

University of Shandi

College of Graduate Studies and Scientific Research

Wound Care Teaching Module Using Standardized Assessment Tool

**A thesis Submitted for Partial Full filament of the Requirement for
Master Degree in Nursing Science.**

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الآية

قالى تعالى

(وقل ربي زدني علما)

صدق الله العظيم

Dedication

This work is dedicated to my family and specially
to my parents,
Brothers, Sisters, colleagues and friends

Acknowledgement

Now that the work of preparing this research is over. I want to take this opportunity to thank au the persons whose help throughout the preparation has been truly invaluable.

First I would like to thank God, the Al-Mighty who guided me to the conduct this work successfully.

Second, I wish to offer my gratitude and grateful acknowledgement to the illustrious institution of learning that is Faculty of Nursing science at university of shandi. Spaniel thanks to my supervisor, Dr. Thank Ahmed for it is a true pleasure to work with her. I am greatly indebted to her for her resourceful comments advices, guidance and suggestions my sincere and personal thanks to all nursing staff in imperial Hospital who willingly and generously responded to the survey regarding the assessment tool of wound care teaching. Their input was invaluable to me in carrying out this research. Finally I owe an incalculable gratitude and debt to my colleagues who, with encouragement and enthusiasm, shored the excitement of the learning process with my.

Saadia

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Abstract

This research tackles the subject matter of the wound care teaching module by using a standardized assessment tool. It aims at elucidating the various steps which should be followed and applied by the nurses in the course of assessment of wounds and caring thereto. The main objective of the research is to evaluate the extent of the nurses' knowledge regarding wound care assessment and care. To achieve this objective the researcher adopted the descriptive/ historical method and the case study method. In addition to this, the researcher designed a questionnaire of several questions to investigate and measure the extent of the nurses' knowledge and acquaintance with the wound caring. The researcher selected a representative sample of the nurses at Imperial Hospital, Khartoum which consists of (50) nurses, and she distributed the questionnaire forms to them. For the data analysis, the researcher used the technique of the statistical package for social séances (SPSS) program. The researcher arrived at several findings and important among them is that most of the nurses in Imperial Hospital (90%) know all that related to the preparation and supply of the requirements in respect of wound caring. Moreover, the study proved the effectiveness of the module for wound care teaching in the evaluation of nurses knowledge of the steps to be undertaken for the wound care. However, specifically the study found some variation in the nurses knowledge concerning the different steps to be followed in wound healing care. The study presented some recommendations and the important among them is to provide nurse with a continuous and on-going education to act as a bridge between the basic training, practice and supervision, so as to raise their efficiency and to enable them to cope with the new and latest developments in knowledge, skills, equipment's and techniques of nursing. Nurses should be enabled to utilize the most up-to-

date approaches to wound healing and remain current in new scientific advances in wound care, and to work for the achievement of the job satisfaction of the nurses profession which will ensure them a long and successful career.

مستخلص

يتناول هذا البحث موضوع مقياس تدريس العناية بالجروح باستخدام أداة تقييم معيارية. ويهدف البحث إلى تبيان الخطوات المختلفة التي ينبغي على الممرضات اتباعها وتطبيقها في مسار تقييم الجروح والعناية بها. يهدف هذا البحث لتقييم مدى معرفة الممرضات بالجروح والعناية بها. ولتحقيق هذا الهدف تبنت الباحثة المنهج الوصفي/ التاريخي ومنهج دراسة الحالة. بالإضافة إلى ذلك صممت الباحثة استبيان من عدة أسئلة لقياس معرفة وإلمام الممرضات بالعناية بالجروح. اختارت الباحثة عينة ممثلة للممرضات في مستشفى أمبريال بالخرطوم تتكون من (50) ممرضة حيث تم توزيع استمارات الاستبيان عليهن. وتحليل البيانات استخدمت الباحثة برنامج الحزمة الإحصائية للعلوم الاجتماعية. توصلت الباحثة إلى عدة نتائج أهمها أن معظم الممرضات تقريباً بمستشفى أمبريال بالخرطوم (90%) يعرفن كل ما يتعلق بتحضير الإمدادات والمتطلبات المتعلقة بالجروح. بالإضافة إلى ذلك أثبتت الدراسة فعالية مقياس تدريس العناية بالجروح في تقييم مدى معرفة الممرضات بالخطوات التي ينبغي اتباعها للعناية بالجروح ولقد أثبتت الدراسة وجود بعض التفاوت في معرفة الممرضات فيما يتعلق بالخطوات المختلفة التي يتعين استخدامها للعناية بالجروح. وقد أثبتت الدراسة وجود بعض التفاوت في معرفة الممرضات بما يتعلق بالخطوات المختلفة التي يتعين اتباعها للعناية بالجروح. وضعت الدراسة بعض

التوصيات ومن أهمها ضرورة توفير التعليم المستمر للممرضات كجسر ما بين التدريب الأساسي والممارسة والإشراف، ومن أجل رفع كفاءتهن، ولتمكينهن من مواكبة التطورات الجديدة في المعرفة والمهارات والمعدات والتقنيات، بالإضافة إلى تمكين الممرضات من الاستفادة من أحدث المناهج فيما يتعلق بالعناية بالجروح وذلك لمواكبة التطورات العلمية فيما يختص بالعناية بالجروح، والعمل على تحقيق الرضا الوظيفي للممرضات مما يضمن لهن نجاح وتحسين عملهن المهني.

Chapter one

Introductions

Justification

Objectives

Introduction:

Nursing is defined as a profession within the health care sector focused on the care of patients so they may attain, maintain or recover optimal health and quality of life. Usually nurses are differentiated from other health care providers by their approach to patient care.⁽¹⁾

This traditional health care provider's role has underwent changes and development as nurses began to practice in a variety of setting due to the development of nurse education which witnessed a process of diversification towards advanced and specialized credentials. (Wound healing Wikipedia, the free Encyclopedia.)⁽²⁾.

Likewise, although nurses are among the medical profession who perform an important role in the patient's care, fewer studies were conducted on the status of nurses knowledge and competency of wound caring, in particular⁽³⁾.

Skin: Structure

- (1) Epidermis
- (2) Basement membrane Layers
- (3) Dermis ("True Skin")
- (4) Hypodermis / Subcutaneous.

Major Skin Functions

1. Provides a protective barrier against mechanical, thermal and physical injury and noxious agents - outside contaminator.
2. Reduces the harmful effects of UV radiation.

3. Perception: sensory organ for:- pain, pressure, touch, and temperature.
4. Plays a role in fluid balance, thermal regulation & excretion - regulates body temperature and prevents loss of moisture.
5. Plays a role in immunological surveillance.
6. Metabolism - vitamin D synthesis(cholecalciferol) in presence of sunlight.
7. Has a cosmetic, social and sexual association⁽⁴⁾.

Tissue Regeneration and Repair

Tissue repair:

- Restoration of tissue architecture and function after an injury
- Occurs in two ways:

Regeneration of injured tissue Replacement by connective tissue (scarring).

- Usually, tissue repair involves both processes.
- Involves cell proliferation, and
- Interaction between cells and extracellular matrix.

Physiology of wound healing

Acute and chronic wound healing

Aim: To provide nurses an overview of the tissue response to injury and tissue regeneration and repair⁽⁵⁾.

Hence, in attempting to investigate current knowledge and practice of nurses concerning wound caring, it is imperative, first, to consider the nurses educational system in the country, in terms of its adequacy and

whether it is coping with the latest developments of the nursing profession. To achieve this objective, studies should be carried out to assess the current knowledge and practices of the nurses with emphasis on wound caring. Such studies should take into consideration various variables such as age and gender of the nurse, type of institution, educational experience. (both theoretical and practical), curriculum and methods of teaching. Further, it is expected that the evaluation of nurses current knowledge and practice may lead to important findings, whether there are gaps and deficiency in knowledge, and this in turn, may call for some recommendations to address such status of knowledge through the upgrading of the curriculum, teaching modules and provision of further advanced training of nurses⁽⁶⁾.

Hence, the objective of the study is to investigate the outcome of using a teaching module on wounds care. To achieve this objective the researcher will conduct a descriptive cross-sectional hospital based study. The population of the study will consists of 50 nurses to be selected from Imperial Hospital-Khartoum. The sample will be representative of deferent wards and units in the hospital. A questionnaire of six questions to will be distributed to the members of the sample. The data will be collected and analyzed by using statistical package of social science (SPSS) program⁽⁷⁾.

Justifications of the study:**Statement of the problem:**

Any review or development of the nursing curricula in the country entails a thorough assessment of the current knowledge and practice among the nurses in all fields of nursing care. This was meant to enable the nurses to meet the growing demands and needs of nursing care. Hence, the general problem is to investigate the wound care teaching module through the use of a standardized assessment tool and to determine the extent of the need for improvement or change.

Rational of the study:

It is imperative for the provision of quality nurses care is to ensure the knowledge regarding such care. Hence, the nurse's knowledge has to be investigated and assessed. This evaluation starts with the care teaching a curriculum which is in this study is the assessment of module to wound care teaching. Wound caring nurses are entrusted with the application and management of all the necessary steps for wound healing. Hence, the assessment will reveal the level of knowledge in wound care teaching and call for addressing any gaps in the respect.

Statement of the study:

This study sets forth to evaluate the status of knowledge among nurses in respect of wound care, through the use of a standardized assessment tool.

Objectives of the study:**General Objectives:**

The main objective of this study is to evaluate the extent of knowledge of the nurses with regard to wound caring.

Specific Objectives:

1. Specifically it aims to know the nurses extent of understanding of the specific steps of wound care teaching.
2. determine any up-dating or change in such wound care teaching module.

Chapter Two

Literature Review

1. Brian J Daley and Zubin J. Panthaki

Wound Care Treatment and Management, Feb 2011.

This study tackled the general treatment of non-healing wounds which requires assessment of the entire patient and not just the wound. It set out the steps for the characterization of the wound starting with the assessment of the size and depth of the wound, its appearance – is it necrotic or viable and characteristics of wound exudates and status of the perwound tissues. The study considered other steps including the insurance of adequate tissue oxygenation, adequate nutrition, vitamin and mineral deficiencies and their effects on the wound healing. The study indicated the steps for the treatment of underlying infection and issues to be considered such wound infection versus colonization and osteomyelitis. The study elucidated in many tables the characteristics and use of wound dressing materials, and treatment of specific types of wounds such as pressure ulcers and the different steps in this respect such as debridement, control of chronic wound contamination and appropriate nutritional management. The study also devoted a section for the treatment of diabetic foot ulcers⁽⁸⁾.

2. Wound care center:

Dealing with problem wounds:

This essay illustrates the most up-to-date approaches to wound healing and wound care. It enumerated types of wounds including those which are associated with complications from diabetes, and other related vascular disorders in addition to types which include pressure sores and traumatic wounds, radiation tissue, damages and crush injuries. Further, the essay elucidates the wound treatment program which is based on the effective treatment options starting from the identification of the type of wound and its underlying causes. The treatment program includes: debridement, diabetic education, hyperbaric chamber treatment infections, disease management, laboratory evaluation, nutritional management, pain management, physical therapy, radiology services and vascular evaluation. The importance of the essay for our present study stems from the fact that the team of the wound care specialist includes nursing staff trained in the care of chronic wounds, hence nurses are among the most important part of the wound healing process. The essay also covers the guiding principles of wound care, wound dressing and treatment devices to meet the aim of the healing process and wound management as a whole⁽⁹⁾.

Furthermore, the essay considers the steps to be performed for the overall holistic assessment of the patient, i.e., the history examination, investigative diagnosis and implementation of the plan care. It

enumerated the five parameters to be considered in wound assessment, i.e. tissue type, wound exudates, per wound condition, pain level and size. Likewise, the essay covers the process for the dressing of surgical wounds, abrasions and laceration. It also considers factors that affect wound healing process such as infection, age, chemical stress, smoking, is addition to cleansing and debridement and its types. The essay finally set forth dressing regimes for managing complex, slow healing wounds.

3. Montana Mohamed Ibrahim Mohamed: The outcome of using a self – instructional Module on Foot care in Type 2 Diabetes Patients in Khartoum city.

This is an interventional hospital – based pre – post – test study conducted in governmental and private diabetes care centers in Khartoum city included Soba University Hospital, Police Hospital and Zenam Center. This study conducted an assessment of the outcome of using a self – instructional module on foot care for the prevention of foot problems in patients with type 2 Diabetes mellitus. The researcher took a sample of 85 patients of the abovementioned hospital and administered a questionnaire and a self – instructional module on them. He used several statistical methods and techniques to test the significant changes between the knowledge and behavior scores of the patients after the use of the self – instructional module. The study found that Diabetes mellitus was more common among females in the age group 42-53 years with mean age 47.5 = 20.4. Furthermore it found that foot care education and foot

examination by diabetes nurse educators didn't exceed (13% - 27%.4) of the study population. However, the study found that the use of a self-instructional module on foot care in type 2 Diabetes patients significantly improved their knowledge score from 41.2=9.4 in the pre-test to 79.6=14.4 in the post-test ($p < 0.05$) and improved their preventive behavior score from 58.2=9.4 in the pre-test to 81.2=9.8 in the post -test ($p < 0.05$). This study came with a conclusion that the use of a self-instructional module on foot care in Type 2 Diabetes patients significantly improved the average score of their knowledge and the average score of their preventive behavior which is likely to be effective in reducing the risk of foot problem, and amputation among the patients. This is one of the most relevant studies to our present study in terms of the use of modules for the assessment of the knowledge concerning wounds care and the methodology adopted by the researcher⁽¹⁰⁾.

4. Siham Ahmed Balla Musa: Evaluation of Diabetic Care at Health Center: Khartoum State, 2013

This study aimed at evaluation of the diabetic care at primary care level through the assessment of the quality of health services provided to diabetic patients at the health centers, Khartoum state, 2013. The researcher conducted the study on a sample of 712 diabetic patients attending 40 governmental and non-governmental hospitals in seven localities in Khartoum state. The researcher used and observation checklist of 16 items for assessment of the structure quality indicators

such as services received by the patients, adherence to services guidelines. Focus group discussions were conducted targeting 15 nurses and 21 doctors. The study adopted several empirical and statistical techniques and tools to evaluate the quality of diabetic services received by patients in the targeted hospital. It found that such quality was low in health centers (50.5%) compared to specialized diabetes centers (63.3%). The main finding of the study is that health centers in Khartoum state had low structural process and outcome quality care indicators. Diabetic patients in health centers were less satisfied with the diabetes care provided. Further, the study found that adherence to service guidelines in the targeted center was inadequate and it recommended motivation and training of care provides. This study is of relevancy to our present study specially its concern with the assessment of the care provided to patients by the medical staff including nurses⁽¹¹⁾.

5. Amani Mahmoud FadulMokhtar Ali – Effect of TIME Education and Stimulated wound Models on Nurses, Competency in Public Hospitals.

This study set forth the objective to examine the effect of TIME education and stimulated wounds models on nurses' competency as the concept of (TIME) for wound care was not practiced in health institutes or being reported in the literature Hence, this study aimed to show that the incorporation of the TIME framework into the educational program will improve the wound care knowledge and practice among community

nurses. This study adopted the method of the prospective pretest-posted one group design using the TIME framework for wound assessment. The study was conducted in a continuous professional development center, Ministry of Health, Khartoum state. The sample of the study was randomly selected from the number of the nurses with a Bachelor degree who are working in different surgical departments in public hospitals and it consisted 40 nurses. The research used the pretest and posttest tools, a questionnaire, observation checklist and 5- point Likert scale.

The implementation phase involved ten full task days. Eight weeks of hospital practice was allowed then followed by posttest program. Knowledge was acquired by lecture – based learning and problem solving scenarios. The researcher used several statistical techniques and tools for the assessment of the score of knowledge and practice among the nurses with respect of wound healing care. The main results of the study are as follows: changes in the test scores for knowledge showed pretest score of mean – 13.6607, SD = 4.65665, besides, posttest score of mean = 25,3021, SD 7.9728s based on negative ranks, the Z – Score value was - 5.909 a which was considered significant at (P = 0.000). For practice, the result showed pretest scores of mean 35.9580, SD 9. 04824 against posttest scores of mean = 49.3333.SD 7-61391 and the Z-score = -5.975a indicated a significant at (p = 0.000). This study concluded that the TIME educational program resulted in improvement in three out of five behavior parameters. It also concluded that this TIME education program

and stimulated wounds models have resulted in improvement of nurses competency. It recommended that TIME framework education program to be included in surgical nursing curricular. This study was of relevance to our present study in terms of the subject matter and methodology and the target of assessment of knowledge among nurses for wound care⁽¹²⁾.

6. Wound care center dealing with problem wounds

This study is a sort of steps aimed at acquainting the nurses and other health professionals with the knowledge of wound caring. It clearly state the wound type and what the treatment aims were. The study indicated that the establishment of the above factor is the key for the evaluation of the effectiveness of a treatment regime. The study then enumerated the types of wounds which are associated with complications from diabetes and other related vascular disorders, as well as pressure sores and traumatic wounds types. The study set forth a specific wound treatment program to be followed after conducting the diagnostic examination for the identification of the types of wounds and the underlying problem causing it⁽¹³⁾.

7. Awatif Bashir Hamid, Nursing Education in the Sudan: Current practice and Future Development.

This study was prepared for a PhD thesis in the Faculty of Arts, University of Khartoum, 1989.

This study reviewed the historical development of the nursing education to describe the current nursing system. I opted to set forth some

suggestions for the promotion of the nursing profession in the Sudan. The importance of the study emanates from its concern with the tracing of the development of the nursing education since independences.

The study investigated the different categories of the nursing personnel in order to know the level of the knowledge of nursing practices and to determine the major improvements in nursing education⁽¹⁴⁾.

important physiological functions Phases of Wound Healing Wound healing occurs in three dynamic, overlapping phases: Hemostasis and Inflammation Proliferation Matrix Synthesis. The Extracellular Matrix (ECM): is the network that surrounds cells Two forms: interstitial matrix and basement membrane.

Maturation and Remodeling Epithelialization Role of GF in Normal wound healing Contraction⁽¹⁵⁾

Body response to Inflammation Process time varies: Local erythema, edema, tenderness and increased wound drainage

The role of growth Factors

- stimulate cell division and proliferation,
- promote cell survival
- Huge list! Usually have ‘GF’ in name.

Moist wound healing theory

Wound exudate production is a normal part of the inflammatory phase of wound healing; blood capillary permeability increases, allowing protein-rich fluid to flow into the interstitial spaces.

Increased fluid production facilitates cleansing of the wound surface and helps provide a moist local wound environment to enhance healing.

Too much wound fluid, however, can inhibit wound healing; chronic wound fluid can break down extracellular matrix proteins and growth factors and inhibit cell proliferation, leading to the degradation of the tissue matrix⁽¹⁶⁾.

Types of wound healing

Depend on mechanism of injury and the time onset of wound, it is divided in to:

- Primary First intention
- Second intention
- Tertiary intention

Healing process continuum

- Abnormal healing: Excess healing (e.g. Hyper trophic scars, keloids)
- Normal Healing: A constant and continual increase that reaches a plateau at some point post injury.
- Delayed Healing: Decreased wound-breaking strength in comparison to wounds that heal at a normal rate

- Impaired Healing Chronic

A failure to achieve mechanical strength equivalent to normally healed wounds
Factors affecting wounds healings.

Aim: To provide nurses an overview of factors that can affect healing process.

Content out line

Classifications of wounds

Factors affect wound healing

A clinical approach to optimizing wound healing

Wounds classification

All wounds classified based upon depth of tissue destruction to:

A. Partial Thickness

B. Full Thickness⁽¹⁷⁾.

A. Partial Thickness

Destruction of epidermis and possible partial loss of dermis
Characteristics: Pink, painful- NO yellow tissue- Shallow wounds with no granulation tissue- Dermal repair with epithelial tissue- Healing is rapid in clean partial-thickness.

B. Full Thickness

Destruction of epidermis, dermis, subcutaneous and/or deeper subcutaneous.
Another classification is according to time frame to: either acute or chronic wounds.

Most Common etiology of chronic wound:

- Vascular insufficiency
- Venous stasis, arterial ulcers
- Pressure/ Decubitus ulcers
- Diabetic foot ulcers (neuropathic)
- Repeated trauma, poor perfusion or oxygenation, and/or excessive
- Inflammation; contribute to the causation and the continuation of the chronicity of wounds
- Infected Surgical Wound
- Dehisced Surgical Wound⁽¹⁸⁾.

According to the presence of microorganism the wound is classified into:

Wound classification depend on the presence of microorganism	
Wound type	Average infection rate
Clean	3%
Clean-contaminated	8%
Contaminated	15%
Dirty	35%

Factors Affecting Wound Healing

Local	Systemic
Mechanical injury	Advanced age
Infection	Nutrition
Edema	Trauma
Ischemia/necrotic tissue	Metabolic diseases
Topical agents	Immunosuppression
Ionizing radiation	Connective tissue disorders

Low oxygen tension	Smoking
Foreign bodies	Steroids and Chemotherapeutic Drugs Previous Radiation Therapy

Assessment of patients with wounds:

- Principles and practice
- Aim of the session

To introduce nurses to the patient centered concerns aspects as a part of wound preparation paradigm for holistic patient care. And facilitate effective use of assessment information for best healing outcome⁽¹⁹⁾.

Concept of TIME acronym Principles of Preparing wounds to heal
Time tool for wounds care:

- Wound bed preparation paradigm
- Causes of wounds
- Wounds etiology
- Wounds location
- Wounds measurement
- Wound-related pain assessment

TIME acronym Principles of Wound Bed Preparation

- Wound Assessment Tool - (T.I.M.E)
- See appended modified assessment tool of TIME
- The concept of wound bed preparation (WBP) and TIME

WBP means prepare the wound bed for healing making the best handling of wound etiology, patient centered approach and local wound care. This in turn is incorporated and interlink with TIME elements of wound care as it has been illustrated in the paradigm below⁽²⁰⁾:

Types of wounds according to these causes:

- Intentional: Surgical wound, stab wound, bullet injuries
- Non intentional: Traumatic wounds

Wound etiology

Co-morbidities - Patient's capacity to heal can be limited by specific disease effects on tissue integrity and perfusion, mobility, compliance, nutrition and risk for infection. Diabetes.

Systemic factors affecting healing:

- Psychosocial Assessment
- Determine ability to comprehend the treatment regime (compliant)
- Review.
- Mental status
- Ability to learn, barriers, learning style
- Depression
- Social support
- Poly-pharmacy
- Alcohol/drug abuse
- Goals/values/lifestyle
- Culture ethnicity

- Sexuality
- Stressors
- Altered body image

Consequences of wound, e.g. work loss, cost of treatment⁽²¹⁾.

Wound Assessment: Frequency: Upon every dressing change/patient visit, and documented weekly at minimum. Wound reassessment and monitoring frequency/rationale are affected by the overall patient condition, wound severity, patient care environment, goal of care and plan of care.

- **Preparation**

Place patient in the same anatomical position each time wound assessment completed.

Place the wound as far from sleep surface as possible.

Clean and or irrigate the wound.

Assess for new skin breakdown.

- **Physical Characteristics**
- Determine anatomical wound location.
- Utilize correct anatomical description.

Wound Measurement

Accurate measurement of a wound is critical to evaluate improvement or decline in healing. All facilities should have a policy to standardize how wounds are measured. Consistency among staff members is critical to

determine wound progression⁽²²⁾. Always measure and document in centimeters.

Always measure the length first at the longest section, then measure the width at the widest section and finally measure the depth at the deepest section.

Length - head to toe dimension

Width - side to side; greatest width perpendicular to the length

Depth - from visible to the deepest area

Document- Length x Width x Depth

Tissue Assessment and management

T-tissue of TIME wound care

To introduce nurses to the T-tissue assessment as a part of (TIME) principles of wound assessment and treatment, and to highlight its practical application in the clinical setting.

preparation principles⁽²³⁾.

Tissue, non-viable or deficient

The T in TIME relates to the physical appearance of the wound bed and describes the tissue type that is present, for example, granulation, slough, epithelialization or necrotic tissue.

Non-viable tissue, such as necrotic tissue, needs to be removed to allow the wound to heal. Slough is also a nonviable tissue but it may vary in color and texture.

Deficient tissue can include abnormal granulation-where the wound appears to be granulating but is fragile and, perhaps, bleeding⁽²⁴⁾.

Parts of a Wound

A. The wound: Open area only

Diameter from edge to edge

Size documented in centimeters: Length x Width x Depth

- The wound base: The bottom of the wound.
- Wound depth.
- Wound edges / margin: Inside perimeter of the wound, the rim.

Tissues types of the Wound Base

- **Healthy Tissue**
- Granulation - red/pink and beefy appearance
- Epithelialization
- Epithelial bridging
- **Necrotic tissue**
- Slough - yellow, tan
- Escher black, brown
- **Healthy Tissue**

Granulation tissue: New tissue that replaces dead tissue grows from base of wound. Moist, beefy red puffy mounded or berry like red or pink.

Epithelial Tissue: Outer most layer of skin. Dry, deep pink to pearly pink, close the wound⁽²⁵⁾.

Hypergranulation tissue: Forms above the surface of the surrounding epithelium. It delays epithelialization.

- Necrotic Tissue – dead; non-viable

Slough - yellow, green, grey, tissue, usually lighter in color, thin, wet stringy or thick and adherent.

Escher- black, brown, dry, tissue, usually darker in color, thicker, hard

Necrotic Escher: As the tissue is rehydrated it will change color and become soft and wet⁽²⁶⁾.

Muscle Tissue, Tendon and Bone

Muscle: Pink to dark red, firm. Highly vascularizes tissue which is striated (striped, grooved, or ridged).

Tendon: Strong fibrous tissue, yellow or white which attaches muscle to bone. It is Shiny white when healthy, thin o thick, contains muscle group

Fascia: Covering over muscles; it is shiny white and great organized

Bone: Shiny and smooth

Wound Base Color

- Red: healthy, good blood flow
- Pale pink: poor blood flow; ischemia, anemia
- Purple: engorged; edema; excessive bio burden; trauma
- Black or brown: nonviable, necrotic tissue
- Yellow: nonviable, necrotic tissue
- Gray: nonviable, necrotic tissue
- Green: infection; nonviable tissue⁽²⁷⁾.

White: ischemia; maceration, may be confused with bone or fascia.

Tissue management according to wound bed preparation and TIME principles

Infection and Inflammation

Aim of the session

To introduce nurses to the I-Infection, Inflammation assessment as a part of (TIME) principles of wound assessment and treatment, and to highlight its practical application in the clinical setting⁽²⁸⁾.

Contents

The concept of acute inflammation and infection

Wound infection continuum

Classification of wound depend on healing ability

Risk factors for infection in chronic wounds

Obtaining wound swab

Infection is the presence of replicating micro-organisms in a wound with associated host injury. Occurs when: the pathogenic activities of the micro-organisms present in a wound overcome the natural defenses of the host's immune system⁽²⁹⁾.

Infection in a wound causes

Pain and discomfort for the patient, delayed wound healing, and may increase cost of care, if associated with wellness in a health condition.

Lastly, it can be life threatening. The likelihood of a wound becoming

infected is clearly related to microbial load, the type of micro-organism, and the ability of the host to resist infection⁽³⁰⁾:

$$\text{Infection} = \frac{\text{number} \times \text{virulence}}{\text{Host resistance}}$$

Host resistance

Diagnosing Infection

Bacterial load tolerance varies between a healthy host and compromised patients

Diagnosis is primarily a clinical skill.

Microbiological data

The classical signs of infection in acute wounds	For chronic wounds Consider additional signs
Pain	Delayed healing
Erythema	Increase exudates
Edema	Bright red discoloration of granulation tissue
Purulent discharge, and	Friable and exuberant granulation
Increased heat	New areas of slough or breakdown on the wound surface, undermining
Pain	Foul odor
Erythema	Delayed healing
	Increased exudates
These are related to the inflammatory process occurring in the wound	Bright red discoloration of granulation tissue

Wounds infection continuum

The progression of bacterial balance to bacterial damage range in a chronic wound.

All wounds contain bacteria at levels ranging from contamination, through critical colonization (occult infection), to inflammation

Contamination/ Colonization

Critical colonization /Local Infection

Infection.

Contamination/ Colonization

Bacteria are present on the wound surface but not multiplying.
(Contamination).

A steady state of replicating organisms are attaching to the wound tissue
Multiplying bacteria with no association of tissue damage or delayed
healing(Colonization)

Critical colonization /Local Infection (covert infection, increased bacterial burden)

Critical colonization is the point in time when the body's local host
response starts to be initiated, but there are no systemic signs of infection.
Initiates the body's immune response inflammation.

The wound is no longer healing at the expected rate: wound size is not
decreasing⁽³¹⁾.

Infection: Bacteria are present within the wound and have spread to the
deeper and surrounding tissue. Associated with host inflammatory
response.

They are multiplying and causing tissue damage.

Painful wound may increase in size with potential satellite areas of
breakdown.

Systemic infection

Fever, rigors, chills, hypotension, and multiple organ failure

Ability of the wound to heal categories

Healable: Adequate blood supply, hence cause can be corrected.

Maintenance: healable but patient or health care, system factors a barrier.

Non-healable: Inadequate blood supply unable to correct the cause⁽³²⁾.

Debridement:

Debride healable wounds, removing non-viable, contaminated or infected tissue (surgical, autolytic, enzymatic, and mechanical)⁽³⁴⁾.

Non-healable wounds should have only non-viable tissue removed and active debridement to bleeding tissue is contraindicated.

Debridement is contraindicated for patient with dry Escher on heel, no signs of infection, and no palpable pulses⁽³⁵⁾.

Managing Inflammation / Infection according to TIME principles

Clinical observations	Proposed path physiology	Clinical actions	Effect of actions	Clinical outcome
Infection or inflammation	<ul style="list-style-type: none"> • High bacterial counts or prolonged inflammation. • Increased inflammatory cytokines. • increased protease 	<ul style="list-style-type: none"> • protease inhibitors • anti-inflammatories • topical or systemic antimicrobials • remove infected foci 	<ol style="list-style-type: none"> 1. low bacterial counts or controlled inflammation. 2. Decreased inflammatory cytokines 3. Decreased protease activity. 4. Increased growth factor activity 	Bacterial balance and reduced inflammation

Procedure for Taking Swab

Indication

In most cases, wounds should not be cultured if no evidence of infection or impaired healing is noted.

Unless screening is being performed for colonization of multi-resistant organisms⁽³⁶⁾.

Procedure Steps for Taking a Swab

The wound bed must first be cleaned with saline and superficially debrided.

So the cultures from the superficial wound compartment more closely resemble those in the deep wound compartment.

Prepare a sterile disposable cotton swab.

Pre-moistening a swab in the transport media is useful if the surface of the wound is dry (it can improve the yield) but is not necessary if the wound is already moist.

The swab should be taken from the granulation tissue surface of the wound, avoiding debris and frank collections of pus

The tip of the swab should be rolled on its side using Levine Technique over the part of the wound granulation tissue with the most obvious signs of infection, avoiding slough and surface purulent discharge.

It is preferable for wounds larger than 5cm to take more than one regional swab from the upper and lower areas of the wound.

If pus or discrete abscesses are collected locally, the fluid should be aspirated into a syringe using a needle.

The fluid is an ideal specimen for culture. Likewise, deep curettin from the debridement process should be sent for analysis, these closely correlate to biopsy samples. They give better results particularly when biofilms are present.

Transport to the laboratory should be carried out promptly.

Moisture balance assessment.

M-moisture imbalance of TIME wound care

To introduce nurses to the M-moisture assessment as a part of (TIME) principles of wound assessment and treatment. And then to highlight its practical application in the clinical setting⁽³⁷⁾.

Epiboly /Epiboly

Rolled edge' and curled under in which epithelial cells cannot migrate to close wound.

- Outside perimeter of wound minimum of 4cm.
- assessment performed by inspection and palpation.
- Assess tissues within 4 centimeters of wound edge.
- Palpate for moisture, temperature, texture, turgor, pulses and mobility.
- Assess for color, induration, warmth, and edema around the wound.
- Observe for brawny edema, hyper or hypopigmentation⁽³⁸⁾.

Erythema: Red: infection, trauma and/ or inflammation

Per-Wound temperature:

- Warm - Hot: possible injection.
- Cool: poor blood flow.

Indurated: Described as firm or hard

Per-Wound Texture

- Moist
- Macerated
- Boggy: soft and/ or mushy.

Edema: Swelling accumulation of fluid in tissues.

Integrity Denuded: Loss of epidermis, caused by exposure to urine, feces, body fluids, wound exudate or friction⁽³⁹⁾.

Excoriated

- Linear erosion- loss of epidermis.
- Destruction of skin by mechanical means

Erosion: Loss of the epidermis: Part or all

Other per wound abnormality

- Lesions
- Rashes

Erythema - redness irritation, dermatitis, demarcated borders, red streaking. In dark skin, may appear purple or a gray hue (type) or deepening of the ethnic skin color⁽⁴⁰⁾.

Dry skin.

Wound edges management according to TIME principles

Clinical observations	Proposed path	Clinical actions	Effect of actions	Clinical outcome
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	physiology			
Non-advancing or undermining	Non-migrating keratinocytes. Non-responsive wound cells and abnormalities in extracellular matrix or abnormal protease activity	Reassess cause or consider corrective therapies: Debridement Skin grafts Biological agents Adjunctive therapies	Migrating keratinocytes and responsive wound cells. Restoration of appropriate protease profile	Advancing edge of wound

Dressings:

Dressings are a material applied to wound with or without medication, to give protection and assist in healing.

Type of Dressings:

- Dry to Dry Dressings.
- Wet to Dry Dressings.
- Wet to Wet Dressings.
- Hydrogel Dressings.

Complication of wound

- Infection

- Periwound erythema
- Edema
- Foul Odor
- Ischemic Wounds
- Neurotrophic Wounds
- Pressure Sores

Chapter Three

Methodology:

Introduction

This chapter contains research approach, study design, the sampling technique, development and description of the tool, pilot study, data collection and plan of analysis.

Study Design:

It's a descriptive cross sectional done in Imperil Hospital to assess the knowledge and practices among cardiac nurses about patient safety after Wound Care Teaching Module Using Standardized Assessment Tool from April to August 2017.

Study Area:

The research was carried out in Imperil Hospital near the Al-Sayd Albalrahman street.

Study setting: Imperil Hospital.

The Imperil Hospital is one of the specialized hospitals .which has 4 specializations namely CU, CCU, ER, LC. The total number of the staff is about 70 plus Head Nurse and 2 medical officers, social worker, medical director in addition to cardiac medicine consultant.

Study population:

The Populations of the study consisted of the staff nurses in ICU and ward who are entrusted with the caring for the patients after cardiac catheterization.

Sample and sampling technique

Random sampling is done for this study; 50 samples were collected. The pilot study was carried out for 5 staff nurses. The total period of study is one month in August 2017.

Data collection:

A specific type of questionnaire was distributed. A number of 30 questionnaires were distributed to ICU and ward. Descriptive statistical methods including frequencies were used to analyze the data gathered from the questionnaires.

Data collection technique:

Data was collected in two weeks during morning shift.

Data analysis:

The investigator conducted the testing of the level of knowledge and practice in order to find out whether it's good or moderate or scarce.

The data was manually coded through a statistical techniques then using computerized software.

A different statistical measure was used then the data were presented in tables.

Ethical considerations:

- The proposal was approved by the Ethical Scientists Committee.
- Permission was obtained from the Director of the Hospital and the Head Nurse.
- Verbal permission was obtained from the participants who were given the free option either to agree or to decline.

Chapter Four

Results

Assessing the patient with a wound questionnaire

Table (1): Distribution of participants with respect to gender:

	Frequency	Percentage
Male	15	30
Female	35	70
Total	50	100

Table (2): Distribution of participants with respect to age:

	Frequency	Percentage
20-30 yrs.	39	78
31-40 yrs.	11	22
Total	50	100

Table (3): Distribution of participants with respect to level of education:

	Frequency	Percentage
Bachelor	35	70
Master Degree	3	6
diploma	12	24
Total	50	100

Table (4): Distribution of participants with respect to experience:

	Frequency	Percentage
1-5 Years	36	72
6-10years	14	28
Total	50	100

Table (5): Distribution of participants as to the first step in the care of a patient with a wound:

	Frequency	Percentage
Procuring the supplies needed for the care.	48	51.7
Determining the amount of wound drainage.	34	27.8
Evaluating the wound care abilities of the patient's caregiver.	6	3.8
Obtaining a thorough patient history and conducting a physical exam	26	16.7
Total	50	100.0

Table (6): Distribution of participants according to injury that results in damage to the epidermis and part of the dermis:

	Frequency	Percentage
Partial thickness wound.	15	19.3
Subcutaneous wound.	13	10.8
Full-thickness wound.	32	73.7
Total	50	100.0

Table (7): Distribution of participants about good wound order includes:

	frequency	Percentage
The specifics to be taught to the family.	16	73
Who is to perform the dressing change.	19	16.7
Length of time permitted for each visit.	5	10
The type of primary and secondary dressing	10	51.3
total	50	100

Table (8): Distribution of participants as to data concerning a wound for the health history review:

valid	frequency	Percentage
Location and initial size and etiology.	21	42
Chronology of the wound and aggravating and alleviating factors.	18	36
Associated symptoms and drug allergies.	9	18
Evaluation of patient's functional abilities as well as review of family history.	13	26
A personal and social history and review of	10	20

system.		
All of the above	35	70

Table (9): Distribution of participants as to methods of wound documentation:

	Frequency	Percentage
Measurement of wound size.	33	66
Tracing of the wound.	45	90
Photographs or diagrams.	44	88
Staging criteria and assessment of per wound skin	27	54
All of the above.	25	50

Table (10): Distribution of participants about wither wound care dressing usually change as the wound heals:

	frequency	Percentage
true	39	78
false	11	22
total	50	100

Table (11): Distribution of participants on the question“if the ability of the patient or caregiver to perform dressing changes must be taken into account when formulating a treatment plan”:

	frequency	Percentage
true	36	72
false	14	28
total	50	100

Table (12): Distribution of participants as to the way that nurse provides to the patient/caregiver who is able to participate in wound care:

	frequency	Percentage
Written instructions.	24	48
Demonstrations of the dressing change.	45	90
Supervision of the dressing change until the procedure is performed independently.	28	56
All of the above.	23	46

Table (13): Distribution of participants as to the wound care order that must be evaluated to insure:

	frequency	Percentage
Site to treat, frequency of changes.	24	48
Cleansing solution.	45	90
Primary and secondary dressings.	28	56
Care of surrounding skin.	23	46
Name of institution prescribing doctor is associated with.	43	86

Table (14): Distribution of participants as to follow-up visits center on:

	frequency	Percentage
Any change in overall health status.	30	60
Vital signs and wound assessment.	18	36
Trajectory of healing with revised instructions.	15	30
All of the above.	45	90

Chapter Five
Discussion

shows that the (30%) of participants are males, while the most (70%) of them are females.

shows that the most (78%) of participants are of 20-30 years old, while (22%) of them are of 31-40 years old.

shows that the educational level for most (70%) of the participants was bachelor degree, while for only (6%) of them was master degree, while for (24%) of them was diploma.

shows that the most (72%) of the participants had 1-5 years of work experience, while (28%) of them had 6-10 years.

shows that most (51.7%) of the participants indicated the first step in the care of a patient with a wound is to procuring the supplies needed for the care, while (28.8%) of them indicated the amount of wound drainage, and (3.8%) of them indicated the evaluation of the wound care abilities of the patient's caregiver, and (16.7%) of them indicated the obtainment of a thorough patient history and conducting a physical exam.

shows that most (73.7%) of the participants indicated the injury that results in damage to the epidermis and part of the dermis is described as full-thickness wound, since for (19.3%) of them is partial thickness wound, and for (10.8%) of them is subcutaneous wound.

shows that (7.3%) of participants indicated the good wound order includes is the specifics to be taught to the family, since for (16.7%) of them is who is to perform the dressing change, (10%) of them is length of time permitted for each visit, while for most (51.3%) of them is the type of primary and secondary dressing.

shows that (42%) of the participants indicated that the health history review would include location and initial size and etiology, while (36%) of them would include chronology of the wound and aggravating and alleviating factors, (18%) of them would include associated symptoms and drug allergies, (26%) of them would include evaluation of patient's functional abilities as well as review of family history,(20%) of them would include personal and social history and review of system, while for most (70%) of them would include all of the data.

shows that (66%) of the participants indicated that they include measurement of wound size as method of wound documentation, while (90%) of them included tracing of the wound, (88%) of them included photographs or diagrams, (54%) of them included staging criteria and assessment of periwound skin, while (50%) of them would include all methods.

shows that the most (78%) of the participants indicated that wound care dressing usually change as the wound heals, while for (22%) of them indicated wound care dressing does not usually change as the wound heals.

shows that the most (72%) of the participants indicated that the ability of the patient or caregiver to perform dressing changes must be taken into account when formulating a treatment plan, while for (28%) of them does not.

shows that (48%) of the participants indicated that nurse provides written instructions to the patient/caregiver who is able to participate in wound care, while for (90%) of them indicated the demonstrations of the dressing change, (56%) of them indicated supervision of the dressing

change until the procedure is performed independently, while (46%) of them indicated that nurse provides all ways.

shows that (48%) of the participants indicated that they must evaluate site to treat frequency of changes to insure the wound, while (90%) of them indicated cleansing solution, (56%) of them indicated primary and secondary dressings, (46%) of them indicated care of surrounding skin, while (86%) of them indicated name of institution prescribing doctor is associated with.

shows that (60%) of the participants indicated that the follow-up visits center on any change in overall health status, while for (36%) of them indicated vital signs and wound assessment, for (30%) of them indicated on trajectory of healing with revised instructions, while for (90%) of them indicated follow-up visits center on all of the above.

Conclusion

This is a descriptive cross-sectional hospital based study. It was conducted in Imperial Hospital during a period extended from May 2017 to December 2017 to evaluate nurse's knowledge regarding wound care. It involved 50 of nurses in different wards. Data were collected by using a questionnaire and analyzed through the use of the statistical package for social science (SPSS) program.

The Study came out with the following findings:

- The age of the majority of the study populations was between (20- 30) years and they had a bachelor degree & diploma of nursing and experience of 1-5 years. Only 7 nurses out of their number had an experience ranging between (6-10) years and no one of them had an experience more than 10 years.
- The study revealed that the majority of the nurses are well acquainted with the knowledge of the various steps of wound caring.

Recommendations

The study presented some recommendations as follows:

- to provide nurses with a continuous and on-going education to act as a bridge between the basic training, practice and supervision, so as to raise their efficiency and to enable them to cope with the new and latest developments in knowledge, skills, equipment's and techniques of nursing. Nurses should be enabled to utilize the most up-to-date approaches to wound healing and remain current in new scientific advances in wound care, and to work for the achievement of the job satisfaction of the nurse's profession which will ensure them a long and successful career.
- According the study findings it revealed the need for a commitment to continuing education for the promotion of high standards of nursing knowledge and practice.

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Questionnaire

Demographic data of participant:

1) Gender:

1-male

2- Female

2) **Age:** 1/ 20-24yrs 2 / 25-29yrs 3/above30yrs.

3) **Level of education:**

1-Bachelor

2-Master degree

3-PhD 4-

diploma

4) **Duration of experience:**

1-(1-2) yrs.

2-(3-4) yrs.

3- 5yrs and above

1. The first step in the care of a patient with a wound is:
 - a. Procuring the supplies needed for the care.
 - b. Determining the amount of wound drainage.
 - c. Evaluating the wound care abilities of the patient's caregiver.
 - d. Obtaining a thorough patient history and conducting a physical exam.
2. An injury that results in damage to the epidermis and part of the dermis is described as a:
 - a. Partial thickness wound.
 - b. Subcutaneous wound.
 - c. Full-thickness wound.
 - d. Decubitus ulcer.
3. A good wound order includes:
 - a. The specifics to be taught to the family.
 - b. Who is to perform the dressing change.
 - c. Length of time permitted for each visit.
 - d. The type of primary and secondary dressings.
4. A health history review will include the following data concerning a wound:
 - a. Location and initial size and etiology.
 - b. Chronology of the wound and aggravating and alleviating factors.
 - c. Associated symptoms and drug allergies.
 - d. Evaluation of patient's functional abilities as well as review of family history.

- e. A personal and social history and review of system.
- f. All of the above.

5. Methods of wound documentation include:

- a. Measurement of wound size.
- b. Tracing of the wound.
- c. Photographs or diagrams.
- d. Staging criteria and assessment of periwound skin.
- e. All of the above.

6. Wound care dressing usually change as the wound heals.

TRUE FALSE

7. The ability of the patient or caregiver to perform dressing changes must be taken into account when.

Formulating a treatment plan.

TRUE FALSE

8. The nurse will provide the following to the patient/caregiver who is able to participate in wound care:

- a. Written instructions.
- b. Demonstrations of the dressing change.
- c. Supervision of the dressing change until the procedure is performed independently.
- d. All of the above.

ASSESSING THE PATIENT WITH A WOUND

9. The wound care order must be evaluated to be sure it includes the following except:

- a. Site to treat, frequency of changes.
- b. Cleansing solution.
- c. Primary and secondary dressings.
- d. Care of surrounding skin.
- e. Name of institution prescribing doctor is associated with.

10. Follow-up visits will center on:

- a. Any change in overall health status.
- b. Vital signs and wound assessment.
- c. Trajectory of healing with revised instructions.
- d. All of the above.