LAUREA
UNIVERSITY OF APPLIED SCIENCES
Prime Mover

Nursing interventions for improving the management of hypertension in adults

Ahiave ,Elikplim & Tom Luma, Johnson

2013 Otaniemi

Laurea University of Applied Sciences
Otaniemi

Nursing interventions for improving the management of hypertension in adults

Elikplim Ahiave &Tom Luma Johnson
Degree Programme in Nursing
Bachelor's Thesis
March, 2013

Laurea University of Applied Sciences
Otaniemi
Degree Programme in Nursing

Abstract

Elikplim Ahiave & Tom Luma Johnson

Nursing interventions for improving the management of hypertension in adults

Year 2013 Pages 44

The purpose for this study was to describe nursing interventions for improving the management of hypertension in adults. The study was undertaken as part of the medication project in Laurea University of Applied Sciences. The research question that this study aimed to answer was; what nursing interventions are used for improving the management of hypertension in adults?

The research method used to carry this study was a systematic review. Electronic databases like EBSCO (CINAHL), EBSCO (Academic Search Elite), Ovid (Medline), Pubmed and the Cochrane central register were searched for scientific journals. The keywords nursing interventions, hypertension, adults and high blood pressure were used for the data search. Books and other health journal were also hand searched to identify scientific articles. Identified articles were screened against pre-determined eligibility criteria and 10 articles were finally selected and analyzed for the study.

Extracted data from the chosen articles included names of authors, title of articles, years of publication and major findings. The principles of qualitative content analysis were then used to categorize data from the findings of the selected articles. 4 main categories emerged and they were nurse led clinics, health education, adherence promotion and telenursing.

The findings revealed that nurse led clinics were beneficial in assisting hypertensive patients to meet their target blood pressure. Nurse prescribing, risk assessment and the use of step wise treatment algorithms were the nursing actions mainly used in nurse led clinics. The findings also showed that patient education given by nurses which focused on the modifiable lifestyle factors of hypertension, self-monitoring and medication management promoted the management of hypertension. Furthermore, promotion of patient adherence using simplified medication dosages and follow up were also to have been effective. Telenursing interventions were also identified to have improved the management of hypertension adults.
Nurse prescribing although considered positive still faced challenges and hence must be reviewed for improvement in the future.

Keywords: Nursing interventions, hypertension, adult, high blood pressure

Table of Contents

1 Introduction

Hypertension or high blood pressure is defined as a sustained and elevated blood pressure with a systolic reading which is equal to or greater than 140 mm Hg and a diastolic reading which is equal to or greater than 90 mm Hg. Hypertension (high blood pressure) is a major contributor to cardiovascular morbidity and mortality. This condition is associated with structural changes in the heart and arteries. It is a major risk factor for stroke, heart failure, myocardial infarction and arterial aneurysms. Hypertension can be classified as primary or secondary depending on its pathophysiology (WHO 2003).

According to a statistical report released by the World Health Organization (WHO) in 2012, "One in three adults worldwide has raised blood pressure – a condition that causes around half of all deaths from stroke and heart disease." It is for this reason that hypertension still remains a disease of major public health concern. High blood pressure is usually age dependent however, the prevalence of contributing factors such as obesity, and unhealthy diet and inactivity have changed its incidence. According to a WHO report in 2003, worldwide hypertension is estimated to cause 7.1 million premature deaths and 4.5 % of the disease burden (64 million disability adjusted life years (DALYs)).

Evidence from randomized trials have shown that, treating hypertension reduces considerably the risk for developing stroke by 30-40% ,myocardial infarction by 20-25% and other cardiovascular related diseases by over 50%(Chobanian, Bakris, Black, Cushman, Green & Izzo 2003). Antihypertensive medication therapy and lifestyle modification are among the interventions used to lower blood pressure in hypertensive patients, however, hypertension still remains inadequately managed globally(WHO 2003). Non-compliance with treatment is the most prominent factor in uncontrolled blood pressure (Krousel-Wood, Thomas, Muntner & Morisky 2004). Furthermore although poor control of blood pressure can be attributed to the type of available healthcare systems, studies have shown that frequent visits to a healthcare practitioner does not automatically guarantee control of blood pressure (Hyman & Pavlik 2001).

The current high statistics of uncontrolled blood pressure however suggests that there is a need for a more rigorous approach to the management of hypertension which will still have medication therapy as its core. Organizing effective care to control hypertension in primary health settings have been considered the way forward in global high blood pressure management. Previous studies mentioned health professional (nurses or pharmacists) led care as a possible beneficial intervention. The purpose of this study is to describe nursing interventions for improving the management of hypertension in adults. Adults in this study is anyone 18 years old and above. Systematic review was used to summarize evidences according to a pre-

defined inclusion and exclusion criteria. 5 Electronic databases EBSCO (CINAHL), EBSCO (Academic Search Elite), Ovid (Medline), Pubmed and the Cochrane central register have been searched. Other journals have also been hand searched and relevant articles retrieved. A total of 11 articles were retrieved, relevant information was extracted and analyzed using the principles of content analysis. The main themes emerged in the findings as nursing interventions that improved the management of hypertension in adults were nurse led clinics, health education, promotion of patients' adherence and telenursing. It was concluded that these interventions must be recommended for use in primary health settings as they impacted the management of hypertension positively. However, interventions like nurse prescribing which was described under nurse led clinics in this paper needs to be further developed as this study showed that it still faced some challenges which were mainly legislation based.

2 Purpose and research question

The purpose of this study is to describe nursing interventions for improving the management of hypertension in adults.

Research question

What nursing interventions are used for improving the management of hypertension in adults?

3 Methodology

The study was realized using a qualitative approach. A systematic literature review was the method of choice because it allowed for appraisal, retrieval and summary of all evidence based knowledge on a subject matter. A systematic literature review(SLR) was defined as systematic, explicit, comprehensive and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners(Fink, 2005). SLR tries to give an exhaustive summary of literature with regards to a specific research question. For Woolf (1992), a systematic literature review was "an efficient scientific technique to identify and summarize evidence on the effectiveness of interventions and to allow the generalizability and consistency of research findings to be assessed and data inconsistencies to be explored". Narrative reviews on the other hand, provided qualitative summary of individual studies or research evidences. They also identified gaps in current research and provided a framework for positioning research endeavors (Petticrew & Roberts 2006).

Systematic reviews vary from narrative reviews methodologically. Articles included in narratives reviews were selected unsystematically and subjectively while systematic review articles tried to where possible, consider all published studies on a specific theme after the application of previously defined inclusion and exclusion criteria. The aim was to extract relevant information systematically from the publications. Since this study aimed at producing relevant scientific information regarding the management of hypertension from a nursing perspective, a SLR was considered. Furthermore, other reasons why systematic review was chosen to undertake this study was, firstly SLR sought to minimize bias because it adapted a transparent, replicable and scientific approach. Secondly it gave statistical power as it summarized an enormous quantity of research findings. Furthermore, it generated inferences which relied on a collation and analysis of scientific evidence. Finally, SLR determined the consistency and generalizability of scientific findings across populations(Chapman 2009). In healthcare, SLR is considered as the most reliable form of medical evidence that is used to influence policy and medical guidelines.

3.1 Data

Published research articles conducted on nursing interventions used in the management of hypertension constituted the primary data collected and analyzed in this study. The stages of data processing were literature search, data screening, data collection, data extraction, and data analysis and data synthesis

3.2 Literature Search

A literature search is "a systematic and explicit approach to the identification, retrieval, and bibliographic management of independent studies drawn from published sources for the purpose of locating information on a topic, synthesizing conclusions, identifying areas for future study and developing guidelines for clinical practice"(Cahn, Auston & Selden 1992).

Electronic databases such as EBSCO (CINAHL), EBSCO (Academic Search Elite), Ovid (Medline), Pubmed and the Cochrane central register of controlled trials and reviews were searched. Furthermore, scientific journals and books were hand searched to identify further research articles related to the topic of this study. The keywords nursing interventions, hypertension, nursing management and adults were keyed into databases in a combination of pairs and triplets to retrieve relevant articles using Boolean operators AND or OR . Substitute words such as nursing strategies and high blood pressure were also used in place of nursing interventions and hypertension respectively. The motive for doing that was to ensure that as many relevant articles that had similar purposes to our study were found. Abstracts and citations of articles that matched with our inclusion and exclusion criteria were identified, retrieved and recorded. The table below summarizes the number of hits recorded when electronic databases were searched using the keywords.

Database ⇨ Keywords ⇩	Ebsco (Academic)	Ebsco (Cinahl)	Ovid Medline	Pub Med	Cochrane Central Register of Trials	Cochrane Database of Reviews
Nursing interventions AND Hypertension	5702	499	173	288	12471	936
Hypertension OR High blood pressure AND Adults	32561	2213	172544	9633	18	24
Nursing interventions OR Management AND Hypertension OR High blood pressure AND Adults	3440	101	21	167	7	19

Hypertension AND Nursing Management	42797	4841	20309	34064	1328	1351
Hypertension AND Nursing Management AND Adults	16366	422	864	18750	91	322
High blood pressure AND Adults AND Nursing interventions	4186	99	5	199	625	822
High blood pressure AND Adults AND Nursing strategies	3947	81	1	114	2	57

Table 1. Summary of the hits registered from the electronic databases

3.3 Data screening

Data screening was carried out in two stages by two independent reviewers. First of all, titles, abstracts and citations of potentially relevant articles yielded by the data search were assessed as against predetermined criteria for inclusion and exclusion. Secondly full reports of studies whose titles and abstracts were not convincing enough to support decision making as to their relevance and eligibility were obtained and assessed against the criteria for inclusion. Each reviewer coded identified articles as relevant, irrelevant or not clear enough to allow judgment. Irrelevant articles were discarded straightway. Relevant articles were those that met all the defined inclusion criteria in the table 1 below. Discrepancies with respect to selected articles by reviewers were resolved basically through discussion and further consultation.

Inclusion criteria	Exclusion criteria
Articles published in English	Articles not published in English
Published after 2002	Published before 2002
Available in full text	Not available in full text
Articles that had abstracts	Articles without abstracts
Purpose of the study relevant	Purpose of the study irrelevant
Articles based on empirical evidence	Article not based on empirical evidence

Table 2. Criteria for inclusion and exclusion

3.4 Data collection

Collecting data entailed the procurement of useful information for the purpose of supporting decision making based on facts. 905 titles were identified through literature search. These were later screened for relevance and eligibility against defined inclusion and exclusion criteria. 817 of these articles were rejected outright and abstracts of the remaining 88 were obtained and examined out of which 63 were further discarded. 10 more were later excluded because of their non-availability in full text. After a rigorous screening process 11 publications were identified to be relevant and were included in this review.

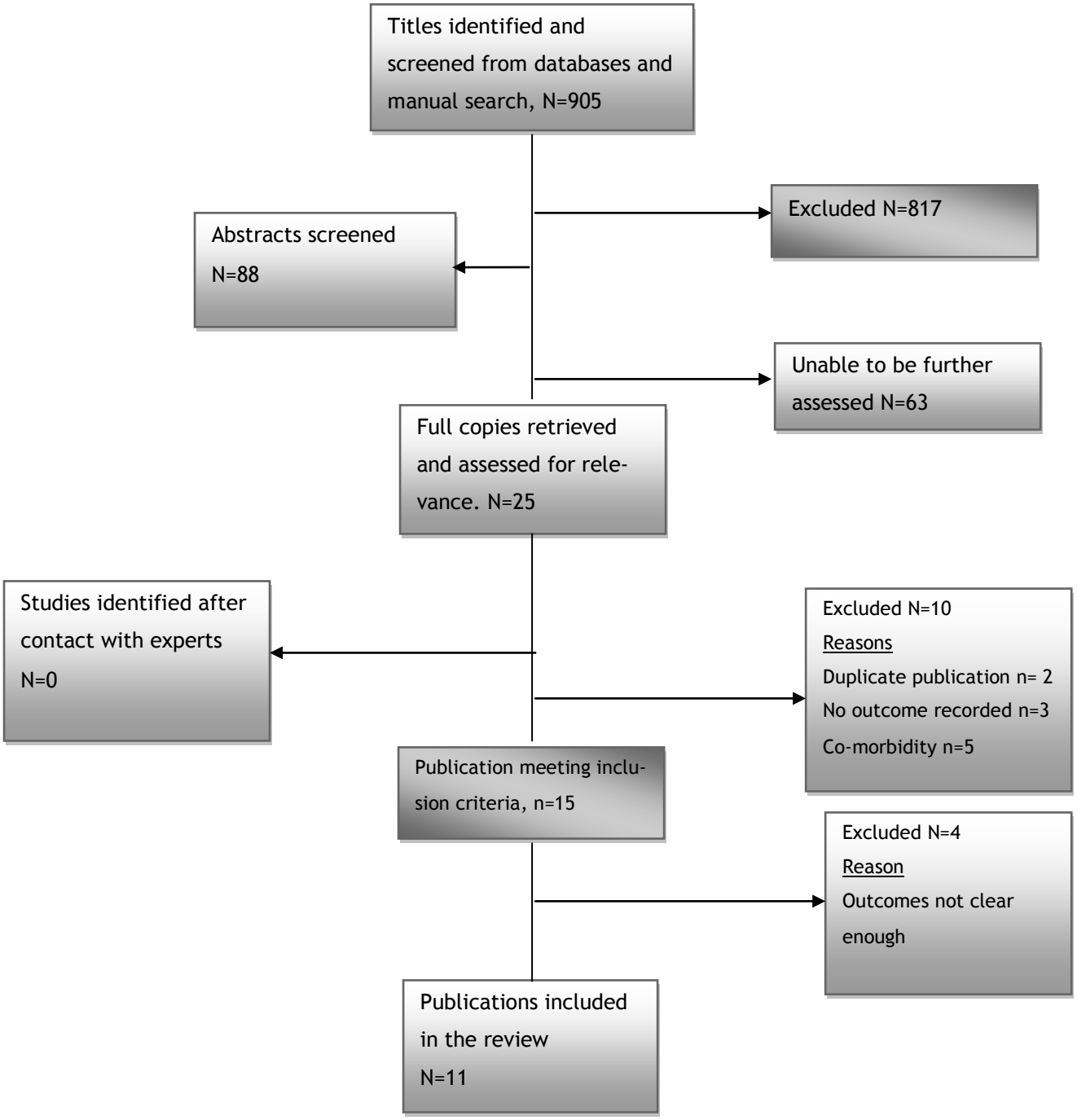


Figure 1. Illustrates the details of the data collection process

3.5 Data Extraction

In this study, data extraction was undertaken by two reviewers (EA & TL) on to a data extraction form. Data extracted were those that contained information which were required for descriptive purposes or for analyses later in the systematic review. Names of authors, titles of articles, year of publication, study design, purpose of study and significant findings were ex-

tracted from the articles that had passed the eligibility criteria. Details of the extracted data can be found in appendix 3. Data extraction is the process by which researchers retrieve relevant information about their study characteristics and findings from data sources. According to Sandelowski & Barroso (2003) data extraction is an attempt to reduce a complex, messy, context-laden and quantification-resistant reality to a matrix of categories and numbers.

The purpose of data extraction "is to describe the study in general, to extract the findings from each study in a consistent manner to enable later synthesis, and to extract information to enable quality appraisal so that the findings can be interpreted. Ideally this should be undertaken in such a way as to require minimal reference to the original papers at data synthesis stage." (Social Care Institute for Excellence 2006).

3.6 Data Analysis

Collected data in this study was analyzed based on a qualitative content analysis. Qualitative content analysis has been defined as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon 2005, 1278). According to Patton(2002,453) qualitative content analysis can be considered as "any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings". In agreement with the principles of conducting a qualitative content analysis, data was analyzed based on both the research objectives of this study (deductive) and also from the identified findings after multiple readings and interpretations of the raw data (inductive).

The main purpose of the qualitative inductive content analysis approach was to allow research findings to be derived from the frequent, dominant or significant themes embedded in raw data, without the restraints imposed by structured methodologies. The analysis process was undertaken using 5 stages. In first stage we prepared the relevant articles by obtaining hard copies, arranging them in alphabetical order and assessing the readability of the text. Once we were satisfied with the condition of the materials we commenced to the initial reading phase to familiarize ourselves with the contents and also to develop an understanding of the themes and details in the text. During the second reading phase we used coding to create both upper(main) and lower(sub) level categories or themes. In creating categories, we copied and pasted relevant text segments into Microsoft word processor, labeled them then identified connections between the ideas they expressed. We also used the in vivo coding technique where we took specific phrases from text segments which we labeled and created lower level(sub) categories based on their similarities. The upper level or main categories were cre-

ated from the lower(sub) categories and they were influenced by our research aim, which was to find out nursing interventions that were used in the improvement of the management of adult patients with high blood pressure. During the next stage we cross checked our labeled texts for overlapping that is, if they were listed into more than one category. Finally we revised the sub categories to ensure they carried the core theme of the main categories.

Initial read through of text data	Identify specific segments of information	Labeling to create sub categories	Reducing over lapping in sub categories	Main categories
10 identified relevant articles				4

Table 3. Summary of the category creating process

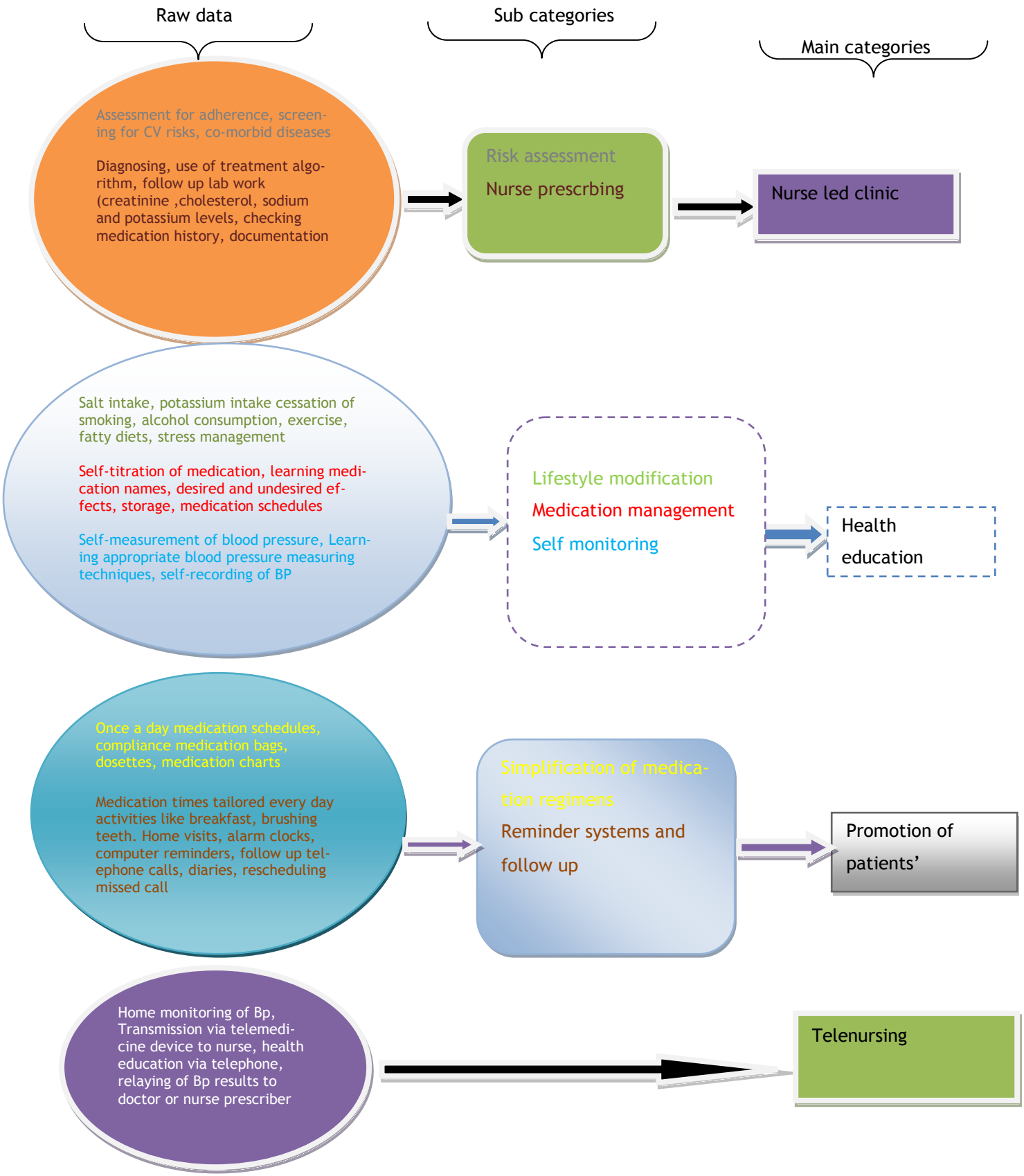


Figure 2. Illustrates the actual contents of categories and sub categories used in this study

4 Findings

4.1 Nurse led clinics

A Nurse-led clinic was described as a clinic headed by a nurse who has received advanced health care training to provide comprehensive health checks, care plan preparation, health education and health promotion to patients. Nurse-led clinics have been based in a range of primary, secondary and tertiary settings including general practices, outpatient clinics, emergency departments, mental health settings, residential care settings, acute care settings, schools and communities(Hatchett 2005).

Growing evidence supported the assertion that people who received care at nurse-led clinics demonstrated improved health outcomes for a range of chronic conditions of which hypertension was no exception(Krothe & Clendon, 2006). The benefits of nurse led clinics according to Aminoff & Kjellgren(2002) included longer patient visit hours and individualized health education which led to patient empowerment(cited in Fahey, Schroeder & Ebrahim, 2005) . Raftery, Yao, Murchie,Campbell & Ritchie(2005) concluded that nurse led clinic as an intervention appeared to be more cost effective compared to other forms of management used in primary health care. Another study by Hatchett (2008) indicated that, the number of nurse-led clinics had soared over the past few years and it had led to improved patient experience and offered opportunities for role development to nurses. He further noted that the clinics varied greatly in the way they were set up both within and between specialties but they had common characteristics. In most cases, nurses had their own caseload and patients consulted them in specified time slots. The nurses had a high level of autonomy, with the ability to often make detailed care decisions, admit and discharge from the clinic and refer to other colleagues. Many clinics demonstrated elements of advanced practice with detailed physiological assessment, subsequent care planning, delivery of treatments, monitoring of the patient's condition and management of medicines (Hatchett 2005).

Roles of a nurse led cardiology clinic
➢ **Educating patients.** ➢ **Providing psychological support and explanation.** ➢ **Monitoring the patient's condition.** ➢ **Conducting physical assessments.** ➢ **Ordering appropriate diagnostic investigations and interpretation.** ➢ **Creating treatment plans, often involving other members of the multidisciplinary team, such as GPs or primary care colleagues.** ➢ **Managing medicines.** ➢ **Empowering the patient or carer to achieve greater self-monitoring and/or care.**

Table 4. Summary of activities at a nurse led clinic in cardiology(Hatchet 2005)

Krothe et al. (2006) identified the overall aim of nurse led clinics as an intervention in the management of hypertension as one that provided quality services based on evidence that were responsive to patients' needs. They went further to explain that these services were crucial in assisting patients achieve desirable outcomes of controlled high blood pressure and a reduction in the number of physician consultations. Hatchett (2005) argued that although the motive of a nurse-led clinic was not be curative care it allowed for consistent monitoring of a patient's condition to prevent further deterioration while maintaining quality of life. Hypertensive patients that received treatment at nurse led hypertension clinic were initially examined by cardiologists or physicians. The nurses carried out risk assessment and gave treatment according to stepped wise treatment algorithms or doctor's instruction.

4.1.1 Risk Assessment

Risk assessment of patients visiting nurse led clinics was one of the major actions that nurses specialized in hypertension management undertook. The methods employed included medical history taking, laboratory examination and health education. According to the American Hypertension Association, risk factors for hypertension were divided into 2 categories namely the modifiable and unmodifiable. They characterized unmodifiable risk factors to be those out of one's control and among them were age, gender, hereditary and race. The association further pointed out that, modifiable risk factors of hypertension were basically lifestyle related and they included excess dietary salt intake , physical inactivity, obesity, stress, alcohol intake, smoking and high cholesterol diets plus low intake of potassium(cited in Krothe et al. 2006).

The most important modifiable risk factor for hypertension was excess dietary intake of salt(Krothe et al 2006). The Scientific Advisory Committee on Nutrition (SACN) in the United Kingdom(UK) in a report published in 2003 concluded that, there was enough evidence which strongly suggested an association between salt intake and elevated blood pressure. Moreover, Feng & MacGregor(2003) identified from their epidemiological studies that the optimal level of salt intake for health was low as 3g. However, since achieving that target had proven to be impractical, the daily salt intake for adults recommended by SACN was 6g which is equivalent to 2.4g sodium(cited in Hatchett 2005).

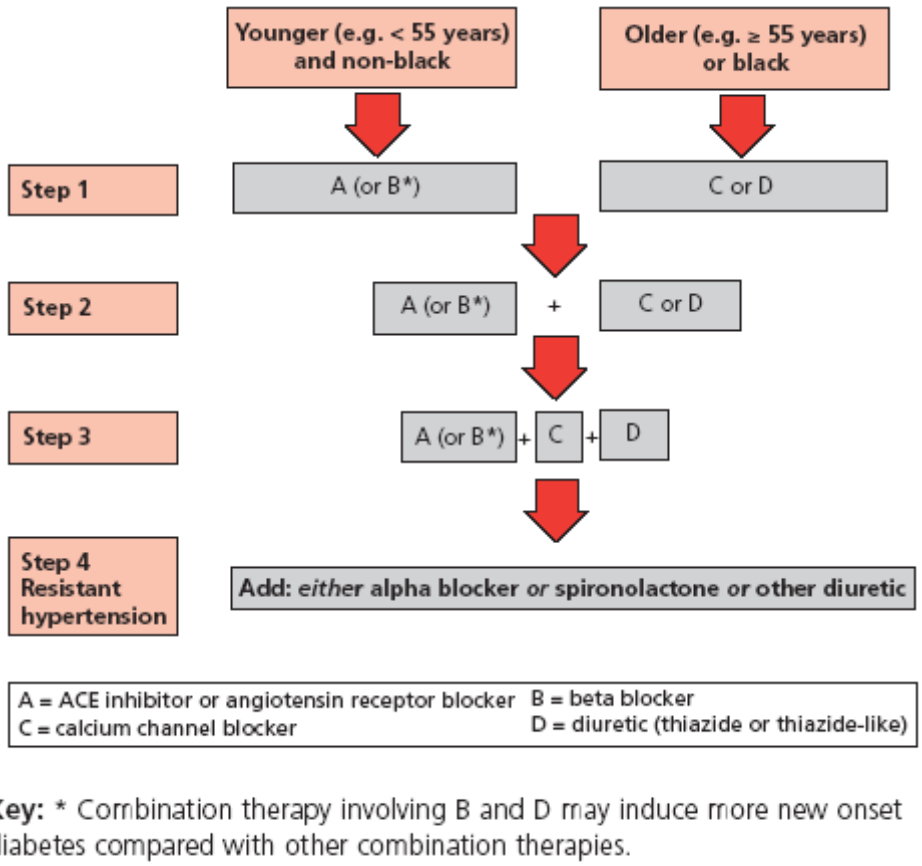
Low dietary potassium intake was also associated with high systolic and diastolic blood pressure. Eating fruits and vegetables was therefore recommended for people with hypertension as they were a good source of potassium. Another strong link was established between obesity and hypertension(Andersen,Simper & Ibsen 2010). According to Kornitzer, Dramaix, & De Backer(2002) obesity increased the risk for developing hypertension by 4 folds in men and 3 folds in women (cited in Andersen et al. 2010). Also, Primatesta, Falaschetti & Gupta (2001) reported that blood pressure briefly rose among the smoking population although the independent long-term effect on blood pressure was small(cited in Andersen et al.2010). Furthermore, the general the risk of cardiovascular disease for any particular level of blood pressure was noted to be higher in smokers and hence it was suggested that strategies for hypertension management given by nurses should enforce the cessation of smoking. Psychosocial stressors like anxiety, anger and mental effort were known to temporarily increase blood pressure. However, an exposure to a prolonged stressful situation was cited to increase blood pressure persistently. For this reason an assessment for stress and its subsequent management were essential in the control of blood pressure. Studies have shown a prevalence of hypertension in people who suffered from both Type 1 and Type 2 diabetes. Nishimura, LaPorte & Dorman (2004) reported that people with Type 1 diabetes suffered from hypertension because of kidney damage while insulin resistance was the causative factor for those with Type 2 diabetes(cited in Krothe et al. 2006)

Patients who attended hypertension nurse led clinic were supported continually through health education on the modifiable risk factors. This empowered them to make active informed choices about the management of their condition. Nurses also ordered laboratory investigations to monitor cholesterol, sodium and potassium levels in order to rule out any threats they might pose to the patient’s condition. A sample of the global risk assessment tool used by nurses can be found in appendix 2.

4.1.2 Nurse prescribing

Nurse prescribing as an intervention was considered as an area of professional development that had progressed appreciably in the past few years. Prescription of medicines by nurses according to Lewis-Evans & Jester(2004) was not only viewed as historic for the nursing profession but had also proved itself to be an integral part of the solution to improving access to medications and decreasing waiting times for patients(cited in Rudd, Miller, Kaufman, Kraemer, Bandura, Greenwald & Debusk 2004). Lewis-Evans et al.(2004), further identified that nurse practitioners perceived prescribing as a predominantly positive experience with added advantages that included time saving for both patient and nurse , convenience for the patient, increased nurses' autonomy and role satisfaction together with cost effectiveness. A randomized controlled trial that compared outpatients who received nurse prescribing services(INT) against those who did not(UC) documented that, 97% of INT's had improved drug therapies against 43% of UC's(Rudd et al. 2004).

4 articles out of the selected 11, mentioned nurse prescribing as an effective and promising intervention for the management of hypertension, however, it was indicated that nurse prescribing should be supported by legislation. Nurse prescribers undertook thorough reviews of patients' medical and medication history together with an assessment of their present conditions before prescribing medications. They were expected to be knowledgeable about antihypertensive medications with regards to both their therapeutic and non-therapeutic effects. Medication prescription was done in accordance with treatment guidelines and subsequent up titration was executed in relation to patients' progress of blood pressure target attainment(Rudd et al. 2004).



Key: * Combination therapy involving B and D may induce more new onset diabetes compared with other combination therapies.

Figure 3. The Cambridge ABCD rule prescribing guide for antihypertensive medications used by nurse prescribers(http://www.clinpharm.medschl.cam.ac.uk).

4.2 Health education

Holistic, patient-centered, care in which the provision of education is paramount and partnership in decision making is upheld constitutes the philosophical foundation of nursing (Wilson & Bunnell 2007,37).Health education and empowerment were the main nursing interventions used to promote health in patients with arterial hypertension within the catalyzing change domain, which focused on enabling changes and empowering individuals and communities to improve health(Coyle, Duffy & Martin,2007). Heath education was structured to improve health by increasing theoretical and practical knowledge and to promote changes in attitude regarding health behaviors(Coyle et al. 2007).

During the counseling of patients diagnosed with hypertension, nurses relied on their professional know how and skills to assist the patients attain self management necessary to help them reach their treatment goals(Marshall,Wolfe & Mckevitt 2012). Patient health education has been recognized as a vital component of the nursing process(Coyle et al 2007). Nurses at nurse-led clinics in hypertension care have demonstrated mastery a professional autonomy,

during their consultation sessions(Hatchett 2005). Prior to health education, nurses considered assessment of patients' physiological and psychosocial states in conjunction patient to ascertain the most appropriate of health education that they required. This holistic view was essential in order to help a patient to decide on behavioral change(Marshall et al. 2012). Fisher & Fisher (2004, 455) identified that, motivation was prime in initiating and maintaining preventive behaviour and this principle applied to even the well-informed and behaviorally skilled patient(cited in Coyle et al. 2007).

Studies have shown that appropriate educational strategies were instrumental in facilitating behavior change. Instructional materials and educational aids were used by nurses to complement verbal communication. Among those used were instruction sheets, pamphlets, brochures, booklets or computer-assisted instructions (Boyd 2002). "Effective teaching is a combination of the use of good communication skills and effective educational strategies"(Salazar 2005).

4.2.1 Health education for lifestyle modification

In the management of hypertension, some of the health education topics that nurses have addressed included instructions for self-monitoring of blood pressure, preventing complications and adhering to pharmacological and non-pharmacological treatment regimens such as physical exercise, healthy diet, smoking cessation, moderating drinking habits and reducing stress (Coyle et al 2007). Hypertensive patients required support to adhere successfully to their prescribed therapeutic regimen(Marshall et al. 2012). Nurses played leading roles in the provision of relevant information that encouraged and enforced empowerment(Coyle et al 2007). Education on lifestyle changes have always been used to as a first approach in managing newly diagnosed hypertensive patients and it was offered alongside other treatments in the course of further management. Nurses worked with clients to identify lifestyle factors that had potential to influence hypertension management, recognized potential areas for change, and created a collaborative management plan that assisted in reaching client goals, which may prevent secondary complications(Coyle et al. 2007).

According to most of the studies that were included in this review , health education on diet given by nurses focused on lowering the dietary intake of sodium, increasing the intake of potassium and regulating the intake of dairy products and saturated fats. Recommendations on adequate consumption of fruits and vegetables were made. The use of the Dietary Approaches to Stop Hypertension(DASH) plan was described by 3 out of the 11 selected articles analyzed in this study. According to Heart and Stroke Foundation of Ontario(HSFO) and Registered Nurses' Association of Ontario(RNAO) in 2005,the DASH diet plan was designed to pro-

mote the reduction of sodium in the diet and it also emphasized on eating variety of foods rich in nutrients that helped to lower blood pressure, such as potassium, calcium and magnesium. It was believed by some of the researchers that by following the DASH diet, blood pressure may be reduced by a few points in just two weeks. The studies further indicated that over time, blood pressure could drop by 8 to 14 points, which constituted a significant difference in health risks(HSFO & RNAO 2005).

According to the Mayo Clinic website, the DASH plan offered other health benefits besides just lowering blood pressure. Among these were protection against osteoporosis, cancer, heart disease, stroke and diabetes. It also cited DASH plan as an effective way to lose weight.

DASH Eating plan- Number of Servings for Calorie Levels		
Food group	Number of servings for 1600 - 3100 Calorie diets	Servings on a 2000 Calorie diet
Grains and grain products (include at least 3 whole grain foods each day)	6 - 12	7 - 8
Fruits	4 - 6	4 - 5
Vegetables	4 - 6	4 - 5
Low fat or non fat dairy foods	2 - 4	2 - 3
Lean meats, fish, poultry	1.5 - 2.5	2 or less
Nuts, seeds, and legumes	3 - 6 per week	4 - 5 per week
Fats and sweets	2 - 4	Limited

Table 5. The contents of a DASH diet plan(Heller 2011).

For the purposes of prevention and treatment, hypertensive clients were also counseled by nurses to limit their dietary intake of sodium to the recommended quantity of 1500 mg (65 mmol) per day for adults age 50 years or less than 1300 mg (57mmol) per day for those aged between 51 to 70 years and 1200 mg (52mmol) per day for adults older than70 years. However, the use of potassium, calcium and magnesium supplements were not recommended for the control of high blood pressure(Coyle et al. 2007). 100 mmol Na = 2400 mg = 1 tsp (6 grams) of table salt(HSFO & RNAO 2005).

With regards to the use of physical activity as measure to control blood pressure, nurses health educated hypertensive's to indulge in 30 to 60 minutes of moderate intensity dynamic exercise such as walking, jogging, cycling or swimming four to seven days per week together with the routine activities of daily living (ADL). Other studies have shown that the use of resistance weight training exercise in non-hypertensive or stage 1 hypertensive individuals did not adversely influence BP(HSFO & RNAO 2005).

Health education also focused on weight reduction. Body mass indexes were measured at the clinics using height and weight. Furthermore, waist circumferences were also checked and recorded. The recommended healthy body weight to reduce blood pressure was one with a body mass index of 18.5 to 24.9 kg/m^2 and a waist circumference less than 102 cm for men and less than 88 cm for women(HSFO & RNAO 2005). All overweight hypertensive individuals were advised to lose weight (Hedayati, Elsayed & Reilly 2011,1061). According to HSFO & RNAO(2005), the most effective weight loss strategies were those that employed multidisciplinary approaches which included dietary education, increased physical activity and behavioral intervention.

Alcohol consumption was another key area of concern nurses tackled with health education. Low-risk drinking guidelines in both normotensive and hypertensive individuals were used to guide patients to reduce blood pressure. One of such of guidelines stated categorically that healthy adults should limit alcohol consumption to two drinks or less per day, and consumption should not exceed 14 standard drinks per week for men and nine standard drinks per week for women. One standard drink was estimated to be equivalent to 13.6 g or 17.2 ml of ethanol or approximately 44 ml of 80 proof 40% spirits, 355 ml of 5% beer or 148 ml of 12% wine(HSFO & RNAO 2005). Hypertensive patients were also counseled on stress management techniques which basically included behavior and relaxation therapies (Coyle et al. 2007).

Intervention	Recommendation	Expected systolic BP reduction (range)
Weight reduction	Maintain ideal body mass index(18.5-24.9 kg/m^2)	5-20 mmHg per 10 kg weight loss
Diet	Consume diet rich in fruit, vegetables and fibre, low fat dairy product with a reduced content of total and saturated fat	8–14 mmHg
Reduced sodium intake	<100 mmol/day (<6 g of sodium chloride or <2.4 g of sodium per day)	2-8 mmHg
Physical activity	regular aerobic physical activity e.g., brisk walking for at least 30 min , 3 times a week	4-9 mmHg
Alcohol moderation	no more than 3 units/day in men no more than 2 units/day in women	2-4mmHg

Table 6. A summary of lifestyle interventions and their effect on systolic blood pressure(HSFO & RNAO 2005)

4.2.2 Health education for medication management

A study by Hobden (2006) showed that, most nurse prescribers used the principle of concordance when it came to medication prescription (cited in Andersen, Simper & Ibsen 2010). Stevenson & Scambler (2005,15) defined concordance as " a term used to describe a partnership between patient and prescriber in which views and beliefs are exchanged and an equal understanding about medicine taking is developed"(cited in Andersen,Simper & Ibsen 2010). "The underlining principles of concordance as described by Latter, Maben, Myall & Young (2007b 9-18)included promoting equality of knowledge on a medicine through information giving, utilizing the expertise of both patient (lived experience) and prescriber (professional experience), valuing the patient perspective, and ultimately shared decision making" (cited in Andersen,Simper & Ibsen 2010).

Health education that was given to hypertension patients by nurses with regards to the pharmacological management of their condition have included teaching medication names of the various antihypertensive drug groupings(mostly the trade names), their active ingredients, desired and undesired effects. Furthermore, issues related to dosage, routes, frequency, documentation, interaction and storage were also addressed(Rudd et al. 2004). Client relatives and significant others were also given information so they could serve as secondary resource persons(HSFO & RNAO 2005). The techniques employed to health educate on medication management included demonstration, active participation, instructional videos and computerized programs. Reinforcement was enhanced through clients' repetition of previously taught techniques, oral narration and the use of reference materials such as leaflets and brochures. A report by the Institute for Safe Medication Practices (ISMP) identified patients taking more than 5 medicines to have a higher risk to commit medication errors. ISMP recommended regular pharmacy consults as an intervention to check medication errors.

4.2.3 Health education to promote patients' self-monitoring of blood pressure

Self-monitoring of blood pressure by patients at home was one of the measures employed to engage hypertensive patients actively in their own health care management (Fahey, Schroeder & Ebrahim 2005, 885-872).Self-monitoring was an intervention used in conjunction with telemonitoring or telenursing. According to a randomized controlled trial study by the University of Birmingham in the United Kingdom on 527 hypertensive patients between the ages of 35- 85 years, patients' active involvement in their care resulted in increased adherence, self-efficacy, behaviour change and better use of medications. However, another study revealed that people who self-monitored were those between 18 to 60 years old, from high risk groups

and were in full time or part time employment. The study further identified that those hypertensive patients who attended primary health care facilities did not self-monitor their blood pressure as much as those who attended specialist clinics.

Nurses empowered patients to self-monitor their conditions in their various homes. They taught them the appropriate blood pressure measuring techniques, established the frequency for measurement and also guided them on documentation. Nurses further encouraged relaying with specialists nurses via the medium of telephone and other teledevices. For nurses, self-monitoring also involved the creation awareness of what was appropriate blood pressure values and what was not. Patients were equipped with guides which directed appropriate actions to taken with regards to the measured blood pressure values over a specific period of time(HSFO & RNAO 2005).

Level	Blood pressure	Action
High	SYSTOLIC(SYS)value equal to 201 or more OR DIASTOLIC(DIA) value greater or equal to 101	Your BP is too high Make an appointment within 24 hours to see your GP or nurse. Record a RED reading
Raised **May need to alter medication**	SYS 131-200 OR DIA 86-100	Your BP is raised. Record an AMBER reading If Four or more AMBER readings in one week on 2 consecutive months then look at your medication change instructions
Normal	SYS 101-130 AND DIA 85 or less	Your BP is normal This is fine provided that you have no side effects Record a GREEN reading
Low	SYS 100 or less	Your BP is too low. Make an appointment to see your GP. Record a RED reading

Table 7. Illustrates the traffic light system guide used in self-monitoring and self-titration of hypertensive medications(developed by the University of Birmingham).

4.3 Promoting of patients' adherence

Adherence was defined by Haynes, McDonald & Garg (2002) as the degree to which a patient's behaviour such as taking medication, following a diet, modifying habits and attending clinics correlated with the advice given by a healthcare provider(cited in HSFO & RNAO 2005). Adherence was considered to be the single most important modifiable factor that compromised the outcome of treatment in any condition (Marshall et al. 2012). Self-care practices that hypertensive patients undertook included adherence to treatment plans. Many studies in the past attributed poor adherence to only patients' failings either in knowledge or following treatment regimens. Educational interventions were hence designed to tackle that problem but were unsuccessful for many years (Marshall et al. 2012). Non- adherence was not solely based on knowledge deficit but also on different perspectives patients had of their diseases and most of them reported not taking their medications deliberately (Marshall et al. 2012).

Furthermore, adherence as a phenomenon according to WHO (2003)was identified to have revolved around five major factors namely, social and economic, health and health system-related, condition-related, therapy-related and client-related factors (cited in HSFO & RNAO 2005). The common economic and social concerns that were considered in relation to adherence were poverty, accessibility to healthcare and medicines, literacy, creation of effective social support networks and mechanisms for the delivery of health services that incorporates cultural beliefs about illness and treatment. The WHO report in 2003 further highlighted barriers to adherence which were related to health and health system factors to include lack of awareness and adequate knowledge about adherence and the absence of clinical tools to facilitate intervention and evaluation of adherence problems. Condition related factors discussed in other studies were the severity of the symptoms, their respective levels of disability and their overall influence on clients' perception of risk, importance of treatment and adherence. The most notable therapy related factors were those related to the complexity of the medication regimen, duration of treatment, previous treatment failures, frequent changes in treatment, the immediacy of beneficial effects, side effects, and the availability of medical support to deal with them. Also, therapy-related factors that influenced the adherence rates to antihypertensive medication therapy included dosing frequency, adverse effects, therapy duration, pill burden, and the asymptomatic nature of hypertension (Takiya, Peterson & Finley, 2004). Finally major client factors that hindered adherence mentioned in some studies were lack of information and skills that promoted self-management, issues related to motivation and self-efficacy and absence of adequate support for behavioral changes (HSFO & RNAO 2005).

Nurses' roles that have enhanced adherence included the establishment of therapeutic relationship with hypertensive patients, the exploration of clients' beliefs and expectations re-

garding their treatment and the provision of honest and clear information that facilitated patients' ability to make educated choices(Takiya et al. 2004). A 2004 meta-analysis projected adherence as a multifaceted subject and stressed that interventions that could promote it optimally should adopt a client-specific approach (Takiya et al. 2004). Furthermore, it was suggested that to improve adherence to long-term treatments a combination of methods would be well suited. Among listed interventions by Haynes et al. (2002) that nurses used were , health education about treatment regimen, counseling on the importance of adherence, organization techniques for medication taking, reminders about appointments and adherence ,rewards and recognition of clients and soliciting social support from friends and relatives (cited in HSFO & RNAO 2005).

4.3.1 Advocating for simplification of clients' medication dosage regimens

Three out of the eleven studies identified for analysis in this paper showed that simplification of dosing regimens increased adherence. Simplifying dosing regimens increased adherence from 8 to 19.6 % (Fahey, Schroeder & Ebrahim 2005).Nurses worked with prescribers to ensure that clients' medications were organized realistically to boost adherence. Some of the issues they emphasized were prescribing long acting once-a-day dosing and fixed dose combination pills together with the use of medication schedules that coincided with regular daily events. They also encouraged the use of medication reminders such calendars and also medication delivery systems such as blister packaging (HSFO & RNAO 2005).

4.3.2 Encouraging the use of reminder systems and follow ups

Ogedegbe, Harrison, Robbins, Mancuso & Allegrante(2004) identified forgetfulness as a common client related factor for non-adherence to treatment. They further named old age, busy schedules and being away from home were some of the factors that contributed to forgetfulness (cited in HSFO & RNAO 2005). Nurses encouraged patients to use daily medication check lists to keep themselves informed about their medication schedules. The use of diaries, computers reminders and support of close relatives were also emphasized. With regards to appointments, reminder letters and phone calls were used(Marshall et al. 2012).

Furthermore, missed appointments were associated with poorer adherence rates to prescribed treatment and they were considered the first signal of dropping out of care entirely (Haynes et al. 2002). Recalling patients who missed their appointment was described as the most important single intervention for keeping them in care (Fahey et al.2005). Nurses' used follow up phone calls and home visits to reschedule appointments for their clients. These en-

abled them to ascertain client specific barriers that interfered with their adherence to treatment regimen(Marshall et al .2012).

4.4 Telenursing

Telenursing an intervention was also described as telemonitoring in some literature. Telenursing was defined by Schlachta & Sparks (1998) as the use of "technology to deliver nursing care and conduct nursing practice" (cited in Bosworth, Powers & Olsen 2011). Schlachta-Fairchild, Elfrink & Deickman(2008) emphasized that although the medium for delivery of care in telenursing was different, the nursing process and scope of practice of nursing were the same. Telenursing involved assessment, planning, intervening and evaluation of nursing care via media such as internet, telephones, digital assessment tools and telemonitoring equipment(cited in Bosworth et al. 2011).

According to some reviewed literature, telenursing for the management of hypertension constituted a collection of clinical data(blood pressure values) and the transmission of such data between a patient and a telenurse using electronic information processing technologies. Telenurses conducted clinical reviews of the transferred data and they provided appropriate responses. The analyzed articles revealed that, patients were given wireless home BP monitors and peripheral telemedicine devices that transmitted blood pressure values via a telephone line to a secured server. Clients were advised to measure their BP every day. Nurses executed teleconsultations when 2 week average home BP measurements exceeded 135/80 mm Hg or when there were other emergencies(Bosworth et al. 2011,73-80). Furthermore, nurses' used teleconsultation sessions to administer behavioral management interventions focused on improving BP self-management with predetermined guidelines and patient-specific designed treatment algorithms. Nurse prescribers used a medication management decision support algorithm that recommended BP medication changes. Nurses relayed changes to the patient and prescribers electronically prescribed the medication.

A published study about the effectiveness of home blood pressure tele-monitoring interventions revealed that, home BP tele-monitoring system and telephone interventions to improve management of hypertension were novel methods in primary care delivery. It went further to state that their cost and effectiveness to improve BP control are still oblique (Bosworth et al. 73-80). Telenursing increased patient adherence to care, improved access to care ,provided an opportunity for networking between nurses and also enabled patients' safety to be monitored(Bosworth et al. 2011). A study conducted by Draus, Walblay & Barraco (2002) investigated the effects of telemanagement techniques employed by advanced practice nurses to monitor newly discharged hypertension patients. They reported a significant decrease in total health care charges although there were no marked disparities in the number patient read-

mission before and after participation in the program(cited in Bosworth et al. 2011). However, a randomized study undertaken recently by Dunagan, Littenberg, Ewald &Jones ,Emery & Waterman (2005) suggested that nurse-administered telephone based management program reduced the number of health care visits and lowered readmission rates of patients(cited in Krothe et al. 2006).

5 Discussion

This chapter focuses on the ethical considerations made during the entire process of writing this paper. It further discusses the findings of the various articles that met the eligibility criteria for inclusion.

5.1 Ethical considerations

The idea of ethics in research is a complex construct, enshrined in particular values and beliefs that determine how research should be approached(Graham & Fitzgerald 2010, 134). Research ethics in their very fundamental form are, “principles of right and wrong conduct” (Gallagher 2009,11). Ethics can also be considered as moral principles with ethical questions “woven through every aspect of research, shaping the methods and the findings” (Alderson & Morrow 2011,5).

In conducting this study, we initially considered ethical principles in general for conducting research. However, since the methodology of choice for this paper was a systematic review, we focused on those principles that were applicable to it to ensure authenticity. We searched databases rigorously to identify articles which were then screened without bias against predefined eligibility criteria. To ensure trustworthiness and reliability, we first of all double checked articles to make sure they were accurate and peer reviewed. Although no research work is considered to be ethically perfect, we endeavored to include those ones with findings generally considered credible. Secondly we avoided plagiarism and used the appropriate text referencing techniques to report findings. Furthermore, we prevented academic fraud by reporting findings from analyzed articles in their original forms and quantities. Personal opinions, conclusions and other ideas were only included in the discussion chapter. The findings were tailored to answer the proposed research question and hence the purpose of this paper could be described as served.

Although the literature search was limited to English, most of the included articles were conducted in different countries and hence the result of this review can be fairly generalized. The methodology was clearly outlined to facilitate reciprocability of findings although differences might arise because the choice of data analysis is subject to individual interpretations.

5.2 Trustworthiness

Trustworthiness in a qualitative research comprises 4 components namely credibility, transferability, dependability, and confirmability (Guba 1985). In qualitative research trustworthiness aims to support the argument that the research findings are worth considering. In this study the writers ensured credibility by following the appropriate methods of conducting a systematic literature review. Also , findings from the analyzed articles were recorded in their original forms. To ensure transferability, we documented our research methodology in detail so that it could be repeated. The well documented research methodology also ensured confirmability and dependability. Moreover, we recognized our limitations and the effects they had on this study.

5.3 Strengths and limitations of this study

The study was able to answer the proposed research question through the aid of the identified articles. The articles analyzed were relevant because they were written in different countries like Canada, USA, England were hypertension is a major health issue. Moreover, they were peer reviewed which indicated that they had some sort of quality. Also the articles were not older than 10 years and hence their contents are still valid. The findings of this study therefore adds to the body of evidenced based knowledge about improving the management of care for adult hypertensive patients.

This study suffered some notable limitations which are worth mentioning. Firstly, the inclusion criteria automatically disregarded articles published in other languages other than English so language bias was not tackled. Secondly, inaccessibility of certain articles in full text that could have contributed immensely to this study was a major setback. Thirdly the assessment of quality of the articles were based on other authors opinions and finally authors were not contacted for clarification or for retrieval of missing data.

5.4 Discussion of findings

The research question that this paper sought to address was; what nursing interventions are used for improving the management of hypertension in adults? After rigorous literature search and analysis answers were reported under four themes which are nurse led clinics, health education, promotion of adherence and telenursing.

Nurse led clinics have been described as an innovative way of healthcare delivery especially in primary health settings for the management of chronic conditions. Many studies have out-

lined the positive roles it had played in assisting hypertensive patients to meet their blood pressure targets (Krothe et al. 2006). The prime objectives of nurse led clinics in managing hypertension were to promote continuity of care while limiting the number physician consultations. Some authors have argued that nurse led clinics were more cost effective. In agreement with that was Raftery et al(2005) who concluded after analyzing a 4 year nurse led follow up service for cardiac patients that their services appeared to be cost effective compared with most interventions in health care. For them, the difference that nurse led clinics made was in the number of life years it saved. Additionally, nurse led care was regarded as attractive as it has been linked with consistent adherence to protocols, enhanced prescribing in concordance with guidelines, frequent follow-up and potentially lower healthcare costs. In the absence of modifications in prescribing models however, the effect on blood pressure level is minimal (Laurant , Reeves , Hermens , Braspenning , Grol &Sibbald 2005).

The conviction of some authors on the cost effectiveness of nurse led clinics was grounded in the premise that it was cheaper to train nurse practitioners than doctors although they both rendered similar services for hypertensive patients in primary health care. Moreover, nurse led clinics made it possible for the same nurses to review the same client over a prolonged period of time. Hatchett (2005) believed that it allowed for the formation of a therapeutic relationship that facilitated the exploration of individual needs. Additionally, he indicated that the therapeutic relationship nurses had with their clients facilitated the development of tailored care plans that addressed specific individual needs which not only promoted adherence but also ensured resources were not wasted.

In findings section of this paper, interventions such as risk assessment, treatment algorithms, nurse prescribing and health education to modify lifestyle and medication management were cited to have been used in hypertension nurse led clinics. Some articles mentioned that the use of treatment algorithms at nurse led clinics produced the best results in patient management. Treatment algorithms provided a guide that allowed nurses to systematically analyze blood pressure values, previous laboratory tests and medication history. This led to the discovery of the most suitable treatment modalities for specific patients. Risk assessment was carried out by nurse prescribers at every meeting with clients. They examined both modifiable and unmodifiable risk factors outlined by the American Hypertension Association using a global risk assessment tool. Modification of risk factors have been instrumental in the control of cardiovascular diseases. Dietary intake of sodium was considered as the important modifiable risk factor in hypertension. The effects of excess sodium have been estimated to be directly proportional to rise in blood pressure. This was so because sodium caused fluid retention in body which increased the volume of circulating blood. Arterial blood pressure however is known a resultant of heart rate, blood volume and resistance from blood vessels. Since the consumption of sodium is a daily event, it posed a major threat to the achievement of target

blood pressure values. The SACN in the UK recommended a daily consumption of 6 g of sodium although their research identified 3 g to be the optimal value. Nurses' health education messages have included salt free diet for people with advanced stage hypertension. There have also been difficulties with patient compliance and hence motivation and rigorous health education have been seen as the keys to enhance success. Since there were compelling evidences that other risk factors such as alcohol, smoking and stress had negative consequences on blood pressure, nurses must endeavor to assist their clients to regulate these factors. A part of health education, support organizations can be used to assist patients to cope with managing their conditions(HSFO & RNAO 2005).

Furthermore, prescription of medications by nurse practitioners for the management of hypertension and other medical conditions was seen as a remarkable breakthrough in the nursing profession(Cashin, Dunn ,Buckley & Newman 2008). It implied nursing roles had been expanded and their autonomies in the medical fraternity were been strengthened. According to Lewis- Evans et al(2004), nurse prescribers were more patient centered and this boosted satisfaction and convenience. The use of treatment algorithms ensured that the most appropriate and accurate pharmacological treatment was selected. Additionally, shorter waiting times implied an increased willingness to honor appointments which boosted a positive trend towards adherence(Laurant et al. 2005). The challenges faced by nurse prescribers were mostly legislation based(Cashin et al. 2008). Limitations as to the use of certain products were considered to be frustrating and this confirmed the opinion in some literature that the recent formulary was too restrictive(Rudd et al. 2004).

Health education constituted a core component of the treatment plan and was seen as a fundamental nursing intervention because it was the focal point around which other interventions revolved. Health education given by nurses employed a mix of good communication and educational strategies as noted by Salazar (2005). Health materials like pamphlets and brochures provided reinforcement of discussed topics in relation to the management of hypertension out the care setting. Issues that pertained to lifestyle modification, self-management and medication were the core themes of the education provided. DASH diet was promoted, daily sodium intake, alcohol, tobacco use discussed. Furthermore, physical inactivity and stress management were addressed. Nurses' taught self-monitoring of blood pressure and medication techniques. In educating patients about medication, the principle of concordance was employed. Patients' perspectives and opinions were considered and their support solicited in the drafting of treatment plans(HSFO& RNAO 2005).

Promotion of adherence was the third nursing intervention used to promote the management of hypertension according to our findings. The concept of adherence was viewed by many authors as multifaceted. A WHO report in 2003 considered adherence to be dependent on five

major factors as pointed out in the findings of this paper. It further recommended that efforts addressing all the five factors could go a long way to promote adherence. Other schools of thought in the past saw poor adherence to be solely related to patient failings in knowledge and hence used targeted educational strategies to breach knowledge deficits. However, as pointed out by Vermeire et al (2001, 1- 42), such efforts were futile. Knowledge deficit was not the sole barrier to adherence as other studies proved that some patients deliberately skipped treatment. The WHO report in 2003 recommended that provision of advice and prescription alone were not enough to optimize adherence. The challenge that this posed to nurses was the need to carry out thorough assessment for adherence at any given contacts they made with their respective clients. An understanding of specific client challenges and realistically drafted measures to address them could be beneficial in promoting adherence on the long term(HSFO & RNAO 2005).

Furthermore, interventions that improved adherence for patients with high blood pressure were considered to be complex. However, the efficiency of these complex strategies could not be established with certainty irrespective of the effort and resources they consumed. Haynes et al.(2002) were of the opinion that since the evidence that low adherence could be cured is inconclusive, efforts to improve adherence must be maintained for as long as the treatment is needed. Interventions like reminder systems, follow up visits and phone calls, simplified medication dosages, compliance packing should be used in combination. The key that promoted adherence was that one that kept patient in care as illustrated by (Fahey et al.2005). Rescheduling missed appointments and collaborating with other health team members to follow up patients in their respective communities have been seen as crucial in the promotion of the welfare of hypertensives.

Telenursing was the last nursing intervention identified in this paper for the management of hypertension. Although it was quite a new and expensive approach to rendering care, it had positive prospects according to literature (Bosworth et al. 2011). Tele-monitoring was designed to promote patients' active participation in their own care. Patients were responsible for measuring and recording their own blood pressure values which served as primary data that were analyzed by nurses at remote stations. Nurses also provided support to enhance behaviour modification and also assistance with medication management. Telenursing took away the burden of being physically present at a health setting to receive treatment and was hence perceived as tolerable. In support of this, Rudd et al (2004) were of the view that telenursing can productively tackle a variety of the systems-related and patient-related issues that interfere with the effectiveness of pharmacotherapeutic management of hypertension.

The use of the telemedicine medium however raised patient safety issues(Schlachta-Fairchild et al. 2008). Confidentiality and privacy of patients were to be maintained. This implied that

telenurses needed to be mindful of the patients environment when personal issues were to be addressed. Moreover, telemedicine devices were to be checked for proper functioning to ensure the transmission of valid and reliable data. Telenurses, were encouraged to see the telehealth platform as a medium to render nursing care but not tool that replaced quality nursing care((Schlachta-Fairchild et al. 2008).

6 Conclusion

Among the numerous nursing interventions used in the management of hypertension, nurse led clinics, health education, promotion of adherence and telenursing were identified as effective in improving the management of hypertension in adults. These interventions however are more effective when they are used in combination. Nurse led clinics have demonstrated positive results in the management of hypertension. For it to produce the best health outcomes for hypertension patients, it should combine activities like nurse prescribing, risk assessment and the use of a step wised treatment algorithm. Moreover, although the major challenges that nurse led clinics face are ones related to legislation, they are seen as a major development in the nursing profession. They are to be encouraged in healthcare delivery especially in primary health care settings for chronic diseases like hypertension.

Health education is an integral component of the nursing process as it influences all over interventions. It is given at nurse led clinics, in patients' homes or over tele-devices like the telephone. Health education provides empowerment of hypertension patients to self-manage their conditions. The role of nurses is to give hypertensive patients accurate and simplified information to help them make educated choices. In the management of hypertension, health education should address keys topics like diet, exercise, medications, self-monitoring and adherence. It is also essential that nurses use appropriate educational strategies to promote and reinforce learning of appropriate behaviour for the management of hypertension.

Dealing with chronic diseases like hypertension can be frustrating for patients and this may lead to poor adherence. Adherence is considered the single most important modifiable factor in the management of hypertension. In the absence of adherence, all other nursing efforts are ineffective. For this reason nurses are tasked to monitor adherence and promote it at any given opportunity. The use of simplified medication dosages, reminder systems like alarms and medication check lists, follow up phone calls and visits together with rescheduling with missed appointments can boost adherence. Since the issues pertaining to adherence vary among individuals, nurses should not just use general health education to promote adherence. Rather they should go a step further to consider their clients' perspectives of their disease and the given care so they can structure care plans and treatments that will meet their

individual expectations. Adherence can also be influenced by how active patients are in their own care, so nursing actions should focus on promoting self-monitoring behaviors.

Finally the use of remote monitoring in the form of telenursing have also assisted hypertension patients to stay in care and control their blood pressure. An advantage of telenursing are is it ensures the rendering of quality nursing care although the physical presence of the patient in a health setting is not required. Furthermore, telenursing promotes adherence and telehealth nurses use teleconsultations to health educate and implement nursing interventions. Although the use of teledevice medium raise safety issues, when telenurses focus on nursing care instead of the technology patient safety could be maintained.

6.1 Implications for practice and research

The findings of this study indicate that nurses are effective players in the management of hypertension especially in primary health settings. Nurse clinics have recorded remarkable improvements in patient management. The use of stepwise treatment algorithms were largely the source of success in these clinics. Based on these findings, it is advised health policymakers should considered empowering nurses to actively manage hypertensive patients in primary health settings. Nurse prescribing although a new intervention was also viewed as promising based on randomized controlled trials. However, there is the need for further research on how nurse prescribing should be carried out to limit errors. Furthermore, law makers must review legislation that limits the prescribing powers of nurse practitioners.

References

Alderson, P. & Morrow, V. 2011. The ethics of research with children and young people. London: Sage Publications.

Bosworth, H.B, Powers, B.J. & Olsen, M.K. 2011. Home blood pressure management and improved blood pressure control,171:1173–80.

Cahn, M.A., Auston, I. & Selden, C. 1992. National library of medicine, office of health services research information prepared for agency for health care policy and research, office of the forum for quality and effectiveness in health care, forum methodology conference. December, 13-16.

Cashin, A., Dunn, S.V., Buckley, T. & Newman, C. 2008. Nurse practitioner prescribing practice in Australia. Journal of the American Academy of Nurse Practitioners, 22(3):150-155.

Chapman, A. 2009. The systematic literature search. California: sage publication.

Chobanian, A.V., Bakris, G.L., Black, H.R., Cushman, W.C., Green, L.A. & Izzo J.L. 2003. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.Hypertension, 42,1206-52.

Coyle, M.K., Duffy, J.R. & Martin, E.M. 2007. Teaching/learning health promoting behaviours through telehealth, 28(1),18-23.

D'Agostino, R.B., Levy, D., Belanger, A.M., Silbershatz, H.& Kannel, W.B. 1998. Prediction of coronary heart disease using risk factor categories. Circulation, 97(18),1843.

de Backer, G., Ambrosioni, E., Borch-Johnsen, K., Brotons, C., Cifkova, R. & Dallongeville, J.2003. European guidelines on cardiovascular disease prevention in clinical practice. Third joint task force of European and other societies on cardiovascular disease prevention in clinical practice. European Heart Journal, 24,1601-1610.

Drevenhorn, E., Bengtson, A., Allen, J.K., Saljo, R. & Kjellgren, K.I. 2007. A content analysis of patient centredness in hypertension care after consultation training for nurses. Journal of Advance Nursing.

Dunagan, W. C., Littenberg, B., Ewald, G. A., Jones, C. A., Emery, V. B. & Waterman, B. M. 2005.Randomized trial of a nurse-administered, telephone-based disease management program for patients with heart failure. Journal of Cardiac Failure, 11(5),358–365.

Draus, C., Walblay, A., & Barraco, D. 2002. Partnering for congestive heart failure: A clinic without walls.Outcomes Management, 6(1),40–43.

Fahey, T., Schroeder, K.& Ebrahim, S. 2005. Educational and organisational interventions used to improve the management of hypertension in primary care: a systematic review, British Journal of General Practice, 55(520), 875–882.

Feng, H.J., MacGregor, G.A. 2003. How far should salt intake be reduced? Hypertension, 42,1093-1099.

Fink, A. 2005. Conducting research literature reviews from the internet papers 2nd edition. Thousand okus, California, sage publication.

Fisher, J. D. & Fisher, W. A. 2004. Changing aids-risk behavior. Psychological Bulletin, 111(3), 455-474.

Graham, A. & Fitzgerald, R. 2011. Children's participation in research: Some possibilities and constraints in the current Australian research environment. Journal of Sociology, 46, 133-147.

Guba, E.G. 1985. Criteria for assessing the trustworthiness of naturalistic inquiries Educational Communication and Technology Journal, 29, 75–91.

Hatchett, R. 2005. Key issues in setting up and running a nurse-led cardiology clinic. Nursing Standard. 20, 14-16, 49-53.

Hatchett, R. 2008. Nurse-led clinics: 10 essential steps to setting up a service. Nursing times,104(4), 62-64.

Heart and Stroke Foundation of Ontario(HSFO) and Registered Nurses' Association of Ontario(RNAO). 2005. Nursing management of hypertension. Toronto, Canada: Heart and Stroke Foundation of Ontario and Registered Nurses' Association of Ontario.

Hedayati, S., Elsayed, E. & Reilly, R. 2011. Non-pharmacological aspects of blood pressure control. Kidney international journal ,79,1061-1070

Heller, M. 2011. The dash diet action plan. Grand central life and style
Hobden, A. 2006. Concordance: a widely used term, but what does it mean? British Journal of Community Nursing, 11(6), 257–260.

Hyman, D.J. & Pavlik, V.N. 2001. Characteristics of patients with uncontrolled hypertension in the United States. New England Journal of Medicine, 345 (7),479–486.

Hsieh, H.F. & Shannon, S.E. 2005. Three approaches to qualitative content analysis. Qualitative Health Research, 15(9), 1277-1288.

Krousel-Wood, M., Thomas, S., Muntner, P. & Morisky, D. 2004. Medication adherence: A key factor in achieving blood pressure control and good clinical outcomes in hypertensive patients. Current Opinion in Cardiology, 19(4), 357-362.

Kornitzer, M., Dramaix, M. & De-Backer, G. 2002. Epidemiology of risk factors for hypertension. Implications for prevention and therapy. Drugs, 57, 695-712.

Krothe, J. & Clendon, J. 2006. Perceptions of effectiveness of nurse-managed clinics: A cross-cultural study. Public Health Nursing, 23(3), 242-9.

Latter, S., Maben, J., Myall, M. & Young, A. 2007a. Evaluating nurse prescribers' education and continuing professional development for independent prescribing practice: Findings from a national survey in England. Nurse Education Today, 27(7),685–696.

Latter, S., Maben, J., Myall, M. & Young, A. 2007b. Perceptions and practice of concordance in nurses' prescribing consultations: Findings from a national questionnaire survey and case studies of practice in England. International Journal of Nursing Studies, 44(1),9–18.

Laurant, M., Reeves, D., Hermens, R., Braspenning, J, Grol, R. & Sibbald, B.2005. Substitution of doctors by nurses in primary care. Cochrane Database,2,1271.

Marshall, I., Wolfe, D. & Mckevitt, C. 2012. Lay perspectives on hypertension and drug adherence: systematic review of qualitative research. BMJ.

Nishimura, R., LaPorte, R.E. & Dorman, J.S. 2004. Mortality trends in type 1 diabetes. Pennsylvania: the Allegheny County. Diabetes Care, 24, 823-27.

Okano G.J., Rascati, K.L., Wilson J.P., Remund, D.D., Grabenstein, J.D.& Brixner, D.I.1997 Patterns of antihypertensive use among patients in the US Department of Defense database initially prescribed an angiotensin-converting enzyme inhibitor or calcium channel blocker. Clin Ther,19(6),1433-45.

Patton, M.Q. 2002. Qualitative Research and Evaluation Methods. Thousand Oaks, California: Sage.

Petticrew, M. & Robert, H. 2006.Systermatic reviews. A practical guide. Blackwell publication.

Primatesta, P., Falaschetti E. & Gupta, S. 2001. Association between smoking and blood pressure. Evidence from the Health Survey for England. Hypertension, 37, 187-93.

Raftery, J .P., Yao, G.L., Murchie, P.,Campbell, N.C. & Ritchie, L.D. 2005.Cost effectiveness of nurse-led secondary prevention clinics for coronary heart disease in primary care: follow up of a randomized controlled trial. British Medical Journal.

Rudd, P., Miller, N.H., Kaufman, J., Kraemer H.C., Bandura, A., Greenwald, G. & Debusk R.F. 2004. Nurse management for hypertension. A systems approach. Am J Hypertens,17(10),921-7.

Salazar, M. K. 2005. Dealing with hypertension - using theory to promote behavioral change. AAOHN Journal,43(6), 313-318.

Sandelowski, M. & Barroso, J. 2003 Classifying the findings in qualitative studies. Qualitative Health Research,13(7),905-923.

Schlachta, L. & Sparks, S. 1998. Definitions of telenursing, telemedicine. Encyclopedia of Nursing Research. New York: Springer Publishing Inc.

Schlachta-Fairchild, L., Elfrink, V. & Deickman, A. 2008. Patient safety, telenursing and telehealth. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): Agency for Healthcare Research and Quality.

Schroeder, K., Fahey, T. & Ebrahim, S. 2004. Interventions for improving adherence to treatment in patients with high blood pressure in ambulatory settings. The Cochrane Library of Systematic Reviews, Issue 3.

Scientific Advisory Committee on Nutrition(SACN).2003. Salt and Health. London: Department of Health.

Social Care Institute for Excellence 2006. The conduct of systematic research reviews for SCIE knowledge reviews.

Stevenson, F. & Scambler, G. 2005. The relationship between medicine and the public: the challenge of concordance. Health, 9(1),5-21.

Takiya, L. N., Peterson, A. M. & Finley, R. S. 2004. Meta-analysis of interventions for medication adherence to antihypertensives. Annals of Pharmacotherapy, 38(10), 1617-1624.

Vermeire E, Hearnshaw H, Van Royen P, Denekens J. 2001 Patient adherence to treatment: three decades of research. A comprehensive review. J Clin Pharm, 26,331-42.

Wilson, J. & Bunnell, T. 2007. A review of the merits of the nurse practitioner role. Nursing Standard ,21(18),35-40.

Electronic

http://www.scie.org.uk/publications/researchresources/rr01.pdf read on 13.01 2013

http://www.mayoclinic.com/health/dash-diet/HI00047 read on 1.02.2013

http://dashdiet.org/weight_loss_solution.asp read 04.02.2013

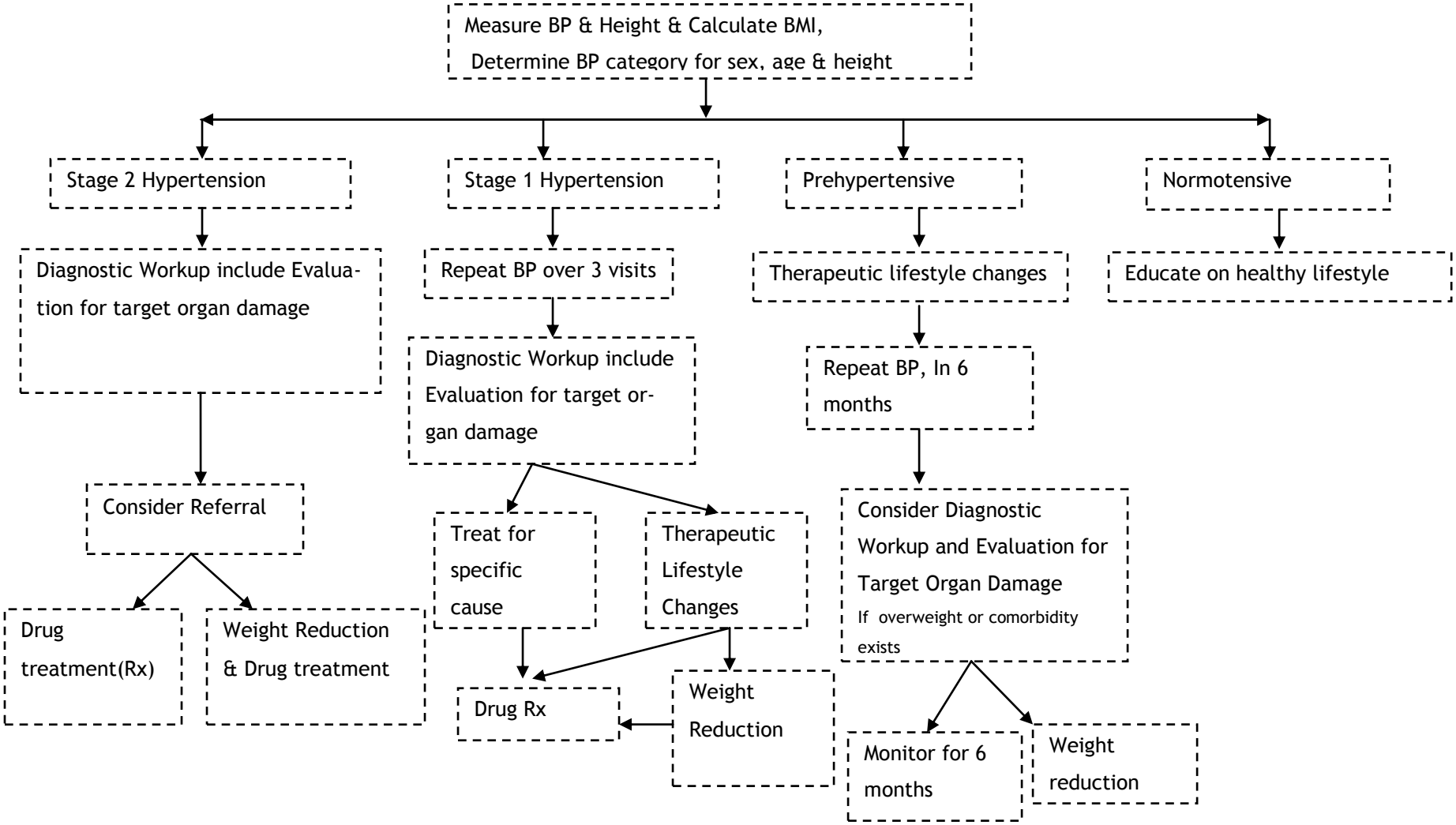
http://www.clinpharm.medschl.cam.ac.uk/public/BPGuidelines.pdf

WHO2003.http://www.who.int/cardiovascular_diseases/guidelines/hypertension_guidelines.pdf. read on the 5.02.2013

WHO 2012. World health statistics. http://www.euro.who.int/en/what-we-do/health-topics/noncommunicable-diseases/obesity/news/news/2012/5/world-health-statistics-2012-report-increase-of-hypertension-and-diabetes. Read on 10.02.2013

Appendices

Appendix 1. Treatment algorithm (HSFO & RNAO 2005)



Appendix 2. Global Risk Assessment Tool (D'Agostino ,Levy, Belanger, Silbershatz & Kannel 1998)

Calculating Global CHD Risk in Men

Step 1: Age

Years	Points	Years	Points
30 to 34	–1	55 to 59	4
35 to 39	0	60 to 64	5
40 to 44	1	65 to 69	6
45 to 49	2	70 to 74	7
50 to 54	3		

Step 2: LDL or TC Level

LDL		
mg per dL	mmol per L	Points
< 100	< 2.59	–3
100 to 129	2.59 to 3.35	0
130 to 159	3.36 to 4.13	0
160 to 190	4.14 to 4.92	1
> 190	> 4.92	2

TC		
mg per dL	mmol per L	Points
< 160	< 4.14	–3
160 to 199	4.14 to 5.16	0
200 to 239	5.17 to 6.20	1
240 to 279	6.21 to 7.23	2
≥ 280	≥ 7.24	3

Step 3: HDL Level

mg per dL	mmol per L	Points (if LDL used in step 2)	Points (if TC used in step 2)
< 35	< 0.91	2	2
35 to 44	0.91 to 1.15	1	1
45 to 49	1.16 to 1.28	0	0
50 to 59	1.29 to 1.54	0	0
≥ 60	≥ 1.55	–1	–2

Step 4: Blood Pressure

Systolic (mm Hg)	Diastolic (mm Hg) < 80	80 to 84	85 to 89	90 to 99	≥ 100
< 120	0 points				
120 to 129		0 points			
130 to 139			1 point		
140 to 159				2 points	
≥ 160					3 points

NOTE: *When systolic and diastolic pressures provide different point scores, use the higher score.*

Step 5: Diabetes Mellitus

Present?	Points
No	0
Yes	2

Step 6: Smoking

Smoker?	Points
No	0
Yes	2

Step 7: Total Points

Step 1: Age ____
Step 2: LDL or TC level ____
Step 3: HDL level ____
Step 4: Blood pressure ____
Step 5: Diabetes mellitus ____
Step 6: Smoking ____
Total points ____

Step 8: CHD Risk

Total points	10-year risk if LDL used in step 2 (%)	10-year risk if TC used in step 2 (%)
≤ –3	1	—
–2	2	—
–1	2	2
0	3	3
1	4	3
2	4	4
3	6	5
4	7	7
5	9	8
6	11	10
7	14	13
8	18	16
9	22	20
10	27	25
11	33	31
12	40	37
13	47	45
≥ 14	≥ 56	≥ 53

Step 9: Comparative Risk

Age (years)	Average 10-year CHD risk (%)	Average 10-year risk of hard event* (%)	Low 10-year CHD risk† (%)
30 to 34	3	1	2
35 to 39	5	4	3
40 to 44	7	4	4
45 to 49	11	8	4
50 to 54	14	10	6
55 to 59	16	13	7
60 to 64	21	20	9
65 to 69	25	22	11
70 to 74	30	25	14

**—Hard events exclude angina pectoris.*
†—Low risk as calculated for a man of the same age who does not smoke or have diabetes, and has optimal blood pressure, an LDL level of 100 to 129 mg per dL or TC level of 160 to 199 mg per dL, and an HDL level of 45 mg per dL.

Key

Color	Relative risk	Color	Relative risk
Green	Very low	Orange	High
White	Low	Red	Very high
Yellow	Moderate		

Calculating Global CHD Risk in Women

Step 1: Age

Years	Points	Years	Points
30 to 34	–9	55 to 59	7
35 to 39	–4	60 to 64	8
40 to 44	0	65 to 69	8
45 to 49	3	70 to 74	8
50 to 54	6		

Step 2: LDL or TC Level

LDL		
mg per dL	mmol per L	Points
< 100	< 2.59	–2
100 to 129	2.59 to 3.35	0
130 to 159	3.36 to 4.13	0
160 to 190	4.14 to 4.92	2
> 190	> 4.92	2

TC		
mg per dL	mmol per L	Points
< 160	< 4.14	–2
160 to 199	4.14 to 5.16	0
200 to 239	5.17 to 6.20	1
240 to 279	6.21 to 7.23	1
≥ 280	≥ 7.24	3

Step 3: HDL Level

mg per dL	mmol per L	Points (if LDL used in step 2)	Points (if TC used in step 2)
< 35	< 0.91	5	5
35 to 44	0.91 to 1.15	2	2
45 to 49	1.16 to 1.28	1	1
50 to 59	1.29 to 1.54	0	0
≥ 60	≥ 1.55	–2	–3

Step 4: Blood Pressure

Systolic (mm Hg)	Diastolic (mm Hg) < 80	80 to 84	85 to 89	90 to 99	≥ 100
< 120	–3 points				
120 to 129		0 points			
130 to 139			0 points		
140 to 159				2 points	
≥ 160					3 points

NOTE: *When systolic and diastolic pressures provide different point scores, use the higher score.*

Step 5: Diabetes Mellitus

Present?	Points
No	0
Yes	4

Step 6: Smoking

Smoker?	Points
No	0
Yes	2

Step 7: Total Points

Step 1: Age ____
Step 2: LDL or TC level ____
Step 3: HDL level ____
Step 4: Blood pressure ____
Step 5: Diabetes mellitus ____
Step 6: Smoking ____
Total points ____

Step 8: CHD Risk

Total points	10-year risk if LDL used in step 2 (%)	10-year risk if TC used in step 2 (%)
≤ –2	1	1
–1	2	2
0	2	2
1	2	2
2	3	3
3	3	3
4	4	4
5	5	4
6	6	5
7	7	6
8	8	7
9	9	8
10	11	10
11	13	11
12	15	13
13	17	15
14	20	18
15	24	20
16	27	24
≥ 17	≥ 32	≥ 27

Step 9: Comparative Risk

Age (years)	Average 10-year CHD risk (%)	Average 10-year risk of hard event* (%)	Low 10-year CHD risk† (%)
30 to 34	< 1	< 1	< 1
35 to 39	< 1	< 1	1
40 to 44	2	1	2
45 to 49	5	2	3
50 to 54	8	3	5
55 to 59	12	7	7
60 to 64	12	8	8
65 to 69	13	8	8
70 to 74	14	11	8

**—Hard events exclude angina pectoris.*
†—Low risk as calculated for a woman of the same age who does not smoke or have diabetes, and has optimal blood pressure, an LDL level of 100 to 129 mg per dL or TC level of 160 to 199 mg per dL, and an HDL level of 55 mg per dL (1.42 mmol per L).

Key

Color	Relative risk	Color	Relative risk
Green	Very low	Orange	High
White	Low	Red	Very high
Yellow	Moderate		

Appendix 3. Extraction form

Author and year of publication	Database	Purpose	Research method	Central findings	Significant findings to this paper
Bosworth,H.B,Olsen M.k & Power ,B.J(2011)	Ebsco	Determine the effectiveness of telephone interventions in managing hypertension	Randomized control trial	Telephone monitoring of BP is effective	BP telemonitoring with remote clinician management are effective
Fahey, T., Schroeder, K., & Ebrahim, S. (2005)	Cochrane	Investigate interventions used to improve the management of hypertension	Randomized control trial	Professional led clinic, health education, self-monitoring	Nurse led clinics and health education improve the management of hypertension
Krothe, J., & Clendon, J. (2006)	Pubmed	Find out the perceptions about effectiveness of nurse led clinics	Cross cultural study	Nurse led clinics have demonstrated positive results in the management of hyper-	Patients attending a nurse led clinic meet their blood pressure targets

				tension	compared to those who did not
Takiya, L.N, Peterson, A.M & Finley, R.S (2004)	Cochrane	Determine how to improve adherence to anti-hypertensive medication therapy	Randomized control trial	Issues with adherence to treatment are multi-faceted	Simplification of dosage regimens and reminder systems improve adherence
Coyle, M.K, Duffy J.R & Martin E.M(2007)	Esbsco(Academic)	To teach health promotion for hypertension using telehealth	Qualitative study	Health education and patient empowerment are positive health promotion strategies in managing high blood pressure	Empowering patients to self-monitor their blood pressure together with educational support brings about active positive coping
Marshall,I.,Wolfe,D.& Mckevitt,C.(2012)	Cochrane	Evaluate patients' understanding of hypertension and drug taking	Systematic review	Patients' non-adherence is attributed to various individual perceptions of high blood pres-	Health education and treatment given by nurses must be designed to include patient

				sure	beliefs about hypertension
Andersen,U.,Simper,A.& Ibsen,H(2010)	Cochrane	Determine whether nurse led clinics aid in achieving target BP levels and also reduce physician workload	Randomized controlled trial(RCT)	Patients seen at the nurse led clinics reached target BP goals after few visits	Nurse led clinics are effective in managing hypertensive patients using interventions such as risk assessment and prescribing
Raftery, Yao, Murchie, Campbell & Ritchie (2005)	Cochrane	To determine the cost effectiveness of nurse led clinics in primary health care	RCT	Nurse led clinics were cost effective compared to other management modalities	Nurse led clinics produced positive patient outcomes at a lowered cost in primary health care
Hatchett R (2005)	Manual	Describe how nurse led clinics are to be set up and run	Scientific journal	Activities carried out at led includes included risk management, health education,	Nurse led clinics were instrumental in promoting well being of hyper-

				medication management	tensive patients
Rudd et al (2004)	Pubmed	To test the efficacy of physician-directed, nurse-managed, home-based system for hypertension management with standardized algorithms	RCT	Pharmacological management by telenurses based on standardized algorithms demonstrated positive results for hypertension management	Treatment algorithms enabled nurses to identify effective medications for hypertensive patients even through the medium of telenursing.
HSFO & RNAO(2005)	Manual	Develop a best practice guidelines to help in the nursing management of hypertension	Systematic literature review	Nurse management of hypertension should address diagnosis,risk assessment,health education and lifestyle modifications	Health education by nurses on lifestyle interventions and risk assessment have been instrumental bring about controlled blood pressure