A CLINICAL PRACTICE GUIDELINE FOR PREHYPERTENSION

IN ARMY SOLDIERS

By

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Abstract

The purpose of this project was to present a proposal for implementing and evaluating a new prehypertension clinical practice guideline (CPG) at the U.S. Army Sergeant Major Academy, Ft. Bliss, Texas. Prehypertension has been identified as being a precursor to hypertension, and is a fairly new concept. Individuals identified as having prehypertension have an extremely increased risk for developing hypertension. One population at great risk is the military, in particular the U.S. Army. Army soldiers are at great risk due to the nature of their occupation, as well as deployments to the Middle East to fight in the war on terror. One particular group within the U.S. Army is the Sergeant Major Academy, which represents the senior ranking, most elite of the enlisted Army. Sergeants Majors are at great risk for developing hypertension due to the presence of risk factors such as: prehypertension, smoking, hyperlipidemia, and stress. By implementing and evaluating a new prehypertension CPG, Sergeant Majors are less likely to develop hypertension and require intensive medical intervention. Pilot testing the CPG at the Sergeant Majors Academy can determine whether permanent implementation is appropriate. The ultimate goal is to prevent progression to hypertension through education, management, and follow-up.
CHAPTER ONE

Introduction

The purpose of this project was to present a proposal for implementing and evaluating a new prehypertension clinical practice guideline (CPG) at the U.S. Army Sergeant Major Academy, Ft. Bliss, Texas. Prehypertension is a major risk factor for hypertension (HTN) and the incidence of deaths related to HTN has been steadily increasing over the last decade (U.S. Department of Health and Human Services, 2004). Hypertension is defined as having a systolic blood pressure measurement equal to or greater than 140 mm Hg or a diastolic blood pressure measurement equal to or greater than 90 mm Hg, use of a hypertensive medication, or being informed more than once by a healthcare professional that an individual has HTN (AHA Heart Disease and Stroke Statistics-2009 Update). Prehypertension is defined as a systolic blood pressure measurement between 120 mm Hg and 139 mm Hg, and/or diastolic blood pressure measurement between 80 mm Hg and 89 mm Hg (U.S. Department of Health and Human Services, n.d.). Efforts to identify prehypertension have increased with the objective of instituting early interventions to prevent progression to HTN (U.S. Department of Health and Human Services, 2004). There have been impressive efforts to improve identification of prehypertension in the general public (U.S. Department of Health and Human Services, 2004b). However, these efforts have not reached military populations, despite evidence that veterans’ may be at even greater risk for hypertension than the general population (Jorgensen, 2009).

This chapter begins with an overview of physiological theory related to HTN and prehypertension, followed by the significance of prehypertension and HTN. Lastly, a brief overview of the Sergeant Major Academy is presented as the context and sample population for a new prehypertension CPG. The Sergeant Major Academy encompasses the highest, most elite of the non-commissioned officers (NCOs) in the Army and most likely represents a high at risk
group for prehypertension and HTN as it relates to stress, smoking, and hyperlipidemia. The background will also include information regarding the military potential risk for prehypertension and HTN, as well as a brief overview of a CPG as it relates to the identification and treatment of prehypertension. The chapter concludes with the purpose statement and specific aims of the best practice proposal.

Physiological Theory Related to Hypertension and Prehypertension

Hypertension is defined as an elevation in systolic and/or diastolic blood pressure. There are two general categories of HTN, essential or primary HTN and secondary HTN. The focus will be on primary HTN, also known as essential hypertension. Essential hypertension is a chronic elevation in blood pressure that occurs without correlation to another disease process. According to the Joint National Committee’s Seventh Report (JNC 7) (2004) on high blood pressure, prehypertension is a systolic pressure between 120 mm Hg and 139 mm Hg and/or a diastolic pressure between 80 mm Hg and 89 mm Hg (Porth & Matfin, 2009). Therefore, HTN is a systolic pressure equal to or greater than 140 mm Hg and/or a diastolic pressure equal to or greater than 90 mm Hg (Porth & Matfin, 2009).

Pathophysiology. Blood pressure reflects the rhythmic ejection of blood from the left ventricle, which is defined as systole. Blood Pressure rises during systole as the left ventricle contracts and falls as the heart relaxes during which the ventricles fill with blood, known as diastole. The systolic pressure reflects the peak pressure during systole and diastolic pressure represents the lowest pressure during diastole (Porth & Matfin, 2009). Blood pressure is regulated by the kidneys. This is on a continual basis, whereas in some instances the brain via the renin-angiotensin-aldosterone (R-A-S) system and vasopressin are activated to help maintain homeostasis of blood pressure (Porth & Matfin). Several variables can affect blood pressure,
such as stroke volume, the elasticity properties of the aorta and large arteries, and resistance to blood flow (Porth & Matfin). However, in the kidneys two major mechanisms affect fluid volume which can cause an increase in blood pressure. One mechanism is a direct effect on cardiac output and the other is an indirect effect, resulting from the auto-regulation of blood flow and its effect on peripheral vascular resistance (Porth & Matfin). This can be affected by many disease processes. However, when the body senses excess fluid volume the blood vessels constrict causing an increase in blood pressure. Other mechanisms can cause increased blood pressure as well, such as insulin resistance and metabolic abnormalities (Porth & Matfin).

_Hypertension Risk Factors and Prehypertension_

Many factors have been linked to the development of HTN, such as family history, age, race, impaired glucose tolerance, type 2 diabetes, hyperlipidemias, and obesity (Porth & Matfin, 2009). Lifestyle risk factors are associated with HTN as well, such as high salt intake, excess alcohol consumption, dietary intake of potassium, calcium, and magnesium, smoking, and stress (Porth & Matfin). All of these behaviors have been linked to HTN, and by controlling and monitoring these different risk factors individuals can lessen their risk of developing HTN. Since JNC 7 (2004) it has been noted that those diagnosed with prehypertension have a very high risk of developing HTN if not treated early. HTN is a multi-factorial disease process, but one that is easily detectable and treatable.

_Hypertension and Prevalence to CVD_

Hypertension is one of the many disease processes related to cardiovascular disease (CVD). If left untreated it may result in severe heart conditions, such as atherosclerosis. Atherosclerosis puts an individual at risk for developing other major atherosclerotic cardiovascular disorders, including coronary heart disease, heart failure, stroke, and peripheral
HTN can also cause left ventricular hypertrophy by increasing the workload of the heart. This leads to coronary heart disease, cardiac dysrhythmias, sudden death, and congestive heart failure (Porth & Matfin). More importantly HTN has been found to account for the majority of all those diagnosed with CVD (AHA American Heart Association Heart Disease and Stroke Statistics-2009 Update, 2009). In 2005 the American Heart Association reported that 57,356 people died solely from HTN and this number has been shown to steadily grow over the years.

*Treatment for Hypertension*

The most common treatment for HTN is medication. According to The Seventh Report of The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7), multiple medications are available to reduce blood pressure and control HTN (U.S. Department of Health and Human Services, 2004). Most individuals with HTN typically need to be prescribed more than one medication to manage their HTN. The first line of pharmacologic therapy is thiazide-type diuretics, such as chlorothiazide (Diuril) and hydrochlorothiazide (Microzide, HydroDIURIL) (U.S. Department of Health and Human Services). Other medications include: angiotension converting enzyme inhibitors (ACEIs), beta blockers, aldosterone receptor blockers (ARBs), and calcium channel blockers (CCBs) (U.S. Department of Health and Human Services). Although, new medications have become available research shows that thiazide-diuretics produce the best result in preventing cardiovascular complications of HTN (U.S. Department of Health and Human Services). Most importantly
once an individual has been prescribed, medication adherence is a must in order to manage HTN and to prevent complications (U.S. Department of Health and Human Services).

Significance

Approximately 80,000,000 Americans have some form of CVD (AHA Heart Disease and Stroke Statistics-2009 Update, 2009), and approximately 73,600,000 have HTN (AHA Heart Disease and Stroke Statistics-2009 Update). This equates to 1 in 3 Americans at risk for HTN (AHA Heart Disease and Stroke Statistics-2009 Update). Approximately 1.47 million Americans are in the U.S. military with 558,840 in the U.S. Army, which means the military are a large portion of the U.S. population and also are at great risk for CVD and HTN (USA.gov, 2010). However, research is lacking that targets military personnel in relation to HTN and CVD.

In 2004 the Joint National Committee through the National Institutes of Health (NIH) published its Seventh Report on the prevention, detection, evaluation, and treatment of high blood pressure, in response to the overwhelming issue of HTN. In order to prevent HTN and decrease its prevalence JNC developed a new category of HTN, identified as prehypertension. Prehypertension is not a disease category, it is a designation to identify individuals at high risk for developing HTN so that health care providers can be made aware of the potential risks involved (U.S. Department of Health and Human Services, 2004). This allows for early implementation of interventions to prevent or delay HTN from developing (U.S. Department of Health and Human Services). JNC 7 stated that through lifestyle modifications and early treatment that the prevalence of HTN and CVD could be decreased by identifying prehypertension in clients (U.S. Department of Health and Human Services). A major responsibility of the healthcare professional is to not only recognize prehypertension but to treat it accordingly and to educate clients about risk factors and lifestyle changes needed to prevent
the development of essential HTN. This means providing education on prehypertension to healthcare professionals, as well as providing guidelines to treat prehypertension in clients.

Background: The Military Context for The Project

Understanding the military context is essential to develop an effective CPG for identifying prehypertension in a military population. The mission of the Army is to conduct both operational and institutional missions “by providing prompt, sustained land dominance across the full range of military operations and spectrum of conflict in support of combatant commanders” (U.S. Army, n.d.). The Army is one branch of the U.S. military and represents 38.0% of all military members (USA.gov, 2010). There are 558,000 active duty Army military members, categorized as either enlisted or officer. The number of enlisted soldiers in the Army is 462,833 plus 4,498 cadets/midshipmen for a total of 467,331, with 91,509 officers (USA.gov).

Demographic characteristics of the Army soldiers differ somewhat from the general public, and the demographics also differ somewhat according to rank. For enlisted Army soldiers, all ethnicities are represented, with Caucasian at 61.1%, 12% Hispanic, 20.9% African American, 3.5% Asian, and 2.5% listed as other (ARMY Demographics, 2009). The general public when compared to the U.S. Army shows that depending on the age, minority groups either rank higher or lower (ARMY Demographics). There are more men than women, with women only making up 40.3% of the total enlisted Army soldiers and men making up 64.2% of the enlisted Army soldiers (ARMY Demographics). The education level of enlisted is approximately 84% with a high school diploma, while 81% of officers have a bachelor’s degree or higher because in order to be an officer in most cases you need at least a bachelor’s degree (Maxfield, 2008). The average age of an enlisted Army soldier is 21 years, with the majority of Army soldiers between the ages of 18 and 24 years (Support Army Recruiting, 2008). There is a general assumption that
Army soldiers are physically fit due to the emphasis on physical fitness in the military. However, there is evidence that this population is at risk for CVD (Prue-Owens, 2007). Although, only 3% of Army active duty were diagnosed with CVD, a majority of those diagnosed were the senior officer leaders, such as those fifty and older (Prue-Owens). The Armed Forces Institute of Pathology reported (as cited in Prue-Owens, 2007) that CVD was one of the top five causes of mortality for all ranks from 1998 to 2002. Furthermore, the Armed Forces Institute of Pathology reported (as cited by Prue-Owens, 2007) for active duty service members age 50 and above, CVD was the number one cause of death. This is consistent with the general population, but the pattern of risk factors is different for military personnel.

**Risk Factors**

According to Prue-Owens doctoral dissertation (2007), for most Army soldiers, obesity or being overweight typically is not the issue related to CVD since only about 5% of active duty Army report a body mass index (BMI) greater than or equal to 30, which is considered obese. Army soldiers are also expected to comply with physical fitness standards as well. Therefore, being overweight could lead to disciplinary or administrative action. However, smoking is a major risk factor for CVD and HTN, and approximately 27% of active duty personnel currently smoke (Prue-Owens). Increased stress has also been reported as a risk factor for HTN and CVD, as well as high cholesterol due to unhealthy eating habits. Currently, the war on terror is a high priority for the U.S. Army, with thousands deployed to the Middle East. There is strong evidence that veterans of war experience high levels of stress, a risk factor for HTN (Jorgensen, 2009). Despite evidence that Army soldiers are at risk for HTN, there has been little effort to prevent HTN by identifying prehypertension. There also has been a lack of effort to implement measures to reduce risk for progression to hypertension in this population.
Overview of Sergeant Major Academy

The setting for piloting the clinical practice guideline for prehypertension was the Sergeant Major Academy of the U.S. Army. This academy is a group of soldiers who are the most elite and highest ranked among the NCOs in the Army. The mission of the Sergeant Major Academy is focused on developing higher functioning non-commissioned officers through professional military education in order to manage the challenges of full spectrum operations in an era of persistent conflict. The vision of the Sergeant Major Academy is to be a foundation and building block that fosters the “intellectual capacity to develop non-commissioned officers who are warrior leaders, critical and creative thinkers, leader developers, and resource managers who have the right mix of education for leadership requirements of full spectrum Joint, Interagency, intergovernmental, and Multinational (JIIM) operations. The point is to transcend from a military organization that trains soldiers to that of an academic institution that educates soldiers” (United States Army Sergeant Major Academy, 2009).

Demographics

Demographic data about the Sergeant Major Academy is unavailable, due to the high level of training, security nature and confidentiality. The Sergeant Major Academy consists of approximately 600 students out of the total 1,036 active duty post members (Ft. Bliss AAA-166 Military Labor report, 2009). However, it is generally known that the Sergeant Major Academy consists of predominantly men between the ages of 30 to 40 years. The age is higher than the general military population because this rank is typically achieved only after 15 to 20 years of service and sequential promotions over time. A variety of ethnicities are represented; however, the percentages are not available. This population was selected for piloting the proposed CPG because they are likely to be at risk for HTN due to stress related to their rank, incidence of
smoking and hyperlipidemia with the intention of identifying prehypertension for the purpose of instituting measures to prevent progression to hypertension. Also, due to their senior enlisted rank, Sergeant Majors can influence and educate the younger enlisted Army soldiers about prehypertension.

*Overview of Military Health Care Services*

Free health care is provided to all Army personnel. For service members in active duty not deployed, health care is delivered on base or at an off-base site approved by the military health insurance organization, Tricare. In addition to acute care needs, soldiers are required to have annual physical exams which typically include height/weight, hearing, mental health and other basic assessments. The Sergeant Major Academy receives more in-depth physical examinations through the Army Physical Fitness Research Institute (APFRI), which also examines muscle strength, body fat percentage, cardiac functioning, and tobacco use.

The current clinical practice guideline developed by the Veterans Administration of the Department of Defense for hypertension addresses diagnosis, evaluation, management, screening, and treatment. However, the current CPG does not include guidelines for prehypertension. Clinical practice in the military is guided by CPGs, which are developed for specific health issues. Therefore, in order to identify and treat prehypertension a CPG specific for prehypertension needs to be developed in order to prevent HTN in Army personnel.

*Overview of Clinical Practice Guidelines*

CPGs are systematically developed statements to assist health care professionals and clients to make appropriate decisions about healthcare for specific clinical situations (U.S. Department of Health and Human Services, n.d.a). They define specific treatments for managing and treating clients. The statements contain recommendations for care based on evidence based
on systemic review and synthesis of the medical literature (U.S. Department of Health and Human Services, n.d.a). The purpose of the guideline is to assist healthcare professionals and clients to make appropriate decisions about healthcare for a specific disease process. This is accomplished by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of a specific disease process, as well as defining practices that meet the needs of most clients in most circumstances (U.S. Department of Health and Human Services, n.d.a). Typically, an expert panel convenes to construct CPGs. They are an unpaid committee chosen based on their scientific and clinical expertise (U.S. Department of Health and Human Services, n.d.a). Lastly, the CPG is reviewed by more experts with similar backgrounds of the expert panel (U.S. Department of Health and Human Services, n.d.a). After recommendations and edits have been considered and annotated the CPG is made available for review by the general public (U.S. Department of Health and Human Services, n.d.a). After all recommendations for change have been heard and considered, the final CPG is implemented in the appropriate settings.

Currently a CPG is in place for diagnosing and managing HTN in the primary care setting. It was created by the Department of Veterans Affairs in May, 1999. Their target population is veterans and department of defense beneficiaries 17 years and older with HTN, with the exclusion of pregnant clients (U.S. Department of Veterans Affairs, 2008). The CPG provides guidelines for identifying and diagnosing individuals with abnormal blood pressure based on the criteria: systolic greater than 140 mm Hg and diastolic greater than 90 mm Hg. However, prehypertension is not addressed. The CPG focuses on identifying and diagnosing, managing, and treating HTN. The authors of the CPG suggest HTN be diagnosed based on blood pressure readings on two separate occasions. The blood pressure must contain a systolic
blood pressure greater than or equal to 140 mm Hg and/or a diastolic blood pressure greater than or equal to 90 mm Hg. The CPG makes recommendations for lifestyle modifications, and states risk factors for HTN as well. The CPG also provides teaching on HTN, but does not include referrals for treatment. With the increasingly growing number of individuals with HTN and the related high incidence of death related to HTN, it would follow that a focus on prevention of HTN as opposed to treatment of HTN could prove to be more beneficial and could decrease the incidence of HTN among Americans. This could be accomplished by constructing a separate CPG aimed at identifying, diagnosing, managing, and treating prehypertension. This would shift the focus from treatment of HTN to prevention of HTN.

**Purpose Statement and Specific Aims**

The purpose of this project was to present a proposal for implementing and evaluating a new prehypertension clinical practice guideline (CPG) at the U.S. Sergeant Major Academy, Ft. Bliss, Texas. The specific aims for the prehypertension CPG were to identify individuals with prehypertension based on specific blood pressure measurements, and risk factors related to HTN: smoking, stress, and hyperlipidemia and to recommend treatment and/or management for those risk factors.

**Summary**

HTN as it relates to CVD is the number one killer of Americans and is a major health issue that needs to be addressed. Many risk factors are associated with HTN, including smoking, stress, and hyperlipidemia. The Joint National Committee’s Seventh Report (2004) on HTN identified prehypertension as a high risk factor for HTN as well. The military makes up a large portion of the American population and also are at great risk for developing HTN, especially the U.S. Army which is the largest military service. However, in the Army the risk factors differ
from the general population. In particular, the Sergeant Major Academy is an especially high risk group due to the risk factors involved, including stress related to rank. HTN is manageable and treatable; however, the number of individuals diagnosed with HTN continues to increase.

The diagnosis and treatment of prehypertension as a precursor to HTN is a strategy to begin addressing the prevention of HTN. Currently CPGs address HTN, but none address prehypertension. This is an issue since individuals who have prehypertension will further progress to HTN if not treated. Therefore, the purpose of this project is to propose a prehypertension CPG to be implemented and evaluated within the highest ranks of the enlisted Army, the Sergeant Major Academy active duty service members.
CHAPTER TWO

Review of Literature and Evidence

Introduction

This chapter reviews the literature and other evidence about risk factors for HTN and recommendations for reducing these risk factors when prehypertension is identified in a military population. The risk factors addressed for prehypertension are stress, smoking, and hyperlipidemia. The relationship of each risk factor with prehypertension and HTN is discussed, as well as strategies that may decrease these risk factors, as well as pharmacological therapy. Lastly, strategies are discussed for identifying prehypertension and HTN, such as: proper measurement of blood pressure, and proper identification of associated risk factors.

Significance of Prehypertension

Prehypertension is a major risk factor for HTN, and if not identified and treated can develop into HTN which is a serious condition. Prehypertension is a major risk factor for HTN, and is further compounded by one or more additional risk factors, including smoking, stress, and hyperlipidemia. When prehypertension is combined with one or more other risk factors there is a high probability of development of HTN. Prehypertension is defined as a systolic blood pressure of measurement between 120 mm Hg and 139 mm Hg and/or diastolic blood pressure measurement between 80 mm Hg and 89 mm Hg, but is not a diagnosis. Prehypertension is a precursor to HTN, which is defined as a systolic blood pressure measurement equal or greater than 140 mm Hg or a diastolic blood pressure equal or greater than 90 mm Hg, use of a hypertensive medication, or being informed more than once by a healthcare professional that an individual has HTN. If prehypertension is identified and treated, as well as the other risk factors involved then the probability of development of HTN is likely to decrease. However, there is a
lack of research concerning the identification and treatment of prehypertension as a means to decrease the development of HTN.

Risk Factors for Prehypertension and Hypertension

Stress

One of the risk factors for prehypertension and HTN is stress. Stress can be due to psychological or physiological factors. Stress, according to Hans Seyle (as cited by Porth & Matfin, 2009), is “a state manifested by a specific syndrome of the body developed in response to any stimuli that made an intense systemic demand on it.” The stress response is a normal function of the body meant to be an acute response to stimuli, and it is activated to bring the body back to a stable state and is deactivated when homeostasis is reached (Porth & Matfin).

Under normal circumstances, the neural responses and hormones released during the stress response do not persist long enough to result in damage to vital tissues (Porth & Matfin). When the neural responses and hormones do persist due to a chronic state of stress then harmful effects can result. One effect of the stress response is the release of antidiuretic hormone and vasopressin from the hypothalamus and posterior pituitary gland. The releases of these hormones results in an increase in water absorption by the kidneys and vasoconstriction of blood vessels, which then leads to increased heart rate and blood pressure (Porth & Matfin). Therefore, chronic stress causes elevated blood pressure and overtime can lead to prehypertension and ultimately HTN if not treated.

In a study conducted in 2006 by Kang, Bullman, and Taylor, former prisoners of war (POWs) had significantly higher increased risk of posttraumatic stress disorder (PTSD), and those who were diagnosed with PTSD also had significantly increased risks of cardiovascular disease including HTN (Kang, et al.). The POWs and non-POWs were compared to validate the
findings. Military members are at great risk for developing PTSD a form of severe psychological stress, which means that they are at an increased risk for developing cardiovascular diseases such as HTN (Kang, et al.). Currently, a high number of Army soldiers including Sergeant Majors are deployed to the Middle East to fight in the war on terror, and either have been POWs or run the risk of becoming a POW. Therefore, the Army soldiers that are deployed run the risk of chronic high levels of stress.

Hamer, Molloy, and Stamatakis (2008) (as cited in von Kanel, 2008) examined the relationship between psychological stress and risk for cardiovascular disease, including HTN. Using the 12-item version of the General Health Questionnaire which rated psychological stress, an increased risk of CVD was predicted in relation to psychological stress (Hamer, et al.). The researchers found that 54% of the 6,576 participants, who were identified as having psychological stress, had an increased risk of a CVD event during the follow-up period of seven years (Hamer, et al.). They concluded that psychological stress was predictive of CVD and further research was needed to examine interventions for psychological stress to reduce HTN, since it is part of CVD (Hamer, et al.). Therefore, Army soldiers who are identified as having psychological stress are at high risk for HTN and prehypertension, as well as CVD.

In a recent study by Granado, Smith, Swanson, Harris, Shahar, and Smith (2009), the link between high-stress situations, such as combat deployments was examined as a risk factor for HTN (Granado, et al.). The sample consisted of 77,047 U.S. active duty Reserve/National Guard members (Granado, et al.). After exclusions and narrowing the sample, the sub-analysis of deployed service members included 8829 participants (Granado, et al.). The results showed that 6.9% has newly reported HTN linked directly to deployments in either Iraq or Afghanistan and those who were deployed several times compared to those who did not deploy were 1.33 times
more likely to report HTN (Granado, et al.). Increased deployment was associated with a greater chance of service members developing HTN. Army soldiers, including Sergeant Majors, are all at risk for deployment due to the current war on terror, and represent the largest U.S. military service currently deployed in the Middle East.

In summary, stress is a normal body function. However, if stress becomes chronic it can lead to an increase in blood pressure, which can result in prehypertension and HTN. According to the 2006 study on POWs and stress, POWs have a higher risk of stress and PTSD, a severe form of psychological stress. Army soldiers and Sergeant Majors run the risk of becoming POWs or have been a POW as a result of the current war on terror. In the 2008 study on psychological stress and CVD it was found that those who are identified as having stress, have a higher risk for CVD, which includes HTN and prehypertension since they are diseases of CVD. Therefore, Army soldiers and Sergeant Majors who have stress are at high risk for HTN and prehypertension. In the 2009 study on stress and combat deployment it was concluded that increased deployment was associated with a greater chance of development of HTN. Currently, Army soldiers and Sergeant Majors are either deployed or will be deployed due to the current war on terror. Ultimately, these studies show that the Army population is at great risk for stress due to the nature of their occupation, and this leads to an increased risk for HTN and prehypertension.

Smoking

Smoking is another major risk factor related to HTN. A 2009 study by Balakumar and Kaur, outlined how nicotine from cigarettes leads to HTN. Nicotine indirectly acts as a sympathomimetic agent by releasing catecholamines locally that elevates the blood pressure and results in HTN (Balakumar & Kaur). Nicotine also affects other body systems as well, which
result in HTN. Nicotine plays a role in the rennin-angiotension-aldosterone system (R-A-S) by prohibiting conversion to an enzyme that allows for vasodilation (Balakumar & Kaur). It also plays a role in increasing arginine vasopressin, which is a potent vasoconstrictor (Balakumar & Kaur). Altogether, nicotine has a negative effect on the cardiovascular system and potentially plays a role in the development of prehypertension and HTN.

McGraw, Turner, Stotts, and Dracup (2008), noted that although a decline in smoking has occurred over the last 25 years in the general population there has been a recent increase in smoking among active duty service members. The overall rate of smoking among all services is approximately 32.3%, with the U.S. Army and Marine Corps showing the highest percentages at 38.2% and 36.3% (McGraw, et al.). Smoking also increases with deployments to Iraq, among U.S. Army personnel (McGraw, et al.).

In summary, smoking is a major risk factor for prehypertension and HTN due to the effects it has via the nicotine in cigarettes, which can cause vasoconstriction leading to prehypertension and HTN. Smoking is also increasing among active duty service members, with the U.S. Army representing one of the largest smoking military services. Smoking increases for those service members who are deployed, and deployment is very common in the U.S. Army due to the current war on terror. Therefore, Army soldiers and Sergeant Majors are at high risk for smoking, which is means they are at high risk for HTN and prehypertension.

Hyperlipidemia

Hyperlipidemia is another risk factor for HTN. McGraw, Turner, Stotts, & Dracup, 2008 discussed the presence of hyperlipidemia among service members and how individuals can have dyslipidemia even if they have normal weight (McGraw, et al.). An individual’s total cholesterol plays a major role in CVD development, which includes HTN (McGraw, et al.). In individuals
with total cholesterol above 240mg/dL there was a 45.3% chance of some form of CVD development, which includes HTN (McGraw, et al.). The abnormal ratio of low-density cholesterol to high-density cholesterol and very-low-density cholesterol leads to atherosclerosis, which in turn leads to CVD events and worsening or development of severe HTN (McGraw, et al.). In the 2005 Department of Defense survey (as cited by McGraw, et al., 2008) assessing the health related behaviors of 16,000 active duty members, 17.7% had abnormal lipoprotein metabolism, and 12.1% were identified with having HTN. Other studies (as cited by McGraw, et al., 2008) have also shown high prevalence of HTN along with hyperlipidemia. In one study (as cited by McGraw, et al., 2008) out of a sample of 58 active duty members, HTN was detected in 38%, increased triglycerides in 28%, and low high-density cholesterol in 31%.

In summary, hyperlipidemia is a risk factor for HTN and prehypertension among Army soldiers. In the 2008 study that examined cholesterol and CVD, individuals with high levels of total cholesterol have an increased risk for CVD development, which includes HTN. According to the 2005 survey on health related behaviors, 17.7% of 16,000 active duty members had abnormal lipoprotein metabolism and 12.1% were identified as having HTN. In another study HTN was detected in 38% of active duty members who also had 28% increased triglycerides, and 31% low high-density cholesterol. The studies show that there is a high correlation between hyperlipidemia and HTN. Hyperlipidemia can exist in those of normal body weight, such as Army soldiers, and can lead to HTN and prehypertension.

Treatment and Prevention: Prehypertension and Hypertension

Treatment and Prevention: Stress

Lucini, Malacarne, Solaro, Busin, and Pagani (2009) examined the use of stress management to treat and prevent HTN. The two stress management interventions were (1)
breathing-guided relaxation training and (2) oriental massage, shiatsu (Lucini, et al.). In a sample of 70 participants, active relaxation was more beneficial than the oriental massage or no alternative stress management (Lucini, et al.). Active relaxation was found to further or slightly reduce arterial pressure, as well as relieve symptoms of stress and induce an improved profile of autonomic cardiovascular regulation (Lucini, et al.). Therefore, the researchers found it beneficial to use active relaxation to improve the health status of individuals’ with HTN both psychologically and physiopathologically.

Cakir and Pinar (2009) examined lifestyle modifications in hypertensive clients. One area was stress management. The researchers identified the causes of stress for the participants and encouraged them to express their fears and concerns about their health (Cakir & Pinar). The researchers also used established realistic and achievable goals; support in using appropriate coping strategies such as rational thinking, imagery, deep breathing, progressive muscular relaxation; and provision of sufficient sound sleep; praise of their accomplishments and progress, and gave assistance in obtaining referrals to social workers or psychologists for further counseling if needed (Cakir & Pinar). They found that the participants learned to manage their stress accordingly, and their blood pressure improved as a result (Cakir & Pinar).

In a research review by Cukor, Spitalnick, Difede, Rizzo, and Rothbaum (2009), various treatments for severe stress disorders among veterans were examined. One of the many suggested treatments was pharmacological therapy. Psychotherapy is the first line of treatment; however, pharmacological interventions could prove to be beneficial in the presence of other health concerns, such as HTN (Cukor, et al.). The most commonly used medications are antidepressants, specifically Selective Serotonin Reuptake Inhibitor (SSRIs) have been found to
be the most beneficial is controlling severe stress which could result in CVD events, such as HTN (Cukor, et al.).

**U.S. Army Resources: Stress**

There are resources available for Army soldiers who are identified as having a problem with stress. The Wellness Center is a resource available to all active duty members, retirees, family members, and civilian employees. A Wellness Center is located at every major military base. The Wellness Center covers the five aspects of wellness, which are spiritual, physical, mental, emotional, and social (Wellness Centers, n.d.). The Wellness Center offers tips on managing stress, such as taking a walk during a break, and making positive thinking a habit (Wellness Centers). The Wellness Center recommends that if you are feeling excessively stressed to contact the Community Mental Health for an appointment. The Wellness Center also offers classes on how to manage stress.

Another resource is the Restoration and Resilience (R&R) Center at Ft. Bliss, Texas. The R&R Center offers services for Army soldiers experiencing PTSD, a severe form of psychological stress (Post Deployment Healthcare, n.d.). The services offered include: biofeedback, individual/couple therapy, testing/cognitive rehabilitation, and family therapy (Post Deployment Healthcare). Alternative therapies are also offered, such as acupuncture, massage therapy, hot stone therapy, and reiki (Post Deployment Healthcare). There is even a meditation room, movement therapy room, and recreational room (Post Deployment Healthcare). However, the services are only available for those diagnosed with PTSD.

Lastly, there is the Army Physical Fitness Research Institute (APFRI). APFRI is not a medical program, but a leader development and enhancement program, which focuses on the complex interplay of health, fitness, leadership, and readiness (Army Physical Fitness Research...
Institute, n.d.). Classes and lectures on stress management are offered through the Executive Enhancement Program (EEP), which is available to the Sergeant Major Academy only (Army Physical Fitness Research Institute).

_Treatment and Prevention: Smoking_

Cakir and Pinar (2009) examined the use of several different lifestyle modifications to improve the condition of individuals with HTN. One modification was directed towards smoking cessation. The researchers provided the participants with information on the health hazards of smoking, encouragement to stop smoking, a specific time frame to quit smoking, motivation, and monitored the participants on a regular basis (Cakir & Pinar). They also provided information on the availability of support groups and state and community resources (Cakir & Pinar). This modification resulted in two participants out of ten who quit smoking (Cakir & Pinar). However, Vesthold Heartcare Study Group, 2003 (as cited by Cakir & Pinar, 2009) showed that smoking cessation based on lifestyle modification is more successful over a longer period. Smoking cessation requires planned, long-term education, psychological interventions, medical interventions, and monitoring (Cakir & Pinar).

Jorenby, Hays, Rigotti, Azoulay, Watsky, Williams, et al. (2006) examined the efficacy of varenicline, a nicotinic acetylcholine receptor partial agonist compared to placebo or sustained release bupropion for use in smoking cessation. A randomized, double-blind, placebo controlled study was conducted at various treatment centers with 1027 participants (Jorenby, et al.). The results were that 43.9% of the participants in the varenicline group were abstinent from smoking compared with 17.6% in the placebo group and 29.8% in the bupropion group (Jorenby, et al.). The authors concluded that varenicline was efficacious, safe, and well-tolerated
pharmacotherapy agent for smoking cessation, and that it’s short term and long-term efficacy exceeded that of both the placebo and bupropion (Jarenby, et al.).

Kenford, Fiore, Jorenby, Stevens, Smith, Wetter, et al. (1994) examined the success of smoking cessation or failure with and without the transdermal nicotine patch. They conducted two independent randomized, double-blind, placebo-controlled studies, one study consisted of 88 participants and the other consisted of 112 participants (Kenford, et al.). The results were that 46% in the first study and 41% in the second study completely quit smoking after use of the nicotine patch and remained non-smokers at the 6-month follow-up (Kenford, et al.). The researchers concluded that smoking status, whether abstinent or smoking, during the first two weeks of nicotine patch therapy was highly correlated with smoking cessation (Kenford, et al.).

U.S. Army Resources: Smoking

There are several resources available to active duty service members who would like to quit smoking. One available resource is the Wellness Center, which offers information and classes on tobacco cessation (Wellness Centers, n.d.). However, appointments must be made in advance for tobacco cessation classes, and they offer 4 sessions and one must attend one class per month (Wellness Centers). At each session Chatix, Zyban, Nicotine patch prescriptions are renewed and counseling and support are provided (Wellness Centers).

Another resource for tobacco cessation is the APFRI. APFRI offers classes and lectures on tobacco cessation. However, all services are only available for the Sergeant Major Academy. APFRI even offers case management for those identified as being at high risk for CVD, which includes tobacco use (Army Physical Fitness Research Institute, n.d.). APFRI also makes referrals to primary care physicians if necessary (Army Physical Fitness Research Institute).

Treatment and Prevention: Hyperlipidemia
In 2004 article in Consumer Reports on Health, it was discussed how high cholesterol should be treated. Two recommendations were made: (1) drug therapy, and (2) lifestyle modifications. The recommended medications were rosuvastatin (Crestor), the most powerful cholesterol-cutting drug, and ezetimibe (Zetia), a new type of drug used mainly with other cholesterol medications (Cholesterol: How Low Should You Go?, 2004). However, statins are the most commonly used medications to lower cholesterol (Cholesterol: How Low Should You Go?). In a 2002 British clinical trial (as cited by Cholesterol: How Low Should You Go?, 2004) it was found that medication use for high cholesterol reduced the risk of having a CVD event by approximately 25%. The recommended lifestyle changes include: (1) reduced intake of saturated fats to less than 7% of total calories a day, (2) minimized intake of trans fats, (3) consumption of less than 200 mg per day of cholesterol, (4) consumption of increased fiber, women should aim for about 25 grams under age 50 and 21 grams for women older than 50 and men should aim for about 38 grams under age 50 and 20 grams older than age 50 a day, (5) loss of excess weight by cutting calories and exercising, and (6) possible consumption of about 2 grams of plant sterols or sterol derivatives and about 25 grams of soy protein a day (Consumer Reports on Health, 2004).

In a research review by Nakashima (2000) the treatment of hyperlipidemia is explored. The author concluded, that the combination of diet, exercise, and drug therapy are effective and beneficial in the treatment of hyperlipidemia and the prevention of CVD events (Nakashima). In the Texas Coronary Atherosclerosis Prevention Study conducted by the U.S. Air Force (as cited by Nakashima, 2000) the administration of a statin significantly suppressed the onset of cardiovascular events among clients with average cholesterol levels, suggesting that statins are effective in primary prevention of cardiovascular events. Nakashima also noted that the three main lifestyle modifications needed to improve total cholesterol are diet, exercise, and weight
loss. However, if diet therapy does not improve cholesterol, drug therapy is recommended (Nakashima). The recommendations include: (1) reduced daily caloric intake, (2) reduced daily cholesterol intake of less than 300 mg, (3) saturated fat: monounsaturated fatty acid ratio and monounsaturated fatty acid: polysaturated fatty acid ratio should be 1:1 and 5:1, and (4) reduced intake of alcohol (less than 25mg/day) and sugar (particularly disaccharides and monosaccharides) (Nakashima). The recommended exercise regimen consists of at least 30-60 minutes of exercise three times a week for a total of 180 minutes of exercise a week, which may lower body weight (Nakashima).

_U.S. Army Resources: Hyperlipidemia_

There are several resources available for active duty service members. One resource would include the Wellness Center. The Wellness Center offers classes and information/literature on diet and nutrition, as well as high cholesterol (Wellness Centers, n.d.). They also offer free, noninvasive body composition tests, one-on-one counseling, machines for screening, and follow-up visits for long-term maintenance (Wellness Centers).

Another resource that is available is APFRI. APFRI also offers classes and lectures on cholesterol for those who exceed the national guidelines for cholesterol levels (Army Physical Fitness Research Institute, n.d.). The services offered are only available to the Sergeant Major Academy. APFRI also makes referrals to primary care physicians if necessary. They also offer case management for those who require it, through the Senior Leader Health Program (SLHP) (Army Physical Fitness Research Institute).

_Treatment and Prevention: Pharmacological_

According to JNC 7 several medications are available to reduce blood pressure and control HTN (U.S. Department of Health and Human Services, 2004b). Most individuals with
HTN typically need to be prescribed more than one medication to manage their HTN. The first line of pharmacologic therapy is thiazide-type diuretics, such as chlorothiazide (Diuril) and hydrochlorothiazide (Microzide, HydroDIURIL) (U.S. Department of Health and Human Services, 2004b). Other medications include angiotension converting enzyme inhibitors (ACEIs), beta blockers, aldosterone receptor blockers (ARBs), and calcium channel blockers (CCBs) (U.S. Department of Health and Human Services). Although, new medications have become available research shows that thiazide-diuretics produce the best result in preventing cardiovascular complications of HTN (U.S. Department of Health and Human Services, 2004b). Most importantly once a medication has been prescribed, medication adherence is a must in order to manage HTN and prevent complications (U.S. Department of Health and Human Services, 2004b).

Detection of Prehypertension and Hypertension

*Assessment and Blood Pressure Measurement*

Detecting HTN early by identifying those with pre-hypertension is a means to preventing progression to HTN or possible complications of HTN (U.S. Department of Health and Human Services, 2004b). Detection and diagnosis can be accomplished by routine blood pressure measurement during an office visit. According to JNC 7, an accurate measurement of blood pressure is pertinent to successful management and detection of high blood pressure (U.S. Department of Health and Human Services, 2004b). A study in 2008, examined the relationship between measuring blood pressure and the accuracy of blood pressure (Turner, Burns, Chaney, Conaway, Dame, Parks, et al., 2008). Client positioning and wait time was found to affect the accuracy of blood pressure measurement in adult ambulatory cardiology clients (Turner, et al.). Blood pressure must be measured as accurately as possible so that the client may be treated
accordingly. It’s also important for healthcare providers to identify those at increased risk for developing HTN and to evaluate their risk factors, such as cholesterol levels, smoking, and high levels of stress.

Identification of Risk Factors for Prehypertension and Hypertension

In the current Veterans Administration, Department of Defense CPG on HTN (2004) it is recommended that clients be screened and HTN diagnosed based on blood pressure measurements using a properly calibrated and validated instrument and screening at appropriate levels based on risk factors, at least annually in adults. The recommended risk factors that should be screened include: (1) lipid profile for dyslipidemia, (2) diabetes mellitus, (3) tobacco use, (4) total body weight, (5) current diet profile, (6) exercise regimen, and (7) other cardiovascular related disease processes such as heart failure, stroke, and chronic kidney disease (Veterans Administration, Department of Defense). However, stress was not addressed. Diabetes mellitus Type II (DM) is not a key factor when considering Army soldiers, since DM Type II is typically related to obesity and obesity is not an issue in the U.S. Army. Therefore, it will not be considered a risk factor for prehypertension and HTN as it relates to the U.S. Army. It’s also important to obtain an accurate client medical history, as well as conduct a proper physical examination to evaluate all vital signs (height, weight, blood pressure, temperature, respiratory rate, and oxygen saturation), as well as a focused examination of all body systems (Veterans Administration, Department of Defense). The more risk factors identified the higher chance of development or diagnosis of prehypertension or HTN.

Summary

Many research studies have examined HTN in many different aspects, such as risk factors for, treatment of, proper detection of, and relationships with other factors. Various risk factors
put individuals at an increased risk for developing HTN, such as stress, smoking, and hyperlipidemia. Another major risk factor is prehypertension, a pre-stage to development of HTN. It’s important to identify these risk factors for clients so that HTN can be prevented or treated early. Treatment includes medications, as well as specific strategies to eliminate risk factors to either prevent or treat HTN. Most importantly healthcare providers need to measure blood pressure accurately to properly identify clients who require treatment. It is also imperative that healthcare providers assess risk factors as well. If the client is diagnosed with prehypertension or other major risk factors for HTN, steps can be taken to prevent the development of HTN and the complications associated with it. In order to achieve this goal, a CPG to help healthcare providers treat prehypertension would be beneficial and could prevent development of HTN. The concept of prehypertension is relatively new. Therefore, the next step would be to create a clinical practice guideline for prehypertension. The CPG would focus on other risk factors for HTN, such as stress, smoking, and hyperlipidemia with the purpose of preventing progression of HTN. Lastly, the CPG would be tested in a sample population, such as the Sergeant Major Academy, and its effectiveness would be evaluated.
CHAPTER THREE: BEST PRACTICE PROPOSAL

Introduction

A Clinical Practice Guideline is a means for informing healthcare decisions for a given clinical situation, such as HTN. Currently a CPG exists for HTN. However, with JNC 7, prehypertension has emerged as a precursor to and risk factor for HTN. Although, prehypertension is not considered a disease it is considered high risk for HTN. Chapter three provides an overview of a CPG for prehypertension and the steps necessary to treat those identified with prehypertension who also have the following risk factors: stress, smoking, and hyperlipidemia. The prehypertension CPG will be implemented and evaluated at the Sergeant Major Academy in Fort Bliss, Texas for the ultimate purpose of preventing HTN in Sergeant Majors in the U.S. Army.

Prehypertension Clinical Practice Guideline Overview

The first step in identifying prehypertension is to properly measure blood pressure using proper technique and proper equipment. If the blood pressure measurement is less than the requirements for prehypertension (systolic blood pressure between 120 to 139 and diastolic blood pressure between 80 to 89) then no action is necessary in regards to treating prehypertension (U.S. Department of Health and Human Services, 2004b). However, education about prehypertension should still be provided to the client (U.S. Department of Health and Human Services, 2004b). If the blood pressure measurement does meet the requirements for prehypertension then the following risk factors should be evaluated: smoking, stress, and hyperlipidemia. If any of the risk factors are identified then treatment for each risk factor should be considered and discussed with the client (U.S. Department of Health and Human Services, 2004b). Please see Figure 1 for depiction of treatment options. Research has shown that treating
risk factors individually along with antihypertensive medication can be beneficial and prevent development or worsening of HTN (Veterans Administration, Department of Defense, 2004).

Summary

Prehypertension is a major risk factor for hypertension and early identification and treatment may prevent the development of HTN. Using a Clinical Practice Guideline aimed at identifying and treating prehypertension would allow healthcare providers to have clear guidelines to treat prehypertension, as well as other risk factors such as stress, smoking, and hyperlipidemia. Various interventions are available to reduce stress, smoking, and hyperlipidemia. It is the healthcare provider’s responsibility to discuss the significance of prehypertension with the client and to recommend the various treatments and lifestyle modifications needed to prevent development of HTN. Hypertension is a serious cardiovascular disease process that could result in fatality. Thus it is imperative to identify those with prehypertension, so that HTN can be avoided.
Figure 1. Prehypertension Decision Model

Prehypertension: Systolic Blood Pressure 120 mm Hg to 129 mm Hg and Diastolic Blood Pressure 80 mm Hg to 89 mm Hg

Risk factors present?

Yes

Management: Classes, counseling, and support groups at Wellness Center; Medication included; Classes and/or lectures, and case management at APFRI

Pamphlets/Literature on smoking--Available at Wellness Center

No

Management: Classes, counseling at Wellness Center; Community Mental Health services; Classes/lectures at APFRI

Pamphlets/Literature on stress management--Available at Wellness Center

Stress

Yes

Management: Classes, testing and information at Wellness Center; Classes/lectures, and case management available at APFRI

Pamphlets/Literature on high cholesterol--Available at Wellness Center

Hyperlipidemia

Yes

Management: Classes, counseling at Wellness Center; Community Mental Health services; Classes/lectures at APFRI

Pamphlets/Literature on stress management--Available at Wellness Center

No

Stress

No

Management:

Prehypertension:
Systolic Blood Pressure
120 mm Hg to 129 mm Hg
and Diastolic Blood Pressure
80 mm Hg to 89 mm Hg

Pharmacological Consultation:
Antihypertensive medications (i.e. thiazide diuretics, ACEIs, beta blockers, ARBs, and CCBs)

Provide educational information and literature on prehypertension and other risk factors and measures to prevent Hypertension (i.e. classes, pamphlets, and internet resources-available at Wellness Center)

Yes

No

Provide educational information on risk factors for prehypertension (i.e. via counseling and pamphlets)

Smoking

Yes

Management: Classes, counseling, and support groups at Wellness Center, Medication included; Classes and/or lectures, and case management at APFRI

Pamphlets/Literature on smoking--Available at Wellness Center

No

Management:

Provide educational information on risk factors for prehypertension (i.e. via counseling and pamphlets)
CHAPTER FOUR: IMPLEMENTATION AND EVALUATION

Introduction

The purpose of this project was to present a proposal for implementing and evaluating a new prehypertension clinical practice guideline (CPG) at the U.S. Sergeant Major Academy, Ft. Bliss, Texas. The prehypertension CPG would be designed to identify individuals with prehypertension based on specific blood pressure measurements, and risk factors related to HTN: smoking, stress, and hyperlipidemia and to recommend treatment and/or management for those risk factors. This chapter presents a proposal and timeline for implementation and evaluation for the prehypertension CPG at the U.S. Sergeant Major Academy, Ft. Bliss, Texas.

Implementation for Prehypertension Clinical Practice Guideline

Process for Approval

The first step in implementing the prehypertension CPG is to organize and create a formatted, formal proposal outlining the specifics of the CPG, which would include: pre-screening, education, and follow-up. The proposal would include the purpose of the CPG, the goals of the CPG, the plan for implementation for the CPG, and the expected outcomes and benefits for the CPG. Once a formal proposal has been written then a proposal meeting with the Deputy Commander for Clinical Services at William Beaumont Army Medical Center (WBAMC) at Ft. Bliss, Texas would be arranged in order to be granted approval for a pilot testing of the prehypertension CPG at the Sergeant Major Academy. The Deputy Commander for Clinical Services, who has oversight and accountability for medical care at WBAMC, would then approve or disapprove the proposed prehypertension CPG for pilot testing. Once, approval has been granted then the proposed plan for implementation would begin. Financing the pilot test would not be an issue since military funds are available for research projects, and it is not
very competitive but rather easy to receive funding. Therefore, budget for the pilot test for the prehypertension CPG will not be discussed as part of the plan for implementation.

Plan for Implementation

All Sergeant Majors currently assigned at the Sergeant Major Academy would receive pre-screening for prehypertension at APFRI (Army Physical Fitness Research Institute) via blood pressure measurement and evaluation for risk factors: smoking, hyperlipidemia, and stress. All Sergeant Majors would be required to receive the pre-screening. Pre-screenings would be available every Thursday at APFRI, since Thursdays are allocated as training days. APFRI would allot 30 appointments every Thursday so that each Sergeant Major could be pre-screened within 6 months. Additional staff would be allocated to APFRI to assist in the pre-screening of all the Sergeant Majors.

At each pre-screening the Sergeant Majors would be educated on pre-hypertension, as well as provided with literature and additional resources for information. If the Sergeant Major is identified as having prehypertension or other risk factors for HTN, such as: smoking, hyperlipidemia, and stress, follow-up would be required. APFRI already provides intensive case management for those at risk for CVD, but not for individuals who are identified as having prehypertension. The pilot testing for the prehypertension CPG would allow for APFRI to provide case management to individuals with prehypertension in order to keep track of their progress. Individuals would also be required to attend the classes and lectures offered on risk factor management, such as: tobacco cessation, high cholesterol, and stress management. They would also be referred to the WBAMC Wellness Center for additional resources, or the R&R Center for those identified as having PTSD, a severe form of psychological stress. The Sergeant Majors would be provided with education/information, classes/lectures, or medications if needed.
according to the risk factors present at time of pre-screening as dictated by the prehypertension CPG.

Constraints

Constraints for the pilot testing for the prehypertension CPG include: time and personnel. Sergeant Majors are only at the Academy for a year, which makes it difficult to follow-up. There are also a limited amount of personnel available at APFRI, and with the pilot testing additional personnel would be required in order to meet the goal of pre-screening every Sergeant Major on Thursdays only. Designated personnel would need to be provided, as well as a plan for follow-up once the Sergeant Majors leave the Academy.

Evaluation of Pilot Testing for Prehypertension Clinical Practice Guideline

Plan for Evaluation

The Sergeant Majors who were identified as having prehypertension would be followed-up at six months from the date of their pre-screening and pre-screened again to determine if the CPG had been effective. This would allow the Sergeant Majors to receive a follow-up appointment prior to leaving the Academy. Based on the follow up outcomes it can be determined whether or not the prehypertension CPG was effective based on the pre-blood pressure measurements compared to the follow-up blood pressure measurements to see if there was any improvement in their blood pressure. A post knowledge survey would also be conducted to assess their knowledge base for prehypertension and other risk factors such as: smoking, hyperlipidemia, and stress, to evaluate the effectiveness of classes and lectures they attended. Should the prehypertension CPG prove to be beneficial in preventing HTN, by lowering baseline blood pressures and eliminating present risk factors then it could be implemented on a permanent basis to be used at all bases for all active duty members.
Summary

The prehypertension CPG would first need to be proposed to the Deputy Commander for Clinical Services in order to implement a pilot test at the Sergeant Major Academy at Ft. Bliss, Texas. Upon approval, the prehypertension CPG would be implemented on a temporary basis to determine whether or not it is effective at preventing HTN. After six months, Sergeant Majors who were identified as having prehypertension would be followed-up to determine whether or not their blood pressure had improved, and if other risk factors were still present, such as: smoking, hyperlipidemia, and stress. Also, an analysis would be conducted to compare the numbers of individuals identified with prehypertension prior to the CPG and the number of individuals with prehypertension post implementation on the CPG. If after analysis of the data the CPG proved to be beneficial then it could be implemented on a more permanent basis. The ultimate purpose of the prehypertension CPG is to prevent progression to HTN through education, management, and follow-up through implementation and evaluation of the CPG in the military population.
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