ANALYSIS OF NCD CLINIC PLUS PROGRAM AMONG HYPERTENSIVE PATIENTS IN KONGRA HOSPITAL PATTHALUNG PROVINCE THAILAND: A 2014-2017 SECONDARY DATA ANALYSIS

Miss Supapron Promjeen

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การวิเคราะห์ข้อมูลผู้ป่วยโรคความดันโลหิตสูงของโครงการเอนซีดี คลินิกพลัส
ในโรงพยาบาลกงหรา จังหวัดพัทลุง ประเทศไทย: การวิเคราะห์ข้อมูลทุติยภูมิ
ระหว่าง พ.ศ. 2557-2560

น.ส.สุภาพร พรมจีน

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต
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ปีการศึกษา 2561

Thesis Title	ANALYSIS OF NCD CLINIC PLUS PROGRAM AMONG HYPERTENSIVE PATIENTS IN KONGRA HOSPITAL PATTHALUNG PROVINCE THAILAND:A 2014-2017 SECONDARY DATA ANALYSIS
By	Miss Supapron Promjeen
Field of Study	Public Health
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สุภาพร พรมจีน : การวิเคราะห์ข้อมูลผู้ป่วยโรคความดันโลหิตสูงของโครงการเอนซีดี คลินิกพลัส ในโรงพยาบาลกงหรา จังหวัดพัทลุง ประเทศไทย: การวิเคราะห์ข้อมูลทุติยภูมิ ระหว่าง พ.ศ. 2557-2560. (ANALYSIS OF NCD CLINIC PLUS PROGRAM AMONG HYPERTEN SIVE PATIENTS IN KONGRA HOSPITAL PATTHALUNG PROVINC E THAILAND:A 2014-2017 SECONDARY DATA ANALYSIS) อ.ที่ปรึกษาหลัก : ผศ. ดร.ณัฏฐา ฐานีพานิชสกุล

การดำเนินโครงการเอนซีดี คลินิกพลัส เริ่มดำเนินตั้งแต่ปี พ.ศ. 2557 ในปี พ.ศ. 2560 โรงพยาบาลกงหรา จังหวัดพัทลุง ซึ่งเป็นโรงพยาบาลขนาดเล็กหรือโรงพยาบาลชุมชนได้รับรางวัลชนะเลิศการประกวดการดำเนินงานเอนซีดี คลินิกพลัส แต่เนื่องจากการประเมินเอนซีดี คลินิกพลัส เป็นการประเมินคุณภาพด้านกระบวนการดำเนินงาน และด้านผลลัพธ์ตัวชี้วัดบริการ แต่ยังไม่เคยได้ประเมินผลการดูแลรักษาผู้ป่วยโรคความดันโลหิตสูง หลังจากเริ่มดำเนินโครงการตั้งแต่ปี พ.ศ. 2557

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อวิเคราะห์ผลการควบคุมระดับความดันโลหิตของผู้ป่วยโรคความดันโลหิตสูง และศึกษาปัจจัยที่มีผลต่อการควบคุมระดับความดันโลหิตของผู้ป่วยโรคความดันโลหิตสูงในโครงการการดำเนินโครงการเอนซีดี คลินิกพลัส ตั้งแต่ปี 2558-2560

ผลการศึกษาพบว่าผู้ป่วยโรคความดันโลหิตสูง ทั้งหมด จำนวน 176 ราย พบว่าจำนวนของผู้ป่วยที่สามารถควบคุมระดับความดันโลหิต ปี 2558 มีจำนวนทั้งหมด 132 คน ร้อยละ 75 ในปี 2559 มีจำนวนผู้ป่วยที่สามารถควบคุมระดับความดันโลหิตได้ จำนวน 142 คน ร้อยละ 80.68 และในปี 2560 พบว่าผู้ป่วยที่สามารถควบคุมระดับความดันโลหิตได้ทั้งหมด จำนวน 164 คน คิดเป็นร้อยละ 93.18 นอกจากนี้ยังพบว่า ปี 2557 ปัจจัยที่มีผลต่อการควบคุมระดับความดันโลหิต การสูบบุหรี่ (p-value = 0.009) และการดื่มแอลกอฮอล์ (p-value = 0.002) อย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

การดำเนินโครงการเอนซีดี คลินิกพลัส ของโรงพยาบาลกงหรา จังหวัดพัทลุง ประสบความสำเร็จ ในการดำเนินงานเพื่อควบคุมระดับความดันโลหิตของผู้ป่วย โครงการเอนซีดี คลินิกพลัสยังเป็นองค์ประกอบสำคัญในการให้บริการดูแลสุขภาพด้านโรคไม่ติดต่อเรื้อรังของโรงพยาบาล เพื่อส่งเสริมให้เกิดการดูแลรักษาโรคไม่ติดต่อเรื้อรังที่มีคุณภาพสูง โดยเฉพาะความดันโลหิตสูง ซึ่งยังต้องมีการพัฒนาและปรับปรุงการดำเนินงานต่อไป

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Supapron Promjeen : ANALYSIS OF NCD CLINIC PLUS PROGRAM AMONG HYPERTENSIVE PATIENTS IN KONGRA HOSPITAL PATTHALUNG PROVINCE THAILAND:A 2014-2017 SECONDARY DATA ANALYSIS. Advisor: Asst. Prof. Nutta Taneepanichskul, Ph.D.

NCD Clinic Plus Program has been implemented in 2014 hospitals in Thailand since 2014. In 2015, Kongra Hospital, located in Patthalung province, is the best of small hospital or first-level hospital in Thailand and receives NCD Clinic Plus Award, The success of NCD Clinic Plus program was evaluated only the function of medical personnel. However, the patients' outcomes have not been yet evaluated after program implementation since 2014.

This research aims, to access percentage of control and uncontrol blood pressure of patients during 2015-2017 and to find associated factors of control and uncontrol blood pressure of patients.A secondary data analysis between 2015 – 2017 from NCD Clinic Plus Program in Kongra Hospital, Phatthalung province and the southern provinces in Thailand. This research export data from HOSxP program in the Kongra hospital.

Hypertensive patients total 176 cases. This result, presented of the number of patients control BP in 2015 to 2017. The hypertensive patient of control BP at 132 persons in 2015, 2016 control BP at 142 persons and in 2017 control BP at 164 persons. So, the total of patients could be control blood pressure in 2015 to 2017 increase total 32 persons (72.72%) and factors associated of control and uncontrol blood pressure in 2015 showed tobacco (p-value =0.009) and alcohol (p-value=0.002) significant difference of whose p-value ≤ 0.05.

Promoting intervention NCD Clinic Plus Program essential element of health care service that encourage high-quality chronic disease (hypertension) service care system. It also requires further development and improvement for Hypertensive patients can control blood pressure.

Field of Study:	Public Health	Student's Signature ....
Academic Year:	2018	Advisor's Signature ....

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List of Abbreviations

BP:	Blood Pressure
BMI:	Body Mass Index
CCM:	Chronic Care Model
CVD:	Cardiovascular Disease
DBP:	diastolic blood pressure.
DM:	Diabetes Mellitus
FBG:	Fasting Blood Glucose
HbA1c:	Glycosylated hemoglobin
HT:	Hypertension
IDF:	International Diabetes Federation
LDL:	Low-Density Lipoprotein
MoPH:	Ministry of Public Health
NCDs:	Non Communicable Diseases
NHES:	National Health Examination Survey
SBP:	Systolic blood pressure,
WHO:	World Health Organization

CHAPTER I

INTRODUCTION

1.1 Background and Rationale:

NCDs or non-communicable diseases that are not caused by pathogens and it can't spread from person to person. The disease is caused by habits or behavior. The disease is slowly progressing gradually accumulated symptoms, when the symptoms of the disease are often chronic. NCDs can be classified as chronic diseases. NCDs kill 40 million people each year, equivalent to 70% of all deaths globally of each year, 15 million people die from a NCD between the ages of 30 and 69 years; over 80% of these "premature" deaths occur in low- and middle-income countries (WHO, 2017). The chronic disease (NCDs) is a major health problem in Thailand. It is a leading cause of illness with serious diseases such as high blood pressure, diabetes, coronary artery disease, stroke, overweight or obese cause complications, deficiency and premature of death. This is causes 73 percent of deaths among Thai people. In specific, stroke in 2016 had the highest death rate of 27,069 people per hour, 3 people per hour, and coronary heart disease. The death rate was 18,922 persons, an average of 2 per hour, If it not control, prevent or reduce chronic disease (IDF, 2015). As a result, the burden of health and economic loss is hindering the development of Thailand. The data from physical examination in people aged more than 15 years and diagnosed with diabetes 3.1 million people in 2014 with 11,389 people died of diabetes an average of 32 people a day hospitalized in the hospital. The 5th National Health Examination Survey (NHES) in 2014, found the highest rates of hypertension in people in Thailand, up to 14 million people. Hypertension causes complications, including cerebral hemorrhage, cerebral hemorrhage, heart failure, kidney failure and pulmonary embolism. It's dangerous in life (NHES, 2016).

In Thailand, the number of new case HT increased each year. In 2015, there are 538,297 person, and in 2016 there are 706,698 new cases. This data presents a rapid increase in the number of new diabetic patients. The number of new case with hypertension is about 2 times higher than that of diabetes (ThaiNCD, 2017b).

NCD Clinic plus developed from Wagner's chronic care model, there is an organizational approach to caring for people with chronic disease in the primary care setting or the hospital(Piatt GA, 2006). The system is population base and creates practical, supportive, evidence-based interaction between a formed, activated patient and a prepared, proactive practice team(Diseases & Center; EH, 1998). The NCD Clinic Plus 2017 Program in Thailand identifies essential element of health care service that encourage high-quality chronic disease (DM/HT) service care. The key elements of quality development NCD Clinic Plus.Program including two parts. Part 1 is the process of evaluation 6 components. There are concise health policy, Information systems, Health Service system. Decision support, Self-management and the community collaboration. Part two is an evaluation of service outcome indicators total 15 indicators. The Quality Assessment Criteria to help Public Health Service of Center Hospital General Hospital and Community Hospital use as a guide. The quality of NCD Clinic Plus in 2017 was evaluated. This has a full rating 100 points are divided into two parts. The hospitals that pass the NCD Clinic Plus Program assessment must to score more than 70 points (ThaiNCD, 2017b).

NCD Clinic Plus Program has been implemented in 2014 hospitals in Thailand since 2014. In this recent year, Kongra Hospital, located in Patthalung province, is the best of small hospital or first-level hospital in Thailand and receives NCD Clinic Plus Award, the scoring of the program, this hospital received a score of 92 out of 100 points which was classified into the excellent level (ThaiNCD, 2017b).

The success of NCD Clinic Plus program was evaluated only the function of medical personnel. However, the patients' outcomes have not been yet evaluated after program implementation since 2014. Therefore, current study will be analyzed of NCD Clinic Plus program's patients in Kongra Hospital, Patthalung Province from 2015–2017. The results of this study would be benefit for MOPH of Thailand in order to fulfill some issues for NCD prevention program among Thai people.

1.2 Research Questions:

This study aims to answer the following question:

What are associated factors of blood pressure change among NCD Clinic Plus Program patients?

1.3 Study Hypothesis:

1) General demographic are associated with blood pressure change among Clinic Plus Program patients.

2) Health status and life style of patients are associated with blood pressure change of NCD Clinic Plus Program patients**.**

1.4 Objectives:

1.4.1 General Objectives

To explain characteristic and blood pressure level of NCD Clinic Plus program patients from 2015-2017.

1.4.2 Specific objectives

1) To compare blood pressure among NCD Clinic Plus Program patients from 2015-2017.

2) To access change of blood pressure from 2015-2017 among patients in NCD Clinic Plus.

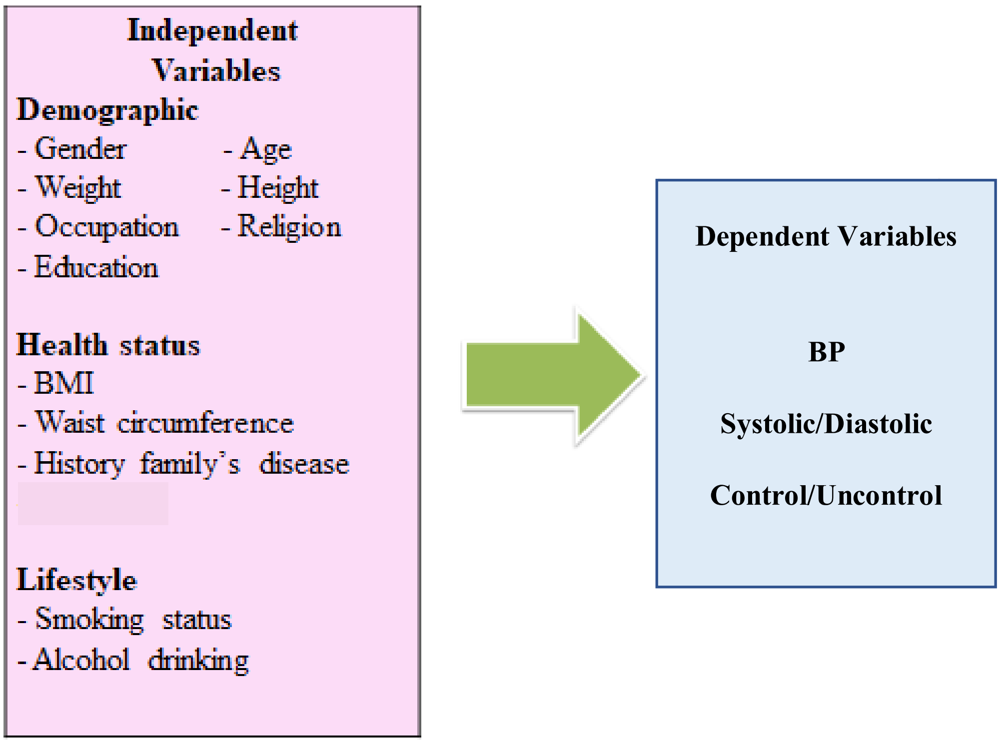
3) To access percentage of control and uncontrol blood pressure of patients during 2015-2017.

4) To find associated factors of control and uncontrol blood pressure of patients.

5) To find associated factors of blood pressure change of patients.

1.5 Conceptual Framework:

The dependent variable is changes of systolic and diastolic blood pressure among hypertension patients. The independent were various risk factors on blood pressure. The conceptual framework given below is proposed for the current study.



Picture 1 : Conceptual Framework

1.6 Operational Definitions:

Hypertensive patients in this study refers to a patient whom had been diagnosed as hypertension by systolic blood pressure more than 140 mmHg/ diastolic blood pressure more than 90 mmHg and involved in the program from 2015 – 2017 in Kongra Hospital, Patthalung province.

Diastolic: It is the pressure that is exerted on the walls of the various arteries around the body in between heart beats when the heart is relaxed. (Diffen, 2004)

Systolic: It measures the amount of pressure that blood exerts on arteries and vessels while the heart is beating. (Diffen, 2004)

Gender: refers to male and female.

Age: In this study, age refers to the age in years of participant at the starting program (year 2014).

Occupation: refers to Agriculturist, Business and Government.

Religion: refers to all religions including Buddhist and Islam.

Education level: We divided the education level 1.Primary school 2. Secondary school 3.Bachelor's Degree

Weight: The number of body weight in kilograms which was measured at the beginning of the program.

Height: The number of heights of the body is centimeters which measured at the beginning of the program.

BMI: Body Mass Index is derived from body weight in kilograms divided by squared height in meters. In this study, BMI was got from weight and height at the beginning of the study.

Waist circumference: Waist circumference refers to a measurement from participants at the beginning of the study. Men's waistline is more than 90 centimeters, meaning it is at risk. Women's waistline is more than 80 centimeters, meaning it is at risk. If they waistline less than 80 or 90centimeters, they are normal group. The waist circumference is centered on the top and bottom ribs of the ribs parallel to the floor, and only breathing out. The hips measure the area where the butt protrudes the most.

History family's disease: This study**,** family history refers to hypertension of family members because of its genetics.

Smoking status: This study refers to Smoker or stop smoking less than 1 mount and Non-smoker.

Alcohol drinking: This study refers to Non-drinker and Drinker.

Control blood pressure: This study hypertension defined as systolic BP (SBP) <140 or diastolic BP (DBP) <90 mm Hg.

Uncontrol blood pressure: This study hypertension defined as systolic BP (SBP) ≥140 or diastolic BP (DBP) ≥90 mm Hg.

CHAPTER II

LITERATURE REVIEW

2.1 NCD Clinic Plus Program

Chronic Care Mod (CCM) comprises 6 components that are hypothesized to affect functional and clinical outcomes associated with disease management(Aryani F, 2015) (EJ, 2007). The 6 components are 1) health system — organization of health care (providing leadership for securing resources and removing barriers to care), 2) self-management support (facilitating skills-based learning and patient empowerment), 3) decision support (providing guidance for implementing evidence-based care), 4) delivery system design (coordinating care processes), 5) clinical information systems (tracking progress through reporting outcomes to patients and providers), and 6) community resources and policies (sustaining care by using community-based resources and public health policy) (Stellefson, Dipnarine, & Stopka, 2013) (Bodenheimer, Wagner, & Grumbach, 2002; Coleman K, 2009) (Bodenheimer et al., 2002).NCD Quality Clinic started since 2013 applied from the Wagner's Chronic Care Model. The NCD Quality Clinic in the center of the general hospital and community hospital. The 6 components of the process evaluation NCD Quality Clinic are Health Policy, Information System, health care service System and Self-management support, decision support system and community support. We have developed and certified 100% NCD Quality Clinic in 2016 after that changes to NCD Clinic Plus in 2017.The hospital's evaluation process is 100 points. We are divided into 2 parts and 50 points per each (ThaiNCD, 2017b).

Part 1 A process assessment (50 point)

1. Health policy

1.1 NCD board consists of network parties in and / or outside the Ministry of Public Health within the district.

1.2 Plan and agree to work together consistently. To strengthen the service system to protect and do not care contact**.**

1.3 Communicate policy directions, to every participant.

1.4 Monitor of progress NCD Clinic Plus.

1.5 Personnel, place and environment appropriate and sufficient for access.

1.6 Tools and equipment for adequate service. The effective and ready to use.

2. The information systems

2.1 A complete and up-to-date system for register service information and computerized records.

2.2 Information system and information exchange link for continuous service in the network and linked to data center, district and health data center of provinces.

2.3 Data to be analyzed to improve the quality of protection. Communicable Disease Control Designing health services for target groups (individual, group, and population).

2.4 Reporting accurate, complete, and timely information for management to make policy decisions.

3. Service system

3.1 Screening services for diabetes Hypertension, disease assessment, risk, risk factors, and determinants of service delivery. The data were analyzed by group (normal group, risk group, complication group).

3.2 Diagnose new patient registrations and report the diagnosis to the network provider.

3.3 Screening for complications of diabetes and high blood pressure.

3.4 Non-Contact Coordinator (NCDs system Manager or Coordinator) Multidisciplinary team.

3.5 Outpatient Disease Treatment Network and outside the Ministry of Health. Linked to the community.

3.6 Transfer System, Home health care system for continuous care and easy access to services.

4. Decision support

4.1 The service to promote knowledge Essential Skills for Decision Making and self-management include self-care planning with the team.

4.2 Communication process for return and exchange of information and self-management of patients. A multidisciplinary team both home and hospital.

4.3. Self-management support of the physical, emotional and social.

4.4 Media and / or tools that support the self-management of the recipient

5. Self-management support.

5.1 Guidelines for the prevention and control of communicable diseases Made in accordance with national guidelines.

5.2. System of coordination, consultation between system managers, system managers. The service providers in the clinic include a network of public health facilities.

5.3 Chronic Case Conference / KM to exchange learning, care and management.

5. Self-management support

6.1 Service to improve risk reduction skills for the community.

6.2 Support policy, Operational plan facilitating the adaptation of the community environment.

6. The community collaboration.

6.3. To establish a community health club to continuously control the disease in the community.

6.4 Promote follow up support Blood sugar Blood pressure measurement Key risk factors / self-reported risk factors, high risk and patient groups.

Part 2 Indicator (50 point.)

Indicator	**Determination**
1. The rate of registered service diabetic patients and to patients in the area of responsibility.	>90 %
2. Percentage of diabetic patients with good glycemic control.	>40 %
3. The rate of diabetic patients receiving LDL.	>60 %
4. Retinal Patient Examination Rate.	>60 %
5. Diabetic foot age received complete foot exam.	>60 %
6. Diabetes mellitus with blood pressure less than 140/90 mmHg.	>60 %
7. The rate of diabetic patients with obesity.	<10 %
8. The incidence of hypoglycemia in diabetic patients.	<10 %
9. Diabetes population in the area responsible for last year was repeatedly screened for sugar.	>90 %

Indicator	Determination
10. The rate of new diabetic patients decreased.	>5 %
11. The rate of hypertensive patients registered and the patients treated in the area of responsibility.	>90 %
12. The rate of new hypertension decreases.	>2.5 %
13. Percentage of hypertensive patients with good blood pressure control	>50 %
14. Diabetes rate and high blood pressure has been screened for kidney complications.	>80 %
15. Diabetes rate and high blood pressure have been evaluated for cardiovascular risk (CVD).	>80 %

Part 2.1 Indicator (Do not score or 0 point.)

Indicator
16. Smoking rates in diabetic patients and high blood pressure.
17. The rate of diabetic patients receiving CVD risk and having a risk factor of 30% or more has been altered.
18. High-risk CVD patients who have been assessed for CVD risk and who have a risk factor greater than or equal to 30%.
19. Percentage of diabetic patients with good glycemic control (Fasting Plasma Glucose less than 130 mg / dl).

Scoring principles, the assessment team will evaluate the quality assurance of hospitals with a better rating. The quality assurance of 6 processes 50 point and the scores from the hospital's total service outcome evaluation were 15 indicator, 50 point.

Criteria for the NCD Clinic Plus Awards in 2017

Level	Point (Total 100 point)
Excellent	85 - 100
Very good	80 - 84
Good	70 -79
Basic	60 - 69

The hospitals that score less than 70 points should develop further and receive advice on improving non-communicable disease services. The assessment team provides counseling and advice on defects and promotes improvements in NCD Clinic plus.

2.2 The Hospital level in Thailand

The Ministry of Public Health plans to develop a service system in the region by implementing a plan to develop a health service plan with a development period of at least 5 years (2 0 1 - 2 0 1 2) Primary level, Secondary level, Tertiary level and includes advanced development expertise. Creating connected service networks at the Provincial Level within the Service Level Zone Conceptual framework for regional health service development. It should be based on three conceptual frameworks: The first, Health Service Network. Second, Provincial Health Service Network and the last one, Referral Hospital Cascade. The service levels are three levels: early, intermediate, and advanced, to maximize the use of limited network resources. Avoid redundant investments and eliminate competition. Classification of hospitals is as follows: First – level Hospital, Middle – level Hospital and Advance – level Hospital. (Ministry of Public Health)

First – level Hospital (F1, F2, F3)

The large Community Hospital (F1) refers to a community hospital with a bed size of 90 to 120 beds or family medicine doctor and specialists in major fields (Surgery, Orthopedics, Pediatrics, Orthopedics and anesthetist) the current branch.

There are 3 to 10 people in operation. There are operating rooms for patients in the birth room, and support for the primary care network of each district.

The medium-sized community hospital (F2) refers to a community hospital with a bed size of 30 to 90 beds. There are no special doctors in the hospital. There are inpatient rooms, operating rooms, delivery rooms for patients and patients in each district. Support the primary care network of each district.

The Small Community Hospital (F3) refers to a 30-bed community hospital with a general practitioner or a family physician. There are no rooms in the operating room. Primary care networks are not required for primary care. And do not need to fully service the patient.

Middle – level Hospital (M1, M2)

The Small General Hospital (M1) is a hospital with the capacity to meet the needs of patients. Sophisticated treatment is provided by all major physicians and minorities in certain fields. Established as a referral hospital for middle-level (M1) patients.

The hospital M2 refers to a community hospital of 120 beds or more with 3 or 5 family physicians or family physicians and 6 physician specialists (Internal Medicine, Surgery, Obstetrics and Gynecology, Orthopedics, Pediatrics, Orthopedics). At least 2 patients in each of the operating rooms, include patients in the operating room, maternity ward, intensive care unit, Diagnostic Laboratory for Specialist Medicine, Diagnostic radiology for the treatment of 6 specialists in 6 main branches. Supporting the transfer from other community hospitals and reducing the transfer to the general hospital and support primary care network of each district.

High level Hospital (A, S)

The Advance-level Hospital (A) is a hospital that is capable of accommodating patients who require advanced and sophisticated technology. (Advance & sophisticate technology) is dedicated to medical education and research. Medical it consists of specialist physicians in both primary and secondary branches as necessary. Designated as high-level referral hospital (A level)

The Standard-level hospital (S) is a hospital that is capable of accommodating patients who require specialized treatment. It consists of specialists in both primary and secondary branches. Designated as standardized delivery hospital (S level).

Thailand, there are 896 hospitals in the Ministry of Public Health.Include,33 of the High level Hospital, A and S , 83 of the Middle – level Hospital M1,M2 and 780 of the First – level Hospital (F1,F2,F3). Therefore, 87 percent of all hospitals in Thailand are the community hospitals or the small hospital. Implementation of the Ministry of Public Health for Non-Communicable Disease Prevent and Control Program, the importance and potential of community hospitals should be considered.

2.3 NCD situation

NCDs or non-communicable diseases that are not caused by pathogens and it can't spread from person to person. The disease is caused by habits or behavior. The disease is slowly progressing gradually accumulated symptoms, when the symptoms of the disease are often chronic. NCDs can be classified as chronic diseases. NCDs kill 40 million people each year, equivalent to 70% of all deaths globally of each year, 15 million people die from a NCD between the ages of 30 and 69 years; over 80% of these "premature" deaths occur in low- and middle-income countries(WHO, 2017). The chronic disease is a major health problem in Thailand. It is a leading cause of illness with serious diseases such as high blood pressure, diabetes, coronary artery disease, stroke, overweight or obese cause complications, deficiency and premature of death. This is causes 73 percent of deaths among Thai people. In specific, stroke in 2016 had the highest death rate of 27,069 people per hour, 3 people per hour, and coronary heart disease. The death rate was 18,922 persons, an average of 2 per hour, If it not control, prevent or reduce chronic disease (IDF, 2015). As a result, the burden of health and economic loss is hindering the development of Thailand. Data from physical examination in people aged 15 years and over diagnosed with diabetes 3.1 million people in 2014 with 11,389 people died of diabetes an average of 32 people a day hospitalized in the hospital under 698,720 times annual treatment fee, nearly 4,000 million. The 5th National Health Examination Survey (NHES) in 2014, found the highest rates of hypertension in people in Thailand, up to 14 million people. Hypertension causes complications, including cerebral hemorrhage, cerebral hemorrhage, heart failure, kidney failure and pulmonary embolism. It's dangerous in life (NHES, 2016) (Kamath).

Diabetes is a chronic disease that is days away. The number of patients increased each year. The International Diabetes Federation (IDF) reports that in 2015 there were 415 million people globally have diabetes. The risk person of becoming a new patient is 318 million. It is estimated that in 2040, the number of people worldwide with diabetes increase to 642 million. In addition, the global population over the age of 18 years with diabetes increased from 4.7 percent to 8.5 percent. At present, one in 11 people with diabetes mellitus(IDF, 2015). According to the Health Data Center, Ministry of Public Health (MoPH). In Thailand, the number of new case DM increased each year. In 2015, there are 271,854 people, and in 2016 there are 298,902 new cases. This data presents a rapid increase in the number of new diabetic patients (IDF, 2015).

Chronic Non-Communicable Diseases (NCDs) is a critical emergency that needs to be resolved nationally and internationally(Si D, 2008). Each year, there are 16 million people worldwide who die prematurely from heart disease, lung disease, cerebrovascular disease, cancer and diabetes, 80% of whom are from low to middle income countries. In South and East Asia, It is the source of the goal of sustainable development of the United Nations, to reduce mortality of one in third, 2030 (WHO, 2017).Chronic non-communicable disease is a very important problem. It is estimated that in South and East Asia, there are approximately 8.5 million people, or an average of 23,000 deaths per day from NCDs (WHO, 2017).

Thailand has an average medical cost for 5 non-communicable diseases (diabetes, high blood pressure, heart disease, stroke In 2008, the rate was 25,225 million baht per year and the average cost of treatment for hypertensive patients was 2,465 million baht per year. Estimated number of hypertension patient 10 million people will lose the treatment fee of 79,263 million baht per year, affecting the quality of the population (ThaiNCD, 2017a).

NDCs situation in Thailand, the morbidity and mortality increase of non-communicable diseases. Public health operations aimed at reducing the morbidity and mortality of people from chronic non-communicable diseases. We can't one side only. But it must be done in all four aspects. It consists of the promotion of health for the people to have a better understanding of their own health care and disease-free communities and healthy physical health (Wichai, 2016). Disease prevention and control by reducing and controlling risk factors affecting health behavior and reducing non-communicable disease, to giving the people to take care of themselves and to manage themselves of non-communicable diseases. Medical care in people with non-communicable disease does not cause complications and disabilities and physical and mental rehabilitation in the context of disability and complications from chronic non-communicable diseases (WHO, 2017). The people living in society happily and without burdening family and society and the operation should be a partnership between the network partners (IDF, 2015).

2.4 Hypertension situation

Hypertension is one of the major causes for premature death in the world population and a serious problem. Hypertension is also known as a silent killer, as it often has no warning signs of disease and its manifestation. Many people have this disease without knowing it. Prior to that, they have high blood pressure, and if not treat, the risk of heart disease and kidney disease (Association, 2017). Hypertension is the leading cause of death worldwide, reaching 7.5 million people, or 12.8 percent. Of all causes of death. They are a lost 57 million years of life, or 3.7 percent of DALYs. The number of people with high blood pressure around the world has reached almost a billion. Two thirds are in developing countries. It is found that the adult population in Southeast Asia, one in three people have high blood pressure in 2025, 1.56 billion adults are expected to have high blood pressure. In addition, adults who are older than 25 years, about 4 in 10, they have high blood pressure. In many countries, one in five people are at high risk for hypertension. It is estimated that 9 out of 10 of adulthood, up to 80 years of age, have high blood pressure (NHES, 2016; WHO, 2013) (Prevention, 2018).

Hypertension situation in Thailand, Based on information from the Bureau of Policy and Strategy. The Ministry of Public Health found that the mortality rate with hypertension was 100,000 person in the five years (2011 - 2015), rising from 5.7 (3,664 person) to 12.1 (7,886 person), respectively, and the rate of hypertension per

100,000 population increased from 1,621.72 (1,047,979 person) to 1,901.06 (1,236,210 person) (ThaiNCD, 2017a).

According to the 5th National Health Examination Survey (NHES) in 2014 found that prevalence of hypertension in people aged 15 years and over increased to 24.7 percent (men 25.6 percent and women Compared with the results of the fourth survey in 2009, the prevalence of hypertension was 21.4% (21.5% in men and 21.3% in women). The prevalence of hypertension High 2557 increase with age. The prevalence of hypertension was highest in the North (32.6%), followed by the South (28.3%)(Wichai, 2016). Hypertension is high. But access to the service system improved. The group was not diagnosed with hypertension. Proportion was treated, but control was not reduced and the proportion of people who can control blood pressure is higher. It is possible that measures of blood pressure care in the Thai population are past. May not be enough to lower blood pressure. Diagnose and the treatment is not as good as it should be, especially in men. Treatment and control of blood pressure is less than women (Wichai, 2016).

2.5 Factors related to Hypertension

2.5.1 BMI

According to the 5thNational Health Examination Survey (NHES) in 2014, the prevalence of BMI> 25 kg / m2 In the population aged 18 years and over, the incidence rate was 28.1, 36.5 and 37.5 in 2004, 2009 and 2014 respectively. As with the prevalence of people with BMI> 30 kg per square meter, the trend is increasing. The prevalence rate was 6.9, 9.0 and 10.9 in 2004, 2009 and 2557. Considering the increase rate before 2009, the rate of increase was very high, increased from 30.4% in 2005**.** The obesity criteria set by the World Health Organization of obese people, obesity is a condition where BMI> 25 kilograms per square meter. When considering the situation in Thailand, it was found that, the prevalence of obesity is likely to increase slightly. The size of the obesity problem can explain that more than one third of the Thai population is obese. This is the risk of NCDs, so overweight and obesity. This problem must to improve.

Body Mass Index Relates to Blood Pressure Among Adults. Cross-sectional studies were conducted by all people in the Punjabi community living in Roshanara

District and Jaina Building in Delhi during the past 20 years and aged 18-50 years. Men are involved in the transportation business. And most women are housewives. The mean of all measurements, height, arm circumference, pulse rate, blood pressure and DBP were higher than those of male. Body mass index (BMI) and fat percentage were higher than females with male, there was a significant positive correlation between BMI percent, lipid and BPP. Both SBP and DBP ratio ratios were found to be those who were overweight or obese were more likely to have high blood pressure than those with normal BMI. Prevalence of prehypertension among overweight/obese suggested an early clinical detection of prehypertension and intervention including life style modification, particularly weight management. (Suman Dua, 2014)

2.5.2 Smoking

Thailand based on the survey of smoking behavior and alcohol consumption by the National Statistical Office in 2011 found that the prevalence of smoking. In the population aged 15 years and over, 21.4% Cigarettes are down 30% in 2025. The prevalence of smoking in the population aged 15 years and over should be 14.952%, although smoking rates will drop to 19.9% in 2015.

Hypertension is normal and is also considered to be a disease of most cardiovascular risk factors, which are often associated with other factors, including smoking. There is also evidence high blood pressure is one of the most common causes and causes of illness and death. Variety of complications from coronary heart disease and atherosclerosis. Some of these events are highly related to cigarette smoke, while others indicate that the disease is associated with high blood pressure. With smoking High blood pressure first observed to be focused and still. There are no answers to the importance of these two factors. The high blood pressure that smokes begins. To smoke before the appearance of high blood pressure. Unless in case of congenital or secondary hypertension. Information will allow you to know whether hypertension is the primary cause. The required blood pressure depends on smoking habits or when conversely, it develops as an event related to nature. Genetic and physiological characteristics of the individual. Disappear direct evidence of this assumption is indirect observation. Evaluate the role of high blood pressure related to smoking alone. High blood pressure was not associated with smoking, smokers and non-smokers. Many observations highlighted the impact of smoking and high blood pressure in both the heart and blood vessels acting as an independent risk factor can raise interest rates cardiovascular disease. A close relationship exists between these two factors, although is still hard well establishing the specific role of each of them when are associated. However, evidence indicates an exponential increase in the rate of cardiovascular disease with respect to the effects of hypertension and smoking separately acting. (Fellow of the American Society of Hypertension, Fellow of the Royal Society for Promotion of Health, & Kingdom, 2015)

2.5.3 Alcohol drinking

Consumption of pure alcohol per capita between 2010 and 2014 is expected to increase slightly. In 2014, the consumption of alcohol Per capita Thai population is 6.90 liters per person per year 5. This is an increase of 3%(NHES, 2016).

Excessive alcohol can cause high blood pressure up to unhealthy levels. Drinking more than three drinks at a time will increase your blood pressure. Repeated drinking can lead to long-term increases.

People who drink heavily to lower their blood pressure can reduce their blood pressure by using a 2 millimeters (millimeters) of mercury and blood pressure. (Lowest blood pressure) 1 to 2 mm Hg. risk factor for high blood pressure. Also, alcohol can interfere with the effectiveness and increase the side effects of some blood pressure medications. (Sheldon G. Sheps, 2015)

2.5.4 Physical inactivity

Situation of physical inactivity from the survey of Thai people's health by physical examination using the criterion of physical activities in the medium level to less than 60 minutes per day. The prevalence of people aged over 15 years with activities Physical inadequacy in 2009, the year of reference. To target 2568 is 18.5%, so if Thailand will achieve the target in reducing the prevalence of inadequate physical activity is 10 percent, the prevalence of people over 15 years of inactivity is not more than 16.65 percent in 2025 (Wichai, 2016).

Regular exercise has many health benefits and protects patients from hypertension and cardiovascular disease. Studies have shown that reducing BP in hypertensive patients with high blood pressure at 5 mmHg leads to a 14% reduction in stroke mortality and coronary heart disease mortality 9% regular exercise is important in preventing and treating high blood pressure. (Organization)

2.5.5 Salt consumption

A high-salt diet is one of the major risk factors in the development and maintenance of hypertension. Numerous experimental and observational studies have confirmed the association of sodium intake with blood pressure levels. The effects of a high-salt diet are related to the function of the renin-angiotensin system, which is normally suppressed by a high-salt diet. Endothelial dysfunction probably plays an important role in the influence of high sodium intake on blood pressure, although the exact mechanisms remain elusive. Genetic factors are known to be very important, and various consomic and congenic rat strains as animal models have proven to be very useful in bringing us a step closer to understanding the interaction between salt intake and hypertension. Study on the effect of different iodine levels on blood pressure in chimpanzees. The high salt content varies between chimpanzees and some animals with high blood pressure, and some increase slightly or none at all. Overall, the authors found that reducing sodium can lower blood pressure and sodium may make blood pressure levels rise significantly. (University Josip Juraj Strossmayer Osijek, 2011)

The survey of Thai people's health by physical examination in 2009 using information Explore 24-hour food consumption to determine the amount of sodium consumed. The median sodium intake was 3,246 mg / day (2,961.9 - 3,633.8 mg / day).Thai people have high salt and sodium intake, compared with standard sodium intake. Do not consume more than 2,000 milligrams a day. It was found that Thai people consumed more salt than the standard (NHES, 2016).

2.5.6 Family History

Family History is an important risk factor that can not change for hypertension. The genetic nature of hypertension is a result of a large number of familial studies. The relationship between blood pressure between siblings and parents is approximately 30% of the variance of blood pressure. Can be attributed to genetic factors and found to differ from 25% in pedigree studies to 65% in paired studies. Among the mechanisms proposed to explain the relationship between hypertension and positive familial history of hypertension, there is an increase in reabsorption of sodium proximal kidney, increasing the genetic characteristics associated with hypertension, such as sodium hypertension. High level lithium transport, low urinary kallikrein excretion, elevated uric acid level, high fasting plasma insulin concentrations, high-density LDL sub-fractions, fat pattern index, oxidative stress and body mass index, as well as shared environmental factors such as sodium intake and heavy metal exposure. There was associations between family history and prevalence of hypertension. In a nationwide screening program, positive family history was found to be correlated with the prevalence of hypertension, twice the values found in individuals with a negative family history and independent of weight. Evidence confirms the need for a family history of hypertension, even in normal individuals. There is clear evidence of prior cardiac morphologic changes (left wall thickness and left wall thickness) and vascular capacity and the ability to respond to person pressure with low blood glucose. Teens with first-degree relatives with high blood pressure are at particular risk for being closely monitored. Hypertension is more likely to be diagnosed earlier in screening programs. If family history is positive, a study of family history of hypertension and other risk factors among healthy people is an opportunity to explore the factors that contribute to hypertension. Positive family history therefore can be considered as an opportunity for involving direct family members in health education, as well as for early interventions and improved control of hypertension. (Priyanga Ranasinghe, 2015)

2.5.7 Increased Age

Age-Related Changes in Blood Pressure is based on three different representative population samples of a total of 1304 men (50-79 years old) and 1246 women (38-79 years old) observed for up to 12 years. Subjects' consumption of antihypertensive drugs and blood pressure levels in subjects with and without such treatment are presented. The prevalence of treatment with antihypertensive drugs (including /3-blockers and diuretics for other Indications) increased from 2% at age 50 years to 37% at 79 years of age among the men and from 1% at 38 years to 61 % at

79 years of age among the women. The mean systolic/diastolic blood pressure in untreated subjects increased from 138/91 mm Hg at age 50 years to 159/91 mm Hg at age 70 years in the men and from 123/79 mm Hg at age 38 years to 168/93 mm Hg at age 70 years in the women. At age 79 years the mean systolic/diastolic blood pressure was 155/83 mm Hg in the men and 161785 mm Hg in the women. In a longitudinal follow-up of reexamined subjects, there was an increase in systolic blood pressure levels up to age 75 years and a reduction in diastolic blood pressure after age 75 years in both sexes. (S Landahl, 1986)

2.5.8 Low Socioeconomic Status:

Socio-economic factors such as education and occupations are associated with high blood pressure. Socio-economic status indicators such as urban or rural housing and individuals, local or national economic conditions, are also associated with high blood pressure, although these associations are complex and sometimes conflicting.

Possible explanations for this effect include awareness of the prevention and control of hypertension and improved access and adherence to treatment in higher socioeconomic status groups, as well as weight. Newborns and higher work stress in lower socioeconomic status. Low socioeconomic status is associated with high blood pressure. It is necessary to develop and test culture-appropriate interventions to reduce the prevalence of hypertension in these populations in order to reduce the rate of morbidity and mortality and cardiovascular disease.

2.5.9 Chronic Kidney Disease

High blood pressure is a major cause of chronic kidney disease. Over time, hypertension can be damaging. Blood vessels throughout your body can be reduce blood volume to vital organs like High blood pressure also causes damage.

The kidney filter may result in the removal of wastes and liquid supplements from blood. Fluid in the blood increases blood vessels, may build up and increase blood pressure. High blood pressure can be a complication to kidney an important role in maintaining your blood pressure during healthy periods. Kidney disease can not control blood. As a result, blood pressure increases. (Grotto I, 2008)

2.5.10 Psychosocial Stress:

The causes of hypertension are diverse and complex, involving both genetic and behavioral factors. The relationship between psychosocial stress and hypertension has been hypothesized. Many people feel pressured by depression and stress from the chronic psychosocial societies of globalization, cultural change, socio-economic changes, and workplace stress. The systematically searched and identified relevant studies from five databases, including PubMed, Cochrane Library, China National Knowledge Infrastructure (CNKI), CQVIP, and the Wanfang Database until April 2016. Eleven studies encompassing 5696 participants were included in the final analysis. Data showed that psychosocial stress was associated with increased risk of hypertension (OR = 2.40, 95% CI = 1.65-3.49). Hypothyroidism may be a risk factor for high blood pressure.The few cohort and case-control studies on the association between psychosocial stress and hypertension employed variable definition of stressors and the responses, making the meta-analysis difficult. Although we find a connection between psychosocial stress and chronic high blood pressure, further study confirms this relationship. (Liu MY, 2017)

2.6 Program (Intervention) on Hypertension

World Health Organization determined to prevent and reduce the burden of disease and death from chronic non-communicable diseases 2010–2025, 9 targets (9 Voluntary Global NCD targets for 2010-2025) for countries that are ready to operate in three groups:

Group 1: Mortality and morbidity (1 Indicator)

Mortality from chronic non-communicable diseases (cardiovascular disease, diabetes, cancer and COPD) decreased by 25%.

Group 2: Risk factor reduction for NCDs. (6 Indicator)

1. Diabetes does not increase (0%) and overweight/obesity does not increase (0%).
2. High blood pressure decreased 25%.
3. Tobacco consumption decreased 30%.
4. Consumption of alcoholic beverages reduced to 10%.
5. Physical inactivity decreased to 10%.

6. Reduce salt consumption 15%.

Group 3: Development of national health services / policies that respond to the reduction of non-communicable diseases (National systems response)(2 indicator).

1. The CVD risk group (with a risk score for the next 10 years from 30 and increase) was treated with medication along with counseling to modify the health behavior. At least 50%
2. Non-communicable disease patients have access to appropriate drugs and technology 80%

The World Health Organization has identified important measures to reduce the disease and Risk Factors for Non-Communicable Disease 3 Measures:

1. Surveillance mapping the epidemic NCDs
2. Prevention reducing the level of exposure to risk factors
3. Management Strengthen health care people with NCDs. The Department of Disease Control has established WHO indicators and implemented the NCD Clinic plus program to control NCDs in accordance with WHO indicators.

2.7 Hypertension related other organs.

Long-term hypertension and untreated It causes destruction of vital organs in the body, such as the heart, kidneys, blood vessels and eyes, etc. Because of the high blood pressure that causes long arterial wall thickening and small holes, blood to organs to reduce. As a result, these organs do not function normally. The duration of high blood pressure is so bad. It depends on blood pressure, such as mild and moderate. It takes more than 10 years. Severe levels will take shot or longer severe blood pressure takes just a month (Peera, 2015).

Heart: High blood pressure affects the heart. The two major causes are enlarged heart and coronary arteries. Cause chest pain from myocardial infarction (Peera, 2015).

Brain: The common paralysis is usually caused by small blood vessels, clogged by platelets, which are common or caused by cerebral vascular breakdown, bleeding in the brain(Prevention, 2018).

Kidney: The body with the most blood vessels in the body. Filter the blood waste. High blood pressure also affects the kidneys and same as coronary artery. Blood to the kidneys is not enough. The kidney impair until the stage of chronic renal failure.

Patients with the first symptoms of chronic renal failure is frequent urinary tract at night, legs swelling in the late, if it is very tired. There is a lot of pale. This is often seen in patients with chronic renal failure and nausea and vomiting in patients with renal failure (Service).

Eye: High blood pressure can affect the blood vessels in the eye, such as bleeding in the retina. Small blood vessels, the retina blocked or make your eyes peel off. Patients may have no symptoms or eyes until blind. Diabetes, which is often associated with high blood pressure, will cause eye complications faster (EJ, 2007).

Vessels: High blood pressure causes arteriosclerosis. Cause small or enlarged arteries. The blood to the lower limbs and internal organs. The patient is not walk so far away because leg pain from ischemia. Take a break and walk away (Prevention).

2.8 Related studies

2.8.1 Diet &Physical Activity Clinic (DPAC Clinic)

DPAC clinics are involved in the process of modifying dietary habits and there are activities, movement, exertion / exercise. It also promotes compliance with the standards set by each age group. Encourage sustainability. The implementation concise:

1. There is a clinic in the service.
2. Have a team
3. There is a concrete activity model.
4. Have a monitoring / evaluation / development system.

DPAC Clinic focus on providing individualized counseling services to patients / patients, health behavior advice the clinic will use the 5A's approach and the 5R's approach to counseling to change behavior. Weight loss and waist circumference by the client will be transmitted from the outpatient clinic and Health Check

Process of DPAC Clinic

Step 1: Setting up a clinic (location)

1.1 Establish / Operate clinic separately

1.2 Establish / Operate Clinic in conjunction with Chronic Non-Communicable Disease Clinic (NCD)

Step 2: Personnel / staffing (multidisciplinary)

Step 3: Supplying tools and equipment

Step 4: Behavior Modification Services

4.1 Screening / Admission

4.2 Assess health behaviors and conditions

- Health behavior (eating and exertion / exercise)
- Physical Fitness Test (Fitness Test / Exercise Test)

4.3 Counseling for motivation / awareness. To change the health behavior. 5 A's approach, 5 R's approach, Stages of change theory, and Cognitive Behavior Therapy: CBT

The goal of DPAC Clinic concise general public with health care, People who are at risk and who are Obesity and high risk / risk and Chronic 5 disease patients without complications.

2.8.2 Healthcare Accreditation (HA)

Healthcare Accreditation (HA) is the external certification to stimulate the hospitals. Improve quality and safety in patient care. It is based on international standards as a development framework. Development and certification of hospitals. There are 3 main activities:

Quality development: The hospitals must be a developer. The nursing home is appropriate for the condition of the area. It is linked to standard guidelines.

Quality assessment: When the hospitals has improved its quality. To apply for accreditation, the Institute will organize a consultant team. Surveyors To evaluate quality development of the hospital.

Quality Assurance: If the hospitals developed in accordance with the criteria. The institute will certify the hospital. The first certification will be 2 years. After that, the hospitals will have to request a new certification.

Benefits for the hospital: The system is consistent with the user It is a learning organization that can accommodate change and continuous development, to strive for excellence, organizations are able to survive and sustainably reduce or prevent potential problems and complaints or litigation(The Healthcare Accreditation Institute, 2015).

Benefits for health worker: Reduce the risk of work-related illness of health worker and misunderstanding health worker with patient, good co-ordination. The health worker has learned and develop their own potential(The Healthcare Accreditation Institute, 2015).

The goal of Healthcare Accreditation.

1. Immune to the hospital with a good system. Guaranteed in quality and safety. To reduce the chance complications and conflicts between service providers and service recipients. It will lead to distrust. In Health Service Systems and to complaints

2. Promote quality and safety. Covered in all areas, all levels and all sectors.

3. Promote proper use of resources on the basis of Academic knowledge and the ability to pay the country.

2.8.3 CVD/CKD detection and prevention control Package

Chronic disease in the world is caused by four major of diseases, including Coronary artery disease, diabetes, cancer and chronic lung disease. The mortality rate of the world population up to 85 percent while the data of Thailand. In 2009, all four groups accounted for 56.6% of total deaths in the Thai population. These 4 groups are caused by four common factors: smoking, drinking and drinking alcohol, inappropriate dietary habits and insufficient physical activity. In 2010, 4x4 concept. It is the concept of managing NCDs at the international level. Especially in the global strategy. Prevent and control NCDs. There are also 4 Risk factors for physiological changes High blood pressure. High blood sugar Hypoglycemia and overweight / obesity It will cause problems for themselves. It is also a link between behavior and disease. Preventive action Controlling coronary heart disease, stroke and chronic kidney disease is required to manage from risk factors. Risky environment Pre-disease Duration of illness and complications are taken care of services at all levels must provide appropriate prevention, treatment and rehabilitation services.

2.9 New Blood Pressure Guideline Sets 130/80 Threshold

High blood pressure should be treated earlier with lifestyle changes and in some patients with medication – at 130/80 mm Hg rather than 140/90 – based on new ACC and American Heart Association (AHA) guidelines for the detection, prevention, management and treatment of high blood pressure.

The new guidelines – the first comprehensive set since 2003 – lower the definition of high blood pressure to account for complications that can occur at lower numbers and to allow for earlier intervention. The new definition will result in nearly half of the U.S. adult population (46 percent) having high blood pressure, with the greatest impact expected among younger people. Additionally, the prevalence of high blood pressure is expected to triple among men under age 45, and double among women under 45, the guideline authors note. However, only a small increase is expected in the number of adults requiring antihypertensive medication ((ACC), 2017).

A new U.S. blood pressure guideline endorsed by the two major U.S. cardiology groups lowers the definition of high blood pressure to 130/80 mm Hg. This means that more than 100 million adults will now have high blood pressure, though many will be unaware of the diagnosis (Larry Husten, 2017).

The 2017 American College of Cardiology (ACC)/American Heart Association (AHA) Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure was released today at the American Heart Association meeting in Anaheim and published simultaneously in Hypertension and the Journal of the American College of Cardiology.

Blood Pressure Categories

American Heart Association | American Stroke Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

The new guideline eliminates the category of prehypertension. The new blood pressure categories are:

Normal: <120/80 mm Hg

Elevated: Systolic between 120-129 and diastolic less than 80 mm Hg

Stage 1: Systolic between 130-139 or diastolic between 80-89 mm Hg

Stage 2: Systolic at least 140 or diastolic at least 90 mm Hg mm Hg

Hypertensive crisis: Systolic >180 and/or diastolic >120 mm Hg.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design:

This study design using secondary data analysis between 2014 – 2017 from NCD Clinic Plus Program in Kongra Hospital, Phatthalung province and the southern provinces in Thailand. To analysis associated factors of blood pressure change among NCD Clinic Plus Program patients from 2014 – 2017. This research export data from HosXp program in the Kongra hospital.

3.2 Study Area:

This study was conducted in Kongra Hospital's the southern provinces in Thailand. Kongra Hospital is the first-hospital level.

Kong Ra Hospital is located of Khlong Sai Khao, Kong Ra District, Phatthalung, southern of Thailand. Kong Ra district is subdivided into 5 subdistricts, 45 villages: 1.Kong Ra 2.Charat 3. Khlong Chaloem 4. Khlong Sai Khao 5.Som Wang. The total number of population 35,833 person.

3.3 Study Period:

The study was conducted in the month of December 2017 to March 2018

3.4 Study population:

The target populations of this study were hypertension patient from all registration system of Kongra Hospital.

3.4.1 Inclusion Criteria:

Participants who were hypertension patient and follow up during 2015 – 2017 in Kongra Hospital.

3.4.2 Exclusion Criteria:

Participants who lost to follow up during 2015 - 2017.

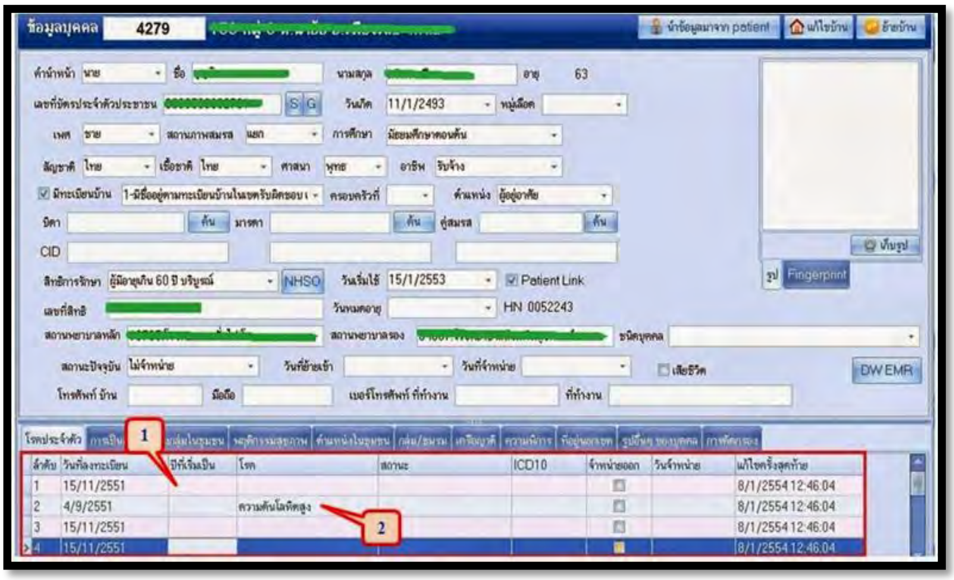
3.5 Sampling Technique and Sample size:

All hypertensive patients who registered since 2015 to 2017 were recruited as study participants in Kongra Hospital, who are the level of systolic blood pressure, SBP > 140 mmHg and /or diastolic blood pressure, DBP > 90mmHg.

3.6 Measurement Tool:

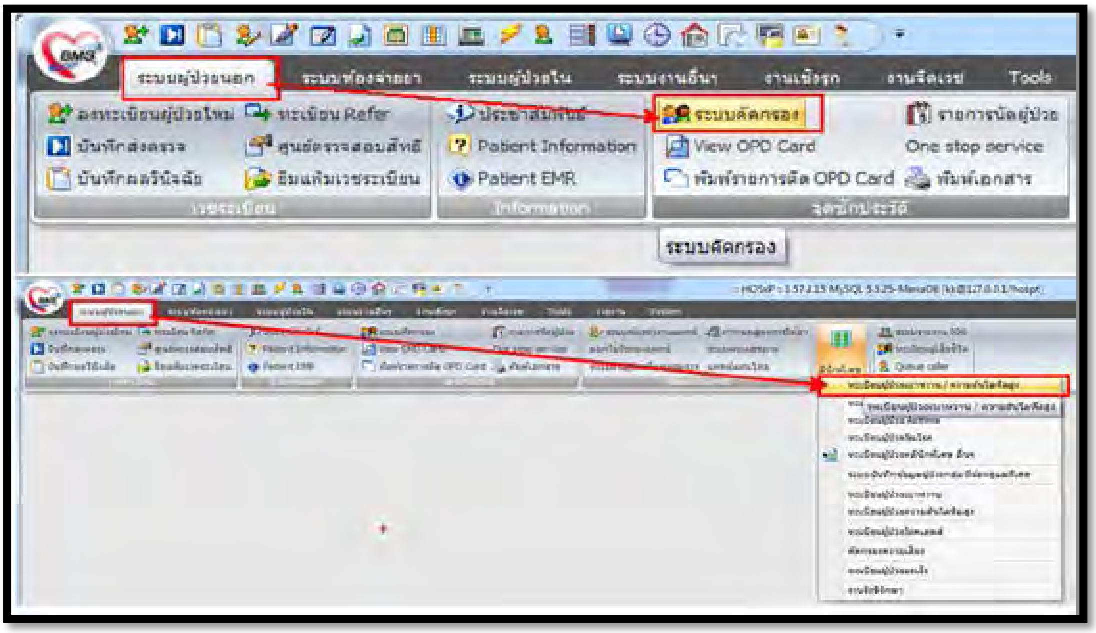
HOSxP Program in Kongra Hospital. Application software For hospitals, health centers and hospitals, developed by personnel volunteers from many hospitals. Aims to develop information systems with high efficiency can actually be used in both the health center level to the hospital Starting in 1999, HOSxP has now been used in hospitals ranging from community level, hospital, hospital, and more than 400 locations in Thailand and has more than 100 health centers included Kongra Hospital.

Patient Registration System in HOSxP.



Data recording method (CHRONICFU) HOSxP:

Outpatient system >> Screening system >> Special clinic >> Diabetes / Pressure: Outpatient system >> Special clinic >> Diabetic patient registration / High blood pressure



HOSxP_PCU:

Receiving system >> One stop service: Receiving system >> Diabetic patient registration / High blood pressure

3.7 Validity:

Data Collection method to select Secondary data, It is validated by the staff responsible for the hospital information system. After that, the accuracy of the information will be checked by the staff, who are prevention and control hypertension disease function on the NCD Clinic program because they will be know the patient's best information.

3.9 Data Analysis:

This study is based on data from the data files are as follows: (1) Person data file: Sex, age, marital status, occupation, education (2) Chronic data file including diagnostic data. And blood pressure records; and (3) data files. Screening for risk factors for chronic disease (NCD screen) including alcohol, smoking, weight, height and history of diabetes in relatives. This research export data from HosXp program in the hospital. We use secondary source for analyze data. The HosXp program used to record patient information or One Stop Service records internal treatment data. The most hospitals use this information system to receive and transmit patient information.

The independent variables and their scale of measurement are shown as below:

Independent variables	**Scale of measurement**
Gender	Nominal Scale (Male, Female)
Age	Continuous Variable
Occupation	Nominal Scale (Agriculturist, Business, Government and Employee)
Religion	Nominal Scale (Buddhism, Islam)
Education Level	Nominal Scale (Grade 1-6, Grade 7-9, Grade 10-12, Certificate and Bachelor Degree)
Weight	Continuous Variable
Height	Continuous Variable
Body Mass Index	Continuous Variable
Waist circumference	Continuous Variable
Underlying diseases	Nominal (Yes, No)

Independent variables	Scale of measurement
History family's disease	Nominal (Yes, No)
Smoking	Nominal Scale (Non-smoker, Smoker)
Alcohol	Nominal Scale (Nondrinker, Drinker)
Frist age of diagnosis	Continuous Variable
Period of Hypertension	Continuous Variable

The dependent variables and their scale of measurement are shown as below:

Dependent variables	Scale of measurement
Systolic blood pressure	Continuous Variable
Diastolic blood pressure	Continuous Variable
Blood pressure control	Nominal Scale (control BP, uncontrol BP)

Analytical Statistics:

Descriptive statistic analyzed for the components of all independent variable for compare and different which have been categorized in nominal and ordinal scale by using frequency, median, minimum, maximum values and range.

Mean/ SD analyzed for compare Body Mass Index and Waist circumference before intervention NCD Clinic on 2015-2017.

Percentage (%) analyzed for compare a difference of each variable include gender, occupation, religion and education level.

Inferential statistics

Pair t-test performed to analysis a different between blood pressure in 2015 (before) and 2017 (after). If data is skewed, Wilcox sign rank test utilized.

Independent t-test analyzed to test a difference of mean for continuous data between patients whose blood pressure had been changes and whose had not. If data is skewed, Mann-whitney U test analyzed.

Chi-square and Fisher X'act test analyzed for an association between 2 categorical data.

Repeated Measure ANOVA analyzed of blood pressure level.

All analysis performed through SPSS version 22. Statistical significant to considered at 0.05.

3.10 Ethical Consideration:

The thesis requests for secondary data of Kongra hospital for analysis data hypertension patient between 2015 – 2017 export data from HosXp program contact directed to the hospital director because all patient information maintained by the hospital and some confidential information of the patient. Ethical reviewed and approved by the Ethics Review Committee for Research Involving Human Research Subjects, approved by Phatthalung Provincial Public Health Office, Ministry of Public Health (MoPH).

CHAPTER IV

RESULTS

This chapter contains descriptive and analytical statistics from secondary data of Kongra Hospital (F3 level-30 beds) to export data from HosXp program for analysis data hypertension patient between on 2015 – 2017. Hypertensive patients in this study total 176 cases.

Data analysis began with descriptive statistics of all independent to showed frequency and percentage. The categories variables such as gender, occupation, education religion etc. The continuous variables such as age, BMI, waist circumference, weight and height expressed by mean, minimum, maximum, and standard deviation. Present of the research results. The meaning is as follows.

4.1 General Characteristic of Hypertensive patients in the first registration.

4.2 Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertension patient s from 2015 – 2017.

4.3 Factors associated with Systolic Blood Pressure Change among hypertensive patients

4.4 Factors associated with Diastolic Blood Pressure Change among hypertensive patients.

4.5 Percentage of control and uncontrol blood pressure of patients during 2015-2017.

4.6 Factors associated of control and uncontrol blood pressure on from 2015 – 2017.

4.1 General Characteristic of Hypertensive patients in the first registration.

Table 1: Socio Demographic, health status and life style factors of the hypertensive patients.

VARIABLES)N=176(	**FREQUENCY**	**PERCENTAGE**
Gender		
Male	65	36.93
Female	111	63.07
Occupation		
Agriculturist	151	85.80
Business	8	4.55
Government	3	1.70
Other	14	7.95
Education		
Grade1-12	139	78.98
Bachelor Degree	4	2.27
Unknown	33	18.75
Religion		
Buddhism	131	74.43
Islam	45	25.57
History Family)HT(		
Yes	52	29.55
No	124	70.45
BMI)kg/m^2(		
< 25	118	67.05
≥ 25	58	32.95
Waist Circumference		
Normal	68	38.64
Abnormal)risk(	108	61.36

VARIABLES)N=176(	**FREQUENCY**	**PERCENTAGE**
Tobacco		
Smoker	5	2.84
Non-smoker	153	86.93
Alcohol		
Drinker	4	2.27
Non-drinker	154	87.50

Table 1 shows general characteristic and health status factors of hypertensive patients in NCD Clinic Plus of Kongra Hospital. There were 176 patients. Who were follow-up blood pressure during 2015 to 2017. Most of patient were females 111 (63.07%) person and males 65 person (36.93%). The occupation of agriculturist has highest number of hypertensive patients. There were 151 (85.80%). In this study most participant graduate Grade1-12. There were 139 (78.98%). The hypertensive patients are mostly Buddhism religion 131 (74.43%).

Health Status factors of hypertensive patients contain history family and BMI. The number of hypertensive patients 124 (70.45%) has not history family and there were history family 52 (29.55%). The number of hypertensive patients 118 (67.05%) has BMI more than or equal 25 and BMI less than 25 about 58 (32.95%). The number of hypertensive patients 68 (38.64%) has waist circumference normal and waist circumference abnormal (risk) about 108 (61.36%).

Life style factors of hypertensive patients. The frequency number of tobacco's similar to alcohol. The number of hypertensive patients smoker 5 person (2.84%), non-smoker 153 person (86.93%) and drinker 4 person (2.27%), non-drinker 154 person (87.50%). In this study minority smoker and drinker of the hypertensive patients.

Table 2: Socio Demographic factors of the hypertensive patients for continuous variables

Variables	**Minimum**	**Maximum**	**Mean**	**S.D**
Age (year)	32	97	66.59	12.97
Weight (kg.)	45	91	57.26	17
Height (cm.)	155	189	156.02	10

Table 2 presents socio demographic factors of the hypertensive patients. The mean age of the hypertension patient participants in this study was 66.59 years, with 97 years as the highest and 32 years as the lowest age among all the participants. The mean weight of the participants in this study was 57.26 kg, with 91 kg as the highest and 45 kg as the lowest weight among all the hypertensive patients. The mean height of the participants in this study was 156.02 cm, with 189 cm as the highest and 155 cm as the lowest age among all the participants.

4.2. Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertension patient s from 2015 – 2017

Figure 1: Systolic blood pressure of hypertensive patients from 2015-2017 (n = 176)

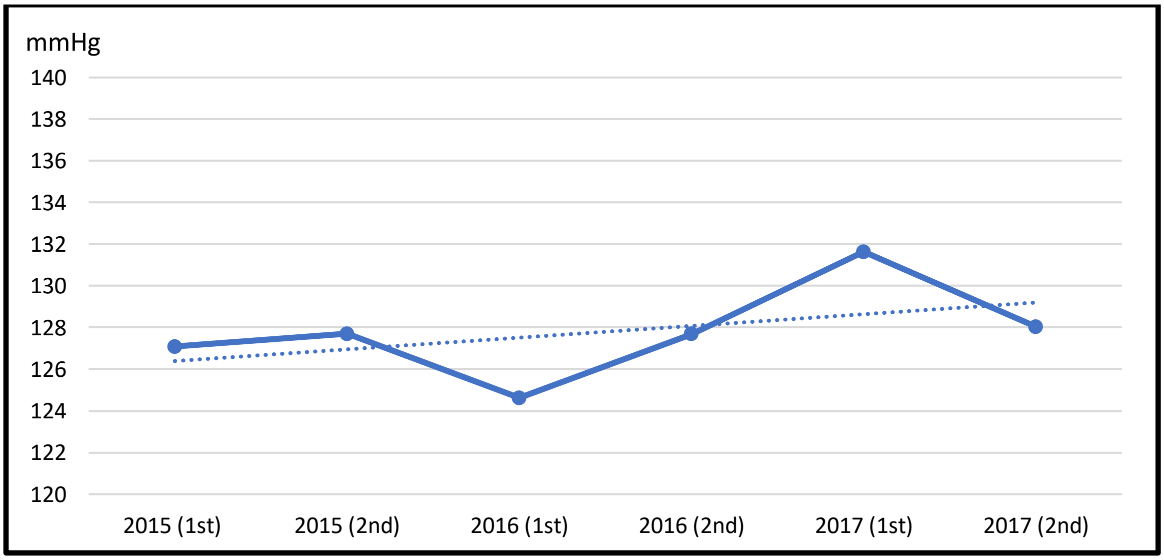


Figure 1 presents systolic blood pressure of hypertensive patients from 2015-2017. The over all of hypertensive patients from 2015 to 2017 was followed up every 6 months. Blood pressure monitoring results, overall systolic blood pressure (SBP) among hypertension patient decreased from 127 mmHg in 2015 (2nd) to 124 mmHg in 2016 (1st) and increased to 128 mmHg in 2017 (2nd). Considering in 2015, trend of SBP was not different. However, the SBP was decreased at the first time of measurement in 2016. After that, it increased to 127.69 mmHg. After 2016, overall SBP was increased in the first and second time visit in 2017.

Table 3: Systolic Blood Pressure of hypertensive patients

Systolic Blood Pressure	**Mean**	**SD**
2015 (1st)	127.09	11.46
2015 (2nd)	127.69	12.51
2016 (1st)	124.62	12.50
2016 (2nd)	127.69	12.33
2017 (1st)	131.64	12.35
2017 (2nd)	128.04	12.60

Table 3 shows Systolic Blood Pressure of hypertension. The mean of Systolic Blood Pressure highest in 2017 (1st) was 131.64. The lowest of mean in 2016 (1st) was 124.62. The mean of Systolic Blood Pressure in 2015 (1st), 2015 (2nd), 2016 (2nd) and 2017 (2nd) were 127.09, 127.69, 127.69 and 128.04.

Table 4: Repeated Measure ANOVA analysis of Systolic blood pressure among hypertensive patients from 2015- 2017

Systolic Blood pressure measurement		Mean Difference	Sig	95% Confidence Interval	
				Lower Bound	Upper Bound
2015 (1st)	2015 (2nd)	-0.608	1.000	-3.27	2.05
	2016 (1st)	2.460	0.506	-0.96	5.88
	2016 (2nd)	-0.602	1.000	-3.91	2.71
	2017 (1st)	**-4.551***	0.004	-8.17	-0.93
	2017 (2nd)	-0.955	1.000	-4.96	3.05
2015 (2nd)	2016 (1st)	3.068	0.144	-0.42	6.55
	2016 (2nd)	0.006	1.000	-3.59	3.60
	2017 (1st)	**-3.943***	0.021	-7.55	-0.33
	2017 (2nd)	-0.347	1.000	-4.33	3.64
2016 (1st)	2016 (2nd)	-3.063	0.058	-6.18	0.05
	2017 (1st)	**-7.011***	0.000	-10.47	-3.55
	2017 (2nd)	-3.415	0.116	-7.19	0.36
2016 (2nd)	**2017 (1st)**	**-3.949***	0.036	-7.76	-0.14
	2017 (2nd)	-0.352	1.000	-4.35	3.65
2017 (1st)	**2017 (2nd)**	**3.597***	0.018	0.35	6.84

Table 4 shows repeated measure ANOVA analysis of Systolic blood pressure among hypertensive patients from 2015- 2017 (within person change). SBP between 2015 (1st) and 2017 (1st) was increase (P = 0.004). SBP between 2015 (2nd) and 2017 (1st) was increase (P = 0.021). SBP between 2016 (1st) and 2017 (1st) was increase (P = 0.000). SBP between 2016 (2nd) and 2017 (1st) was increase (P = 0.036). SBP between 2017 (1st) and 2017 (2nd) was increase (P = 0.018). There are statistically significant differences P- value < 0.05.

Figure 2: Diastolic blood pressure of hypertensive patients from 2015- 2017 (n = 176)

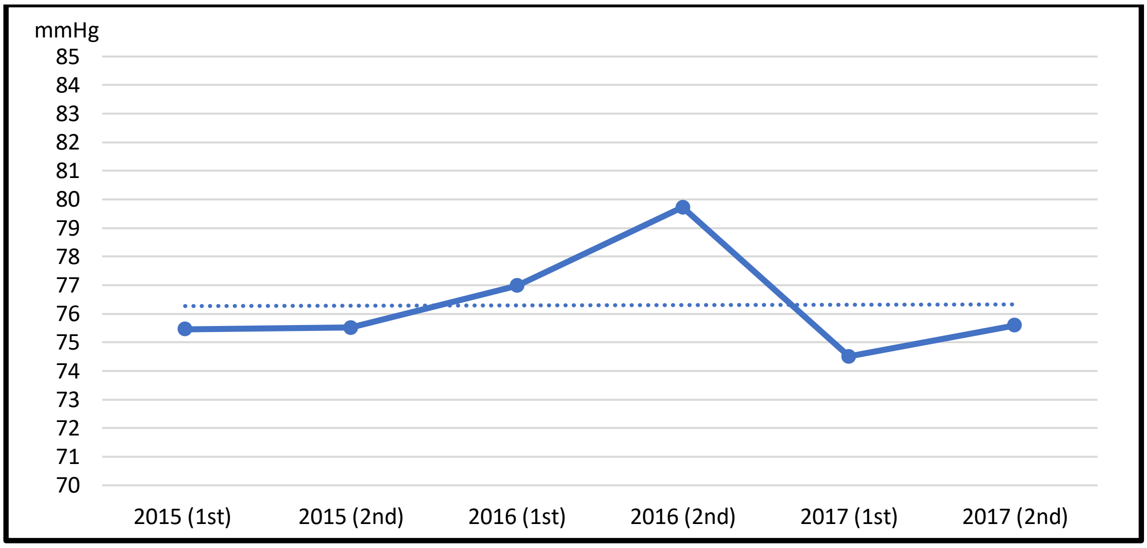


Figure 2 presents diastolic blood pressure of hypertensive patients from 2015-2017. The over all of hypertensive patients from 2015 to 2017 was followed up every 6 months. Blood pressure monitoring results, overall diastolic blood pressure increase (DBP) among hypertension patient decreased from 79 mmHg in 2016 (2nd) to 74 mmHg in 2017 (1st) and increased to 75 mmHg in 2017 (2nd). Considering in 2015, trend of DBP was not different. However, the DBP was increased at the first time of measurement in 2016. After that, it increased to 79 mmHg. After 2016, overall DBP was increased in the first and second time visit in 2017.

Table 5: Diastolic blood pressure of hypertensive patients

Diastolic blood pressure	**Mean**	**Std. Deviation**
2015 (1st)	75.47	9.339
2015 (2nd)	75.51	7.661
2016 (1st)	76.98	11.767
2016 (2nd)	79.73	14.425
2017 (1st)	74.51	10.122
2017 (2nd)	75.6	8.789

Table 5 shows diastolic blood pressure of hypertensive patients. The mean of diastolic blood pressure highest in 2016 (2nd) was 79.73. The lowest of mean in 2017 (1st) was 74.51. The mean of diastolic blood pressure in 2015 (1st), 2015 (2nd), 2016 (2nd) and 2017 (2nd) were 75.47, 75.51, 76.98 and 75.6.

Table 6: Repeated Measure ANOVA analysis of Diastolic blood pressure among hypertensive patients from 2015- 2017

Diastolic Blood pressure measurement		**Mean Difference**	**Sig**	**95% Confidence Interval**	
				Lower Bound	**Upper Bound**
2015 (1st)	2015 (2nd)	-0.045	1.00	-1.71	1.62
	2016 (1st)	-1.517	1.00	-4.13	1.10
	2016 (2nd)	-4.261	1.00	-16.66	8.14
	2017 (1st)	0.955	1.00	-1.88	3.78
	2017 (2nd)	-0.131	1.00	-2.93	2.67
2015 (2nd)	2016 (1st)	-1.472	1.00	-4.36	1.41
	2016 (2nd)	-4.216	1.00	-16.56	8.13
	2017 (1st)	1	1.00	-1.72	3.72
	2017 (2nd)	-0.085	1.00	-2.79	2.62
2016 (1st)	2016 (2nd)	-2.744	1.00	-14.99	9.50
	2017 (1st)	2.472	0.26	-0.59	5.54
	2017 (2nd)	1.386	1.00	-1.54	4.31
2016 (2nd)	2017 (1st)	5.216	1.00	-7.12	17.55
	2017 (2nd)	4.131	1.00	-8.19	16.45
2017 (1st)	2017 (2nd)	-1.085	1.00	-3.40	1.23

Table 6 present repeated measure ANOVA analysis of diastolic blood pressure among hypertensive patients from 2015- 2017 (within person change). DBP between 2015 (1st) to 2015 (2nd) was increase (P = 1.000). DBP between 2015 (1st) to 2016

(1st)) was increase (P = 1.000). DBP between 2015 (1st) to 2016 (2nd) was increase (P =1.000). DBP between 2015 (1st) to 2017 (2nd) was increase (P = 1.000). DBP between 2015 (2nd) to 2016 (1st) was increase (P = 1.000). DBP between 2015 (2nd) to 2016 (2nd) was increase (P = 1.000). DBP between 2015 (2nd) to 2017 (2nd) was increase (P = 1.000). DBP between 2016 (1st) to 2016 (2nd) was increase (P = 1.000). DBP between 2017 (1st) to 2017 (2nd) was increase (P = 1.000). There are not statistically significant differences P- value < 0.05.

Table 6: Blood Pressure change between 2015 (1st) and 2017 (2nd) among hypertensive patients.

Blood Pressure Change	**n**	**%**
Systolic Blood Pressure Change		
Decrease	68	38.64
No change or Increase	108	61.36
Diastolic Blood Pressure Change		
Decrease	68	38.64
No change or Increase	108	61.36

Table 6 shows systolic and diastolic change between 2015 (1st) and 2017 (2nd) In this study showed of Systolic Blood Pressure Change are decrease 68 patients (38.64%), no change or increase 108 patients (61.36%) and Diastolic Blood Pressure Change are decrease 68 patients (38.64%), no change or increase 108 patients (61.36%).

4.3 Factors associated with Systolic Blood Pressure Change among hypertensive patients

Table 7: Systolic blood pressure analysis for categories variables

Variables	Decrease (n = 68)		No change /Increase (n = 108)		P-value
Gender					
Male	28	(41.18%)	37	(54.64 %)	0.335[b]
Female	40	(58.82%)	71	(65.74%)	
Occupation					
Agriculturist	59	(86.76%)	92	(85.19%)	0.168[a]
Business	3	(4.41%)	5	(4.63%)	
Government	3	(4.41%)	0	(0%)	
Other	3	(4.41%)	11	(10.19%)	
Religion					
Buddhism	47	(69.12%)	84	(77.78%)	0.218[b]
Islam	21	(30.88%)	24	(22.22%)	
Education					
Grade1-12	52	(76.47%)	87	(80.56%)	0.3[a]
Bachelor Degree	3	(4.41%)	1	(0.93%)	
Unknown	13	(19.12%)	20	(18.52%)	
History Family					
Yes	21	(30.88%)	31	(28.70%)	0.865[b]
NO	47	(69.12%)	77	(71.31%)	
Tobacco					
Smoker	3	(4.41%)	2	(1.85%)	0.074[a]
Non-smoker	65	(95.59%)	106	(98.15%)	
Alcohol					
Drinker	9	(13.24%)	13	(12.04%)	1.000[a]
Non-drinker	59	(86.76%)	95	(87.96%)	

[a] Chi-Square Test

[b] Fisher's Exact Test

Table 7 present systolic blood pressure analysis. Systolic blood pressure analysis for categories variables use Chi-Square Test and Fisher's Exact Test for analysis associated between Systolic blood pressure and categories variables contains 7 variables such as gender, occupation, religion, education, history family, tobacco and alcohol. The associated blood pressure between SBP and gender (P=0.335), SBP and occupation (P=0.168), SBP and religion (P=0.218), SBP and education (P=0.3), SBP and history family (P=0.865), SBP and tobacco (P=0.074), SBP and alcohol (P=1.000).In this study showed of all variables no significant difference of whose p-value ≤ 0.05.

Table 8: Systolic blood pressure analysis for continuous variables.

Variables	N = 176	$\bar{x}$	S.D.	P-value
Age				
Decrease	68	67.13	14.31	0.662[a]
No change /Increase	108	66.25	12.12	
Weight				
Decrease	68	57.80	20.50	0.846[b]
No change /Increase	108	56.92	15.75	
Height				
Decrease	68	157.13	13.00	0.187[b]
No change /Increase	108	155.31	10.00	
Waist Circumference				
Decrease	68	72.76	17.25	0.725[b]
No change /Increase	108	71.71	17.50	
BMI				
Decrease	68	23.20	5.00	0.598[b]
No change /Increase	108	23.56	6.84	

[a] Independent T-Test

[b] Mann-Whitney Test

Table 8 presents systolic blood pressure analysis Systolic blood pressure analysis for continuous variables use Independent T-Test and Mann-Whitney Test for analysis associated between Systolic blood pressure and continuous variables contains 5 variables such as age, weight, height, waist circumference and BMI. SBP decreased 68 person and No change/Increase 108 person. Average age among SBP decreased patients 67.13 and No change/Increase 66.25 (P=0.662). Average Weight among SBP decreased patients 57.80 and No change/Increase 56.92 (P=0.846. Average Height among SBP decreased patients 157.13 and No change/Increase 155.31 (P=0.187) . Average Waist Circumference among SBP decreased patients 72.76 and No change/Increase 71.71 (P=0.725). Average BMI among SBP decreased patients 23.20 and No change/Increase 23.56 (P=0.598) . In this study showed of all variables no significant difference of whose p-value ≤ 0.05.

4.4 Factors associated with Diastolic Blood Pressure Change among hypertensive patients.

Table 9: Diastolic blood pressure analysis for categories variables.

Variables	**Decrease (n = 68)**		**No change /Increase (n = 108)**		**P-value**
Gender					
Male	28	(41.18%)	37	(54.64 %)	0.335[b]
Female	40	(58.82%)	71	(65.74%)	
Occupation					
Agriculturist	59	(86.76%)	92	(85.19%)	0.168[a]
Business	3	(4.41%)	5	(4.63%)	
Government	3	(4.41%)	0	(0%)	
Other	3	(4.41%)	11	(10.19%)	
Religion					
Buddhism	47	(69.12%)	84	(77.78%)	0.218[b]
Islam	21	(30.88%)	24	(22.22%)	

Variables	Decrease (n = 68)		No change /Increase (n = 108)		P-value
Education					
Grade1-12	52	(76.47%)	87	(80.56%)	0.3[a]
Bachelor Degree	3	(4.41%)	1	(0.93%)	
Unknown	13	(19.12%)	20	(18.52%)	
History Family					
Yes	21	(30.88%)	31	(28.70%)	0.865[b]
NO	47	(69.12%)	77	(71.31%)	
Tobacco					
Smoker	3	(4.41%)	2	(1.85%)	0.074[a]
Non-smoker	65	(95.59%)	106	(98.15%)	
Alcohol					
Drinker	9	(13.24%)	13	(12.04%)	1.000[a]
Non-drinker	59	(86.76%)	95	(87.96%)	

[a] Chi-Square Test

[b] Fisher's Exact Test

Table 9 shows diastolic blood pressure analysis. Diastolic blood pressure analysis for categories variables use Chi-Square Test and Fisher's Exact Test for analysis associated between Diastolic blood pressure and categories variables contains 7 variables such as gender, occupation, religion, education, history family, tobacco and alcohol. The associated blood pressure between DBP and gender (P=0.335), DBP and occupation (P=0.168), DBP and religion (P=0.218), DBP and education (P=0.3), DBP and history family (P=0.865),DBP and tobacco (P=0.074), DBP and alcohol (P=1.000).In this study showed of all variables no significant difference of whose p-value ≤ 0.05.

Table 10: Diastolic blood pressure analysis for continuous variables.

Variables	N = 176	x̄	S.D.	P-value
Age				
Decrease	68	67.13	14.31	0.662[a]
No change /Increase	108	66.25	12.12	
Weight				
Decrease	68	57.80	20.50	0.846[b]
No change /Increase	108	56.92	15.75	
Height				
Decrease	68	157.13	13.00	0.187[b]
No change /Increase	108	155.31	10.00	
Waist Circumference				
Decrease	68	72.76	17.25	0.725[b]
No change /Increase	108	71.71	17.50	
BMI				
Decrease	68	23.20	5.00	0.598[b]
No change /Increase	108	23.56	6.84	

[a] Independent T-Test

[b] Mann-Whitney Test

Table 10 present Diastolic blood pressure. Diastolic blood pressure analysis for continuous variables use Independent T-Test and Mann-Whitney Test for analysis associated between Diastolic blood pressure and continuous variables contains 5 variables such as age, weight, height, waist circumference and BMI. DBP decreased 68 person and No change/Increase 108 person. Average age among DBP decreased patients 67.13 and No change/Increase 66.25 (P=0.662). Average Weight among DBP decreased patients 57.80 and No change/Increase 56.92 (P=0.846). Average Height among DBP decreased patients 157.13 and No change/Increase 155.31 (P=0.187). Average Waist Circumference among DBP decreased patients 72.76 and No change/Increase 71.71 (P=0.725). Average BMI among DBP decreased patients 23.20 and No change/Increase 23.56 (P=0.598). In this study showed of all variables no significant difference of whose p-value ≤ 0.05.

Table 11: Age of the first diagnosis and Period of the hypertension disease (Age Range).

VARIABLES)N = 176(	FREQUENCY	PERCENTAGE
Frist age of diagnosis (year)		
< 30	3	1.70
30 - 39	10	5.68
40 - 49	25	14.20
50 - 59	49	27.84
≥ 60	89	50.57
Period HT)year(		
<5	63	35.8
5-9	59	33.5
≥ 10	54	30.7

Table 12: Age of the first diagnosis and Period of the hypertension disease.

Variables (N = 176)	**Minimum**	**Maximum**	**Mean**	**S.D**
Frist age of diagnosis	26	88	59.51	12.72
Period of HT	2	17	7.08	3.57

Table 11 age of the first diagnosis and Period of the hypertension disease. The mean age of the first age of diagnosis in this study was 59.51, with 88 years as the highest and 26 years as the lowest age among all the participants. The mean period of HT of the participants in this study was 7.08.

Table 12 shows age of the first diagnosis and period of the hypertension disease. Most of patient were the first age of diagnosis more than 60 around 89 person (50.57%) and less than 60 around 60%. In this study, the most period of the hypertension disease less than 5 years. There are 63 (35.8%), 5 to 9 around 59 (33.5%) and period of the hypertension disease less than 10or equal around 54 (30.7%).

4.5 Percentage of control and uncontrol blood pressure in patients during 2015-2017.

Analyze hypertensive patients total 176 persons. This study, Success or control in BP control was defined as systolic BP <140 mm Hg and diastolic BP <90 mm Hg.

Figure 3: The number of control and uncontrol blood pressure on 2015 - 2017.

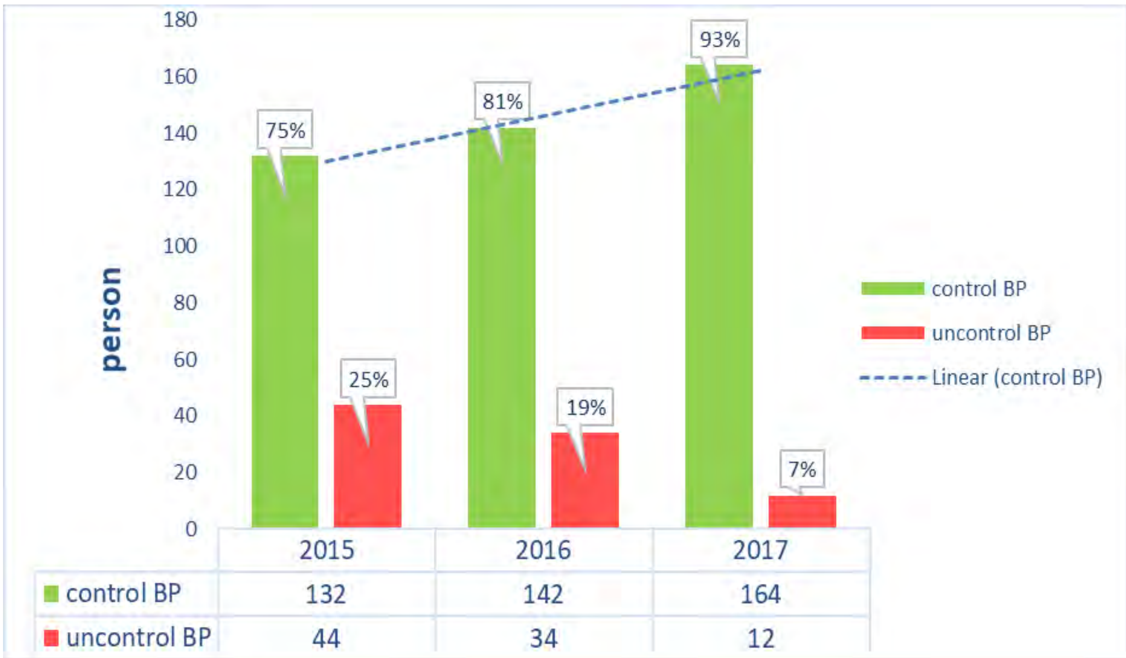


Figure 3 show of the number of control and uncontrol blood pressure on 2015 – 2017. 2016, the number of control BP increase 10 persons from 2015 and 2017, increase 22 persons from 2016. So, 2015-2017 the number of control BP increase total 32 persons. In 2016 the number of uncontrol blood pressure decrease 10 persons from 2015. In 2017 uncontrol decrease 22 persons. So, 2015-2017 the number of uncontrol BP decrease total 32 persons. In 2015, the hypertensive patient control 132 person (75%) and uncontrol 44 person (25%). 2016, hypertensive patient control 142 person (80.68%) and uncontrol 34 person (19.32). 2017, hypertensive patient control 164person (93.18%) and uncontrol 12 person (6.82%).

Table 13: Characteristic of uncontrol blood pressure's hypertensive patient on 2015.

VARIABLES)N = 176(	FREQUENCY	PERCENTAGE
Frist age of diagnosis (year)		
< 30	1	2.27
30 - 39	4	9.09
40 - 49	8	18.18
50 - 59	11	25.00
≥ 60	20	45.45
Period HT)year(		
<5	14	31.82
5-9	22	50.00
≥ 10	8	18.18
Tobacco		
Smoker	4	9.09
Non-smoker	40	90.91
Alcohol		
Drinker	6	13.64
Non-drinker	38	86.36
BMI		
< 25	29	65.91
≥ 25	15	34.09

Table 13 showed the characteristic of uncontrol blood pressure's hypertensive patient on 2015. Age of the first diagnosis more than 60 years, 20 person or 45.45% and less than 30, 2 persons or 2.27%. Period HT (year) less than 5 years,14 persons or 31.82%, in period 5 to 9 years, 20 persons or 50% and period HT more than 10 years, 8 persons or 18.18%. The patient uncontrol blood pressure on 2015 were smoker 4 persons or 9.09% and non-smoker 40 person 90.91%. All of them, drinker 6 persons or 13.64 % and non-drinker 38 persons or 86.36%. Body Mass Index of uncontrol patients, who was BMI less than 25, 29 persons or 65.91% and BMI more than or equal 25, 15 persons or 34.09%,

4.6 Factors associated of control and uncontrol blood pressure on from 2015 – 2017.

Analyze hypertensive patients total 176 persons. This study, Success or control in BP control was defined as systolic BP <140 mm Hg and diastolic BP <90 mm Hg.

Table 14: Factors associated with control and uncontrol of hypertension on 2015.

Variables	**Control (n=132)**		**Uncontrol (n=44)**		**P-value**
Tobacco					
Smoker	1	(0.76%)	4	(9.09%)	0.009[b]
Non-smoker	131	(99.24%)	40	(90.91%)	
Alcohol					
Drinker	2	(1.52%)	6	(13.64%)	0.002[b]
Non-drinker	130	(98.48%)	38	(86.36%)	
BMI					
< 25	84	(63.64%)	29	(65.91%)	0.785[a]
≥ 25	48	(36.36%)	15	(34.09%)	

[a] Chi-Square Test

[b] Fisher's Exact Test

Table 14 show of factors associated with control and uncontrol of hypertension on 2015. Control and uncontrol blood pressure analysis for categories variables use Chi-Square Test and Fisher's Exact Test associated between and categories variables contains 3 variables such as tobacco, alcohol and BMI on 2015.

Analysis of tobacco are smoker could be control 0.76% and uncontrol 9.09%, non-smoker could be control 99. 24%, uncontrol 90. 91% (P=0.009).In this study showed tobacco significant difference of whose p-value ≤ 0.05.

Alcohol are drinker could control 1.52% and uncontrol 13.64%, non-smoker could control 98.48%, uncontrol 86.36% (P=0.002), In this study showed alcohol significant difference of whose p-value ≤ 0.05.

Analysis BMI less than 25 could control 63.64% and uncontrol 65.91%, BMI more than 25 or equal 25 could control 36.36%, uncontrol 34.09% (P=0.785), In this study showed BMI no significant difference of whose p-value ≤ 0.05.

Table 15: Factors associated with control and uncontrol of hypertension on 2016. Analyze hypertensive patients total 176 persons. This study, Success or control in BP control was defined as systolic BP <140 mm Hg and diastolic BP <90 mm Hg.

Variables	**Control (n=142)**		**Uncontrol (n=34)**		**P-value**
Tobacco					
Smoker	3	(2.11%)	2	(5.88%)	0.278[b]
Non-smoker	139	(97.89%)	32	(94.12%)	
Alcohol					
Drinker	3	(2.11%)	2	(5.88%)	0.278[b]
Non-drinker	139	(97.89%)	32	(94.12%)	
BMI					
< 25	92	(64.79%)	23	(67.65%)	0.753[a]
≥ 25	50	(35.21%)	11	(32.35%)	

[a] Chi-Square Test

[b] Fisher's Exact Test

Table 15 show of factors associated with control and uncontrol of hypertension on 2016. Control and uncontrol blood pressure analysis for categories variables use Chi-Square Test and Fisher's Exact Test associated between and categories variables contains 3 variables such as tobacco, alcohol and BMI on 2016.

Analysis of tobacco are smoker could control 2.11% and uncontrol 5.88%, non-smoker could control 97.89%, uncontrol 94.12% (P=0.278), In this study showed tobacco significant difference of whose p-value ≤ 0.05.

Alcohol are drinker could control 2.11% and uncontrol 5.88%, non-smoker could control 97.89%, uncontrol 94.12% (P=0.278), In this study showed alcohol no significant difference of whose p-value ≤ 0.05.

Analysis BMI less than 25 could control 64.79% and uncontrol 67.65%, BMI more than 25 or equal 25 could control 35.21%, uncontrol 32.35% (P=0.753), In this study showed BMI no significant difference of whose p-value ≤ 0.05.

Table 16: Factors associated with control and uncontrol of hypertension on 2017.

Analyze hypertensive patients total 176 persons. This study, Success or control in BP control was defined as systolic BP <140 mm Hg and diastolic BP <90 mm Hg.

Variables	**Control (n-164)**		**Uncontrol (n=12)**		**P-value**
Tobacco					
Smoker	2	(1.12%)	0	(0.00%)	0.594[b]
Non-smoker	162	(98.78%)	12	(100%)	
Alcohol					
Drinker	4	(2.44%)	0	(0.00%)	0.045[b]
Non-drinker	160	(97.56%)	12	(100%)	
BMI					
< 25	113	(68.90%)	5	(41.67%)	0.062[a]
≥ 25	51	(31.10%)	7	(33.17%)	

[a] Chi-Square Test

[b]Fisher's Exact Test

Table 19 show of factors associated with control and uncontrol of hypertension on 2017. Control and uncontrol blood pressure analysis for categories variables use Chi-Square Test and Fisher's Exact Test associated between and categories variables contains 3 variables such as tobacco, alcohol and BMI on 2016.

Analysis of tobacco are smoker could control 1.12% and uncontrol 0.00%, non-smoker could control 98.78%, uncontrol 100% (P=0.594). In this study showed tobacco no significant difference of whose p-value ≤ 0.05.

Alcohol are drinker could control 2.44% and uncontrol 0.00%, non-smoker could control 97.56%, uncontrol 100% (P=0.045). In this study showed alcohol no significant difference of whose p-value ≤ 0.05.

Analysis BMI less than 25 could control 68.90% and uncontrol 41.67%, BMI more than 25 or equal 25 could control 31.10%, uncontrol 33.17% (P=0.062), In this study showed BMI no significant difference of whose p-value ≤ 0.05.

CHAPTER V

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The main objective of this thesis was to determine change of blood pressure among NCD Clinic Plus program patients from 2015-2017 and identify association factors of blood pressure change among NCD Clinic Plus Program patients in Kongra Hospital or small hospital size (F3 level-30 beds). Hypertensive patients in this study total 176 case. After extensive reviews literature several factors associated with the change of blood pressure, like gender, age, occupation, religion, education level, weight, height, body Mass Index, waist circumference, history family's disease, and smoking status.

This Chapter is divided into following five sections:

5.1 Discussion

5.1.1 General Characteristic of Hypertensive patients

5.1.2 Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertension patient s from 2015 – 2017.

5.1.3 Factors associated with Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertensive patients

5.1.4 Percentage of control and uncontrol blood pressure in patients during 2015-2017.

5.1.5 Factors associated of control and uncontrol blood pressure on from 2015 – 2017.

5.2 Benefits from the study

5.3 Conclusions

5.4 Recommendation

5.1 Discussion

5.1.1 General Characteristic of Hypertensive patients.

This study the hypertensive patients has females 111(63.07%) person and males 65 person (36.93%).Normally, males are more likely to have hypertension than females.(Society).The hypertensive patients had 66.59 years, with 97 years as the highest and 32 years as the lowest age among all the participants, the most at an older age, blood pressure is higher(Society). The mean BMI of the participants in this study was 23.42 kg/m2, The World Health Organization data body mass index of Asians more than 2 3 kg/m2 will be at risk for coronary heart disease. (Thaidietinfo) The mean of Waist Circumference had 84.96 cm, The disease is caused by excessive fat in the abdomen, it is important to reduce belly fat to prevent hypertension disease. Health Status factors of hypertensive patients contain history family and CVD risk. The number of hypertensive patients 124 (70.45%) has not history family and there were history family 52 (29.55%). It was found that those with high blood pressure were more likely to have hypertension than those who did not, parents with high blood pressure had a higher risk of developing hypertension. The elderly are more likely to high blood pressure when they are older (bangkokhospital). In this study most the hypertension patient low risk of CVD 86 (48.86%) and the number of moderate risk 48 (27.27%). Thailand found that patients with type 2 diabetes and hypertension had complications. Cardiovascular disease increased complication rate in diabetic patients and complications rate in hypertensive patients. The patients risk assessment for cardiovascular disease in diabetes and hypertension at least 1 time per year (EJ, 2007). (Grundy et al., 2005)

The frequency number of tobacco is similar to alcohol. The number of hypertensive patients non-smoker 153 (86.93%) and non-drinker154 (87.50%). In this study minority smoker and drinker of the hypertensive patients. There are many factors that cause high blood pressure, high sodium, too much salt, high sleep, eating fruits and vegetables (sources of potassium salt), and drinking alcohol. Environmental factors such as obesity, diabetes, eating salty. Drinking and smoking, stress, etc. (bangkokhospital). Modifying life habits changing can control blood pressure, nutritional consumption and appropriate physical activity with behavior to healthy, such as non-smoking, avoid alcoholic beverages (Merai R, 2016).

5.1.2 Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertension patient s from 2015 – 2017.

Systolic blood pressure (SBS)

The over all of hypertensive patients from 2015 to 2017 was followed up every 6 months. Blood pressure monitoring results, overall systolic blood pressure (SBP) among hypertension patient decreased from 127 mmHg in 2015 (2nd) to 124 mmHg in 2016 (1st) and increased to 128 mmHg in 2017 (2nd). Considering in 2015, trend of SBP was not different. However, the SBP was decreased at the first time of measurement in 2016. After that, it increased to 127.69 mmHg. After 2016, overall SBP was increased in the first and second time visit in 2017. Changes of SBP levels can be achieved by modifying behavior such as Eat a well-balanced, low-salt diet, Limit alcohol, Enjoy regular physical activity, Manage stress, Maintain a healthy weight, Quit smoking, Take your medications properly, Work together with your doctor (Association, 2017).

The mean of Systolic Blood Pressure highest in 2017 (1st) was 131.64. The lowest of mean in 2016 (1st) was 124.62. The mean of Systolic Blood Pressure in 2015 (1st), 2015 (2nd), 2016 (2nd) and 2017 (2nd) were 127.09, 127.69, 127.69 and 128.04. The mean of Systolic Blood Pressure is not different each year. This is quite high level (Society). However, elevated systolic or diastolic blood pressure alone may be used to make a diagnosis of high blood pressure. And, according to recent studies, the risk of death from ischemic heart disease and stroke doubles with every 20 mm Hg systolic or 10 mm Hg diastolic increase among people from age 40 to 89 (Association). Typically, more attention is given to systolic blood pressure (the top number) as a major risk factor for cardiovascular disease for people over 50. In most people, systolic blood pressure rises steadily with age due to the increasing stiffness of large arteries, long-term build-up of plaque and an increased incidence of cardiac and vascular disease (Association).

SBP between 2015 (1st) and 2017 (1st) was increase (P = 0.004). SBP between 2015 (2nd) and 2017 (1st) was increase (P = 0.021). SBP between 2016 (1st) and 2017 (1st) was increase (P = 0.000). SBP between 2016 (2nd) and 2017 (1st) was increase (P = 0.036). SBP between 2017 (1st) and 2017 (2nd) was increase (P =

0.018). There are statistically significant differences P < 0.05. This study, the patients should return to the doctor regularly and take medication as directed by a physician. In general, Hypertensive patients require long-term treatment and no dose adjustment is required, the patient has to take medicine with him. Patients can measure and record their blood pressure consistently for the purpose of follow-up. Healthy lifestyle habits can help control this disease.

Diastolic blood pressure (DBP)

The over all of hypertensive patients from 2015 to 2017 was followed up every 6 months. Blood pressure monitoring results, overall diastolic blood pressure increase (DBP) among hypertension patient decreased from 79 mmHg in 2016 (2nd) to 74 mmHg in 2017 (1st) and increased to 75 mmHg in 2017 (2nd). Considering in 2015, trend of DBP was not different. However, the DBP was increased at the first time of measurement in 2016. After that, it increased to 79 mmHg. After 2016, overall DBP was increased in the first and second time visit in 2017. Changes of DBP levels can be achieved by modifying behavior such as Eat a well-balanced, low-salt diet, Limit alcohol, Enjoy regular physical activity, Manage stress, Maintain a healthy weight, Quit smoking, Take your medications properly, Work together with your doctor (Association, 2017).

The mean of diastolic blood pressure highest in 2016 (2nd) was 79.73. The lowest of mean in 2017 (1st) was 74.51. The mean of diastolic blood pressure in 2015 (1st), 2015 (2nd), 2016 (2nd) and 2017 (2nd) were 75.47, 75.51, 76.98 and 75.6. The mean of DBP is not different each year. This is normal level (Society).

DBP between 2015 (1st) to 2015 (2nd) was increase (P = 1.000). DBP between 2015 (1st) to 2016 (1st)) was increase (P = 1.000). DBP between 2015 (1st) to 2016 (2nd) was increase (P = 1.000). DBP between 2015 (1st) to 2017 (2nd) was increase (P = 1.000). DBP between 2015 (2nd) to 2016 (1st) was increase (P = 1.000). DBP between 2015 (2nd) to 2016 (2nd) was increase (P = 1.000). DBP between 2015 (2nd) to 2017 (2nd) was increase (P = 1.000). DBP between 2016 (1st) to 2016 (2nd) was increase (P = 1.000). DBP between 2017 (1st) to 2017 (2nd) was increase (P = 1.000). There are not statistically significant differences P < 0.05. Normal of diastolic pressure will not change. The change is a little bit more - not much like systolic blood pressure.

NCD Clinic Plus program analyze blood pressure change after intervention of from 2015-2017 in Kongra Hospital. The hypertensive patients less than 50% can't control their blood pressure. In this study, Systolic Blood Pressure Change are decrease 68 patients (38.64%), no change or increase 108 patients (61.36%) and Diastolic Blood Pressure Change are decrease 68 patients (38.64%), no change or increase 108 patients (61.36%). In this study showed increasing of diastolic blood pressure (Mean 127.09 - 128.04 mmHg) and systolic blood pressure (Mean 75.47 - 75.6 mmHg) from 2015-2017. The reduction in Systolic Blood Pressure 5 mmHg would reduce the mortality from stroke 14%, reduce the mortality from coronary heart disease 9% (bangkokhospital).

Diastolic pressure, but now recognized that both high systolic pressure and high pulse pressure. (The difference between systolic and diastolic pressure) is a risk factor. In some cases, excessive hypertension may increase the risk, which may be due to the difference between systolic and diastolic pressure (Diffen, 2004).

5.1.3 Factors associated with Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertensive patients

Blood pressure changes of Systolic blood pressure (SBS) and Diastolic blood pressure (DBP) among hypertensive patients in the same way of all variables.

Gender:

Among the hypertensive patients presents the male decrease of blood pressure 43.08%, increase 56.92% and female decrease 36.04%, increase 63.96%. The associated blood pressure between SBS/DBP and gender (P=0.335). In this study showed of gender no significant difference of whose p-value ≤ 0.05. According form Thai Hypertension Society, It is common for males to gets hypertension disease more than females and this study, for male can control blood pressure more than female.

Age:

Average age of SBS/DBP decreased patients 67.13 and No change/Increase 66.25. The associated blood pressure between SBS/DBP and age (P=0.662). In this study showed of age no significant difference of whose p-value ≤ 0.05. The older age, blood pressure is higher. For example, 18 years old, blood pressure is 120/70 mmHg, but at age 60 years old, blood pressure may increase to 140/90 mmHg, but it is not a fixed age rule. Blood pressure is always higher, it can measure 120/70 mmHg. (Society) The most population, hypertension gets more than 35 years old. (ThaiNCD, 2017a)

Occupation:

This result, almost hypertensive patients were the agriculturist decrease of blood pressure 39.07%, increase 60.93%.The associated blood pressure between SBS/DBP and occupation (P=0.168). In this study showed of occupation no significant difference of whose p-value ≤ 0.05. It does not have evidence support to the occupation associated with blood pressure change.

Religion:

Among the hypertensive patients presents 2 religions, Buddhism and Islam. Buddhism decrease of blood pressure 35.88%, increase 64.12% and Islam decrease 46.67%, increase 53.33%. The associated blood pressure between SBS/DBP and religion (P=0.218). In this study showed of religions no significant difference of whose p-value ≤ 0.05. It does not have evidence support to the religions associated with blood pressure change.

Education:

This study, presented almost hypertensive patients were graduates, Grade1-12 level, decrease of blood pressure 62.59%, increase 37.41%. The associated blood pressure between SBS/DBP and education (P=0.3). In this study showed of gender no significant difference of whose p-value ≤ 0.05. It does not have evidence support to the education associated with blood pressure change.

Weight:

Average weight of SBS/DBP decreased patients 57.80 and No change/ Increase 56.92. The associated blood pressure between SBS/DBP and weight (P=0.846). In this study showed of weight no significant difference of whose p-value ≤ 0.05. According from the World Health Organization (WHO) in 2015, overweight people will reach 2,300 million obese people, 700 million people, overweight or obese, which are risk factors for chronic non-communicable diseases such as cardiovascular disease, hypertension and diabetes result each year the number of deaths more than 2.8 million.

Height:

Average height of SBS/DBP decreased patients 157.13 and No change/ Increase 155.31. The associated blood pressure between SBS/DBP and height (P=0.187). In this study showed of gender no significant difference of whose p-value ≤ 0.05. It does not have evidence support to the height associated with blood pressure change.

BMI:

Among the hypertensive patients presents, average height of SBS/DBP decreased patients 23.20 and No change/ Increase 23.56. The associated blood pressure between SBS/DBP and BMI (P=0.598). In this study showed of BMI no significant difference of whose p-value ≤ 0.05. Globally, high blood pressure (BP) is estimated to cause 7.1 million deaths, about 13% of the total. About 62% of cerebrovascular disease and 49% of Ischaemic heart disease are attributable to suboptimal BP (systolic >115 mmHg). Overweight and obesity increase the risks of high BP, coronary heart disease, ischaemic stroke, type II diabetes mellitus and certain cancers. Worldwide about 58% of diabetes mellitus and 21% of ischaemic heart disease are attributable to BMI above 21 kg/m2.(Tesfaye1 et al., 2007)

Waist Circumference:

This study, average waist circumference of SBS/DBP decreased patients 72.76 and No change/ Increase 71.71. The associated blood pressure between SBS/DBP and waist circumference (P=0.725) . In this study showed of waist circumference no significant difference of whose p-value ≤ 0.05. The survey of obesity in people aged 15 years in 2008. The Department of Health found that the men with waist circumference over the standard more than 90 centimeters,34 percent and female waist circumference more than 80 centimeters, 58 percent due to excess abdominal fat. Obesity is also called obesity or Metabolic Syndrome causes high blood sugar, high Blood Pressure, high cholesterol influent to risk of diabetes, hypertension, cardiovascular disease and stroke.

History family:

Among the hypertensive patients presents the patients ware history family decrease of blood pressure 40.38%, increase 59.62% and no history family decrease 37.90%, increase 62.10%. The associated blood pressure between SBS/DBP and history family (P=0 . 8 6 5) . In this study showed of history family no significant difference of whose p-value ≤ 0.05. If father and mother ware history family with High blood pressure is more likely to develop this disease than those with no family history. It also has a tendency to become high blood pressure as well. (Society)

Tobacco:

Among the hypertensive patients presents, the patients ware smoker decrease of blood pressure 50%, increase 50% and Non-smoker decrease 80.00%) , increase 20.00%. The associated blood pressure between SBS/DBP and tobacco (P=0.074) . In this study showed of gender no significant difference of whose p-value ≤ 0.05. Smoking cessation may not directly reduce blood pressure, but may reduce the risk of cardiovascular disease. (Peera, 2015)

Alcohol:

This study, presents the hypertensive patient's drinker of blood pressure 25.00%, increase 75.00% and Non-drinker decrease 38.31%, increase 61.69%. The associated blood pressure between SBS/DBP and alcohol (P=1.000). In this study showed of alcohol no significant difference of whose p-value ≤ 0.05. Alcoholic affects the cardiovascular system causes of cardiovascular disease and high blood pressure and may be acute death. High blood pressure is a risk factor for heart disease. And stroke. People who drink more than 8 units of alcohol per time are more likely to cardiovascular disease than those who are twice as likely to have high blood pressure. for a long time, the body will be destroyed. Hypertension is the cause of the signs of various diseases that will follow. Cardiovascular system when drinking a lot of alcohol will make the heart beat abnormal. At the same time, if drinking too much alcohol, vitamin B1 deficiency. It will make the heart muscle does not work well. These factors cause big heart. Not working normally. The symptoms are not normal. Vascular system Alcohol causes the blood vessels to expand and cause high blood fat to clog the arteries cause of stroke. (promotivecare)

5.1.4 Percentage of control and uncontrol blood pressure in patients during 2015-2017.

This result, presented of the number of patients control BP in 2015 to 2017 increase total 32 persons (72.72%). Therefore, the quality of assessment NCD Clinic Plus is a self-assessment to improve the quality of preventive services. Control of non-communicable diseases of public health facilities By using the Chronic Care Model together with PMQA, consisting of process evaluation based on 6 components concusses health system — organization of health care (providing leadership for securing resources and removing barriers to care), self-management support (facilitating skills-based learning and patient empowerment), decision support (providing guidance for implementing evidence-based care), delivery system design (coordinating care processes), clinical information systems (tracking progress through reporting outcomes to patients and providers), and community resources and policies all of them supporting the service of the non-communicable diseases clinic to be quality and able to carry out preventive activities to control non-communicable diseases and holistic complications and a comprehensive operation to reach the customers community health network participates in the care of risk groups and non-communicable diseases.

In addition, the Ministry of Public Health also encourages people to measure blood pressure at home, thus allowing people to know their blood pressure values. Hypertension is a risk factor for heart disease, kidney disease, coronary artery disease, paralysis, heart disease, a high mortality rate. Therefore, prevention of high blood pressure can prevent the death rate from heart disease and paralysis. High blood pressure is a silent threat that threatens the lives of everyone and without warning symptoms. Therefore, knowing that high blood pressure is necessary to measure blood pressure the guidelines for treating hypertension (2013 ESH / ESC Guidelines) focus on home blood pressure monitoring (HBPM) in prognosis, diagnosis and treatment of hypertension. Home blood pressure monitoring (HBPM) is a measure of blood pressure at home. With the patient's own body or family member who has been recommended methods and techniques for measuring blood pressure should be done in a quiet room Patients should be in a sitting position. With back and arm support For at least 5 minutes before the pressure measurement Should measure pressure 2 times in a distance of 1 to 2 minutes and record the information in the notebook immediately, complete the measurement in each cycle Blood pressure measurement should be done every day for at least 3 to 4 days and should be regularly measured at every 7 days in the daytime at night.

5.1.5 Factors associated of control and uncontrol blood pressure on from 2015 – 2017

In this study, factors associated of control and uncontrol blood pressure on from 2015 – 2017 showed tobacco and alcohol significant difference of whose p-value ≤ 0.05. The patients of hypertensives need to reduce or stop risky behaviors, such as smuggling or drinking alcohol. To increase the severity, disease and complications of high blood pressure. From Thai National Health Examination Survey, NHES IV, found that blood pressure was present at 14.1 percent. In this number, one third of the smokers or 32.9 percent had reduced-and-quit smoking and those with hypertension together, there are currently 19.1 percent, alcohol drinking behavior among people who drink alcohol, nearly half or 49.0 percent have reduced - quit drinking alcohol to control their own high blood pressure.

Blood pressure is a problem with the image that is very common in Thailand. Found approximately in Five of those aged 15 years and above, high blood pressure, are silent, often do not show symptoms of the disease, causing people Do not know that he has a silent disease or deaths from non-communicable diseases such as heart disease and stroke, congestive heart failure, stroke, kidney disease, etc. At various levels of blood pressure, can classify the severity of hypertension according to the criteria, but for the blood pressure, SBP 120-139 mmHg and / or DBP 80-89 mmHg or prehypertension group Is a group that has risk factors that develop into illness soon, but can be change the way of life in order to reduce blood pressure to normal levels without using life modification drugs. Preventing sickness with blood diseases Will lead to a reduction in the number of other non-communicable diseases Is a risk group that is important in preventing disease. Therefore, advice should be given to those who have hypertension. To be able to control blood pressure levels. Instruction for patient / High-Risk Group to consist of body weight control to normal. With a body mass index (BMI) of less than 23 kg /m^2, waist circumference less than 90 cm in men and 80 cm in women With diet control and regular exercise, consuming dietary pressure or dietary diets (Dietary approaches to stop hypertension – DASH diet) by focusing on eating vegetables and fruits with fiber Dairy products that are low in fat, whole grains, nuts, reduced consumption of large meats, flour, sugar, sweets, saturated fats and cholesterol and reduce the consumption of salty or sodium foods, reduce the amount of sodium salt consumed not more than 2.4 grams per day (equivalent to 6 grams of salt or about 1 teaspoon), reduce alcohol drinking which men can drink up to 2 drinks per day (drink) which is equivalent to 90 ml whiskey, 300ml wine or 720 ml beer. women drink no more than 1 drink, no smoking, regular aerobic exercise such as brisk walking, jogging, cycling, swimming 30-45 minutes at a time, 3-5 times a week and maintain good mental health, not stress, understand and accept life. Including regularly practicing stress relaxation and mental health management.

5.2 Conclusions

NCD Clinic Plus program successful control blood pressure of hypertensive patients after intervention from 2014-2017 in Kongra Hospital. Hypertensive patients total 176 cases. This result, presented of the number of patients control BP in 2015 to 2017. The hypertensive patient of control BP at 132 persons in 2015, 2016 control BP at 142 persons and in 2017 control BP at 164 persons. So, the total of patients could be control blood pressure in 2015 to 2017 increase total 32 persons (72.72%) and factors associated of control and uncontrol blood pressure in 2015 showed tobacco (p-value =0.009) and alcohol (p-value=0.002) significant difference of whose p-value ≤ 0.05.

5.3 Benefits from the study

1. This study will enhance the knowledge of policy makers and healthcare providers regarding to control blood pressure among NCD Clinic Plus Program patients in Kongra Hospital.

2. This study can be of great help to policy makers to formulate their health policy to tackle to control blood pressure keeping in mind, the key findings and recommendations of the study.

3. Findings of this study can be used to generate hypothesis for future research.

5.4 Recommendations

The NCD Clinic Plus is operational to enhancing NCD service efficiency but it can't increase self-management of hypertensive patients. Analysis of hypertension patient data is essential to planning for self- management to control blood pressure.

This study found that the intervention of NCD Clinic Plus program should develop in hypertension patient health services and follow up patients to monitor behavioral modifications such as weight control is normal. lose weight, exercise regularly, choose low salt foods, reduce the alcohol, non-smoking and Stress management. However, it must be development NCD Clinic Plus program to continuous. The NCD Clinic Plus program in next year must be project develops as follows:

1. The project develops the capacity to provide services in the form of preventive services for High Blood Pressure, to the multidisciplinary team of DHS to develop the potential of multidisciplinary teams and follow up the results of the High Blood Pressure and improved quality of patient care. Reduce the risk factors and complications of the disease to better quality of life of the recipient. To reduce the risk of hypertension disease, reduce the rate of disease and reduce complications, including the reduction of mortality rates of chronic non-communicable diseases in the normal and risk groups.

2. The new project for develop effective measures to prevent disease control and health hazards. The strategies and measures in the implementation will have to develop measures. Intervention packages provide timely, quality, cost-effective solutions to the effects of disease prevention and disease coverage, both in the at-risk population and in population.

3. Implementation to achieve the development of NCD Clinic Plus Quality Assurance and Quality Assurance (NCD Clinic Plus).

5.5 Limitations:

1. The data from HosXp program can't link completed with OPD card.

2. The data from HosXp program some data variables are incomplete or missing.

3. This study can't export data from HosXp program like a physical activity, sodium intake which is another important risk factor for hypertension.

4. This study can't export data from HosXp program like a behavior modification, which are important to determine control blood pressure among patients.

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