

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Shendi University



Faculty of Graduate Studies and Scientific Research

Research about:

**Assessment of Nurses Knowledge Regarding
Factors Affecting Nursing Measurement of
Blood Pressure.**

**Pediatric Unit Elmak Nimer University
Hospital**

*A thesis Submitted in Requirements of Partial Fulfill for The
Master's Degree in pediatric Nursing Science*

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قال تعالى:

﴿لَقَدْ كَرَّمْنَا بَنِي آدَمَ وَحَمَلْنَاهُمْ فِي الْبَرِّ وَالْبَحْرِ وَرَزَقْنَاهُمْ مِنَ
الطَّيِّبَاتِ وَفَضَّلْنَاهُمْ عَلَى كَثِيرٍ مِمَّنْ خَلَقْنَا تَفْضِيلًا﴾
صدق الله العظيم

سورة الإسراء - الآية (70)



Dedication

To those

*Who give me the best of life without payment
Happily, I would like to dedicate this simple attempt
to,,,,,*

*To essence of life and meaning of humanity
"MY MOTHER"*

*The one who have taught me how to be a valuable member
of the community
"MY FATHER"*

*To who share with me all moments of happiness and sadness
and made me happy at time of sadness*

" My lovely family"

*To who gave me sense of everlasting warmth and beauty
"My best friends"*

Acknowledgment

*First the greatest thanks to God Almighty
Allah.*

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*For her support, guideline and patience, thanks
alot for her.*

*Finally I would like to thanks all friends and
colleagues those who make me feel friendship and share
with me the all burden of carrying out this research.*

Especial thanks:

" to all my teachers "

ملخص الدراسة

مراقبة ضغط الدم هي جزء من جمع البيانات الروتينية و المستمرة للأطفال .

أجريت هذه الدراسة الوصفية المقطعية في مستشفى الملك نمر الجامعي في مدينة شندي لتقييم معرفة الممرضات عن العوامل التي تؤثر في قياس الممرضات لضغط الدم في الفترة ما بين أغسطس - نوفمبر 2016 . شملت الدراسة عدد تسعين ممرضا، وكانت عينة شاملة، وقد تم جمع البيانات عن طريق الاستبيان. الذي شمل أربعة أجزاء ويحتوي علي (21) سؤال . و تم تحليل البيانات بواسطة برنامج الحزم الإحصائية للعلوم الاجتماعية .

أظهرت نتائج الدراسة أن 65.6% لديهم معرفة متوسطة عن تعاريف ضغط الدم ، بينما أظهرت الدراسة أن 50 % لديهم معرفة قليلة عن أجهزة الجسم التي تنظم ضغط الدم.و 50% منهم لديهم معرفة عن الطرق التي يقاس بها ضغط الدم ، وأيضا أظهرت الدراسة انه لا توجد هنالك علاقة إحصائية بين سنين خبرة الممرضات ومعرفة الممرضات عن العوامل التي تؤثر في قياس الممرضات لضغط الدم .

وأخيرا توصلت الدراسة إلي العديد من التوصيات أهمها: إقامة ورش العمل والدورات التدريبية عن ضغط الدم وتوفير جميع المعدات اللازمة والمناسبة لقياس ضغط الدم في قسم الأطفال.،كما أوصت أن يكون قياس ضغط الدم من المهارات الروتينية مثل العلامات الحيوية الأخرى.

Abstract

Blood pressure monitoring is part of routine and ongoing data collection for children. This was descriptive a cross-sectional study was conducted at E Imek Nimer university hospital in Shendi city to assess knowledge of nurses about factors affecting nursing measurement of blood pressure in pediatric unit at the period extended from august to November 2016 . The Sample was total coverage sample ,included (90)nurses. Questionnaire was used for data collection which composed of four parts and contain 21 question . data were analyzed by using SPSS

The result showed that Two third of study group had fair knowledge about definitions of blood pressure and half of study group had poor knowledge about blood pressure regulating system , Half of Study group were knowledgeable about methods of measuring blood pressure . The statistical test revealed that no statistical relation between years of nurses experience and knowledge of nurses about factors affecting nurses measurement of blood pressure .

Finally The study recommended that hospital must be develop of Training program for the nurses about blood pressure measurement , proper equipment for measuring blood pressure should be available in pediatric unit . Blood pressure must be measured routinely similar to others vital signs.

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Introduction

Blood pressure monitoring is a part of routine and ongoing data collection for children 3 years of age and older. Take a baseline blood pressure for a child of any Age ⁽¹⁾. Also blood pressure is a function of Cardiac output and systemic vascular resistance is the force that blood exerts against the walls of blood vessels ⁽²⁾. Blood pressure measurement is indicated in any situation that requires assessment of cardiovascular health, including screening for hypertension and monitoring the effectiveness of treatment in patients with hypertension, Therefore Proper techniques are important to ensure consistent and reliable measurements ⁽³⁾.

When the nurses measure blood pressure, they record two points the systolic (contraction) pressure which means pressure of the blood as a result of contraction of the ventricles, that is the pressure of the height of the blood wave, and the diastolic (relaxation) pressure of the blood within the arteries ⁽²⁾ which means is the pressure when the ventricles are at rest , then is the lower pressure, present at all times within the arteries. The difference between the diastolic and the systolic pressures is called the pulse pressure⁽⁴⁾.

There are various factors that commonly cause errors when nurses measuring a patient's blood pressure. blood pressure measurement is affected by wide factors which are the mercury is not set to zero; the glass is dirty; numbers on the manometer are not clearly visible; equipment may be tilted, or not correctly calibrated or positioned; there may be a defective control valve, or leaks due to cracked or perished rubber tubing ⁽⁵⁾. There are different between normal blood pressure in children and normal blood pressure in adult. In adults, normal blood pressure reading is less than 120 mmHg for the systolic pressure and less than 80mmHg for the diastolic. Normal blood pressure reading in children vary depending on the age, sex and height of children ⁽⁶⁾.

Variability of blood pressure is greater than in adults Values obtained during sucking , crying, or eating will not be representative As with adult ⁽⁷⁾.

Justification

- ❖ Blood pressure measurement is indicated in any situation that requires assessment of cardiovascular health ⁽³⁾, The accurate measurement of blood pressure is essential to promoting positive patient outcome.
- ❖ Blood pressure is affected by wide range of factors, also the most diagnosis of abnormal blood pressure based on accurate measurement of blood pressure. Therefore the researcher need to conduct this research to assess nurses knowledge regarding factors affecting nursing measurement of blood pressure in pediatric unit.

Objectives

General objective

To assess nurses' knowledge regarding factors affecting nursing measurement of blood pressure in pediatric unit Elmak Nimer university hospital.

specific objectives:

- ❖ To assess nurses knowledge about blood pressure .
- ❖ To identify nurses knowledge about measurement of blood pressure.
- ❖ To identify Correlation between years of nurses experience and nurses knowledge about factors affecting nursing measurement of blood pressure .

Chapter One

Introduction

Justification

Objectives

Literature review

Blood pressure (BP):

Is a measurement of the pressure within the vascular system as the heart contracts (systole) and relaxes (diastole). BP indirectly reflects your patient's overall cardiovascular functioning ⁽⁸⁾. It is also reflects the pressure exerted on the walls of the arteries. This pressure varies with the cardiac cycle, reaching a high point with systole and a low point with diastole). Therefore, blood pressure is a measurement of the pressure of the blood in the arteries when the ventricles are contracted (systolic blood pressure) and when the ventricles are relaxed ⁽⁹⁾. According to the WHO definition, Blood pressure is a measure of the force that the circulating blood exerts on the walls of the main arteries. The pressure wave transmitted along the arteries with each heartbeat is easily felt as the pulse. The pressure caused by the heart pumping blood to all parts of your body is called blood pressure ⁽¹⁰⁾).

Determinants of Blood Pressure:

Arterial blood pressure is the result of several factors:

- pumping action of the heart .
- peripheral vascular resistance (the resistance supplied by the blood vessels through which the blood flows) .
- blood volume and viscosity ⁽⁴⁾.

Pumping action of the Heart:

When the pumping action of the heart is weak, less blood is pumped into arteries (lower cardiac output), and the blood pressure decreases. When the heart's pumping action is strong and the volume of blood pumped into the circulation increases (higher cardiac output), the blood pressure increases ⁽⁴⁾.

Peripheral vascular resistance:

Peripheral resistance can increase blood pressure. The diastolic pressure especially is affected. Some factors that create resistance in the arterial system are the capacity of the arterioles and capillaries, the compliance of the arteries,

and the viscosity of the blood. The internal diameter or capacity of the arterioles and the capillaries determines in great part the peripheral resistance to the blood in the body. The smaller the space within a vessel, the greater the resistance. Normally, the arterioles are in a state of partial constriction. Increased vasoconstriction, such as occurs with smoking, raises the blood pressure, whereas decreased vasoconstriction lowers the blood pressure⁽⁴⁾.

Systemic vascular resistance or total peripheral resistance is the force opposing the movement of blood through the blood vessels. SVR primarily affects diastolic blood pressure. SVR is typically thought of as “vasomotor tone.” This means that blood vessels can change (increase or decrease) their diameter (constriction or dilation) depending on the needs of the body. BP is highest as blood leaves the left ventricle into the aorta. The differences in BP as blood flows through the systemic circulation are necessary for filtration of nutrients through capillaries⁽²⁾.

Blood Pressure Regulation:

Many factors other than the force and rate of the pumping heart help to maintain or regulate blood pressure. BP is mainly determined by the small arteries and arterioles. The arterioles have very thick walls in proportion to their bore. They are primarily made up of smooth muscle, which has an inherent tonus, helping to regulate the amount of blood flow within . They can quickly dilate and contract, to regulate blood pressure. In addition, the greatest pressure drop occurs within the arterioles.

Blood pressure regulating systems include the nervous, endocrine, cardiovascular, and urinary systems⁽²⁾.

Factors affecting blood pressure are those that affect cardiac output , Systemic vascular resistance, or both. These factors may include the amount and contents of circulating blood, elasticity and ability of smooth muscles in arterial walls to dilate and constrict, plaque build-up on arterial walls, kidney functioning, and hormones. Special sensory receptors in blood vessel walls, called baroreceptors, are stimulated by a change in blood pressure. They send

signals that cause various body reactions that help maintain normal BP. Scientists also believe that diet, physical and emotional status, smoking, and heredity influence blood pressure . Many medications are available to help regulate blood pressure. It is very important to maintain blood pressure within normal limits ⁽²⁾.

The body has four hemodynamic regulators for blood pressure control:

❖ Blood volume:

The volume of blood in the circulatory system. Blood pressure is proportional to the blood volume. Hemorrhage causes a loss in blood volume that, in turn, lowers the blood pressure. Rapid infusion of intravenous fluids causes an increase in volume and subsequent rise in pressure.

❖ Cardiac output:

The major factor that influences systolic pressure ⁽¹¹⁾.

❖ Peripheral vascular resistance

The size and distensibility of the arteries, which is the most important determinant of diastolic pressure. Arterial resistance (decreased distensibility) is encountered when the left ventricle pumps blood from the heart under pressure during the systolic phase. The arteries contain smooth muscles that allow them to contract, which decreases their compliance (tone) and causes resistance. The varying degrees of tone allow some of the arterioles to remain constricted while others dilate to protect the body's circulatory system from accommodating a greater blood capacity than the actual blood volume ⁽¹¹⁾.

❖ Viscosity

The thickness of the blood based on the ratio of proteins and cells to the liquid portion of blood. The greater the viscosity, the harder the heart must work to pump blood, with a resultant increase in blood pressure.

These regulators work in unison to create a constant blood pressure. For instance, when the blood volume decreases, the body compensates with an

increased heart rate and vasoconstriction that increases peripheral resistance to maintain normal pressure and functions of the vital organs.

Blood pressure is a result of the cardiac output and peripheral vascular resistance⁽¹¹⁾.

Factors that affect Blood Pressure:

Developmental Stage:

An average newborn has a systolic BP of about 60 to 80 mm Hg and a diastolic BP of 40 to 50 mm Hg. It increases gradually throughout childhood. A child or adolescent's BP depends on body size; therefore, a smaller child or adolescent has a lower blood pressure than does a larger child.

Both systolic and diastolic BP continue to increase with age as a result of decreased arterial compliance and changes in the left ventricular wall. These normal aging process changes can lead to cardiovascular instability⁽¹²⁾.

Family History:

A family history of hypertension markedly increases the likelihood of an individual's developing hypertension⁽¹²⁾.

Exercise:

Physical fitness has been shown to reduce blood pressure in many individuals. However, muscular exertion temporarily increases blood pressure as a result of increased heart rate and cardiac output. You should, therefore, wait about 30 minutes before you assess the blood pressure of someone who has been physically active.

Body Position:

Blood pressure is higher when a person is standing than when sitting or lying down. Readings are higher if taken with the client's arm above heart level or if the arm is unsupported at the client's side. Seated readings are higher if the client's feet are dangling rather than resting on the floor or if the legs are crossed at the knees.⁽¹²⁾

Stress:

Fear, worry, excitement, and other stressors cause BP to rise sharply because of sympathetic nervous system stimulation (fight-or-flight response). One example of this is “white-coat hypertension.” This occurs when a patient’s blood pressure is elevated in the physician’s office or clinic—a situation in which he is likely to experience stress—but not at other times. However white coat hypertension may indicate what happens during other times of stress, so if it is consistently displayed, treatment may be indicated ⁽¹²⁾.

Pain:

Pain often causes the blood pressure to increase. However, severe or prolonged pain can significantly decrease blood pressure.

Race:

African Americans have a higher rate of hypertension than do European Americans, and they have a higher incidence of complications and hypertension related deaths.

Obesity:

As a rule, obesity increases blood pressure. This increase is related to the additional vascular supply required to perfuse the large body mass and the resultant increase in peripheral resistance ⁽¹²⁾.

Diurnal Variations:

Generally, blood pressure varies according to the person’s daily schedules and routines. blood pressure is lower while the person is sleeping and when he first gets up, rising during the day and dropping again toward bedtime.

Medications:

Many medications alter blood pressure. This effect may be intended, as with antihypertensive medications, or unintended, such as the drop in blood pressure that often results when a client receives pain medication.

Many over-the counter preparations, herbal products, and illicit drugs can affect blood pressure ⁽¹²⁾.

Affection of Diseases:

That affect the circulatory system or any of the major organs of the body (e.g., the kidneys) may affect blood pressure. recognized 29 genetic variants known to influence systolic and diastolic blood pressure to develop a genetic risk score. Twenty-nine percent of people with the top 10% of genetic risks had hypertension compared with 16% in the lowest risk groups. ⁽¹²⁾

Blood pressure measurement:

Blood pressure measurement for the child is basically the same as for an adult ⁽¹³⁾ Obtaining a blood pressure measurement in an infant or small child is difficult, but equipment of the proper size helps ease the problem ⁽¹⁾ .the blood pressure is measured in millimeters of mercury (mmHg), and it has two numbers. The first is the systolic blood pressure, and is the pressure when the heart is contracting. The second is the diastolic blood pressure, and is the pressure when the heart is resting ⁽¹⁰⁾

Assessment of measuring blood pressure

Blood pressure may be assessed directly or indirectly.

Direct Measurement:

In the direct method, a catheter is threaded into an artery under sterile conditions and attached to tubing that is connected to an electronic monitoring system. The pressure is constantly displayed as a waveform on the monitor screen. Although the direct method of measuring BP is very accurate, its use is confined to critical care areas and surgery because of the risk of sudden arterial blood loss ⁽¹²⁾ .

Indirect Measurement:

Usually the nurses will measure BP via the indirect, or noninvasive, method. This is an accurate estimate of arterial BP that can be performed in any clinical or community setting ⁽¹²⁾ .

The advantage of direct measurement:

It allows continuous beat-to-beat blood pressure monitoring. This is useful in patients who are likely to display sudden changes in blood pressure (e.g. vascular surgery), in whom close control of blood pressure is required (e.g. head-injured patients). Also, it allows accurate blood pressure readings at very low pressures⁽¹⁴⁾.

Common Errors in Assessing Blood Pressure:

The importance of the accuracy of blood pressure assessments cannot be overemphasized. Many judgments about a client's health are made based on blood pressure. It is an important indicator of the client's condition and is for blood pressure errors are hurried on the part of the nurse and subconscious bias in which a nurse may be influenced by the client's previous blood pressure measurements or diagnosis and "hear" a value consistent with the nurse's expectations. Some reasons for erroneous blood pressure readings are given in Table⁽⁴⁾.

| Error | Effect |
|------------------------------------------|------------------------------------------------------|
| Bladder cuff too narrow | Erroneously high |
| Bladder cuff too wide | Erroneously low |
| Arm unsupported | Erroneously high |
| Insufficient rest before the assessment | Erroneously high |
| Repeating assessment too quickly | Erroneously high systolic or low diastolic readings |
| Cuff wrapped too loosely | Erroneously high |
| Deflating cuff too quickly | Erroneously low systolic and high diastolic readings |
| Deflating cuff too slowly | Erroneously high diastolic reading |
| Failure to use the same arm consistently | Inconsistent measurements |
| Arm above level of the heart | Erroneously low |

Normal blood pressure readings in children vary depending on the age, sex, and height of children⁽⁶⁾.

Normal blood pressure ranges according developmental stage⁽¹⁾

| Age | Systolic | Diastolic |
|-------------------------|----------|-----------|
| Newborn—12 hr (3,000 g) | 50 – 70 | 24 – 45 |
| Newborn—96 hr (3,000 g) | 60 – 90 | 20 – 60 |
| Infant | 74 –100 | 50 – 70 |
| Toddler | 80 –112 | 50 – 80 |
| Preschooler | 82 –110 | 50 – 78 |
| School-age | 84 –120 | 54 – 80 |
| Adolescent | 94 –140 | 62 – 88 |

Sites used to obtain a blood pressure reading in children are:

The upper arm, lower arm or forearm, thigh, and calf or ankle. When the upper arm is used, the cuff should be wide enough to cover about two thirds of the upper arm and long enough to encircle the extremity without overlapping. If other sites are used, the size of the cuff is determined by the size of the extremity; a smaller cuff is used on the forearm, whereas a larger cuff is used on the thigh or calf ⁽¹⁾.

Optimum conditions for measurement:-

- ❖ Relaxed patient.
- ❖ Comfortable temperature.
- ❖ Quiet room—no telephones or noises ⁽⁷⁾.

Factors affecting nurses' measurement of blood pressure:

❖ Posture:

Posture affects blood pressure, with a general tendency for it to decrease when a person moves from the lying position to the sitting or standing positions. Some patients may have postural hypotension, especially those who are taking certain antihypertensive drugs. When this is likely, blood pressure should also be measured when the patient is standing .

Posture and position:

- ✓ Measure blood pressure routinely with patient in sitting position.
- ✓ Back should be supported.
- ✓ Legs should be uncrossed.
- ✓ Patient should be relaxed.
- ✓ Measure after ten minutes of rest.
- ✓ Measure after two minutes of standing if indicated ⁽⁷⁾.

❖ Arm support:

If the arm in which blood pressure is being measured is unsupported as tends to happen when the patient is sitting or standing the patient is performing isometric exercise, which increases blood pressure by as much as 10%. The arm therefore must be supported during measurement of blood pressure, especially when the patient is in the standing position. This is achieved best in practice by the observer holding the patient's arm at the elbow ⁽⁷⁾.

❖ Arm position and sides of the arms:

The forearm should be at the level of the heart that is, the mid sternum . Measurement in an arm lower than the level of the heart leads to an overestimation of systolic and diastolic pressures, while measurement in an arm above the level of the heart leads to underestimation. Such inaccuracy can be as much as 10 mm Hg, especially when the patient is in the sitting or standing position, when the arm is likely to be below heart level by the side. Arm position is important for self measurement of blood pressure with devices for wrist measurement ⁽⁷⁾.

Many of these devices inherently are inaccurate, but measurement is even less accurate if the wrist is not held at the level of the heart during measurement. Arterial disease can cause differences in blood pressure between arms, but because blood pressure varies from beat to beat, any differences may simply reflect blood pressure variability or measurement errors, or both. Bilateral measurement should be made at the first consultation; if differences

20 mm Hg for systolic or 10 mm Hg for diastolic blood pressure are present on consecutive readings, the patient should be referred to a cardiovascular centre for further evaluation with simultaneous bilateral measurement and the exclusion of arterial disease ⁽⁷⁾.

❖ **Cuff and bladder**

The cuff is an inelastic cloth that encircles the arm and encloses an inflatable rubber bladder. The cuff is secured around the arm most often by means of Velcro on the adjoining surfaces of the cuff, occasionally by wrapping a tapering end into the encircling cuff, and rarely by hooks.

Velcro surfaces must be effective; when they lose their grip the cuff should be discarded. The bladder should be removable from the cuff for washing⁽⁷⁾.

❖ **Cuff hypertension:**

However sophisticated a blood pressure measuring device, if it is dependent on cuff occlusion of the arm (as most devices are), it will be prone to the inaccuracy of *miscuffing*. This occurs when a cuff contains a bladder that is too long or too short relative to the circumference of the patient's arm. Miscuffing is a serious source of error that leads inevitably to incorrect diagnosis in clinical practice and erroneous conclusions in research into hypertension. A further problem is that inflation of the cuff itself may result in a transient but substantial increase (up to 40 mm Hg) in the patient's blood pressure ⁽⁷⁾.

Mismatching of bladder and arm:

Bladder too small (undercuffing):

Overestimation of blood pressure.

- **Range of error:**

3/3 to 12/8 mm Hg pressure

As much as 30 mm Hg in patients who are obese .

Bladder too large(over cuffing):

Underestimation of blood

❖ Range of error:

10–30 mm Hg

Under cuffing is more common than over cuffing ⁽⁷⁾ .

❖ Blood pressure cuff used over clothing:

When the nurses having blood pressure measured, the cuff should always be placed directly on your arm, study have shown that clothing can impact systolic blood pressure from 10 to 50 mm hg ^(15, 16, 17) .

❖ Talking:

If the child talking to nurse while measuring blood pressure, studies have shown that your systolic blood pressure measurement may increase 10 to 15 mm hg ^(15, 16, 17)

❖ Full bladder:

Your blood pressure is lower when your bladder is empty. As your bladder gradually fills your blood pressure increase studies have shown that your systolic blood pressure measurement could increase 10 to 15 mm hg ^{.(15, 16, 17)} .

❖ Not resting 3-5 minutes:

To obtain an accurate blood pressure measurement ,it's important that you relax and rest quietly in comfortable chair for 3to 5 minutes before reading is taken . any activities can affect systolic blood pressure 10 to 15 mm hg ^{.(15,17)}

Equipment used in blood pressure measurement.

An accurate device is fundamental to all measurements of blood pressure⁽⁷⁾ .The essential equipment for blood-pressure measurement includes a stethoscope and a sphygmomanometer. The stethoscope tubing should be long enough to permit the practitioner to auscultate Korotkoff sounds while viewing the manometer at eye level. Use of the bell side of the stethoscope chestpiece facilitates auscultation of the low-frequency Korotkoff sounds ⁽³⁾ .

The sphygmomanometer consists of a blood-pressure cuff containing a distensible bladder, a rubber bulb with an adjustable valve for inflation, tubing that connects the cuff to the bladder, and a manometer . Regular inspection and calibration of the equipment are important to ensure that it is in proper working order. For accurate measurement, calibrations are recommended every 6 months . Many institutions have removed mercury manometers from clinical settings and replaced them with aneroid manometers. The steps required for accurate blood pressure measurement with an aneroid or a mercury manometer are identical ⁽³⁾

Guidelines for Sphygmomanometer Selection: ⁽¹⁸⁾

| Midpoint*Arm Circumfermidpoi CUFF WIDTH** | Bladder Cuff Width | Bladder Length |
|------------------------------------------------------|---------------------------|-----------------------|
| 5–7.5cm (newborn) LENGTH | 3cm | 5cm |
| 7.5–13 cm (infant) DER | 5cm | 8cm |
| 13–20cm (child) | 8cm | 13cm |

Types of sphygmomanometers:

❖ Mercury sphygmomanometer

It is considered as the gold standard and consist of Straight glass tube in assembly with a reservoir contain Mercury.

Mercury sphygmomanometer is operated by inflating a rubber cuff Placed around a patients arm by means of the pump until blood flow stops the cuff pressure is measured via the mercury column and the heart sounds heard using a stethoscope auscultatory method .

Advantages

- Consistent and accurate readings.
- Durable easy to read and doesn't require readjustment.
- Permanent accuracy.
- Easily replaceable parts.

- Does not require frequent calibrations .
- Minimal maintenance and lasts life long ⁽¹⁹⁾ .

Aneroid sphygmomanometer:

Aneroid basically means without fluid it is similar to that of the mercury machine except that instead of the mercury column you have a dial where in you could read the blood pressure.

Advantages:

- Equipment is often inexpensive lightweight and more portable than mercury.
- Accurate.
- Available in variety of models for convenient use including models having easy to read extra large gauge and attached built in stethoscope ⁽¹⁹⁾.

Digital sphygmomanometer:

It is also called oscillometric method, oscillometric measurement devices used and electronic pressure sensory with numerical readout of blood pressure .the cuff is inflated and deflated electronically and need batteries.

Advantages:

- Easy to operate , and practical in noisy environment .
- Contained in one unit, so less manual skills are required than for systems with separate gauge and stethoscope
- Its easy to use minimizes human error and is good for people with hearing or vision loss
- Large easy to read digital display and error indicator ⁽¹⁹⁾ .

Preparation:

The examination room should be quiet, with a comfortable ambient temperature. Ideally, blood pressure should not be measured if the patient has engaged in recent physical activity, or eaten within the past 30 minutes ⁽³⁾.

Positioning of the Patient:

Correct positioning of the patient is essential for accurate measurement. The patient's back and legs should be supported, with the legs uncrossed and the feet resting on a firm surface. The arm in which blood pressure will be measured should be bare to the shoulder, and the garment sleeve, if raised, should be loose, so that it does not interfere with blood flow or with proper positioning of the blood pressure cuff. The arm should be supported and level with the heart. The manometer should be positioned at the health care practitioner's eye level⁽³⁾.

Arm Measurement:

A common error in measuring blood pressure is the use of an improperly fitted cuff. Undersized cuffs will result in overestimation of blood pressure. Selection of an appropriately sized cuff requires assessment of the patient's arm circumference at the midpoint of the upper arm. One half the distance between the acromion and the olecranon processes determines the midpoint of the arm. The circumference is then measured at the midpoint⁽³⁾.

Cuff Sizing:

Cuffs are typically marked with line indicators intended to facilitate proper fitting. The index line runs perpendicular to the length of the cuff, and the range line runs parallel to the length of the cuff. Once the cuff has been wrapped around the arm the index line should fall within the range-line limits, and the midpoint of the bladder should sit over the brachial artery. In addition to index and range lines, cuffs will often indicate size or size ranges. The sizes marked on the cuff should correspond to the appropriate arm circumference. Although these may be helpful guides, it is most important to use a cuff size that is based on the arm measurement and on the match between the index and range lines once the cuff is placed on the patient. A cuff that is too small may contribute to a falsely elevated blood pressure measurement⁽³⁾.

Cuff Placement:

The cuff should be placed on a bare arm, approximately 2 cm above the elbow crease, with the midline of the bladder (usually indicated by the manufacturer) directly over the brachial artery . It should fit snugly but should still allow for two fingers to slide under the cuff. ⁽³⁾.

Pulse-Obliteration Pressure:

Inflating the cuff to an arbitrary level runs the risk of overinflation and undue patient discomfort or of underestimation of systolic blood pressure. To avoid underestimation of blood pressure due to an auscultatory gap, determine the pulse-obliteration pressure, which can be used to estimate an appropriate initial cuff-inflation pressure. An auscultatory gap is present when there is intermittent disappearance of the initial Korotkoff sounds after their first appearance.

It is more likely to be present in older hypertensive patients and can lead to underestimation of systolic blood pressure. Estimating systolic blood pressure by first measuring pulse-obliteration pressure ⁽³⁾.

Blood-Pressure Measurement:

Place the bell of the stethoscope over the brachial artery, using sufficient pressure to provide good sound transmission without over-compressing the artery. To avoid extraneous noise during cuff deflation, ensure that the stethoscope is not in contact with the patient's clothing or with the blood-pressure cuff. Once the pulse-obliteration pressure is determined, initiate the auscultatory blood-pressure measurement by rapidly inflating the cuff to a level 20 to 30 mm Hg above the pulse-obliteration pressure. Then deflate the cuff at a rate of 2 mm Hg per second while listening for the Korotkoff sounds ⁽³⁾.

Korotkoff Sounds:

As the cuff is deflated, turbulent blood flow through the brachial artery generates a series of sounds. Classically, these have been described according to five phases.

Phase 1 is characterized by a clear, repetitive tapping sound, coinciding with reappearance of a palpable pulse. The initial appearance of phase 1 sounds is equal to the systolic blood pressure. During phase 2, audible murmurs in the tapping sounds are heard. In phases 3 and 4, muted changes in the tapping sounds occur (usually within 10 mm Hg of the true diastolic pressure) as the pressure measurement approaches the diastolic pressure.

Phase 5 is not really a sound; it indicates the disappearance of sounds and equates to the diastolic blood pressure. To ensure that diastole has been reached, continue to deflate the cuff pressure for an additional 10 mm Hg beyond the fifth Korotkoff sound. Obtain a minimum of two blood-pressure measurements at intervals of at least 1 minute. Record the average of the measurements as the blood pressure ⁽³⁾.

Nursing considerations in measuring blood pressure in children:

Infants:

- ❖ Use a pediatric stethoscope with a small diaphragm.
- ❖ The lower edge of the blood pressure cuff can be closer to the antecubital space of an infant.
 - ❖ Use the palpation method if auscultation with a stethoscope is unsuccessful.
 - ❖ Arm and thigh pressures are equivalent in children under 1 year of age.
 - ❖ The systolic blood pressure of a newborn averages about 75mmHg ⁽⁴⁾.

Children:

- ❖ Blood pressure should be measured in all children over 3 years of age and in children less than 3 years of age with certain medical conditions (e.g., congenital heart disease, renal malformation, medications that affect blood pressure).
- ❖ Explain each step of the process and what it will feel like.
- ❖ Demonstrate on a doll.
- ❖ Use the palpation technique for children under 3 years old.

- ❖ Cuff bladder width should be 40% and length should be 80% to 100% of the arm circumference .
- ❖ Take the blood pressure prior to other uncomfortable procedures so that the blood pressure is not artificially elevated by the discomfort.
- ❖ In children, the diastolic pressure is considered to be the onset of phase 4, where the sounds become muffled.
- ❖ In children, the thigh pressure is about 10 mmHg higher than the arm pressure.
- ❖ One quick way to determine the normal systolic blood pressure of a child is to use the following formula:

Normal systolic BP: $80 + (2 * \text{child's age in years})^{(4)}$.

Contraindications of measurement:

Measurement of blood pressure at the brachial artery is a generally benign procedure. However, there are some circumstances in which obtaining readings from a particular arm may not be appropriate; such circumstances include the presence of an arterial–venous shunt, recent axillary node dissection, or any deformity or surgical history that interferes with proper access or blood flow to the upper arm. If these relative contraindications are present, blood pressure should be assessed in the opposite arm. There may also be pre-existing conditions that can interfere with the accuracy or interpretation of readings, such as aortic coarctation, arterial–venous malformation, occlusive arterial disease, or the presence of an antecubital bruit. If neither arm can be used, then measurement of blood pressure in a leg may be indicated ⁽³⁾.

Chapter Two

Literature Review

Material and methods

Study design:

This was descriptive cross sectional . hospital based study ,carry out in Elmak Nimer university hospital at the period extend from august to November 2016 to assess knowledge of nurses about factors affecting nursing measurement of blood pressure.

Study area:

This study carried out in Sudan -River Nile state - Shendi city ,which is located 172km to Khartoum city . It is bounded by Khartoum state to the south, El-ddamer locality to the north, River Nile to the west and Kassala state to the east . Shendi city now is one of the rich cities in health care facilities; It contains three main hospitals: Elmak Nimer University hospital, Shendi teaching hospital and military hospital, and also there is hoshbannaga hospital and elmiseiktab hospital. It's population about 80000 persons (WHO 2003) most of them are farmers

Setting:

This study was conducted in Elmak Nimer university hospital pediatric unit. Was established in 2002. It has different department which provide good health services for Shendi area. It is also reference for medical and nursing students.

Study population:

It includes all nurses had been working in E-lmek Nimer university hospital in pediatric unit with three shift during the period extend from august to November 2016.

Excluding criteria:

- ❖ All nurses who have years of experience less than one year .
- ❖ Any nurses had not working in pediatric unit .

Sampling technique:

The sample included all nurses in pediatric unit during the period of study (all nurses rotate on three shifts morning , afternoon ,and night shift).

Sample size:

Total Coverage sample, (90) nurses had working in pediatric unit.

Data collection tools:

Data was collected by questionnaire closed ended questions, designed by researcher based on available literature review it consist of four part:

■ Part one:

designed to collect sociodemographic characteristic for study group which contain three questions (1-3) .

■ Part two:

designed to collect data about nurses' knowledge about blood pressure which contain four questions (4-7) .

■ Part three:

designed to collect data about knowledge of nurses about measurement of blood pressure which contain four questions (8-11) .

part four:

■ designed to collect data about factor affecting nursing measurement of blood pressure which contain ten questions (12-21) .

Scoring system:

Scoring system was established by researcher, the data was distributed in four categories to measure the level of nurses knowledge about factors affecting nursing measurement of blood pressure : if the nurse respond to (4,3) choice it consider good knowledge; (2) choices consider fair knowledge; (1 , 0) choice consider poor knowledge

Data collection technique:

The data was collected during the working time within three shift. Any participant filled all questionnaire by himself.

Data analysis technique:

The data was analyzed by using statistical package for social sciences (SPSS version 15.0) and presented in form of table and figures. And crosstabs (chi-square) used to find out correlation between years of nurses experiences and knowledge of nurses about factor affecting nursing measurement of blood pressure .

Ethical consideration:

The study was approved by faculty committee researcher. The original director and the head nurses of the hospitals permit to conduct the research. Purpose of the study was explain verbally to each participate and there where accept to participate

Chapter Three

Methodology

Results

This results represented into (24) tables and (3) figures , part one contain socio demographic characteristic of study group and part two contain knowledge of study group about (blood pressure, blood pressure measurement and factors affecting nursing measurement of blood pressure) and part three contain correlation between years of nurses experiences and knowledge of nurses about factor affecting nursing measurement of blood pressure .

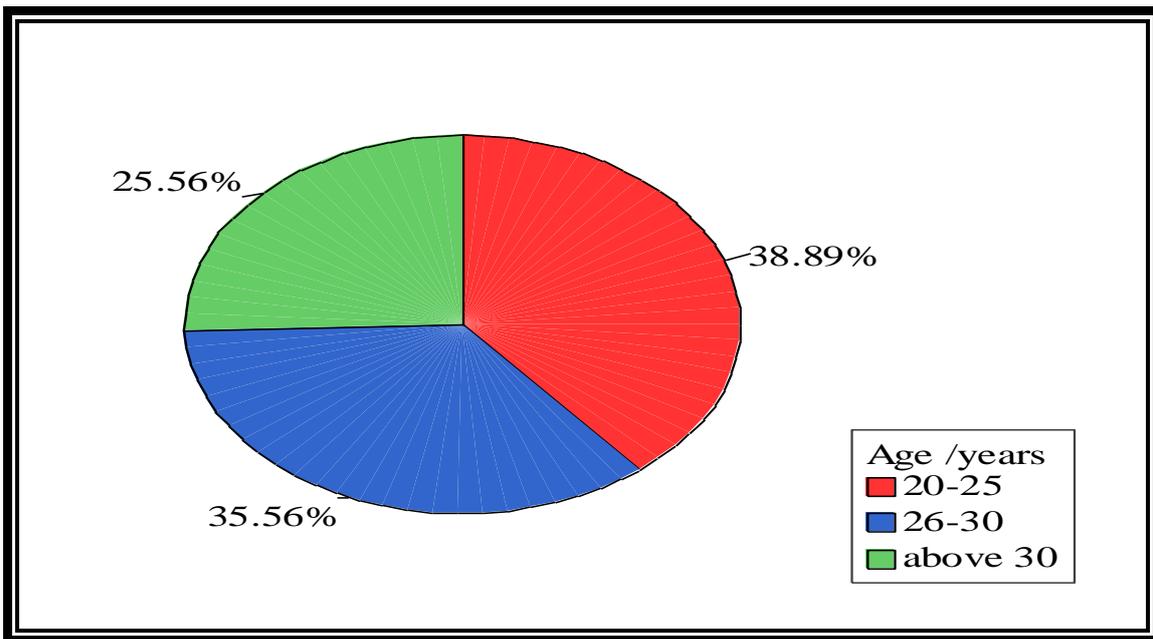


Figure No: (1) Distribution of study group according to their age :

Above Figure showed that (38.9%) of Study group their age between 20-25 years , (35.6%) of them between 26-30 years, and (25.6%)above .30years

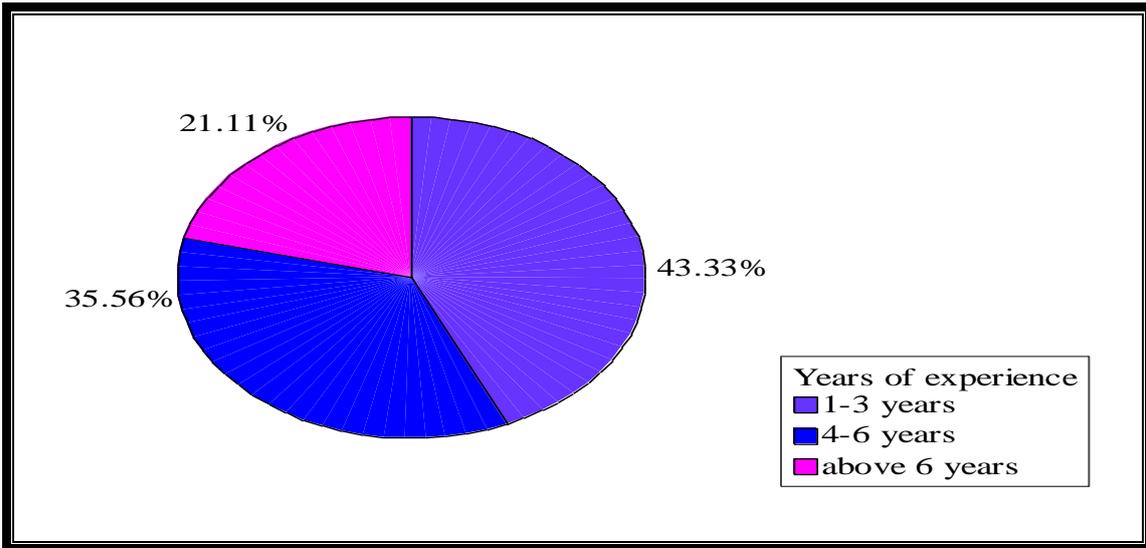


Figure No: (2) Distribution of study group according to their years of experience:

Above Figure showed that (43.3%) of Study group their years of experience were between 1– 3 years, 35.6% of them were between 4- 6 years, and(21.1%) above 6 years.

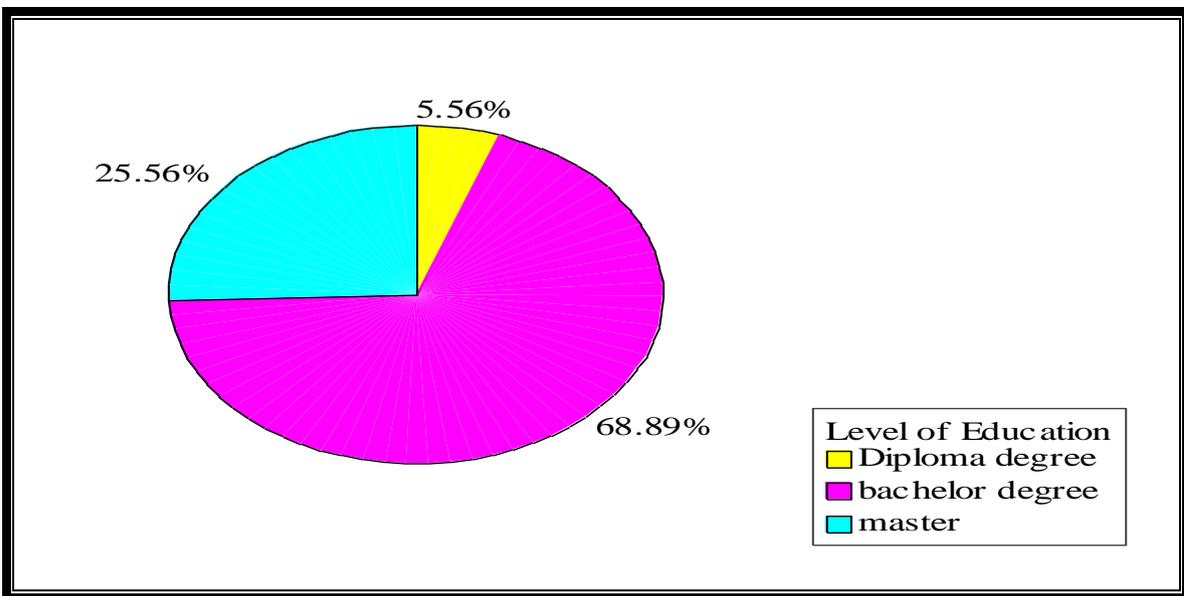


Figure No: (3)Distribution of studied group according to their level of education : Above figure showed that (68.9%)of study group had Bachelor degree,(25.6%) of them had master degree, and (5.6%)had diploma degree .

Table No (1): Distribution of study group in relation to their knowledge about Definitions of blood pressure:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 9 | 10% |
| Fair knowledge | 59 | 65.6% |
| Poor knowledge | 22 | 24.4% |
| Total | 90 | 100.0% |

The above table explained that (10%)of study group had good knowledge about Definitions of blood pressure, and (65.6 %)of them had fair knowledge about definitions .

Table No (2): Distribution of study group according to their knowledge about blood pressure regulating system:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 28 | 31.1% |
| Fair knowledge | 17 | 18.9% |
| Poor knowledge | 45 | 50% |
| Total | 90 | 100.0% |

The above table showed that half (50%) of study group had poor knowledge about blood pressure regulating system. And (18.9%) had fair knowledge about blood pressure regulating system.

Table No (3): Distribution of study group in relation to their knowledge about Factors affect blood pressure:

| Factors that affect blood pressure | Frequency | Percent |
|-------------------------------------------|------------------|----------------|
| Development stage | 31 | 34.4% |
| Family History | 28 | 31.1% |
| Exercise | 29 | 32.2% |
| Did not know | 2 | 2.2% |
| Total | 90 | 100.0% |

The above table clarified that (34.4 %) of Study group consider development stage as Factors that affect blood pressure, and (2.2%)of them were didn't know.

Table No (4): Distribution of study group in relation to their knowledge about variations range of normal blood pressure in children:

| Range of normal blood pressure | Frequency | Percent |
|---------------------------------------|------------------|----------------|
| developmental Stage | 48 | 53.3% |
| weight of child | 13 | 14.4% |
| Gender of the child | 21 | 23.3% |
| Did not know | 8 | 8.9% |
| Total | 90 | 100.0% |

The above table showed that (53.3%) of Study group were aware about range of normal blood pressure in children, and (8.9%) of them were didn't know.

Table No(5) :Distribution of study group in relation to their knowledge about methods of measuring blood pressure:

| Methods of measuring blood pressure | Frequency | Percent |
|-------------------------------------|-----------|---------|
| Invasive | 2 | 2.2% |
| Noninvasive | 45 | 50.0% |
| Both | 33 | 36.7% |
| Did not know | 10 | 11.1% |
| Total | 90 | 100.0% |

The above table explained that (50%) of Study group consider non Invasive as method of measuring blood pressure, and (11.1%) of them did not know .

Table No (6): Distribution of study group in relation to their knowledge about sites used to obtain blood pressure reading in children:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 15 | 16.7% |
| Fair knowledge | 27 | 30.0% |
| Poor knowledge | 48 | 53.3% |
| Total | 90 | 100% |

The above table showed that (53.3%) of study group had poor knowledge about sites used to obtain blood pressure reading in children, and (16.7 %) had good knowledge about it.

Table No (7): Distribution of study group according to their knowledge about Types of sphygmomanometers:

| Types of sphygmomanometers | Frequency | Percent |
|----------------------------|-----------|---------|
| Aneroid | 18 | 20.0% |
| Digital | 34 | 37.8% |
| Mercury | 37 | 41.1% |
| Did not know | 1 | 1.1% |
| Total | 90 | 100.0% |

The above table explained that (41.1%) of Study group consider mercury as types of sphygmomanometers, and (1.1%)of them did not know about it .

Table No (8): Distribution of study group according to their knowledge about contraindications of measuring blood pressure:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 26 | 28.9% |
| Fair knowledge | 34 | 37.8% |
| Poor knowledge | 30 | 33.3% |
| Total | 90 | 100.0% |

The above table showed that only (28.9%) of study group had good knowledge about contraindications that affect measurement of blood pressure, and only (33.3%) of them had poor knowledge about it .

Table No(9) :Distribution of study group in relation to their knowledge about right position for measuring blood pressure:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 16 | 17.8% |
| Fair knowledge | 41 | 45.6% |
| Poor knowledge | 33 | 36.7% |
| Total | 90 | 100.0% |

The above table clarified that less than half (45.6 %) of study group had average knowledge (Fair knowledge) about right position for measuring blood pressure, and (17.8%) of them had good knowledge about it.

Table No (10): Distribution of study group according to their knowledge about the child sitting position when measuring blood pressure:

| Level of knowledge | Frequency | Percent |
|--------------------|-----------|---------|
| Good knowledge | 19 | 21.1% |
| Fair knowledge | 25 | 27.8% |
| Poor knowledge | 46 | 51.1% |
| Total | 90 | 100.0% |

The above table showed that more than half (51.1%) of study group had poor knowledge about position of the child in sitting when measuring blood pressure, and (27.8%) of them had average knowledge about it.

Table No:(11) Distribution of study group according to their knowledge about position of (arm and fore arm) of the child when measuring blood pressure:

| Variable | Frequency | Percent |
|--------------------------------------|------------------|----------------|
| Position of arm | | |
| Supported | 61 | 67.8% |
| Unsupported | 5 | 5.6% |
| Holding the child's arm at the elbow | 10 | 11.1% |
| Did not know | 14 | 15.6% |
| Total | 90 | 100.0% |
| Position of forearm | | |
| At the level of the heart | 75 | 83.3% |
| Above the level of the heart | 2 | 2.2% |
| At lower than the level of the Heart | 8 | 8.9% |
| Did not know | 5 | 5.6% |
| Total | 90 | 100.0% |

The above table explained that most (83.3%) of Study group and two third (67.8%) of them were knowledgeable about suitable position of forearm and arm when measuring blood pressure respectively.

Table No (12): Distribution of study group according to their knowledge about Bladder cuff used in measurement of blood pressure (width - length -position -wrapping):

| Variable | Frequency | Percent |
|---------------------------------------------------------|-----------|---------|
| Bladder cuff (width) | | |
| Developmental stage | 40 | 44.4% |
| Mid arm circumference | 29 | 32.2% |
| Did not care | 5 | 5.6% |
| Did not know | 16 | 17.8% |
| Total | 90 | 100.0% |
| Bladder cuff (length): | | |
| Developmental stage | 52 | 57.8% |
| Length of the child | 21 | 23.3% |
| Did not care | 4 | 4.4% |
| Did not know | 13 | 14.4% |
| Total | 90 | 100% |
| Position of the cuff | | |
| Directly on child's skin in the part of the measurement | 78 | 86.7% |
| Over clothes | 3 | 3.3% |
| Did not care | 6 | 6.7% |
| Did not know | 3 | 3.3% |
| Total | 90 | 100.0% |
| Wrapping of the cuff | | |
| The index line should fall within the range-line limits | 70 | 77.8% |
| Too tight | 4 | 4.4% |
| Too loose | 2 | 2.2% |
| Did not know | 14 | 15.6% |
| Total | 90 | 100.0% |

The above table clarified that (44.4%) of Study group were aware about Bladder cuff width used in measurement of blood pressure ,also (57.8 %)of Study group were aware about Bladder cuff length which using in measurement of blood pressure , while (86.7%)of Study group knowledgeable about position of cuff when measuring blood pressure, and (77.8%) of Study group were aware about cuff wrapping when measuring blood pressure.

Table No (13): Distribution of study group according to their knowledge about accurate time of relaxation before measurement of blood pressure:

| Accurate time of relaxation before measurement of blood pressure | Frequency | Percent |
|-------------------------------------------------------------------------|------------------|----------------|
| 2-3 Minutes | 18 | 20.0% |
| 3-5 Minutes | 38 | 42.2% |
| Did not care for time | 20 | 22.2% |
| Did not know | 14 | 15.6% |
| Total | 90 | 100.0% |

The above table explained that only (42.2%) of Study group were aware about the accurate time of relaxation before measurement of blood pressure, while (22.2%) of them were didn't care for accurate time.

Table No (14): Distribution of study group in relation to their knowledge about The optimum environment for measuring blood pressure:

| Level of knowledge | Frequency | Percent |
|---------------------------|------------------|----------------|
| Good knowledge | 22 | 24.4% |
| Fair knowledge | 35 | 38.9% |
| Poor knowledge | 33 | 36.7% |
| Total | 90 | 100.0% |

The above table showed that only (24.4%)of study group had good knowledge about The optimum environment for measuring blood pressure, while (75.6%) of them their knowledge distributed between average and poor knowledge.

Table NO(15): correlation between years of nurses experience and knowledge of nurse about right position while measuring blood pressure :

| Years of Experience | knowledge about right position while measuring blood pressure | | | Total | p-value |
|---------------------|---------------------------------------------------------------|--------|-------|-------|---------|
| | good | fair | poor | | |
| 1-3 years | 6 | 17 | 16 | 39 | .458 |
| | 6.7% | 18.9 % | 17.8% | 43% | |
| 4-6 years | 5 | 18 | 9 | 32 | .459 |
| | 5.5% | 20% | 10% | 35.5% | |
| above 6 years | 5 | 6 | 8 | 19 | .539 |
| | 5.5% | 6.7% | 8.9% | 21.1 | |
| Total | 16 | 41 | 33 | 90 | |
| | 17.7 | 45.6 | 36.7 | 100% | |

Correlation is significant if the p-value less than 0.05 ,highly significant if p-value at 0.00 not significant if the p-value more than 0.05. the relation between years of experience and knowledge of nurse about right position was not significant .

Table NO(16): correlation between years of experience and knowledge of nurse about the position of child in sitting while measuring blood pressure:

| Years of experience | The position of the child in sitting when measuring blood pressure | | | Total | p-value |
|---------------------|--------------------------------------------------------------------|-------|-------|-------|---------|
| | good | fair | poor | | |
| 1-3 years | 9 | 9 | 21 | 39 | .425 |
| | 10% | 10% | 23.3% | 43.3% | |
| 4-6 years | 8 | 10 | 14 | 32 | .470 |
| | 8.9% | 11.1% | 15.6% | 35.6% | |
| above 6 years | 2 | 6 | 11 | 19 | .480 |
| | 2.2% | 6.7% | 12.2% | 21.1% | |
| Total | 19 | 25 | 46 | 90 | |
| | 21.1% | 27.8% | 51.1% | 100% | |

The relation between years of experience and knowledge of nurse about position of child in sitting while measuring blood pressure was not significant .

Table NO(17): correlation between years of experience and knowledge of nurse about The suitable position of the arm when measuring blood pressure:

| Years of experience | The suitable position of the child's arm when measuring blood pressure | | | | Total | p-value |
|---------------------|------------------------------------------------------------------------|-------------|-------------------------------------------|--------------|-------|---------|
| | supported | unsupported | holding the arm of the child at the elbow | did not know | | |
| 1-3 years | 25 | 2 | 5 | 7 | 39 | .994 |
| | 27.7% | 2.2% | 5.6 % | 7.8% | 43.3% | |
| 4-6 years | 23 | 2 | 3 | 4 | 32 | .994 |
| | 25.6% | 2.2% | 3.3% | 4.4% | 35.6% | |
| Above 6 years | 13 | 1 | 2 | 3 | 19 | .630 |
| | 14.4% | 1.1% | 2.2% | 3.3% | 21.1% | |
| Total | 61 | 5 | 10 | 14 | 90 | |
| | 67.8% | 5.5% | 11.1% | 15.6% | | |

The relation between years of experience and knowledge of nurse about The suitable position of the arm when measuring blood pressure was not significant .

Table NO(18): correlation between years of experience and knowledge of nurse about The suitable position of child's forearm when measuring blood pressure:

| Years of experience | The suitable position of child's forearm when measuring blood pressure | | | | Total | p-value |
|---------------------|------------------------------------------------------------------------|------------------------------|--------------------------------------|--------------|-------|---------|
| | At the level of the heart | above the level of the heart | At lower than the level of the heart | Did not know | | |
| 1-3 years | 32 | 0 | 5 | 2 | 39 | .130 |
| | 35.6% | 0.0% | 5.6% | 2.2% | 43.3% | |
| 4-6 years | 29 | 0 | 1 | 2 | 32 | .177 |
| | 32.2% | 0.0% | 1.1% | 2.2% | 35.6% | |
| Above 6 years | 14 | 2 | 2 | 1 | 19 | .958 |
| | 15.6% | 2.2% | 2.2% | 1.1% | 21.1% | |
| Total | 75 | 2 | 8 | 5 | 90 | |
| | 83.3% | 2.2% | 8.9% | 5.6% | 100% | |

The relation between years of experience and knowledge of nurse about The suitable position of child's forearm while measuring blood pressure was not significant .

Table NO(19): correlation between years of experience and knowledge of nurse about Bladder cuff width variation.

| Years of experience | Bladder cuff width variation | | | | Total | P-value |
|---------------------|------------------------------|------------------------------------|--------------|--------------|-------|---------|
| | developmental stage | mid arm circumference of the child | Did not care | Did not know | | |
| 1-3 years | 17 | 13 | 2 | 7 | 39 | .790 |
| | 18.9% | 14.4% | 2.2% | 7.8% | 43.3% | |
| 4-6 years | 15 | 8 | 3 | 6 | 32 | .669 |
| | 16.7% | 8.9% | 3.3% | 6.7% | 35.6% | |
| above 6 years | 8 | 8 | 0 | 3 | 19 | .837 |
| | 8.9% | 8.9% | 0.0% | 3.3% | 21.1% | |
| Total | 40 | 29 | 5 | 16 | 90 | |
| | 44.4% | 32.2% | 5.6% | 17.8% | 100% | |

The relation between years of experience and knowledge of nurse about a bout Bladder cuff width variation was not significant .

Table NO(20): correlation between years of experience and knowledge of nurse about Bladder cuff length variation.

| Years of experience | Bladder cuff length variation | | | | Total | p-value |
|---------------------|-------------------------------|---------------------|--------------|--------------|-------|---------|
| | developmental stage | length of the child | Did not care | Did not know | | |
| 1-3 years | 21 | 9 | 3 | 6 | 39 | .676 |
| | 23.3% | 10% | 3.3% | 6.7% | 43.3% | |
| 4-6 years | 21 | 6 | 0 | 5 | 32 | .514 |
| | 22.2% | 6.7% | 0.0% | 5.6% | 35.6% | |
| above 6 years | 10 | 6 | 1 | 2 | 19 | .621 |
| | 11.1% | 6.7% | 1.1% | 2.2% | 21.1% | |
| Total | 52 | 21 | 4 | 13 | 90 | |
| | 57.8% | 23.4% | 4.4% | 14.4% | 100% | |

The relation between years of experience and knowledge of nurse about Bladder cuff length variation was not significant .

Table NO(21): correlation between years of experience and knowledge of nurse about The suitable position of the cuff when measuring blood pressure:

| Years of experience | The suitable position of the cuff | | | | Total | p-value |
|---------------------|--------------------------------------------------------------|--------------|--------------|--------------|-------|---------|
| | directly on skin of the child in the part of the measurement | over clothes | Did not care | Did not know | | |
| 1-3 years | 34 | 1 | 2 | 2 | 39 | .868 |
| | 37.8% | 1.1% | 2.2% | 2.2% | 43.3% | |
| 4-6 years | 28 | 1 | 3 | 0 | 32 | .752 |
| | 31.1% | 1.1% | 3.3% | 0.0% | 35.6% | |
| above 6 years | 16 | 1 | 1 | 1 | 19 | .950 |
| | 17.8% | 1.1% | 1.1% | 1.1% | 21.1% | |
| Total | 78 | 3 | 6 | 3 | 90 | |
| | 86.7% | 3.3% | 6.7% | 3.3% | 100% | |

The relation between years of experience and knowledge of nurse about The suitable position of the cuff when measuring blood pressure was not significant .

Table NO(22): correlation between years of experience and knowledge of nurse about Warping of cuff while measuring blood pressure:

| Years of experience | Warping of cuff while measuring blood pressure | | | | Total | p-value |
|---------------------|---------------------------------------------------------|-----------|-----------|--------------|-------|---------|
| | the index line should fall within the range-line limits | too tight | too loose | Did not know | | |
| 1-3 years | 28 | 3 | 1 | 7 | 39 | .503 |
| | 31.1% | 3.3% | 1.1% | 7.8% | 43.3% | |
| 4-6 years | 28 | 1 | 0 | 3 | 32 | .361 |
| | 31.1% | 1.1% | 0.0% | 3.3% | 35.6% | |
| above 6 years | 14 | 0 | 1 | 4 | 19 | .913 |
| | 15.6% | 0.0% | 1.1% | 4.4% | 21.1% | |
| Total | 70 | 4 | 2 | 14 | 90 | |
| | 77.8% | 4.4% | 2.2% | 15.6% | 100% | |

The relation between years of experience and knowledge of nurse about warping of cuff while measuring blood pressure was not significant .

Table NO(23): correlation between years of experience and knowledge of nurse about the accurate time of relaxation before measuring blood pressure:

| Years of experience | The accurate time of relaxation before measuring blood pressure | | | | Total | p-value |
|---------------------|-----------------------------------------------------------------|-------------|--------------|--------------|-------|---------|
| | 2-3 minutes | 3-5 minutes | Did not care | Did not know | | |
| 1-3 years | 8 | 19 | 5 | 7 | 39 | .686 |
| | 8.8% | 21.1% | 5.6% | 7.8% | 43.3% | |
| 4-6 years | 6 | 12 | 10 | 4 | 32 | .666 |
| | 6.6% | 13.3% | 10% | 4.4% | 35.6% | |
| above 6 years | 4 | 7 | 5 | 3 | 19 | .708 |
| | 4.4% | 7.8% | 5.6% | 3.3% | 21.1% | |
| Total | 18 | 38 | 20 | 14 | 90 | |
| | 20% | 42.2% | 22.2% | 15.6% | 100% | |

The relation between years of experience and knowledge of nurse about the accurate time of relaxation before measuring blood pressure was not significant .

Table NO(24): correlation between years of experience and knowledge of nurse about The Optimum environment for measuring blood pressure:

| Years of experience | The Optimum environment for measuring blood pressure | | | Total | p-value |
|---------------------|------------------------------------------------------|-------|-------|-------|---------|
| | good | fair | poor | | |
| 1-3 years | 8 | 15 | 16 | 39 | .739 |
| | 8.9% | 16.7% | 17.8% | 43.3% | |
| 4-6 years | 10 | 13 | 9 | 32 | .737 |
| | 10% | 14.4% | 10% | 35.6% | |
| above 6 years | 4 | 7 | 8 | 19 | .784 |
| | 4.4% | 7.8% | 8.9% | 21.1% | |
| Total | 22 | 35 | 33 | 90 | |
| | 24.4% | 38.9 | 36.7% | 100% | |

The relation between years of experience and knowledge of nurse about the Optimum environment for measuring blood pressure was not significant .

Chapter Four

Results

Discussion

Blood-pressure measurement is indicated in any situation that requires assessment of cardiovascular health, including screening for hypertension and monitoring the effectiveness of treatment in patients with hypertension, Therefore Proper techniques are important to ensure consistent and reliable nursing measurements.

This study designed to assess knowledge of nurses about factors affecting nursing measurement of blood pressure in El mek Nimer university hospital pediatric unit, the period extended from august to November 2016.

The study found that most (83.3%) of Study group were knowledgeable about suitable position of the forearm when measuring blood pressure , and right position of cuff during the procedure, while more than two third of study group had same knowledge about optimum environment during measuring of the blood pressure. because most of the nurses in this hospital their qualification was Bachelor and master degree , this qualification make them more knowledgeable because their created hours more than other nurses which their qualification was diploma certificate.

Also the study reflected that two third (65.6%) of study group had fair knowledge about definitions of blood pressure, while more than one third (37.8 %) of them had fair knowledge about contraindications, and similar percent had poor knowledge about right position for measuring blood pressure, while half (50%) of study group also had poor knowledge about position of the child in sitting during measurement of blood pressure, and more than half of them had same knowledge about sites used to obtain blood pressure reading in children. All results were reflected to: nurses staff did not attended any courses or workshops about blood pressure measurement ,also did not measure blood pressure routinely similar to other vital signs, and the policy of hospital haven't program for staff development.

The study clarified that, near to half of Study group were aware about Bladder cuff width, and more than half of Study group were aware about bladder cuff length which using in measurement of blood pressure, while 67.8 % of Study group were knowledgeable about position of the arm, and 77.8% of them were aware about cuff wrapping when measuring blood pressure, all results were reflected to blood pressure measurement is basic fundamental in nursing science.

As regard to the study, more than one third (34.4 %) of Study group consider the developmental stage as Factors affected the blood pressure this result agree with that found in fundamentals of nursing theory ,concepts and application 2016 ⁽¹²⁾ which state that : (blood pressure it increases gradually throughout childhood). A child or adolescent's BP depends on body size; therefore, a smaller child or adolescent has a lower blood pressure than does a larger child, Both systolic and diastolic blood pressure continue to increase with age) ⁽¹²⁾ . while more than one third (41.1%) of study group were consider mercury sphygmomanometer as the suitable type which using in measurement of the blood pressure because the most common equipment available in hospital and also this result agree with that found <http://www.Bpmeasure.com>>-types-of-sphygmomanometer⁽¹⁹⁾ whichstate that : (mercury sphygmomanometer considered as the gold stander ⁽¹⁹⁾).

On the other hand, the study showed that more than half of Study group had good knowledge about normal range of blood pressure in children and same result were consider the methods of the measuring blood pressure as non invasive procedure, the results agree with <http://WWW.LIVE Strong-com>> health (6) and fundamentals of nursing theory ,concepts and application 2016 (12) respectively. Which state that : (normal blood pressure reading in children vary depending on the age, sex and height of children ⁽⁶⁾, (the noninvasive method is most common, an accurate estimate of arterial BP that can be performed in any clinical or community setting. ⁽¹²⁾).

The current study clarified that less than half (42.2%) of study group were knowledgeable about accurate time of relaxation (3-5)minute before measurement of blood pressure this result more than the result of the previous study, conducted in Einstein that mentioned accurate time of relaxation need (5) minute for rest with percent (12.9%)⁽²⁰⁾.

The statistical test revealed that no statistical relation between years of nurses experience and knowledge of nurses about factors affecting nursing measurement of blood pressure. this result reflected to instability of nurses in pediatric unit and the movement of nurses to other departments during the years of experience .

Conclusion

Based on finding of the present study, it was concluded that:

Two third of study group had fair knowledge about definitions of blood pressure and half of study group had poor knowledge about blood pressure regulating system , Half of Study group were knowledgeable about methods of measuring blood pressure . The statistical test revealed that no statistical relation between years of nurses experience and knowledge of nurses about factors affecting nursing measurement of blood pressure .

Recommendations

Based on the result of study and conclusion the following recommendation should be implementing:

A) To head director:

- ❖ Importance of work shop and training program for the nurses about blood pressure skills.
- ❖ proper equipment to measurement of blood pressure should be available in pediatric unit.
- ❖ Blood pressure must be measured routinely similar to others vital signs .

B) To nurses them self:

- ❖ Importance of self learning about all the update knowledge regarding blood pressure.

Chapter Five

Discussion

Conclusion

Recommendations

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Shendi university

Faculty of Graduate Studies and Scientific Research

Questionnaire about Assessment of Nurses Knowledge about Factor

Affecting Nursing Measurement Blood Pressure in pediatric unit

Elmak Nimer university hospital

Part one: Sociodemographic characteristic:

1. Age.....

- a) 20-25 () b) 26- 30 () c) above 30 ()

2. Level of education

- a) diploma degree () b) bachelor degree () c) master degree ()

3. Years of experience.....

- a) 1-3years () b) 4-6years () c) above 6 years ()

Part two:

Knowledge about blood pressure:

1. Defintions of blood pressure.....

- a) is a measurement of the pressure within the vascular system as the heart contracts (systole)and relaxes (diastole). ()
- b) Blood pressure is a measure of the force that the circulating blood exerts on the walls of the main arteries . ()
- c) blood pressure is a function of Cardiac output and systemic vascular resistance (resistance in blood vessels), is the force that blood exerts against the walls of blood () d) I don't know ()

2. Blood pressure regulating systems include.....

- a) nervous system () b)endocrine system ()
- c) urinary system () d)cardiovascular system ()

3. Factors that affect blood pressure include

- a) Developmental Stage ()
- b) Family History ()
- c) Exercise ()
- d) I don't know ()

4. The normal blood pressure in children ranges varies according to....

- a) developmental stage ()
- b) weigh of child ()
- c) gender of child ()
- d) I don't know ()

Part three

Knowledge about measurement of blood pressure

1. The Method of measuring blood pressure are

- a)invasive ()
- b) noninvasive ()
- c) both ()
- d) I don't know ()

2. The sites used to obtain a blood pressure reading in children are.....

- a) upper arm ()
- b) lower arm or forearm ()
- c) thigh ()
- d) calf or ankle ()

3.Types of sphygmomanometers include

- a) aneroid ()
- b) digital ()
- c) mercury ()
- d) I don't know ()

4. The contraindications of measuring blood pressure are

- a) arterial-venous shunt ()
- b) fracture in the part of measurement ()
- c) deformity ()
- d) I don't know ()

Part 4:

knowledge about factors affecting nursing measurement of blood pressure

1. The right position for measuring blood pressure is

- a) sitting position ()
- b) lying position ()
- c) standing position ()
- d) I don't know ()

2. The child position in sitting when measuring blood pressure is:

- a) Back of the child should be supported ()
- b) Legs of the child of the child should be uncrossed ()
- c) child should be relaxed ()
- d) I don't know ()

