Effect of Sitting and Supine Position on Measuring Blood Pressure among Healthy Students Faculty of Nursing Shendi University2017

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Abstract

Background: Blood pressure is commonly measured in the seated or supine position; however, the two positions give different measurement values. With that in mind, any time a value is recorded, body position should also be recorded(2).

AIM: - The aim of this study was to evaluate the effect of sitting and supine position on measuring blood pressure for healthy adult students.

Method: - Comparative analytical study done during the period from March to June 2017 from Faculty of nursing science .A total of 205 healthy young students measured by stratified simple random sampling by toys whom had accepted to participate in the study. In all subjects the blood pressure was measured subsequently in two positions: Sitting then supine, with the arm supported at the elbow and the cuff at the heart level. The data was analyzed by (SPSS), and presented in forms of tables and figures.

Result: - The blood pressure tended to drop in the setting position compared with the supine. Systolic and diastolic blood pressure was the highest in supine position (120/74 mm/hg) when compared the setting positions (116.2/74.5 mm/hg).SBP reading range from (0-4 mm/Hg) while in DBP was range from (0-0.5 mm/Hg). All blood pressure measurement in supine and setting position was not statistically significant with age.

Recommendation: -The study recommended that: suggested to use supine position when measuring blood pressure if there is not contraindicated, The nurses and other health worker personnel have to be document site of measuring blood pressure, and The study have to be done in large population to give scientifically evidence.

Key words: - blood pressure – position - healthy adult –

1.1. INTRODUCTION

Blood pressure measurements are internationally recognized as essential parameters for monitoring change in health and illness. Vital signs indicate the function of some of the body homeostatic mechanism, measurement and interpretation of it is important components of assessment that can yield information about underlying health status .During initial measurement of the clients vital sign the values are compare with the normal range to determine any variation that might indicate illness .The frequency with which to assess blood pressure should be individualized for each people. Healthy person may have vital signs checked only during annual physical examination; client seen in ambulatory seating and wellness clinics may requires infrequent checks (1).

Blood pressure is commonly measured in the seated or supine position; however, the two positions give different measurement values. With that in mind, any time a value is recorded, body position should also be recorded. It is widely accepted that diastolic pressures while sitting are higher than when a patient is supine by as much as 5 mmHg. When the arm is at the level of the heart, systolic pressure can be 8 mmHg higher**,** such as when a patient is in the supine position rather than sitting. A patient supporting their own arm (isometric exercise) may increase the pressure readings. If the patient's back is not supported (i.e., when a patient is seated on an exam table instead of a chair) the diastolic pressure may be increased by 6 mmHg. Crossing the legs also may raise systolic pressure by 2-8 mmHg. Arm position plays a dramatic role in value errors as well. If the arm is below the level of the heart, values will be too high; if the arm is above the level of the heart, values will be underestimated. For every inch the arm is above or below the level of the heart, a 2 mmHg difference will be found. (Pickering et al. *Circ* 2005; 111:697-716) (2).

It is known that many factors influence individual's blood pressure measurement. However, guidelines for accurately measuring blood pressure inconsistently specify that patient's position and they should keep feet flat on the floor. The study conducting that body position affected on the accuracy of blood pressure measurement (3).

The world health organization /international society of hypertension (WHO /ISH)guideline on Blood pressure measurement recommend that blood pressure should be routinely measured with patient seated with the arm supported at heart level but patients may also be supine or

standing provided that the arm is supported at heart level for all body posture (Campbell et al . 2005)

In addition, the approximation of the heart level or reference right atrium level is often vaguely mentioned or none mentioned at all (Pickering.2002). Prevalence of hypertension among rural population was 15.8% overall means of systolic and diastolic blood pressure were 128.6_+ 17.7 and 81.5_+ 11.6 respectively while the means among hypertensive individuals was 154.74_+ 14.4 and 97.98_+ 8.4 respectively known hypertensive individuals were 20.1% out of whom 71.7 %were hypertensive and 22.4 % have target organ damage (3) .

Monitoring blood pressure for client's measurement help nurses and medical staff to establish the ability of the clients to fill with blood, the efficiency of the heart as pump and the volume of circulation blood. It is normally taken using the arm but the thigh can also be used if required. Monitoring client blood pressure forms part of the assessment vital signs and to determining the clients cardiovascular status, general health and wellbeing, Remember, machine can and do mal function; if the reading seen too high or low given the client overall condition and demeanor recheck the measurement either by using another machine or by checking it manually .All devices should be inspected and calibrated annually (4).

1.2. Justification

Factors that can significantly influence blood pressure measurement are sometime erroneously neglected one of these factors is the position of the both the patient and the arm during BP measurement (Bailey & Bauer 1993, Norman et al .1999). Almost all of the studies evaluating blood pressure values bilaterally have demonstrated differences between the two values in a fair percentage of patients. It is not clear why this occurs, and hand dominance (i.e., left vs. right handedness) does not seem to play a role. Approximately 20% of patients will have differences of >10 mmHg between sides. When the difference in values is greater than 10 mmHg, other secondary causes for this variation should be investigated. These can include, but are certainly not limited to, coarctation of the aorta (i.e., narrowing of the aorta), congenital obstruction of the aorta, and upper extremity occlusion (Pickering et al. *Circ* 2005; 111:697-716) (3).

1.3. Objectives

General Objective:-

-To evaluate affect of sitting and supine position on measuring blood pressure for healthy adult students.

Specific Objective:-

1- To identify factor influence on measuring blood pressure.
2- To assess accurate position for measuring blood pressure.
3- To determine technical procedure and criteria for measuring BP.
4- To assess accuracy of machine or device measurement.
5- To assess the effect of supine position on measuring blood pressure reading and sitting position.
6- To identify different in mean reading of supine position and sitting position.

2. Literature Review

2.1. Blood pressure (BP):

Blood pressure is an important indicator in diagnosis and in the assessing treatment of patient. To measure blood pressure exactly, the cuffed upper arm and the heart level should be kept at same level whether the patient is reclining, sitting or standing (Potter & Perry, 1995). The following four positions that are often used in daily clinical practice are investigated: sitting position with arm supported at the right a trial level, standing with the arm supported at the right a trial level, supine position and supine position with legs crossed (5).

Blood pressure should be routinely measured having the patient comfortably seated, with the arm passively supported at the reference level of the right atrium (Petrie et al. 1986). Blood pressure measurement is perhaps the most frequently performed clinical procedure and important therapeutic decision relies on its accuracy However, its accuracy strongly depends both on the number of measurements and the circumstances during the procedure (Arm-strong 2002)(4).

2.2. Measuring Blood pressure (BP)

Is the force of blood pumped by the heart against the arterial walls? In humans the blood is pumped through two separate circuits in the heart: the pulmonary circuit and the systemic circuit. The right ventricle of the heart pumps deoxygenated blood through the pulmonary circuit to the lungs where CO2 waste is released and O2 is taken up by the blood. Oxygenated blood returns to the heart on the left side and is pumped out from the left ventricle into the aorta and to the systemic circuit where O2 is supplied to the rest of the body. Oxygenated blood travels through the arteries away from the heart towards body tissues while deoxygenated blood travels through veins towards the heart away from body tissues Blood pressure is measured in millimeters of mercury (mmHg), and is recorded as two separate values: systolic blood pressure and diastolic blood

pressure. The systolic BP occurs when the ventricles contract and eject blood into arteries; and the diastolic BP occurs when the ventricles relax and fill with blood from the atria. The average blood pressures of Healthy young adults (about 20 yrs old) are 120 / 80 mmHg. The first value (120) represents systolic and the second value (80) represents the diastolic BP. In this lab you will use a sphygmomanometer placed over the brachial artery of the arm to measure blood pressure (6).

2.3. The Effect of Changing Body Posture on Blood Pressure

Gravity is a constant force that influences nearly every aspect of biological activity, to some extent. The gravitational force on organisms follows physical laws that are well-known; thus, the gravity can have predictable effects. There are gravitational forces acting on physiological systems such as the cardiovascular and circulatory systems. Any fluid columns, like blood vessels, are subjected to large pressure gradients when subjected to sudden changes in body Posture, especially in humans which are designed for upright posture. There are physiological adaptations in the human cardiovascular system designed to counteract the effects of gravity on the circulatory system under postural changes such as when in a standing, sitting, or lying down (supine) position. Some of the things occur in the body in response to changes in posture are heart rate (number of heart beats per minute) and blood pressure (pressure of blood against arterial vessel walls). When you lie down in the supine position, your heart is at the same gravitational level as the blood vessels in our head and limbs. Therefore, when lying down your blood pressure is similar along your entire body and blood return to the heart is less influenced by the pull of gravity. When you stand for a long period of time without moving, or when you have lain down for a long time and stand up suddenly, you might experience a feeling of faintness or dizziness that passes quickly. This slight dizziness is due to the effects of gravity on the cardiovascular system. This sudden posture change from a supine to an upright posture creates a strong vertical gradient of gravitational pull on the fluid (blood) in our circulatory column. The heart is now below the head and neck, and the heart is approximately 2-4 ft above the legs. Blood pressure decreases briefly in the head and neck while pressure increases in the legs. Furthermore, the increased blood pressure in our lower limbs causes blood to pool in our venous system because the vessels are elastic and stretchy, unlike the rigid-walled arterial vessels. The venous system stores about 80% of your total blood volume while the arterial system stores about 10% at any one time. Thus, the venous system is a blood reservoir.

There are several things that occur in your body when you change from a supine to a standing position quickly: (1) there is a decrease in venous return of blood to the heart. Blood pools in the elastic-walled venous vessels due to the sudden increased gravitational pull on blood within your lower limbs; (2) there is a decrease in cardiac blood volume (end diastolic volume) due to the decreased venous return; and (3) there is a decrease in arterial blood volume and Blood pressure within your head and neck. These changes are sometimes accompanied by feelings of dizziness or lightheadedness, and might even lead to fainting (syncope).

When you change quickly from a supine to an upright posture there are several things that your body will do immediately to counteract the change in blood pressure and pooling of blood in the veins. (1) Your heart rate increases and pumps a greater volume of blood. This will increase blood pressure (BP) so that you avoid fainting. (2) The valves in your veins maintain a one-way flow of blood to the heart which aids venous return of blood to the heart. (3) Your skeletal muscles contract and help compress the veins providing resistance to pooling of blood. These muscle twitches act much like a flight suit of jet pilots which squeeze the body and provide resistance to the elastic-walled veins. (4) The nervous system elicits several compensatory and autonomic responses to restore normal blood volume and pressure. Your medulla oblongata has two autonomic centers: the cardiac and vasomotor center. The cardiac center responds by increasing sympathetic stimulation, by epinephrine/nor epinephrine, of increased heart rate by increasing cardiac pacemaker cell depolarization rates. The medulla also stimulates vasoconstriction of smooth muscle within arterioles, especially those leading to the brain, to increase blood pressure against the force of gravity (6).

2.4. Measuring Blood Pressure Responses to Changes in Body Posture

The sphygmomanometer is a tool to measure systemic blood pressure in the brachial artery. It attaches around the upper arm and has a pump with a valve, and a pressure gauge. Blood pressure is expressed as 2 numbers: the upper number or systolic blood pressure is the highest blood pressure resulting from contraction of the left ventricle. The lower number or diastolic blood pressure results from relaxation of the left ventricle. Note that while the pressure in the left ventricle may drop to zero, the pressure in systemic arteries is maintained by the elastic recoil of the artery walls. When the pressure in the blood pressure cuff is increased to greater than the

systolic pressure, the brachial artery will be temporarily occluded. As the pressure in the cuff is gradually decreased it will reach a stage where it is just below the
Systolic pressure. At this time blood will push through the artery in spurts at the end of ventricular contraction. At this time the blood can be heard rushing through the artery by auscultation distal to the blood pressure cuff. Sounds are detected first when pressure in the cuff approximates the systolic blood pressure. As the cuff pressure is reduced sounds of blood being pushed through the constricted artery will be heard until its pressure falls below the diastolic blood pressure. When sounds of blood moving in the artery can no longer be heard, the pressure in the cuff approximates the diastolic blood pressure (6).

Blood pressure measurement is performed during a physical examination, at initial assessment, and as part of routine vital signs assessment. Depending the clients condition the blood pressure measured by either a direct or an indirect technique. The direct method requires an invasive procedure in which an intravenous catheter with an electronic sensor is inserted into an artery and the artery transmitted pressure on an electronic display unit is read. The indirect method requires use of the sphygmomanometer and stethoscope for auscultation and palpation as needed (7).

The most common site for indirect blood pressure measurement is the client arm over the brachial artery. When the client condition prevents auscultation of the brachial artery the nurse should assess the blood pressure in the forearm or leg site. when the clients has any venous access devices such as(an intravenous infusion or arterivenous fistula for renal dialysis), surgery involving the shoulder, axilla , arm , or hand and injury or disease to the shoulder , arm or hand such as trauma , burns ,or application of a cast or bandage ;do not measure Blood pressure from brachial artery site . When blood pressure measurements in the upper extremities are not accessible, the popliteal artery, located behind the knee becomes the site of choice. The nurse can also assess the blood pressure in other sites such as the radial artery in the forearm and posterior tibias or dorsal is pedis artery in the lower leg because it is difficult to auscaltate sound over the radial, tibias and dorsal is pedis arteries these sites are usually palpated to obtain systolic reading (7).

2.5. Assessing blood pressure:

Selecting the proper equipment and following procedural technique are basic to ensuring an accurate reading. Psychomotor skills acquired with practice , are needed for manipulate the blood pressure equipment , a sphygmomanometer is advice used to measure indirect BP and a cuff that consist an inflammable rubber bladder connected to two pieces of rubber tubing , one pieces of the tube connects the bladder to manometer or gauge , and the second tubing is attached to pressure bulb with a release valve to inflate and deflate the cuff when pressure is applied to the bulb , air enter the bladder and inflates the cuff . The sphygmomanometer wears with usage. If there is a defect in any part of system m the blood pressure reading will be inaccurate, The aneroid gauge needle or mercury in the manometer column should be at a zero reading, when the cuff is deflated and should be rise evenly when pressure is applied to the bulb. The valve should turn freely and all tubing should be intact, secured connection to prevent air from leaking out the system. An accurate reading also requires the correct width of the blood pressure cuff as determined by the circumference of the clients extremities, the bladder cuff must encircle the width and the length of the site according to the American Heart Association (1987), the bladder width should be approximately 40 % of the circumference or 20% wider than the diameter of the midpoint of the extremity. To measure the width of the bladder, the nurse should place the cuff length wise on the client's extremity and extend the width to cover 40 %of the extremity circumference. The length of the sphygmomanometer bladder should be twice the width. A falsely elevated reading will result if the bladder is too narrow and a falsely low reading will result if it is too wide. Use stethoscope to auscultation the blood pressure, place the diaphragm of stethoscope over the area where the pulse was palpated, when BP cuff is removed inspect the area, and note abnormalities such as bruising, hematoma, or skin tears. Document in the medical record the systolic and diastolic BP, the site, the size of BP cuff (systolic reading in thigh may be 10 to 40 mm Hg higher than in the arm, but diastolic reading is generally the same) (8).

Blood pressure is the amount of the blood pumped by the heart in relation to size and condition of arteries. Measured by force of blood on arteries wall, measured in millimeters of mercury (mmHg). Arteries take blood away from the heart ,arterial pressure is the force exerted by the blood upon the walls of the arteries .Veins bring blood to the heart , venous pressure is the force exerted by the blood upon walls the veins .Blood pressure generally refer to arterial pressure .(9)

2.5.1. Systole over Diastole:-

Blood pressure measurement =systolic pressure over diastolic pressure = 120/80 mmHg (healthy measurement). During systolic pressure, ventricles contract. Blood pressure is the highest during systole .During diastolic pressure, ventricles relax and refill. Blood pressure is lowest during diastole. BP = 120/80 = systole /diastole.

Impossible to precisely categories 120/80 considered normal for healthy adult Systolic pressure 140mmHg or below, diastolic pressure 90 mmHg or below (10).

2.5.2. Factor influence blood pressure variability :

Circumstances of measurement.-Age.-Race.-Respiration.-Pain.-Emotion.-Exercise.Tobacco and alcohol.- Bladder distension..-Diurnal variation (BP lowest during sleep). Condition of the kidney, nervous system and blood vessel. Volume of water in body. Salt content of body.

2.5.2.1. Age:

BP gradually increase throughout childhood and correlate with height, weight and age .These normal change make it difficult to identify abnormal blood pressure level for children at various developmental stages .Age New born have a systolic pressure of about 75mmhg the pressure rises with age reaching peak at the onset of puberty and then tend to decline somewhat. in older adult elasticity of the arteries is decreased –The arteries are rigid and less yielding to the pressure of the blood .this produces an elevated systolic pressure because the walls no longer retract as flexibly with decrease pressure. The diastolic pressure may also be high. In adult systolic and diastolic pressure increase gradually as age advances.

2.5.2.2. Exercise:

Physical activity increase the cardiac output and hence the blood pressure. For reliable assessment of resting blood pressure wait 20 to 30 minutes following exercise.

2.5.2.3. Stress:

Stimulation of the sympathetic nervous system increase cardiac output and vasoconstriction of the arterioles thus increasing the blood pressure reading. However, severe pain can increase blood pressure greatly by inhibiting the vasomotor center and producing vasodilatation. 4-Race:- African American older than 35 years old tend to higher blood pressure than European of the same age although the exact reasons for these difference are unclear .

2.5.2.4. Sex

After puberty, female usually have lower blood pressure than male of the same age, this differences are thought to be due to hormonal variation. After menopause women generally have high blood pressure than before.

2.5.2.5. Medication:

any medications that alter one or more of the previously describe determining factor may causes change in blood pressure ,including caffeine may increase or decrease blood pressure, diuretics which decrease blood volume ,narcotic, analgesia and specific antihypertensive agents .

2.5.2.6. Obesity:

Both childhood and adult obesity predispose to hypertension.

2.5.2.7. Diurnal variations:

Pressure is usually lowest in the morning when metabolic rate is lowest, then rises throughout the day and peaks in the late afternoon or early evening.

2.5.2.8. Medical conditions:

Any condition affecting the cardiac output ,blood volume ,blood viscosity and/or compliance of the arteries has a direct affect on blood pressure.

2.5.2.9. Temperature:

Because of increase metabolic rate fever can increase blood pressure, however external heat causes vasodilatation and decrease blood pressure. Cold causes vasoconstriction and elevated blood pressure (4).

2.5.3. Cardiac Cycle:

Its complete cycle of the heart event beginning of the first heart beats to the beginning of the next.

2.5.3.1. Systolic pressure (sp):

Highest recorded arterial pressure reading occurs near the beginning of the cardiac cycle.

2.5.3.2. Diastolic pressure (DP):

Lowest recorded arterial pressure reading, resting phase of cardiac cycle.

2.5.3.3.Phases of cardiac cycle:

The cardiac cycle is broken down into four phases included:-

2.5.3.4. Phases one: A trial systole:-

It occur when the atria is electrically stimulated and is denoted as the P-wave in an ECG. This is stimulation causes the ventricle to contract.

2.5.3.5.Phase two: ventricular systole:

It occurs when the ventricle is electrically stimulated and is denoted as the QRS-segment wave in an ECG. This stimulation causes ventricle to contract and its here that we get our systolic pressure reading.

2.5.3.6.Phase three: early diastole:-

It is when the heart begins to relax after it is stimulation and is denoted at T-wave in an ECG. Here the ventricles relax.

2.5.3.7.Phase four: diastole:

The heart finishes up its relaxation period; this moment is denoted as TP-period in an ECG.The diastolic pressure reading comes from the diastolic period of phases of the cardiac cycle.

2.5.3.8. Mean Arterial pressure (MAP):-

Average pressure throughout cardiac cycle
~ = diastolic pressure (DP) + 1/3 (SP –DP).

2.6. PULSE Pressure:-

Difference between maximum and minimum pressure measured = (SP – DP)(10).

2.7. Procedure for measuring blood pressure:-

1- Explain procedure and ensure adequate understanding.
2- Before proceeding check that the client is rested and has not been consuming alcohol or nicotine, and advice them not talk during the procedure to ensure an accurate reading.
3- Ensure client is positioned correctly , blood pressure should be taken in the same position and no the same limb each time if possible
4- Used correct size cuff for an accurate reading
5- Apply the cuff 2.5 cm above the antecubital fossa with the clients palm up wards; ensure that the cuff is level with the sphygmomanometer and client heart.
6- If using automated device commence the reading. If undertaking the measurement manually located the radial pulse on the arm then inflate the cuff until pulse is not the sphygmomanometer scale.

7- Deflate the cuff for 30 second ensuring that all air has been released to allow circulation to return to the limb.
8- Locate the brachial artery and place the stethoscope over the pulse.
9- Inflate the cuff again to approximately 20 -30 mm Hg above the estimated systolic reading.
10- Deflate the cuff slowly, at approximately 2 – 3 mm Hg per second and listen for and note the first sound that your hear (systolic); this will be followed by other sound listed, note the point at which the sound disappear (diastolic).
11- Compare reading with client's previous reading and normal range and note any abnormality or improvement. If necessary repeat the reading but allow the clients to rest the limb between attempts.
12- Record blood pressure measurement on appropriate , documentation and report any abnormality
13- Remove and clean equipment. Wash hands thoroughly (11).

3. Material and Methodology

3.1. Study Design:

Comparative analytical study done during the period from March to June 2017 to evaluate affect of sitting and supine position on measuring blood pressure among healthy adult students.

3.2. Study area:

Shendi or Shandi is a town in northern Sudan, situated on the east bank of the Nile River 150 km northeast of Khartoum. Shandi is also about 45 km southwest of the ancient city of Meroe. Located in the River Nile state, Shandi is the center of the Ja'aliin tribe and an important historic trading center.

3.3. Setting:

Faculty of nursing science one of the faultiest of shendi university, located at convention of medicine and health faculties , established science 1994,and provide four years bacholrea of nursing science , and have post graduate studies.

3.4. Study population:

All students registered to the academic year 2016 -2017 from all classes were included in the study.

3.4.1. Exclusion criteria:-

All students whom were suspended were excluded from the study.

3.5. Sampling method and sample size:

3.5.1. Sampling Method:

Stratified simple random sampling technique was used in the study.

Educational level	Class number	Sample size
Class II	**109**	**50**
Class IV	**118**	**55**
Class VI	**120**	**56**
Class VIII	**94**	**44**

Strata sample sizes are determined by the following equation:

$nh = (Nh / N) * n$

Where:-

nh is the sample size for stratum h

Nh is the population size for stratum h

N is total population size

And n is total sample size.

3.5.2. Sample size:

205 were participating in the study, and they were selected by toes.

3.6. Data collection tools:

Recording sheet was developing by the researcher composed three parts as:

Systolic and diastolic reading in sitting position.

Systolic and diastolic reading in supine position.

Age of participant.

3.6.1. Normal standard for sitting and supine position:

Blood pressure	Normal reading	Standard reading
Systolic pressure	90-140mm/hg	120mm/hg

Diastolic pressure	60-90mm/hg	80mm/hg

3.7. Material:

Classical sphygmomanometer devices with stethoscope, alcohol cotton swab were used for measuring reading.

3.8. Data Collection Technique:

The data was collected during two weeks , after lecture in for every class level during the day time the purpose of the study were explained to every students, Then blood pressure taken was initial in supine position then in sitting position from the arms .

3.9. Data analysis tools:

The data was coded then analyzed by manual simple then by used statistical method (master sheet) Then analyzed by computer – soft ware program (SPSS)different statistical measures was used (frequency , means , percentage ,STD). And presented in form of figures and tables.

3.10. Ethical consideration:-

The study was approve by the research committee of the faculty , then a permission was taken from dean faculty , then the purpose of the study was explain verbally to participant and they have chance to refuse or continue .

Table (1) Distribution of the study group by age

N=205

Age	Frequency	Percent
17-22years	**185**	**90.2%**
>22years	**20**	**2.05%**
Total	**205**	**100.0**

The above table showed that,(90.2%) young adult, and (9.8%) were middle adult.

Table (2) measurement of systolic blood pressure reading in supine position

N=205

Systolic blood pressure	Frequency	Percent
normal 90 - 140mm/hg	**204**	**99.5%**
above140mm/hg	**1**	**0.5%**
Total	**205**	**100.0**

The above table showed that, normal systolic blood pressure reading (99.5%), and high reading above 140mm/hg was (0.5%).

Table (3) measurement of systolic blood pressure reading in setting position

N=205

Systolic blood pressure	Frequency	Percent
normal 90 - 140mm/hg	**201**	**98.00%**
above140mm/hg	**4**	**2.00%**
Total	**205**	**100.0**

The above table showed that, normal systolic blood pressure reading (98%),and high reading above 140mm/hg was (2%).

Table (4) measurement of diastolic blood pressure reading in setting position

N=205

diastolic blood pressure	Frequency	Percent
normal 60 - 90mm/hg	204	99.5%
Above90mm/hg	1	0.5%
Total	**205**	**100.0**

The above table showed that, normal diastolic blood pressure reading (99.5%), and high reading above 90mm/hg was (0.5%).

Table (5) measurement of diastolic blood pressure reading in supine position

N=205

diastolic blood pressure	Frequency	Percent
normal60 - 90mm/hg	201	98.0%
high >90mm/hg	1	0.5%
low<60mm/hg	3	1.5%
Total	**205**	**100.0**

The above table showed that, normal diastolic blood pressure reading (98%), and high reading above 90mm/hg was (0.5%).while lower reading was (1.5%).

Table (6) cross tabulation between age of the study group and systole & diastole blood pressure reading in setting and supine position

	Position			
	Setting		supine	
	systole	diastole	systole	diastole
Age	0.5*	0.74	0.74	0.80

*significance = 0.5 ** highly significance =0.000

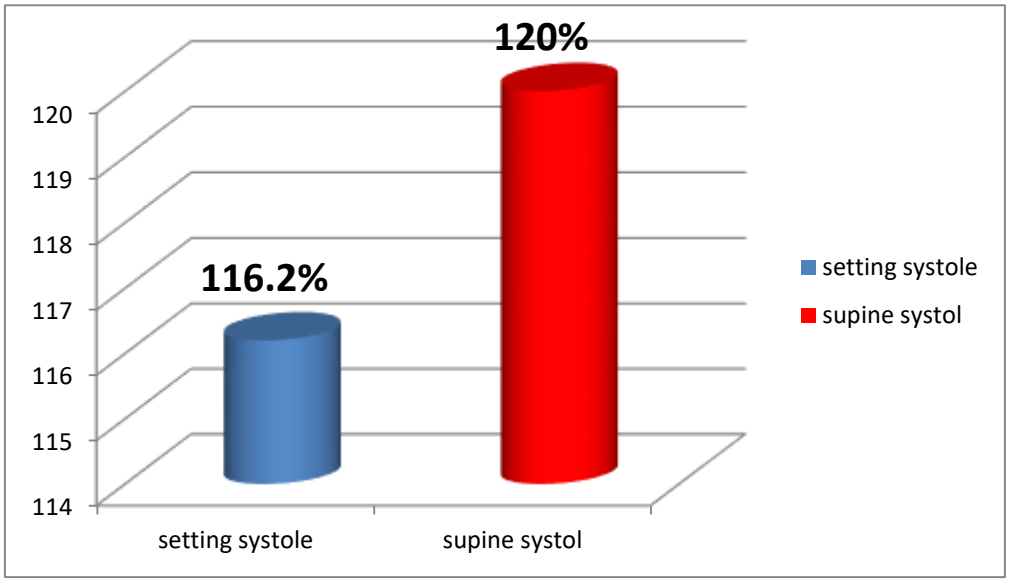

Figure (1) showed the mean average reading of systolic blood pressure in setting & supine position

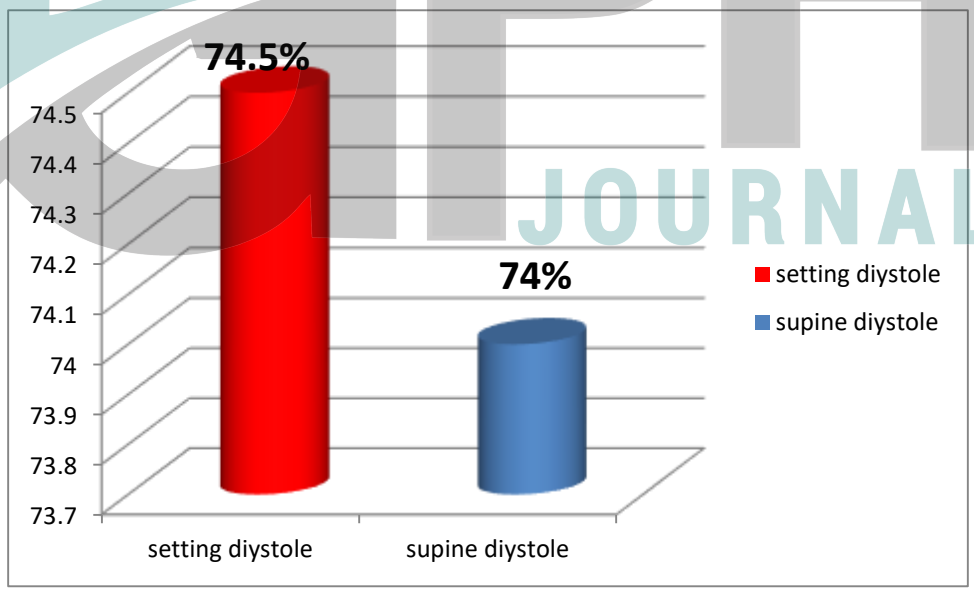

Figure (2) showed the mean average reading of diastolic blood pressure in setting & supine position

Discussion

Blood pressure is commonly measured in the seated or supine position; however, the two positions give different measurement values. With that in mind, any time a value is recorded, body position should also be recorded. It is widely accepted that diastolic pressures while sitting are higher than when a patient is supine by as much as 5 mmHg. To measure blood pressure exactly, the cuffed upper arm and the heart level should be kept at same level whether the patient is reclining, sitting or standing(2).

The result of the study represented that most of study group (90.2 %) they were young adult and the age range between (17-22 years) while little of them (9.8 %) they were middle age adult and their age more than 22years. In addition the study reflected the mean reading of systolic blood pressure measurement in setting position was (116.2 %) while the systolic blood pressure on supine position was (120%).Farther more the study revealed the mean reading of diastole blood pressure measurement in setting position was (74.5 %) while the diastolic blood pressure on supine position was (74%).from the above result finding it was indicated that the average in variation of systolic blood pressure reading range from(0-4mm/hg) while average of diastolic was range from (0-0.5mm/hg)

Several studies compared BP values when measured in sitting or supine positions, reporting variations which ranged from 0 to a maximum of 10mmHg. In most studies, the average SBP was higher when measured in supine than sitting position, whereas the mean DBP was usually highest in sitting position. The sample of this study subjects showed the same trends for SBP and DBP, although the differences in SBP and DBP across positions were generally smaller that in most previous studies.. Although we cannot be sure that the duplication of BP measurement is enough to overcome BP variations across recordings, taking the mean value between two measurements reduces the possibility of a large measurement error or a large random variation (2).

This study was taken during the rest and the researcher was excluded any factors that change the measurement of blood pressure. The result of this study represented that, majority of systolic blood pressure measurement was in normal reading 90-140 mm/hg in supine position and represented by (95.5%).also the result of this study revealed same presented of normal diastolic blood pressure in supine position, while the study justified that majority of normal reading of systolic and diastolic blood pressure in sitting position was (98%).

Accurate blood pressure measurements, including blood pressure differences when lying down versus standing up and sitting can be very helpful when healthcare providers are trying to monitor the condition. However, it's important to understand the impact that each position has on blood pressure levels. Accurate blood pressure measurements, including blood pressure differences when lying down versus standing up and sitting can be very helpful when healthcare providers are trying to monitor the condition. However, it's important to understand the impact that each position has on blood pressure levels (8).

furthermore, the result of this study justify that , the mean reading of supine blood pressure was (120/74mm/hg)and the mean reading of setting position blood pressure was (116.2/74.5mm/hg),these finding indicated that supine measurement was near to standard blood pressure reading than setting position. This study confirms and expands existing research suggesting that BP significantly varies according to body position, and that BP values as measured in Fowler's position are intermediate between those recorded in sitting and supine positions. Despite the degree of BP variation is small on average, a relevant proportion of subjects showed large differences in BP from one position to another, suggesting that more emphasis should be posted on body position. Current guidelines suggests that BP can be measured indifferently in supine or sitting position, although it has been repeatedly documented that diastolic (DBP) and, less convincingly, systolic (SBP) BP can be higher if measured in sitting position. Given that the differences between supine and sitting BP have been found to be relatively small, health professionals commonly do not consider or underestimate the effect of position when interpreting the results of BP measurements. However, even a mean difference of a few millimeters of mmHg may have relevant implications, because those individuals with larger differences in BP as measured in supine or sitting position may be at risk of substantial changes, Systolic and diastolic blood pressure was the highest in supine position when compared the other positions. There was no significant statistical relationship between age group of the study and their reading in different position

Conclusion

The conclusion of this study was that:-

- Body position affected the accuracy of BP measurement in healthy young students.

- The present study shows that the assumption that BP in sitting and supine position can be considered similar is Incorrect even when the arm of the patient is placed at the correct right atrium level in both positions.

- The average blood pressure reading in supine position(120/74) is nears to standard reading than setting position(116.2/74.5).

-systolic blood pressure reading range from (0-4 mm/Hg) while in diastolic pressure was range from (0-0.5 mm/Hg).

Recommendation

The study recommended that:-

1-suggested to use supine position when measuring blood pressure if there is not contraindicated.

2- The nurses and other health worker personnel have to be document site of measuring blood pressure.

3- The study has to be done in large population to give clear scientifically evidence.

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