians were shared as common practice with advanced practice nurses (WHO, 2002 as cited in Schober and Affara, 2006). The time is right for the development of APN role and opportunities for practice appropriate to the context of Philippine healthcare.To alleviate the access to healthcare problem in the country, experienced master's prepared nurses can be trained in the management of chronic conditions, which includes hypertension. The body of evidence is mounting that the quality of care given by APN-led clinics is comparable to the care provided by the standard care clinics.

Objective: This study aimed to

1. Validate a hypertension training program module that would equip the nurse with a Master of Arts in Nursing (MAN), or Master of Science in Nursing (MSN) with the requisite clinical knowledge, and attitudes in providing entry level APN/NP-care for patients with primary hypertension.

2. Determine the effectiveness of the hypertension training program on the clinical knowledge and attitudes of nurses with MAN or MSN in providing entry-level APN care for patients with primary hypertension.

In the context of this study, an Advanced Practice Nurse/Nurse Practitioner (APN/NP) is a registered nurse (RN) who holds a master's degree in Nursing (MAN/MSN) majored in Adult Health or Medical-Surgical Nursing and had completed the 32-hour hypertension training program offered by the principal investigator. By advanced education and substantial clinical experience, the APN had gained the adept knowledge base, complex decision-making skills and clinical competencies for expanded practice in the care of patients with primary high blood pressure(Adapted from ICN, 2001). Additionally, and APN/NP is an RN, who is prepared to assume responsibility and accountability for health promotion and maintenance as well as the assessment, diagnosis, and management of patient problems, including non-pharmacologic interventions (CANP, 2016). In this study, APN and NP are used interchangeably. In the context of the United States (US) healthcare system, an Advanced Practice RN (APRN) as defined by the Consensus Model for APRN Regulation and Licensure (2008) is a master's prepared, nationally certified registered nurse with advanced clinical knowledge and skills to provide direct care to patients. Further, an APRN holds a responsibility and accountability for health promotion and/or maintenance as well as the assessment, diagnosis, and management of patient problems, which include the use and prescription of pharmacologic and non-pharmacologic interventions and lastly, has obtained a license to practice as an APRN in one of the four APRN roles: certified nurse anesthetist certified midwife, clinical nurse specialist and certified nurse practitioner (Consensus Model for APRN Regulation: Licensure (2008)

2.1 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 specialized training in the management of patients with primary hypertension. 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.

2.2 Study setting

This study took place in the City of Manila, Philippines, a highly urbanized city with high population density and a reported prevalence of hypertension at 21.7% (Capanzana, 2014). 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.

2.3 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).

Inclusion criteria were: (1) graduate of an accredited Master's program in Nursing, with a major in Adult Health or Advanced Medical-Surgical Nursing, or at least have completed all major and core courses, (2) valid license to practice Nursing in the Philippines, (3) minimum of two years of hospital experience,(4) willingness to undergo a 32-hour training, and (5) willingness to conduct clinic consultation with patients who have primary hypertension while collaborating with a physician, and 6) signing an informed consent form.

Exclusion criteria were: (1) graduate of other Master's program in Nursing, 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.

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

2.4 Validation of the Training Modules

A panel of six experts reviewed and validated the modules used in the Hypertension 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 in a large federal facility in Washington DC in the US with 16 years of experience managing patients with hypertension, (2) a staff RN with 25 years of experience working in a Medical-Surgical ward of a large teaching hospital in Manila, Philippines, (3) a nurse educator with more than 20 years of experience teaching cardiovascular nursing at the master's level in Manila, Philippines, (4) a health professions education expert with five years experience in module development, in Manila, Philippines, and (5) two primary care physicians in general practice with a total of over 20 years experience in managing patients with hypertension.

The experts reviewed each module and rated whether each competency/ learning objective was covered adequately in the module by checking the appropriate column in the 4-point Likert Scale: 4 for adequate, 3 for moderately adequate, 2 for somewhat adequate and 1 for not adequate. They also wrote their recommendations and remarks in a separate column.

2.5Intervention

The Hypertension Training Program covered the topics in Table 1, addressing the applicable competencies identified by the NONPF (2014). The training lasted for four days or 32 hours.

After signing the informed consent, the APNs completed the baseline instruments regarding knowledge and self-efficacy on hypertension management (n=24). The training

Table 1. List of Modules, Schedules and Time Allotment

Session	Topic	Time Allotment
Day 1	Module 1: Pathophysiology of Hypertension	1 hour lecture/discussion
	Module 2: Clinical Decision Making in Hypertension – Assessment	2 hours lecture/discussion 2 hours demonstration/validation
	Module 3: Clinical Decision Making in Hypertension – Non-Pharmacological Treatment	2 hours lecture/discussion 1 hour demonstration
Day 2	Module 4: Clinical Decision Making in Hypertension –Pharmacological Treatment	2 hours lecture/discussion 1 hour small group discussion
	Module 5: Patient Teaching – Motivational Interviewing, Anticipatory Guidance and Counseling	1 hour lecture 1 hour demonstration
	Module 6: Practice Inquiry: Identifying Clinical Practice Issues, Appraising Evidence	1 hour lecture/discussion 30 minute small group discussion
	Module 7: Quality Improvement, Patient Safety and Collaboration	1 hour lecture 30 minute small group discussion
Day 3	Clinic Visit and Demonstration	4 hours demonstration 4 hours return-demonstration
Day 4	Written Examination Oral Examination Skill Performance Evaluation/Validation	2 hours 2 hours 4 hours

program accommodated the participant's varied schedules which included: 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 experts gave the lectures; facilitated the demonstration sessions, and small group discussions. A physician with a specialty in cardiovascular diseases discussed the pathophysiology of hypertension and pharmacologic therapy. The principal investigator, a board-certified adult nurse practitioner (NP)with over a decade of experience as an independent healthcare provider in California, USA, discussed the remaining topics.

Both the physician and the nurse practitioner (NP)/principal investigator prepared the 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 (OSCE) 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 hypertension. During the first four hours 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 by demonstrating the application of the skills discussed during the previous sessions of the training program. The next four hours 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 conducted 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.

2.6 Research Instruments

The investigator-developed instrument that measured knowledge on hypertension management was based on the content of the modules in the Hypertension Training Program. Test

items in this tool were written based on the objectives and content of the training modules, To ensure the validity of the tool in meeting the objectives of the learning modules, the items were clustered in a test blue print according to the objectives and the classification of the question (recall, understand, analysis, apply or synthesis).

A different panel consisting of six experts reviewed the knowledge instrument to establish the scale's content validity: (1) a board-certified gerontology nurse practitioner with a PhD in Nursing, practicing in California, USA with an expertise in managing patients with hypertension, (2) a registered nurse in Manila, Philippines with five years of experience taking care of patients with high blood pressure, (3) a nurse educator with 14 years of experience teaching cardiovascular nursing at the master's level, (4) an expert in health professions education with an experience in module development, and (5) two practicing physicians with expertise in managing patients with hypertension, with 35 and 11 years of experience, respectively. The panel evaluated the questions in terms of being representative of the objectives of the training, relevant to the concept being measured, and clarity of wording.

Four items were judged unclear, therefore were revised accordingly. Additionally, the expert panel judged five items as either too basic for advanced practice nursing or not relevant to the construct being measured and therefore were dropped. After replacing the dropped items, the panel reviewed and accepted the changes. The content validity index (CVI) for the final scale was 0.9815. The instrument was then administered to the participants before and after the training. The Cronbach's alpha for the instrument for pre-test and post-test were 0.718 and 0.820 respectively, indicating acceptable internal consistency.

The shortened 17-item version of the original 51-item East Carolina University Nurse Practitioner Self-Efficacy Scale (NPSES) by Leonard and Steele (Walsh, n.d.) was used to measure self-efficacy on hypertension management. The Cronbach's alpha of the 17-item instrument was 0.93, indicating an excellent internal reliability. To the knowledge of the researcher, no other published work had used this tool.

2.7 Data Analysis

The characteristics of the participants were described using frequencies, percentages, means and standard deviations. 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 paired t-test. All statistical analyses were done in IBM SPSS Statistics 23. A two-sided p-value of 0.05 is considered statistically significant.

3. Results

3.1 Participant characteristics

Twenty eight nurses consented and took 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 mean age of 32.42 years (SD=8.397) and with a mean clinical experience of 5.84 years (SD=3.503).

3.2 Validation of Hypertension Training Modules

The expert panel determined that most of the learning objectives were covered adequately or moderately adequate by the module content.

3.3 Effectiveness of Hypertension Training Program

3.3.1 Level of Knowledge on Hypertension Management

The total score of the participants on the knowledge instrument was 33.00 points (SD=5.25) before the training program. After the training program, the total score of the participants was 43.08 points (SD=43.08). The increase of 10.08 points (SD=4.393) was statistically significant (t=-11.245, p<.001). All participants got the correct answer on the following items: target organ damage revealed by 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 hypertension, and health teaching on hypertension.

3.3.2 Level of Self-Efficacy on Hypertension 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 & 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<.001).

4. Discussion and Recommendations

The validated hypertension training program module was effective in equipping the master's-prepared nurses with the required knowledge, skills and self-efficacy in providing entry-level APN care for patients with primary hypertension. Upon expert review of the training program, the seven-part module addressed the learning outcomes adequately, identified from the competencies outlined by the National Organization of Nurse Practitioner Faculty (NONPF) based in the United States. The investigator-developed scale to measure the nurses' knowledge on hypertension 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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Medication Errors Among Adult Patients in Acute Care Settings: An Integrative Review

Aldin D. Gaspar, MSc, MHC, MN, RN
Assistant Professor, University of the Philippines Manila - College of Nursing
E-mail: adgaspar@up.edu.ph

ABSTRACT

Aims: Promoting a safety culture in healthcare institutions is considered an essential goal to ensure excellent quality care, and promote patient safety as a whole. One recognizable major safety concern in acute care settings is medication errors, which continue to transpire in an increasing rate. Rendering care to adult patients especially in acute care settings poses many challenges for safe use of medications. The main purpose of this project was to determine the different factors associated with medication errors that occur among adult patients in the acute care settings.

Methods: This project utilized an integrative review process and mainly involved eighteen (18) research which were obtained via a systematic search process. PubMed, Cinahl, Medline, EBSCO Academic Search Premier, OvidSP, ProQuest Health, and Elsevier or Science Direct were used in the search. Studies published between 2008 and 2018 were chosen, and critically appraised using specific modified JBI Critical Appraisal Checklists. A qualitative, inductive content analysis was done to derive a major theme, and critically read and interpret categories and sub-categories from all the included studies.

Results: Four (4) major categories were derived from the integrative review, namely: (1) errors associated with healthcare providers (HCPs), (2) errors associated with patient-related factors, (3) errors associated with healthcare systems and/or work organizations, and (4) errors associated with safety culture. Furthermore, fourteen (14) sub-categories were identified to specifically discuss the implications of medication errors among adult patients in acute care settings.

Conclusion: Occurrence of medication errors among adult patients in acute care settings is multi-factorial. To address and improve medication and patient safety of acutely-ill adult patients, it is imperative to look into the various factors that may affect the incidence of medication errors. These factors should be taken into consideration holistically to enhance the care of adult patients, improve processes that may influence medication errors, and develop collaboration among healthcare professionals in acute care settings.

Keywords: medication error, acute care, adult patients, patient safety

INTRODUCTION

The healthcare industry is currently and constantly in a state of transition. In most countries, hospitals face overwhelming challenges such as allocation of budget and worsening workforce shortage. Along with these issues, patient safety is one of the most demanding concerns that the healthcare team tackles, because it does not only affect the patients themselves but also the HCPs that renders care to them. According to the National

MIRACLE
Home Health Care, Inc.

Felix F. De Guzman, RN

Administrator

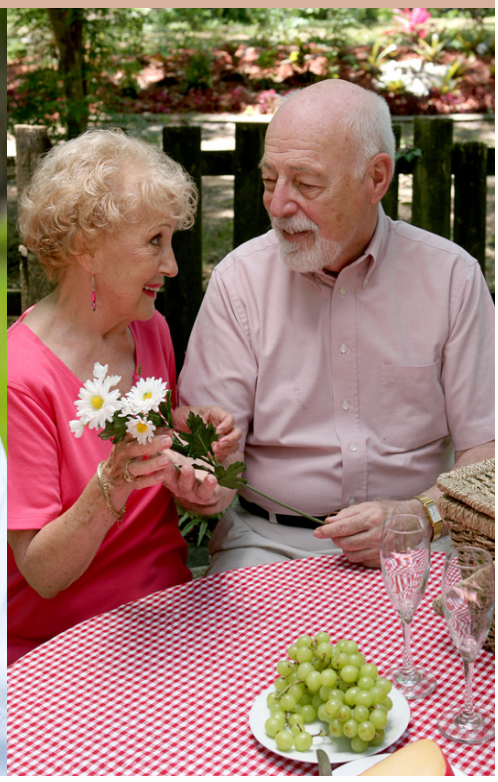
(323) 782-3883

Fax (323) 782-3841

6399 Wilshire Blvd. Suite 810

Los Angeles, CA 90048

miraclehomehealthcare@yahoo.com



Health Service (NHS, 2014), it is *"expected to treat patients in a safe environment and protect them from avoidable harm"*. Patient safety issues are the preventable errors in healthcare setting that can cause harm to patients (i.e. injury, suffering, disability or death). One of the most avoidable patient safety issues is medication error. Anderson & Townsend (2010) noted that *"potentially adverse drug events kill 7,000 Americans annually… medication errors that result in harm are the number-one cause of inpatient fatalities"*. Furthermore, Institute of Safe Medication Practices (2006) reported that medication errors injure 1.5 million Americans each year and cost $3.5 billion in lost productivity, wages, and additional medical expenses. In European Union states, statistics consistently show that drug *"errors and other healthcare-related adverse events occur in 8-12% of hospitalizations"* (World Health Organization, 2014). Specifically, in the United Kingdom, there were an estimated 850,000 adverse events annually. Meanwhile, other EU countries such as Spain, France and Denmark have also published incidence studies of medication errors with the same results (WHO, 2014).

In developing countries, there are generally limited national data or statistics that shows the actual or correct statistics on medication errors due to unrecognition of and non-reporting of such incidences (Hartigan-Go, 2006). A small-scale observational study in Malaysia showed that the most common types of drug administration errors were incorrect time, incorrect technique of administration and unauthorized drug errors; it concluded that *"in terms of clinical significance, 10.4% of the administration errors were considered as potentially life-threatening"* (Chua, Tea & Rahman, 2009). In the Philippines, a study employed factor analysis and structural equation modeling to explore the factors affecting medication errors by student nurses (Valdez, de Guzman & Escolar-Chua, 2013). Upon exhaustive search of literature, there are no known research that presents national statistics of medication errors in the Philippines.

It is a known fact that medication errors pose great risks and consequences especially in the acute and/or critical care setting, where patients are sicker and lack the resilience to respond adequately to an adverse event. With its debilitating effects to patients and to the healthcare industry as a whole, occurrence of medication errors is one area that clinicians should focus and intervene on. Patient safety improvement, such as medication error prevention, is about tackling and investigating the causes of these errors that may come from distinct different factors.

This project's ultimate goal is to improve medication safety among adult patients in the acute care setting. Furthermore, it determines and presents the factors that are associated with the incidence and/or occurrence of medication errors in the care of adults in the acute care setting, utilizing an inductive content data analysis approach. Specifically, it aims to answer the research question: "What are the factors associated with the occurrence of medication errors in the care of adult patients in the acute care settings?"

METHODOLOGY

The author conducted an integrative review of eighteen (18) research studies obtained via a systematic search process. The following electronic databases were used: PubMed, Cinahl,

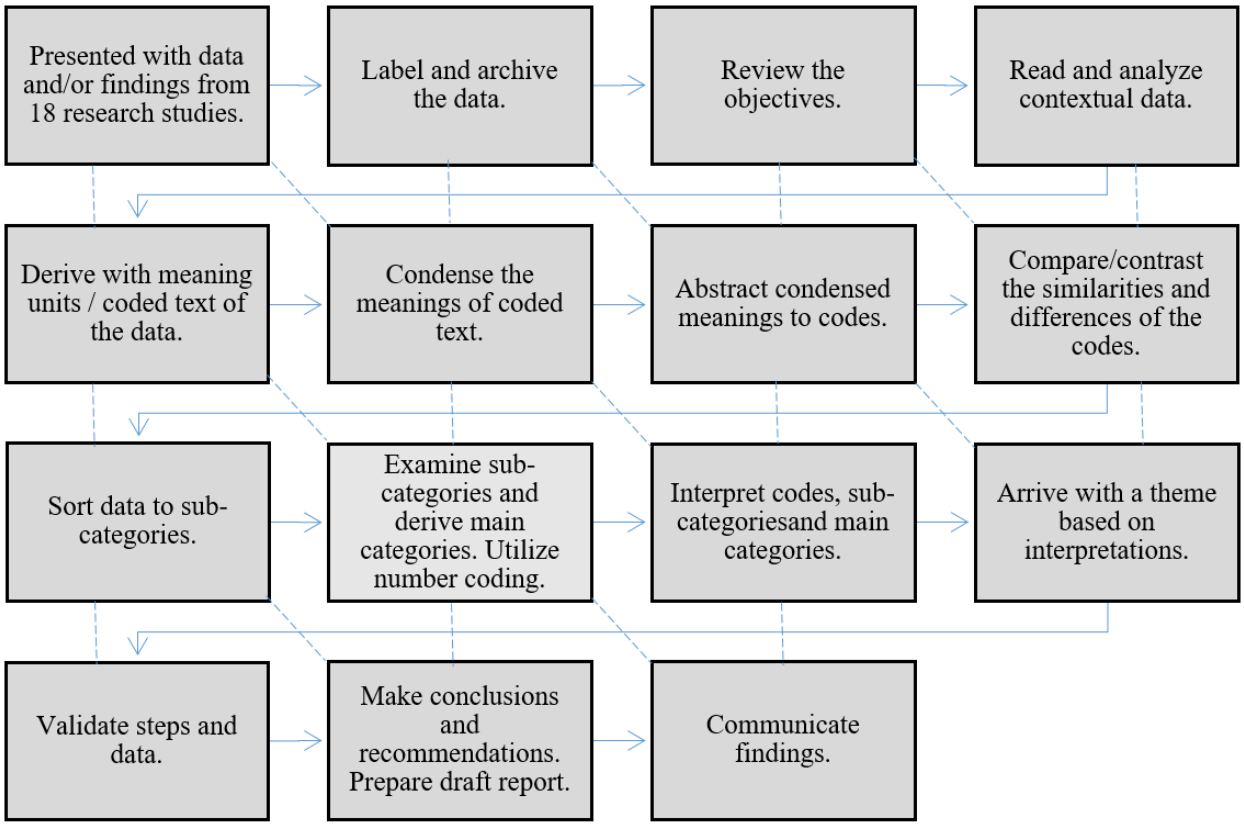


Figure 1. Analysis of data processes.

Medline, EBSCO Academic Search Premier, OvidSP, ProQuest Health, and Elsevier or Science Direct. A manual search of articles was also performed using both MeSH terms and keywords by the options "Search all text". The original primary keywords utilized for the search process were: medication error, acute care, adult patients, and patient safety. Studies published between 2008 to 2018 were chosen so as to allow collection of more timely, current, and updated data regarding the topic.

Inclusion and exclusion criteria were employed to specifically respond to the PICO question: "What are the factors associated with medication errors (Outcome) that occur in the acute care (Context) of adult patients (Population)? Inclusion criteria for the studies were the following: (1) research articles should be written in English; (2) full-text research studies;

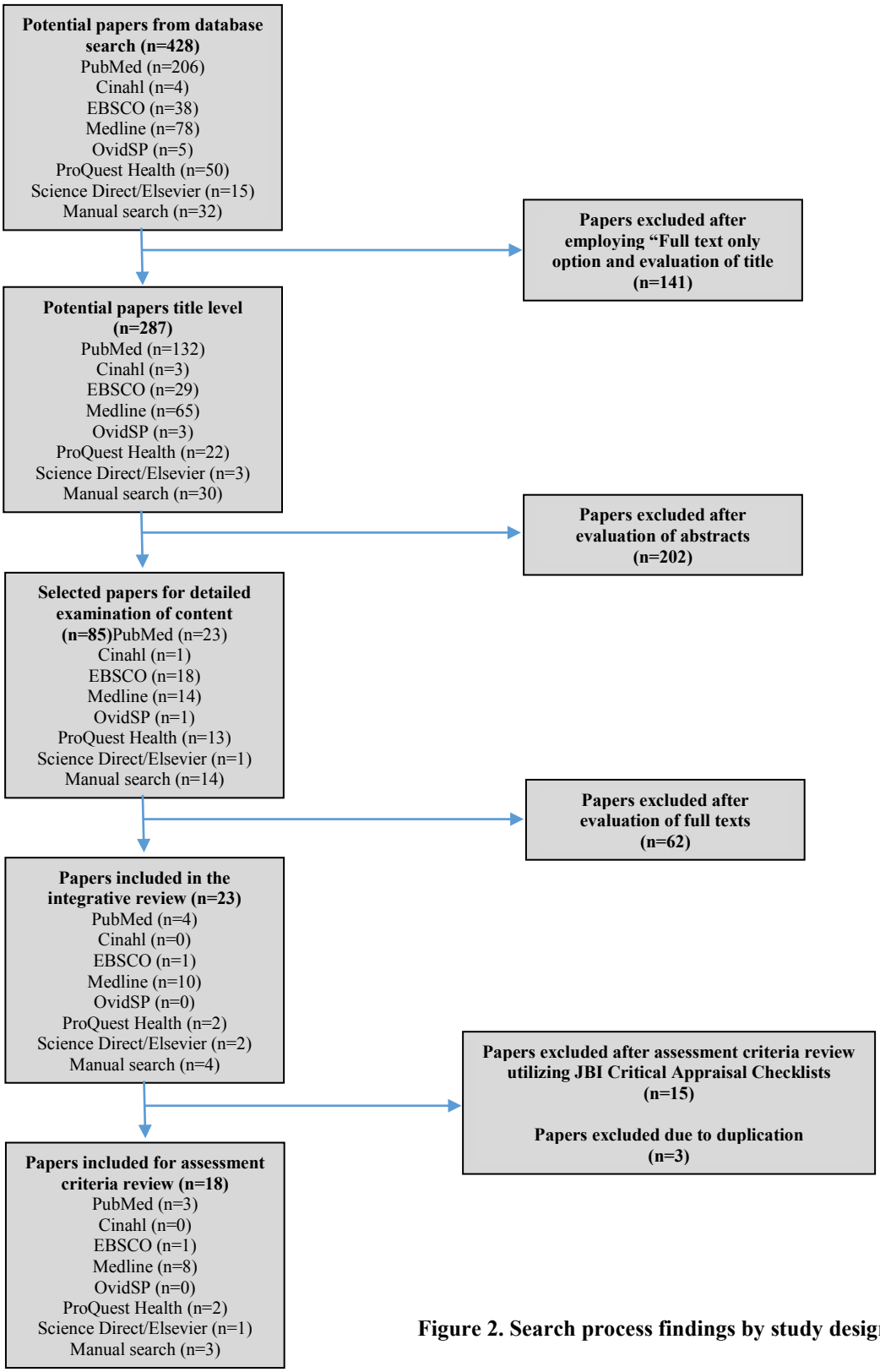


Figure 2. Search process findings by study design.

Table 1. Factors associated with the incidence of medication errors in the care of adults in the acute care settings

(1) Errors associated with healthcare providers (HCPs)
(2) Errors associated with patient-related factors
(3) Errors associated with healthcare systems and/or work organizations
(4) Errors associated with safety culture

(3) systematic reviews and high-quality quantitative and qualitative studies where medication errors and associated factors were described; and (4) selected studies must have been carried out or be applied in the acute care settings among adult patients. On the other hand, the following studies were excluded from the search process: (1) case studies, literature reviews and incomplete studies; (2) abstract-only studies; (3) studies with non-adult population; and (4) studies with locale of non-acute care areas (such as wards and outpatient departments).

The author performed database searches during the month of December 2018. Upon completing the research question, objectives, and creating inclusion and exclusion criteria, a concise database search process,and data analysis algorithm were utilized. For the database search, the author examined all the titles and selected relevant titles for abstract-level review. Abstracts were then inspected, and out of these relevant abstracts, relevant full-text articles were chosen. The author then evaluated the quality of the research articles based on modified JBI Critical Appraisal Checklists for specific studies. After evaluation, results sections of the selected studies were analyzed using an inductive content data analysis, to critically read, interpret and reach shared understandings from all the included studies.

The analysis involved an iterative and progressive process so as to reach the goal of having coded texts, obtaining the condensed meanings, codes, sub-categories and main categories of the topic, which further aim to answer the research question. It was conducted in several repetitive, non-linear and cyclical steps. There were six main phases of the analysis: (1) reading, understanding and analyzing the contextual data, (2) deriving meaning units and their condensed meanings and abstracting these into codes, (3) comparing and contrasting the similarities and differences of codes and deriving sub-categories, (4) examining and scrutinizing the sub-categories and deriving main categories, (5) deriving a theme according to interpretations of the codes, sub-categories and main categories, and (6) validating the data, making conclusions and recommendations, and communicating the findings. Figure 1 shows the continuous and progressive process of data analysis.

Ethical Consideration

This project only focused on integrative review of research studies and qualitative inductive content analysis of data from known and published research studies, thus no ethical issues were deemed necessary.

RESULTS

Search Process Findings

Utilizing the keywords enumerated previously, 428 potential papers were found from all databases and manual searches done. At the title-level search and after choosing *"Full text only"* option, the following research studies were derived: PubMed 132, Cinahl 3, EBSCO 29, Medline 65, OvidSP 3, ProQuest Health 22, Science Direct/ Elsevier 3, and manual search 30. One hundred and forty one (141) articles were removed from the potential list of articles.

After scrutinizing the abstracts, a total of eighty-five(85) articles were then selected for detailed examination of contents: PubMed 23, Cinahl 1, EBSCO 18, Medline 14, OvidSP 1, ProQuest Health 13, Science Direct/ Elsevier 1, and manual search 14. A large number of 202 articles were excluded at this phase of the search process.

Upon evaluating the full texts, sixty two (62) articles were rejected, and only thirty (23) articles were deemed potential papers for integrative review purposes:PubMed (n=4), Cinahl (n=0), EBSCO (n=1), Medline (n=10), OvidSP (n=0), ProQuest Health (n=2), Science Direct/Elsevier (n=2), and manual search (n=4). These articles were involved in criteria assessment using the *modified JBI Critical Appraisal Checklists*, where ten parameters were utilized to assess and critically appraise the contents of the papers. In the end, after removing duplicated articles, eighteen (18) of these were chosen to comprise the data for this review. Figure 2 shows the search process algorithm results.

The most frequent reasons for excluding articles were that the topic was not focused for the integrative review. There were narrative reviews, case studies, and incomplete studies that did not fulfil the methodological quality demands, and were part of grey literature. Also, there were duplicates of an article found in another database. A large number of articles were also removed upon choosing the *"Full text only"* option. All other excluded articles were used as additional references for the whole project.

Description of chosen studies

Thirty nine percent (n=7) of the studies were from the USA, five from Europe, four from Asia, and one each from Australia and Canada. Majority of the studies (78.8%) were focused on the types of medication errors, and the factors involving its incidence in the care of adult patients in acute care settings. The other studies mainly focused on the impact of medication errors, and other concepts of patient safety involving medications. Five of the studies were systematic reviews; four each of the following: retrospective studies and qualitative studies; two each of the following: cohort studies and case-control studies; and one randomized-controlled trial. All studies fulfilled at least eight of the ten quality criteria using the modified JBI Critical Appraisal Checklists.

DISCUSSION

The main objective of this article was to determine the main factors that are associated with the incidence and/or occurrence of medication errors in the care of adults in the acute care setting. Upon taking into account the research

Table 2. Errors associated with healthcare providers (HCPs)

Nurse-related	Skills (mathematical skills, use of technology/systems, drug administration/ preparation)
	Knowledge (pharmaceutics, new equipment/drug dispensing systems, drug interactions, drug administration/preparation)
	Education (BSN-prepared vs. non-BSN-prepared nurses)
	Length of experience (new graduate nurses vs. more experienced nurses)
Doctor-related	Quality of prescription (poor/illegible/ambiguous handwriting)
	Length of experience
Pharmacist-related	Knowledge about pharmaceutics (i.e. drug name, drug interactions, etc.)

Table 3. Errors associated with patient-related factors

Demographics	Age, gender, race
	Physical / cognitive / psychological disease or condition
	Knowledge about disease and drug
	Length of hospitalization
Polypharmacy	Use of multiple drugs (PP or EPP)
	Drug interactions

question and employing the data analysis process, four main categories were derived: (1) errors associated with healthcare providers (HCPs), (2) errors associated with patient-related factors, (3) errors associated with healthcare systems and/or work organizations, and (4) errors associated with safety culture [Refer to Table 1]. Furthermore, it must be noted that fourteen (14) sub-categories were also derived from the analysis of data. These will be presented in each main category's discussion of results on the following section.

Errors associated with healthcare providers (HCPs)

The results indicated that one of the main reasons why medications occur in the acute care setting is due to aspects associated with HCPs. Three sub-categories were listed under this main category: nurse-related, doctor-related, and pharmacist-related.

Nurses' skills or expertise, knowledge, length of experience, and education were all mentioned inresearch studies as aspects that may affect medication errors (Chang, 2007; Folkmann& Rankin, 2010; Tang et al., 2007; Wimpenny& Kirkpatrick, 2010). Lack of knowledge of nurses about pharmaceutics (i.e. drug name) and certain equipment or new technology or system contributed to medication errors. In addition, lack of knowledge of drug interactions, delivery route and administration equipment (i.e. use of infusion pumps) were also stated. Furthermore, the skills of nurses specifically on mathematics (i.e. computation of right dose of drug) and education were also considered. Chang (2007) noted that nursing units with more BSN-prepared nurses had the lowest rate of medication errors. It was also mentioned that the length of experience of nurses affect the incidence of medication errors especially in the critical care setting. According to one study, new graduate nurses are included in the top three factors associated with drug errors (Tang, Sheu, Yu, Wei & Chen, 2007). Lack of experience in drug preparation/ administration, utilization of drug-dispensing systems and drug charts were also noted (Brady et al., 2009; Sheu et al., 2008).

The doctor's length of experience was also one factor that may be contributory to medication errors in the acute care setting. It must be noted, however, that most doctor-related issues mentioned in the studies were associated with the poor/ illegible/ambiguous handwriting of the doctor and incorrect description, i.e. wrong dose or drug prescription (Wimpenny&Kirkpatrik, 2010; Brady et al., 2009; Ulanimo et al., 2007; Mayo & Duncan, 2004; Taxis & Barber, 2003). Lastly, the pharmacist's knowledge about the drug products and drug interactions was also indicated as one of the concerns associated with medication errors (Taxis & Barber, 2003).

Errors associate with patient-related factors

Another main factor that resulted from the analysis of data were medication errors connected with patient-related factors. Two (2) sub-categories were derived upon careful scrutiny of the studies: (1) patient's

demographics and (2) polypharmacy. The most frequent medication errors in adult patients in acute care settings are associated with polypharmacy and drug interactions. Ahonen (2011) stated that the "amount of inappropriate drugs used and their interactions were associated with amount of drugs used by the patients and their diseases" especially in the elderly. Excessive polypharmacy was also observed to be occurring in every fourth elderly person (Jyrkkä et al., 2009).

The patient's demographic profile is also a main contributing factor to the incidence and occurrence of medication errors. According to studies, older persons are more prone and at risk to these drug errors (Ahonen, 2011; Jyrkkä et al., 2009). Female patients with advanced age, poor physical, cognitive and psychological conditions, and those who have multiple medical diagnoses are at greatest risk of drug interactions and medication errors (Picone et al., 2008; Lin et al., 2008). According to Mensio et al. (2007), *"medication errors frequently occur in adult psychiatry patients using anti-psychotic drugs*". The patient's race was also taken into consideration (Picone et al., 2008). The patient's specific disease and other factors such as *"lack of venous access and patient'sunwillingness to cooperate with drug administration"* (Taxis & Barber, 2003) were also obtained from the analysis of data. The patient's long hospitalization time may also contribute to medication errors (Mensioet al., 2007). Lastly, the patient's knowledge about his/her disease condition and the drugs utilized for these may also contribute to drug errors. Jyrkkäet al. (2009) reported that poor self-reported health was strongly associated with both polypharmacy and excessive polypharmacy.

Errors associated with healthcare systems and/or work organizations

The third main factor that contributes to the incidence of medication errors is/ are the healthcare systems and/or work organizations. This main category was grouped as such because it involves all healthcare systems, organizations, processes, procedures/policies and management issues that may have a great impact on the errors that happen in the acute care setting. There were four (4) sub-categories listed under this category, and these answers the what's, where's, when's and how's of healthcare systems and work organizations.

The conditions (what) of the management, technology/equipment, and systems in the acute care setting may contribute to the incidence and occurrence of medication errors. Management-related conditions comprise the following: high workload, shifting patterns, staffing issues and distraction among nurses. According to Ulanimoet al. (2007) and Mayo & Duncan (2004), some of the most frequent causes of medication errors are "tiredness and exhaustion of nurses" and distractions in the workplace, especially when carrying out several tasks at the same time (Taxis & Barker, 2003). Wimpenny&Kirkpatrik (2010) and Picone et al. (2008) also included nurses' shifting patterns and staffing issues as two of the most correlated factors of drug errors. Furthermore, efficacy and production pressures of nursing work are associated with medication errors (Folkmann& Rankin, 2010). On the other hand, "the design of the technology itself – such

Table 4. Errors associated with healthcare systems and/or work organizations.

Condition (what)	Management-related (i.e. high workload, shifting patterns, staffing issues and distractions)
	Technology/equipment-related (i.e. poorly-designed or new), and poor drug package/labelling
	Systems-related (i.e. lack of proper guidelines and policies, and poor communication)
Method (how)	Medication delivery/dispensing/preparation systems
	Medication administration processes
	Policies, procedures and specific interventions
Time (when)	Medication administration time
Place (where)	Storage area, drug preparation area, clinical area (i.e. ICU and medical wards)

Table 5. Errors associated with safety culture.

Safety culture	Insufficient/inappropriate rules/laws
	Deviation from correct practices
	Deliberate negligence
	Workplace learning climate and social organization
	Fear of reporting errors due to consequences

as complicated drug vial presentations, preparation or administration equipment – was the second most common error producing condition" (Taxis &Barber 2003). Confusion on different types and functions of infusion devices and syringe drivers, and ambiguous or difficult to read labels of ampules may also lead to drug errors (Ulanimo et al., 2007; Taxis & Barber, 2003). The lack of (or poor) conditions of guidelines and policies, and the healthcare team's communication also affects the occurrence of adverse drug errors. One study found out that information on drug administration is not communicated in between patient transfers, and there is failure in adequately using and checking patient's drug charts (Taxis & Barber, 2003).

The methods (how) of medication delivery/dispensing/preparation systems, medication administration processes, policies, procedures and specific interventions in the clinical setting may also contribute to adverse drug events. Factors such as medication delivery systems, medication administration process policies and procedures may affect the occurrence of medication errors (Wimpenny&Kirkpatrik, 2010). Furthermore, medication errors occur due to incorrect picking, preparation, and administration procedures such as the following: wrong rate of infusion, dose error and omission error (Chapuiset al., 2010). In addition, according to research studies, certain medication reconciliation and drug distribution system uncommon procedures and specific medical and nursing interventions (Brady et al., 2010; Midlov et al., 2005; Piconeet al., 2008; Taxis & Barker, 2003) may also contribute to having high risk of drug errors. For example, failure to check patient's name, having undissolved drugs, misreading a drug label contributes to drug errors (Ulanimo et al., 2007), and utilization of wrong intravenous or blood transfusion sets (Sheu et al., 2008) are some of the reasons of why medication transpire in the acute care setting.

Meanwhile, the time and place of healthcare systems and work organizations are included as two main subcategories, as well. Two studies (Sheu et al., 2008; Chapuis et al., 2010) revealed that administration time errors are one of the most apparent causes of medication errors. Furthermore, the same study by Chapuiset al. (2010) also documented that incorrect storage areas may affect the incidence of errors. Lastly, it was noted in another study that, *"medical wards (36·1%) and intensive care units (33·3%) were the two most error-prone places"* (Tang et al., 2007).

Errors associated with safety culture

Factors that involve the safety culture of an organization or workplace, in this case the acute care setting, may also contribute to the frequency of medication errors. This group of correlated issues were clustered as such because the organizational, social or personal perspectives of the culture within a specific locale are inter-related. The culture not supportive or in favor of medication safety in the acute care setting included insufficient/ inappropriate rules/laws, deviation from correct practices, deliberate negligence, poor workplace learning climate and social organization, and fear of reporting errors due to consequences (Brady et al., 2009; Chang, 2007; Folkmann& Rankin, 2010; Mayo & Duncan, 2004; Metsala&Vaherkoski, 2014; Tang et al., 2007; Taxis & Barber, 2003).Once these factors become accepted in practice, these create a cultural context of unsafe drug use.

Folkmann& Rankin (2010) revealed that *"medication errors are associated with social organization of medication work, safety culture, inappropriate or insufficient rules, laws and management."* Personal neglect – such as deliberate forgetting of administration time and inadvertent withdrawal (or addition) of drugs – was one of the main factors associated with the safety culture (Mensioet al., 2007; Sheu et al., 2008; Midlovet al., 2005). A study by Tang et al. (2007) showed that healthcare members *"need to solve other problems while administering drugs,"* thus making the medication administration process less favorable to having an error-free nursing care. An ethnographic study by Taxis & Barber (2003) also noted conversations with nurses showing that they knew the correct speed of administration but deliberately deviated from these guidelines. The same set of authors also noted that the unsafe culture of not supervising new staff nurses or student nurses were also documented (Taxis & Barber, 2003). Furthermore, workplaces with positive learning climate implies under-reporting and under-detection of medication errors (Chang, 2007). *"Only 45.6% of the 983 nurses believed that all drug errors are reported, and reasons for not reporting include fear of manager and peer reactions"* (Mayo & Duncan, 2004).

RECOMMENDATIONS

Taking into account the results of this project, it is recommended that both individual and organizational factors should be focused on (Metsala&Vaherkoski, 2014). It is imperative that nurses, doctors, pharmacists and all other members of the healthcare team be working hand-in-hand and be collaborative to attain a safe environment for medication usage. A multi-disciplinary team may be formed to create strategies to improve medication safety (Metsala&Vaherkoski, 2014), which may include development of trainings or workshops regarding patient and medication safety, information about pharmaceutics (i.e. most common drugs used in the clinical area), interventions to help prevent drug errors, etc. Aside from this, it must be recommended for healthcare team members to have continuing education about medication safety. A number of research studies emphasized that HCPs working in acute care settings need lifelong education about the medication of acutely-ill patients, comprising the side effects, polypharmacy and medical interactions (Ahonen, 2011; Brady et al., 2009;Jyrkka et al., 2009; Lin et al., 2008;Wimpenny& Kirkpatrick, 2010). Components of this continuing education activities may be focused in the pharmaco-kinetics and pharmaco-dynamics of different drugs (i.e. drugs' indications, contraindications, adverse effects and interactions, especially when these drugs are being utilized by elderly, and critically or acutely-ill patients). HCPs, especially nurses, must also be acquainted with calculation of right dosages, and trained on proper utilization of different kinds of medication dispensing systems

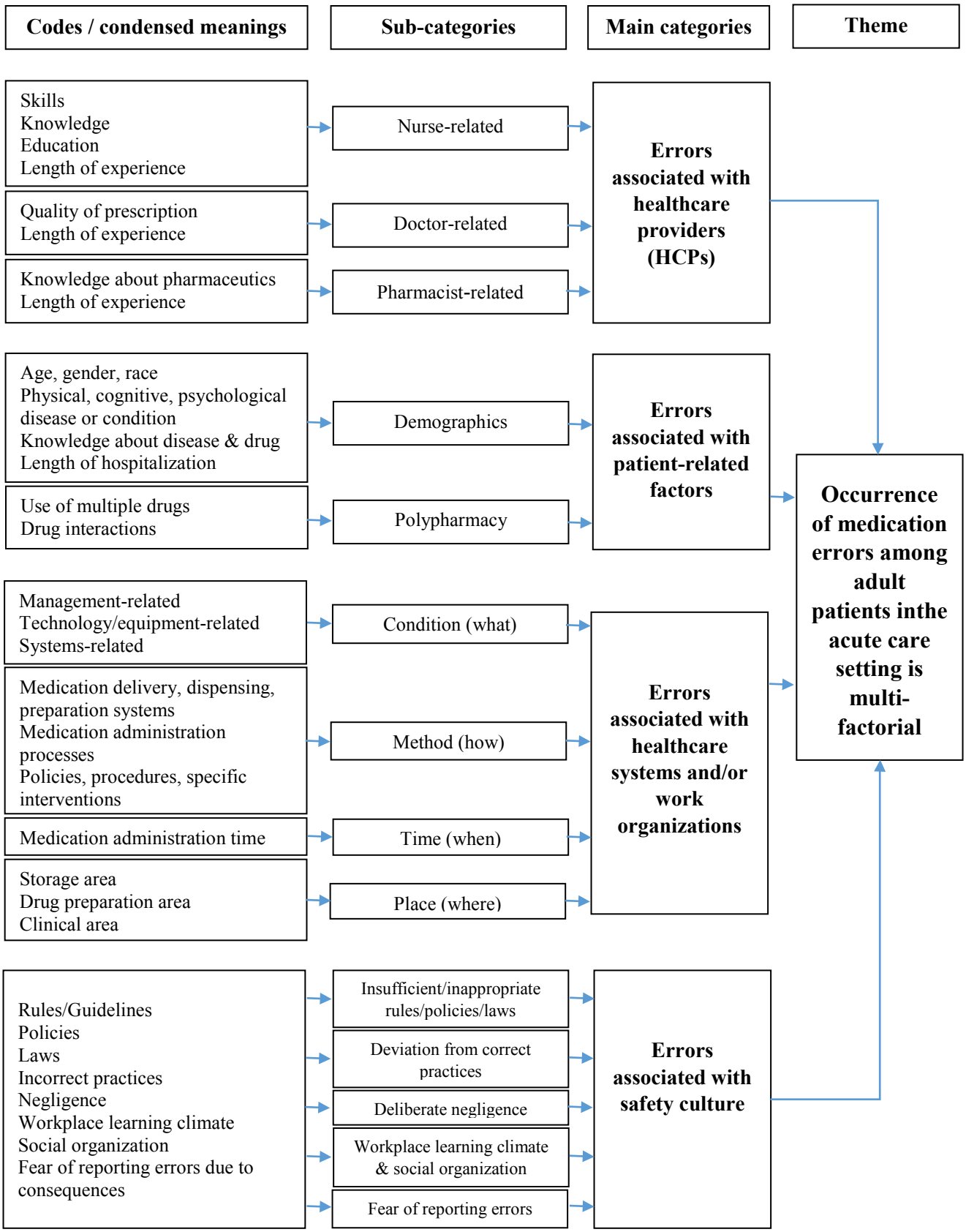


Figure 3. Results: Codes/condensed meanings, sub-categories, main categories, and theme.

and other equipment used to deliver drugs (Brady et al., 20009; Ulanimo et al., 2007; Taxis & Barber, 2003; Wimpenny& Kirkpatrick, 2010).

Furthermore, the medication safety multi-disciplinary team's plan may also involve conducting frequent regular checks of medication safety issues for monitoring and evaluation purposes, thus improving the quality management of the clinical area(Ahonen, 2011; Jyrkka et al., 2009; Lin et al., 2008). Excellent communication among the HCPs (i.e. endorsements) should be observed, as well. This way, there is collaboration among and between the HCPs to better prevent and alleviate the incidence of medication errors in the clinical area. In addition, studies by Ahonen (2011) and Jyrkka et al.(2009) indicated that family members and/or caregivers must also be involved and included in the care of the patients to attain a more wholistic approach of preventing medication errors.

It is noted that polypharmacy and excessive polypharmacy usually occurs not only in the acute care setting but also in the sub-acute and nursing home facilities (Jyrkka et al., 2009). With this issue, it is imperative that HCPs monitor and check the patient frequently for issues concerning polypharmacy. Also, timely and accurate documentation of the drugs taken by the patient should be kept not only for monitoring purposes, but also for evaluation. With this kind of documentation, the nurse can be empowered to become the patient's advocate. On the other hand, a clear and good prescription must be performed by the prescribing HCP (Asad et al., 2011; Tang et al., 2007; Ulanimo et al., 2007). Although it is the physician's role to prescribe the medications, ensuring proper dispensing, utilization, and intake of the medications must also be ensured by all HCPs (Barker et al., 2002;Brady et al., 2009; Chang, 2007; Mayo & Duncan, 2004;Sheu et al., 2008; Wimpenny& Kirkpatrick, 2010;Wolf et al., 2000).

It is beneficial that HCPs must be educated about the consequences of not reporting medication errors. According to studies, if negligent ways of handling medications and violations of rules or policies are allowed, medication errors will certainly occur (Brady et al., 2009; Folkman& Rankin, 2010;Tang et al., 2007; Taxis& Barber, 2003). In addition, HCPs must be assured to have a non-blaming workplace and organization when medication errors occur. Instead of punishing them, HCPs must be encouraged to report, and information should be provided on how to effectively manage the occurrence of medication errors.According to studies, rewarding HCPs – instead of blaming or punishing them – is associated with reduced amount of medication errors (Barker et al., 2002; Mayo& Duncan, 2004; Taxis& Barber, 2003; Wolf et al., 2000).

Results of this integrative review give several implicationsfor the leadership and management of the healthcare organizations in the acute care settings (Asad et al., 2011; Chapuis et al., 2010; Picone et al., 2008; Wimpenny& Kirkpatrick, 2010). It must be distinguished that medication errors can be better prevented and eradicated with the help of the institution's or organization's leadership and management, not only of the individual persons involved but also the HCPs who render care to them. Because of these, prescribing, dispensing, preparation and administration processes must be ironed out. Better facility and good working conditions (proper nurse-patient ratio, workload, absent distractions, peaceful workplace) must also be provided.

According to a WHO report, fewer than half of all countries in the world are implementing even basic policies needed to ensure appropriate use of medicines (Holloway & Van Dijk, 2011). Due to this, a multi-disciplinary team may contribute in formulating and implementing policies and regulations regarding the issue in medication safety, especially staffing levels and workload, policies and procedures that guide medication administration (Mayo & Duncan, 2004; Tang et al., 2007; Wimpenny& Kirkpatrick, 2010). Healthcare institution leaders' and managers' roles should be well-defined so as to improve medication safety and provide an ethical and wholistic care, not only to patients but also to HCP themselves. With this, regulations, laws and policies should be practiced and strictly observed, while good attitude and work ethics of the HCPs should be recognized and rewarded. It must be emphasized that the whole management's teamrole is to lead the workforce to attain a culture that is safe for the patients and the employees (HCPs) of the healthcare institution.

CONCLUSION

The results from this project derived a *theme* that the occurrence of medication errors is multi-factorial. There are four (4) major categories – those that are associated with the healthcare professionals (HCPs), patient-related factors, healthcare systems and/or work organizations, and safety culture. The results of this task are in line with most of the older and previous research studies, especially that most of these were done in developed countries. In all of the included studies, there was a wide array of medication errors; and thus these errors occurring in the acute care setting must be more or less similar in all developed countries where the studies were published. On the other hand, the conditions might be different in less developed countries where implementations of policies about medication safety are limited (WHO, 2016).

As it was mentioned and discussed in the results and data analysis part, there were four main categories of medication error causes, and fourteen (14) sub-categories under these main factors [Refer to Figure 3]. Principally, origins of medication errors in the acute care setting can be viewed either in an individual or organizational manner. The first two main categories (healthcare provider-related and patient-related factors) are under the individual-level point of view, while the last two main categories (healthcare systems and/or work organizations and safety culture) are contained in the organizational-level point of view. It must be noted that the author initially intended to have only two major categories (individual and organizational), but medication errors occurred due to a variety of reasons. Inasmuch as having just two major factors may simplify the data analysis, this would have also been a reason for over-simplifying (over-condensing) the phenomenon of medication error in the acute care setting. In addition to that, it was this project's aim to improve

medication safety in the clinical setting; having these four distinct main categories may empower the healthcare team (especially nurses) to develop more specific plans and interventions for each cause (main category) of medication errors.

In conclusion, medication errors are a serious safety issue in healthcare institutions across the nation and around the globe. An ongoing battle exists to decrease medication errors in acute care settings, but opportunities for improving processes and quality measures in this area are limitless. All in all, it must be the whole healthcare team, the patient, and the family, a conducive environment and/or organization, and a culture of safety, that work together to attain a common goal – that is to improve medication safety and alleviate (if not totally eradicate) medication errors in the acute care settings.

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Are Health Behaviors and Risk Factors for Atherosclerotic Cardiovascular Disease Interrelated Among Older Filipinos in Underserved Communities?

Jo Leah A. Flores, MSN-MBA, RN
University of the Philippines Manila College of Nursing

Marysol C. Cacciata, PhD, RN
University of California-Irvine Sue and Bill Gross School of Nursing

Mary Abigail Hernandez, MPH, RN
University of the Philippines Manila College of Nursing

Erwin William A. Leyva, MPH, RN
University of the Philippines Manila College of Nursing

Josefina A. Tuazon, DrPH, RN
University of the Philippines Manila College of Nursing

Lorraine S. Evangelista, PhD, RN, FAHA, FAAN
University of Texas Medical Branch School of Nursing

Contact person for this paper
Lorraine S. Evangelista, PhD, RN, FAHA, FAAN
lsevange@utmb.edu / https://nursing.utmb.edu

Abstract

Introduction:

Moving individuals toward ideal cardiovascular health through adoption of healthy lifestyle behaviors is critically important for prevention of atherosclerotic cardiovascular disease (ASCVD) and other important health conditions. However, associations between health behaviors and risks for ASCVD is poorly understood among older adults (≥ 60 years) living in rural areas in the Philippines. Likewise, their access to healthcare and health-seeking practices are unknown.

Purpose:

To 1) compare risk profiles of Filipinos at low- vs. moderate to high-risk for ASCVD; and 2)examine the relationships between demographic variables, risk profiles, and health behaviors.

Methods:

A convenient sample of 427 Filipinos (≥ 60 years old) were recruited to participate in this comparative, cross-sectional study. Data on sociodemographic characteristics, risk profiles, and health behaviors (e.g., dietary patterns, physical activity, smoking status,and alcohol use)were collected.

Results:

Of the 427 participants (mean age was 69.2± 6.7 years, primarily women [65%], married [52.8%]), 319 (75%) were at low-risk and 108 (25%) were at moderate to high-risk for ASCVD. Those at moderate to high-risk were more likely to have cardiometabolic diseases(e.g., hypertension, hyperlipidemia, diabetes, and obesity, all p's < .001).Health behaviors did not differ between the two groups except for consumption of ≥ 5 servings of fruit which was higher in the low-risk group.

Conclusion:

Findings showed that there is highly consistent and convergent evidence that older Filipinos living in rural areas are at high risk for ASCVD and other health conditions. Much of this is attributable to the suboptimal implementation of prevention strategies, uncontrolled ASCVD risk factors, and poor access to effective and equitable healthcare services commonly observed in low-income countries. Clinicians, researchers, policy makers, and other stakeholders need to address these issues to improve primary and secondary prevention and disease management in this population.

Keywords:

Atherosclerotic cardiovascular disease, cardiometabolic risks, Filipinos, Philippines

Introduction

Atherosclerotic cardiovascular disease (ASCVD) is a global epidemic that affects morbidity and quality of life of all racial and ethnic populations.[1] It is the leading cause of death worldwide; predictions show that by 2025, 80-90% of all deaths in the world will occur in low- and middle-income countries.[2] The estimated cost of healthcare services, medications, and lost productivity associated with ASCVD in the U.S. alone is estimated at more than 200 billion annually.[3]

Although the U.S. has made major strides in attaining the WHO's impact goal of improving cardiovascular health and reducing the rates of premature deaths associated with ASCVD by one-third through prevention and treatment,[4] these efforts are abysmal in low- and middle-income countries.[2,4,5] Much of this is attributable to the suboptimal implementation of prevention strategies, uncontrolled ASCVD risk factors -- hypertension, diabetes, elevated cholesterol, tobacco use, overweight/obesity -- also referred to as cardiometabolic diseases (CMD),[6] and poor access to effective and equitable healthcare services (including early detection services) in individuals from these countries.[2,7]Older adults are at greater risk for both ASCVD and CMD.[3]Given the high prevalence of ASCVD among older adults in low- and middle-income countries like the Philippines, the projected increase in this population will be a major challenge for the country's health care system.[8]

Research also suggests that ASCVD is interrelated with health behaviors (e.g., poor eating habits, high sedentary behaviors, smoking and alcohol use, and overweight and obesity.[8] While eating healthier, increasing physical activity levels, avoidance of alcohol use and/or smoking or its cessation, and weight maintenance are recommended for prevention of ASCVD,[2] millions of older adults worldwide do not receive key evidence-based preventive services.[5] Rural populations are especially disadvantaged with multiple health care disparities, resulting in lower rates of primary and secondary risk prevention measures.[8] This is especially true in Filipinos in the U.S. who are at higher risk for both ASCVD and CMD. In a study conducted among older Asian Americans in California,

Filipinos along with their Vietnamese counterparts tended to have poorer physical health and reported the greatest number of chronic diseases including asthma, high blood pressure, and heart disease and the highest level of disability.[9] Another study found older Filipinos in the U.S. to be at high risk of hypertension, coronary heart disease, diabetes mellitus at midlife and old age, and other metabolic problems.[10] While there have been many studies exploring health characteristics of Filipino Americans compared across different subcategories of Asian Americans in the U.S.,[9] there is a paucity of research examining health behaviors among Filipinos in their native country. Likewise, there is little data on the number of Filipinos in the Philippines who have access to evidence-based preventive services to support healthy lifestyle behaviors.

Moving individuals toward ideal cardiovascular health are critically important for the prevention of many important health conditions.[11] The most important way to prevent ASCVD is to promote a healthy lifestyle throughout life.[5,6] Observational data indicate that adhering to a healthier lifestyle was associated with lower risk for ASCVD,[12] whereas a high-quality diet, regular exercise, and smoking cessation lowered morbidity and mortality.[13] While the literature is replete with studies examining prevention strategies focused on improving diet, physical activity, and avoidance of alcohol and tobacco use, and weight management,[3,11] there is a dearth of studies examining these health behaviors and their association with risks for ASCVD in low-income countries like the Philippines. This study was conducted to overcome the current gaps in research as clearly depicted in the foregoing sections. The specific aims of this comparative, correlational study are to 1) compare health behaviors of older Filipinos at low- vs. high-risk for ASCVD; and 2) examine the relationships between sociodemographic characteristics, risk profiles, and health behaviors.

Methods

A comparative, cross-sectional design was used to conduct a secondary analysis of data from a nationally representative cohort of Filipinos living in underserved communities in the Philippines who participated in extensive interviews conducted by trained bilingual (English and Tagalog) community workers. The methodological approach, including the interview and survey guides developed by the U.S. Department of Health and Human Services describing efforts to build partnerships within Filipino communities in the U.S. and focus local community action on creating heart disease prevention activities,[1] were replicated for this study. The overall goal of the parent study was to examine perceptions and knowledge of heart disease and motivation to making lifestyle changes in underserved communities in the Philippines.

For the study, 1203 participants, age between 18 and 83 years were recruited from the National Capital Region, Cordillera Administrative Region, Ilocos Region, Central Luzon, and Western and Central Visayas. For the current study, only data from 427 older participants (≥ 60 years old) were included. The study received Institutional Review Board approval from both universities involved. Written informed consent was waived given the low risk nature of the study. Data used for this secondary analysis were de-identified.

Sociodemographic variables and cardiometabolic risk factors

Sociodemographic characteristics including age, gender, marital status, education, and income were collected using a standardized form created for this study. The community workers who conducted the interviews helped assess each participants' risk for

ASCVD using the non-lab Framingham algorithm, which substituted body mass index (BMI) for lipids in the laboratory based Framingham algorithm. The non-lab algorithm was previously tested in a cohort of African Americans and shown to have higher sensitivity that led to better detection of at-risk cases and higher specificity that led to fewer false positive case.14 For the current study, participants at low-risk (n = 319) were compared to participants considered at moderate and high risk (n = 108), defined as a ≥ 10% chance of developing ASCVD.[15]

Data on presence or absence (i.e. yes/no) of cardiometabolic risk factors were obtained using self-report and included 1) hypertension, defined as systolic blood pressure ≥140mmHg and/or diastolic blood pressure ≥ 90mmHg and/or self-reported treatment with antihypertensive medication(s) during the two weeks before the interview; 2) type 2 diabetes, defined as previous diagnosis based on a fasting plasma glucose level of ≥ 126 mg/dL, a random plasma glucose, or 2-hour plasma glucose level of ≥ 200 mg/dL during a 75-g oral glucose tolerance test, or a glycosylated hemoglobin (A1C) ≥ 6.5%; 3) hyperlipidemia, based on lipid profile lab values - total cholesterol ≥ 200, low density lipoprotein ≥ 100 mg/dL, high density lipoprotein < 40 for men or < 50 for women, and triglycerides ≥ 140 mg/dL; and 4) overweight and obesity, defined as ≥ 23 kg/m2based on standards for Asian populations.[16]

Health Behaviors

Health behaviors were collected using a general health survey. To simplify choices for participants, we used binary variables similar to the collection of data for cardiometabolic risk factors. For example, physical activity was defined as engaging in ≥ 150 minutes per week of accumulated moderate-intensity or 75 minutes per week of vigorous-intensity aerobic physical activity, based on American Heart Association Guidelines.[3] Healthy dietary patterns were defined as consuming five or more servings of fruits and vegetables (at least 400 grams per day); fewerthan five servings were categorized as insufficient.[17] Tobacco use was classified as never, previous smoker or current smoker,while alcohol consumption was based on presence or absence of moderate drinking defined as of up to one drink per day for women and up to two drinks per day for men.[17]

Results

Of the 427 participants (mean age was 69.2± 6.7 years, primarily women [65%], married [52.8%]), 319 (75%) were low-risk and 108 (25%) were moderate to high-risk for ASCVD. Demographic characteristics were comparable between the two groups (Table 1). Differences in risk profiles between those at low- and moderate to high-risk are also illustrated in Table 1. Those at moderate to high-risk were more likely to have cardiometabolic diseases (e.g., hypertension, hyperlipidemia, diabetes, and obesity [i.e. measured by BMI and waist circumference])(all p's < .001). Health behaviors did not differ between the two groups except for consumption of ≥ 5 servings of fruit which was higher in the low-risk group (Table 2).

Moderate to high-risk status was associated with adiposity (e.g., BMI, waist circumference), elevated systolic blood pressure, and a history of hypertension, hyperlipidemia, and diabetes (Table 3). Female gender was associated with higher waist circumference and BMI but lower systolic blood pressure; being female was also associated with having a higher risk for diabetes. Low fruit consumption, below the recommended intake of ≥ 5 servings per day was associated with female gender, higher BMI, and lower likelihood of having a history of hypertension.

Discussion

In 2010, the World Health Organization (WHO) reported that older people, ≥ 60 years old comprise 13% of the population in the Western Pacific Region with 78% living in low- and middle-income countries.[20] The Philippines, belonging to this region, was reported to have 5.7% older persons in its general population in the same year. The WHO further notes that non-communicable diseases comprise 90% of the total disease burden of men and women ≥ 70 years old in the WPR in 2012. Of the non-communicable diseases, ASCVD was the leading cause of morbidity both in the Philippines and WPR, with more men inflicted by this condition than women.[20],[21] Globally, 17.9 million people succumb to ASCVD, accounting for 31% of deaths worldwide. More than 75% of these deaths occur in low-and middle-income countries.[21] According to the Department of Health in the Philippines ASCVDis among the top 4 leading causes of death in the country.[18] As the number of older adults worldwide is projected to increase by approximately 4% in 2030,[21] strategies are needed to prepare for the challenges confronting an aging population and their increased risk for ASCVD and its complications.[20] The WHO's recommendations for improving cardiovascular health and reducing the rates of premature deaths associated with ASCVD is through prevention, early recognition, and treatment of CMD.[4]

In 2013, the prevalence rates of the major CMD risk factors among adults ≥ 20 years old in the Philippines included: diabetes (5.4%), hypertension (22.3%), dyslipidemia, low high density lipoprotein (71.3%), obesity, BMI >25 kg/m2 (31.1%), and smoking (25.4%).26An unpublished report in 2016 revealed a 27% prevalence of metabolic syndrome.[28] In 2008, Sy and colleagues conducted the National Nutrition and Health Survey II (NNHeS II),a survey assessing the prevalence of non-communicable or lifestyle-related conditions and corresponding risk factors among Filipino adults ≥ 20 years old.[22] This succeeds 2 other national surveys done in 1998 and 2003. The 2008 survey showed an increase in the prevalence of hypertension in the general adult population by 4.2% from that of 2003 (16.4%); older adults (≥ 65 years) were three times more likely to be diagnosed with hypertension,[22] which is consistent with studies conducted in the U.S.[24]

As with hypertension, type 2 diabetes places a person at higher risk for ASCVD.[23] The prevalence of type 2 diabetes is associated with increased morbidity and mortality, increased risk for ASCVD and other complications, increased risk of hospitalization or institutionalization, decreased functional status, and increased economic losses.[25] Globally, the incidence of diabetes increased four-

Table 1. Demographic and Risk Profile of Low- vs. Moderate to High-Risk Older Adults

	All Participants (N = 427)	Low-Risk Group (n = 319)	High-Risk Group (n = 108)	*P* value
Age, years (Mean±SD)	69.2± 6.7	69.1± 7.0	69.5± 6.4	.588
Female, N (%)	277 (64.9)	201(63.0)	76 (70.4)	.166
Married, N (%)	230 (52.8)	176 (55.2)	54 (50.0)	.278
≤ High schooleducation, N (%)	324 (75.9)	243 (76.2)	81 (75.0)	.919
Waist Circumference, inches (Mean ± SD)	34.2± 3.7	33.2± 3.5	35.2± 4.0	< .001
Body Mass Index (Mean ± SD)	24.5± 4.9	22.3± 4.5	26.8± 5.3	< .001
Body Mass Index Categories, N (%)				< .001
Underweight	45 (11.0)	44 (13.2)	1 (0.9)	
Normal weight	258 (60.4)	220 (69.0)	38 (35.2)	
Overweight or Obese	124 (29.0)	55 (17.2)	69 (63.9)	
Systolic Blood Pressure (Mean ± SD)	131.2± 15.3	127.6± 15.2	134.8± 15.4	< .001
Diastolic Blood Pressure (Mean ± SD)	84.5± 12.8	84.6± 15.7	84.4± 10.0	.958
Hypertension, N (%)	313 (73.3)	207 (64.9)	106 (98.1)	< .001
Hyperlipidemia, N (%)	145 (33.9)	66 (20.7)	79 (73.1)	< .001
Diabetes mellitus, Type 2 N (%)	130 (30.4)	52 (16.3)	78 (72.2)	< .001
Depression, N (%)	91 (23.1)	65 (21.4)	26 (24.1)	.567

fold from 108 million in 1980 to 422 million in 2014.26 More than 25% of adults, ≥ 65 years old in the U.S. suffer from type 2 diabetes.[27] Surprisingly, the rates of type 2 diabetes among older Filipinos in this study was 5% higher than older adults in the U.S. and almost six-fold higher than the latest 2013 Philippine NNHeS of the general adult population. This poses a major problem on our already limited resources as a recent study in Manila showed that adults diagnosed with type 2 diabetes also had greater diabetic complications and CMD risk factors.[29]

Unlike studies with Caucasian cohorts where obesity is highly associated with type 2 diabetes, type 2 diabetes among Filipinos is not commonly associated with obesity. The prevalence of obesity in the Philippine NNHeS of 2008 was less than 10% but visceral adiposity was observed in 65.5% of women which suggest that visceral adiposity and not obesity per se was a more influential risk factor for type 2 diabetes.[25] In this study, diabetes was associated with hypertension, gender, and dyslipidemia. However, there was no significant association between diabetes, BMI, and waist circumference. This may be attributed to the varied topography and cultural

milieu of the different regions in the Philippines that shape the heterogeneous lifestyle, activity, and food preferences of Filipinos. This has to be considered in developing strategies for preventing disease.[25]

The WHO has the following estimates in 2016: 1) there are 1.9 billion adults, >18 years old, who are overweight, 650 million of which are obese; 2) the adult prevalence of obesity is 13%, with the women having a 4% higher prevalence than men; and, 3) the prevalence of obesity has increased by almost three-fold from 1975 to 2016.[31]

The prevalence of obesity in this study is five-fold more than the general adult population. Our findings are consistent with the increasing prevalence of obesity worldwide, as uncovered by numerous studies.[30] Likewise, the Philippines NNHeS data showed an upward trend in overweight and obesity from their surveys in 1987 through 2008. The general Filipino adult prevalence of overweight almost doubled from 11.8% in 1987 to 21.4% in 2008 while the obesity prevalence tripled from 1.7% in 1987 to 5.2% in 2008.[33] The Economist Intelligence Unit (2017), in a report commissioned by the Asia Roundtable on Food Innovation for Improved Nutrition (ARoFIIN), stated that the steadily increasing prevalence of obesity and overweight in the ASEAN region can be attributed to greater incomes, urbanization, changing health behaviors, and globalization.[32] ARoFIIN notes that although the prevalence of obesity in the Philippines is still low, healthcare costs for obesity and obesity-related problems were between 4.11% to 7.87% of the national healthcare spending. ARoFIIN further reports that among the six sample countries in the ASEAN, the most significant reductions in productive years due to obesity were found in the Philippines (8 to 12 years). We speculate that these findings are related to the decreased functional capacity and poorer quality of life reported by individuals suffering with overweight and/or obesity."[30]

Hyperlipidemia was reported in approximately a third of the sample for the current study and is consistent with global prevalence of hyperlipidemia of 39% as reported by the WHO.[34] However, data from the NNHeS from 2008 showed that 72% of the sample had hyperlipidemia.[22] This inconsistency maybe related to the age, where younger adults may have had higher levels of hyperlipidemia which increased the overall prevalence. Our findings corroborates established facts that hyperlipidemia is associated with higher risks for ASCVD, overweight or obesity and hypertension.

Lifestyle changes such as a healthy diet, physical activity or exercise, and smoking cessation are necessary to reduce CMD risk factors. Smoking prevalence among older adults in this study was lower (7.6%) compared to the NNHeS study of the general adult population in the Philippines (31%).[22] The WHO reports a declining trend in smoking rates worldwide except for data from the Eastern Mediterranean and African regions.[35] The prevalence of smoking in Filipino adults by also decreased by 4.9% in 2008 compared to the 2003 NNHeS.[22]

The prevalence of CMD risk factors increases with age and can partially explain the high prevalence rates in this study. National and global trends, likewise, show increase in prevalence in the general adult population. These CMD risk factors, either on its own or in conjunction with the others, all have significant physical, psychological, social, and economic implications to individuals, families, society, and the globe. Clearly, additional strategies are needed that target unhealthy lifestyle behaviors (e.g., poor eating habits, high sedentary behaviors, smoking and alcohol use, and overweight and obesity) of older Filipinos living in

Table 2. Health Behaviors of Low- vs. Moderate to High-Risk Older Adults

Affirmative response to the following (yes)	All Participants (N = 427)	Low-Risk Group (n = 319)	High-Risk Group (n = 108)	*P* value
≥ 150 minutes physical activity/week, N (%)	280 (65.6)	214 (67.1)	66 (61.1)	.259
< 4 hours of sedentary activity/day, N (%)	74 (37.5)	51(16.0)	23 (21.5)	.110
≥ 5 servings of vegetables/day, N (%)	48 (22.7)	34 (10.7)	14 (12.0)	.431
≥ 5 servings of fruits/day, N (%)	39 (17.3)	31 (9.8)	8 (7.5)	.001
1 drink/day - women/2 drinks/day - men, N (%)	34.2± 3.7	73 (23.0)	20 (18.5)	.812
Current smoker, N (%)	100 (23.4)	77 (24.1)	23 (21.1)	.240

Table 3. Correlation Matrix for Key Variables (N = 427)

Variables	1	2	3	4	5	6	7	8	9
1 Risk status (↑ risk)	1.000								
2 Gender	.067	1.000							
3 Waist Circ.	.231**	..096*	1.000						
4 Body mass index	.387**	.129**	.383**	1.000					
5 Systolic BP	.201**	-.095*	.262**	.160**	1.000				
6 Hx., hypertension	.327**	.044	.144**	.107*	.290**	1.000			
7 Hx., hyperlipidemia	.482**	-.032	.166**	.170**	.200**	.232**	1.000		
8 Hx., diabetes	.528**	103*	.094	.093	-.012	.250**	.095*	1.000	
9 ≤ 5 servings of fruit	.019	.098*	.031	.181**	-.003	-.127**	.044	-.038	1.000

** Correlation is significant at the 0.01 level (2-tailed); * correlation is significant at the 0.05 level (2-tailed); Circ., circumference, Hx. history

underserved areas in the Philippines.[8] Programs that support primary and secondary risk prevention measures for ASCVD (e.g., eating healthier, increasing physical activity levels, avoidance of alcohol use and/or smoking or its cessation, and weight maintenance)[5] should be recognized as a health care priority in the Philippines, especially in older adults living in rural areas where health care access is also a problem.[8]

It is important recognize that although we had a fairly large sample, we were limited in terms of the geographic areas where participants were recruited. We were unable to recruit from any of the regions in Mindanao because of the current political-social disarray on the island. Thus, results should not be generalized to the larger Filipino community in the Philippines. Epidemiological studies and qualitative research to further assess ASCVD risks are warranted. Mixed-methods research, especially studies conducted in partnership with health care clinics and the Department of Health would enhance the capacity to develop more informed and effective prevention programs for ASCVD.

Conclusion

Our findings confirm reports from the Department of Health that risks for ASCVD is highly prevalent in older Filipinos living in rural areas. Atherosclerotic cardiovascular disease is the leading cause of death for Filipinos, representing about 32% of all Filipino deaths.[18] One of the major risk factors that is quite prevalent among Filipinos both in the U.S. and in the Philippines, and increases their risk of ASCVD, is hypertension.[9] Seventy-three percent of older Filipinos who participated in the current study suffer from hypertension and approximately one-third suffer from hyperlipidemia and diabetes. In addition, one-fourth of the sample were current or previous smokers. Thus, community-based programs to promote healthy eating patterns and improve screening, referral, and follow-up for hypertension as well as programs to support smoking cessation may help reverse the increasing prevalence of ASCVD in this population. By conducting studies of risks behaviors among a subgroup of older Filipinos living in low-income communities in the Philippines, we were able to gain a greater understanding of the heart health problems that plague this population, and how to prevent them to help enhance the overall well-being of older Filipinos nationwide.

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