PRESSURE ULCER PREVENTION FOR HOSPITALIZED ADULT PATIENTS: EVIDENCE-BASED NURSING

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Thematic Paper
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ABSTRACT

Pressure ulcer is an area of skin damage caused by any external mechanical force, such as shear, friction or under lived pressure. It is a major complication among hospitalized patients leading to an increased length of hospital stay, morbidity and mortality.

The purpose of this study was to summarize current evidence-based guidelines for prevention of pressure ulcers for hospitalized adult patients. The search strategy was followed by population, intervention, comparison, and outcome (PICO) framework. The guidelines were searched from the electronic databases from Mahidol University library system. The guidelines' qualities were appraised according to the steps, and principles of AGREE II. A total of 14 guidelines were included in this study, and the findings were analyzed, synthesized and summarized. The recommendations synthesized from the guidelines included 1) Conducting a comprehensive skin and risk assessment, 2) Performing moisture management, 3) Encouraging nutrition support by providing sufficient calories intake, and 4) Minimizing pressure, shear & friction; repositioning for reduce the duration of pressure on the skin.

It is recommended that pressure ulcer prevention recommendations should be applied to suit the context of the Bangladesh clinical settings. Strategies to implement the recommendations among hospitalized patients are suggested. Moreover, further research should be conducted to test the effectiveness of the guidelines.

KEY WORDS: HOSPITALIZED ADULT PATIENTS / PRESSURE ULCER PREVENTION / PRESSURE ULCER / EVIDENCE-BASED NURSING

55 pages

CONTENTS

LIST OF TABLES

CHAPTER I
INTRODUCTION

1.1 Background and significance of the clinical problem

A pressure ulcer is an area of localized damage to the skin muscle, and underlying tissues caused by any external mechanical force such as shearing, friction or underlying pressure. Ulcer usually occurs over prominent bony areas (National Pressure Ulcer Advisory Panel [NPUAP], 2009). Pressure ulcers have been reported in all health care settings in many countries. A pressure ulcer is a significant burden to the patients, families, and caregivers. Pressure ulcer also contributes to morbidity and mortality (Tweed & Tweed, 2008). Among hospitalized patients, pressure ulcers are correlated with severe pain, extended hospital stay, increased costs, risk for sepsis and death (Cherry, Moss, Maloney, & Midyette, 2012; Jenkins & O'Neal, 2010; Theisen, Drabik, & Stock, 2011). In the United States of America (USA) it was estimated that 60,000 deaths occur each year due to complications involving pressure ulcers (Agency for Healthcare Research and Quality [AHRQ], 2011). Furthermore, more than 2.5 million patients are affected; cost of treating these patient ranges from $9.1 billion to $11.6 billion per year (AHRQ, 2011; Cynosure Health, 2012). In the United Kingdom (UK), more than 4 million patients develop new pressure ulcers yearly (Bennett, Dealey, & Posnett, 2004).

In 2005, a study was conducted in Australia and 95,695 adult patients were found to be suffering from pressure ulcer, and their bed days lost 398,432, and total cost were AU$285 million; it was the greatest cost attributed to New South Wales (Australian Wound Management Association [AWMA], 2012). In 1993 to 2006, 80% hospitalized adults patients developed pressure ulcers in acute care settings who had been admitted to hospital without pressure ulcers (Jenkins & O'Neal, 2010; Russo, Steiner, & Spector, 2008). The pressure ulcer rate increases during surgery with 14.8% found in orthopedic wards of four hospitals in Tehran (Abdolrahimi, Bolourchifard, Yaghmaei, & Baghban, 2013). The impacts of pressure ulcer on health are widely

recognized: A study by Brain and lyder (2004) revealed that hospitalized patients with pressure ulcer due to immobility had twice higher mortality rate as compared to patients without pressure ulcer. The social, physical, emotional and economic burdens of pressure ulcers are rapidly increasing worldwide (Kevin & He, 2009; Lindgren et al., 2004). The incidence rate of pressure ulcer is very high in Asian countries. However, Bangladesh has no appropriate data regarding the incidence and prevalence of pressure ulcers.

Nurses' knowledge and practice are also significant factors in the development of pressure ulcer. Inadequate knowledge and practice of nurses also influences higher prevalence of pressure ulcers (Vaishampayan, Clark, Carlson & Blanche, 2012). Although numerous evidence-based guidelines are available around the globe, there are no such guidelines at the national level or in the hospital setting in Bangladesh. Appropriate scientific guideline implementation and prevention of pressure ulcer activities would reflect a climate of patient safety. However, preventive action for pressure ulcers is carried out by routinely turning and changing positions by using pillows as a support surface. Assessment of pressure ulcer has never been performed at admission time or within departments. Clearly evidence-based guidelines are essential to pressure ulcers prevention and would be very useful in Bangladesh.

1.1.1 Pathophysiological process of pressure ulcer development: The event triggering pressure ulcers are density of the tissues caused by an external force such as a mattress, wheelchair pad or bed rail. Other traumatic forces that might be present include shearing forces and friction. These forces cause microcirculatory occlusion as pressure rises above capillary filling pressure and transforms into ischemia. Ischemia leads to inflammation and tissue anoxia. Tissue anoxia leads to cell death, necrosis and ulceration. The main factors contributing to pressure ulcers are described as follows (Bogie, Powell, & Ho, 2012; Casey, 2013; Cherry et al., 2012; Sharp & McLaws, 2005).

Pressure: When soft tissues are compressed between bony prominences and contact the surface, microvascular occlusion with tissue ischemia and hypoxia occurs. If compression is not relieved, a pressure ulcer can develop within 3 to 4

hours. These pressure ulcers most commonly occur over the sacrum, ischial trochanters, malleoli and heels, but can appear anywhere (Sharp & McLaws, 2005).

Friction: The friction occurs between the skin and support surface when changing the position of immobile patients and rubbing against clothing or bedding can cause skin ulcerations leading to local erosion and breaks in the epidermis and superficial dermis (Sharp & McLaws, 2005).

Shearing forces: Shearing forces occur when patients are placed on an incline, when stress and damage of supporting tissues are caused by the force of muscles and subcutaneous tissues drawn down by gravity to oppose the more superficial tissues remaining in contact with external surfaces. Shearing forces do not directly contribute to pressure ulcers (Cherry, Moss, & Midyette, 2012; Sharp & McLaws, 2005).

Moisture: Perspiration and incontinence can lead to tissue breakdown and maceration which can initiate or worsen pressure ulcers because muscles are more susceptible to ischemia with compression than skin. Therefore, muscle ischemia and necrosis may by underlying factors in pressure ulcers resulting from prolonged compression (Bogie, Powell, & Ho, 2012; Sharp & McLaws, 2005).

Ischemia: It is a condition that leads to decreased oxygenated blood supply to the capillaries due to shearing. Ischemia triggers anaerobic metabolism in affected cells with occlusion of larger vessels. Ischemia also increases lactic acid levels in the area, thereby leading to acidosis. Waste products accumulate due to lack of venous and lymphatic drainage, thereby causing edema (Casey, 2013).

Damage: Damage to cell organelles and muscle fibers follow in as soon as 90 minutes. Prolonged ischemia reduces adenosine triphosphate (ATP) production, and impairs cellular activity, eventually causing necrosis of the cells and formation of pressure ulcers (Casey, 2013).

1.1.2 International Pressure Ulcer Classification System: As part of the guideline development process, the National Pressure Ulcer Advisory Panel and the European Pressure Ulcer Advisory Panel NPUAP and EPUAP (2009), have developed a common international definition and classification system for pressure ulcers. Costa (2013) recommended that a standard categorical scale should be employed in order to

assess the severity of pressure ulcers. According to this scale, pressure ulcers can be divided into 4 categories with a 4-stage system to describe this classification as follows:

Table: 1.1 - Pressure Ulcer Categorization (Costa, 2013) and Staging System NPUAP and EPUAP (2009).

Pressure Ulcer Category (Costa, 2013).	Pressure Ulcer Staging System (NPUAP &EPUAP, 2009).
4 categories	4 stages
Category I: Skin intact with non-blanchable erythema of a localized area that is usually over a bony prominence. Skin discoloration, warmth, edema, hardness or pain can be present. Skin that is darkly pigmented may not have visible blanching.	Stage I: The skin remains intact with non-blanchable redness of a localized area over a bony prominence. Skin that is darkly pigmented may not have visible blanching; its color can differ from the nearby area.
Category II: Thickness, partial loss of the dermis presenting as a shallow open ulcer with a reddish pink wound bed without slough; can also present as an intact, open or ruptured serum-filled blister.	Stage II: Thickness, partial loss of the dermis presenting as a shallow open ulcer with a reddish pink wound bed without slough; can also present as an intact or open/ruptured serum-filled blister.
Category III: Full thickness and tissue loss. Subcutaneous fat may be visible but bone, tendon and muscle are not exposed. Some slough may be present; may include undermining and tunneling.	Stage III: Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon and muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss; may include undermining and tunneling.
Category IV: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. often includes undermining and tunneling.	Stage IV: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present in some parts of the wound bed. often includes undermining and tunneling.

According to Table 1.1 there are two famous classification systems for pressure ulcers. The first one is Costa (2013), and the second one is the pressure ulcer staging system provided by NPUAP and EPUAP (2009). According to Costa, pressure ulcers are classified by the standard categorical scale aimed at assessing the

severity of pressure ulcers. According to this scale, pressure ulcers can be divided into 4 categories. Furthermore, NPUAP classifies pressure ulcers according to the depth of tissue injury. NPUAP redefined its definition of stages in 2007. The stages of pressure ulcers progress from 1 to 4 with healing from 4 to 1. The similarities and differences between the categories are presented below:

Category I- Intact skin with non-blanching erythema of a localized area that is usually over a bony prominence; skin discoloration, edema, warmth, hardness or pain can also be present. Darkly pigmented skin may not show visible blanching (Costa, 2013).

Stage I- Intact skin with non-blanchable redness of a localized area that is usually over a bony prominence; darkly pigmented skin may not show visible blanching; the color of the surrounding areas may vary (NPUAP & EPUAP, 2009).

The difference can be found in Category I where discoloration of the skin, warmth, edema, hardness or pain may also be present and Stage I where its color may differ from the surrounding areas. All other descriptions are nearly the same.

On the other hand, the most important difference can be found in the stages system where two additional definitions are offered: One is suspected deep tissue injury and another one is unstageable. These two additional definitions are mostly used in the USA.

1.1.3 Pressure ulcer risk factors

It is essential that the risk factors for pressure ulcers are recognized. More than 100 risk factors have been identified for pressure ulcers (Manzano et al., 2010; García-Fernández, Agreda, Verdu, & Pancorbo-Hidalg, 2013). Immobility is the major risk factor for developing pressure ulcer (Lindgren, et al., 2004). Hospitalized patients due to immobility have decreased serum albumin whereby prolonged immobility results in cardiovascular reconditioning; the combination of deconditioned cardiovascular reflexes and diminished plasma volume can lead to postural hypotension, changes in body fluid composition and reduced oxygen uptake leading to impaired reactive hyperemia and impaired peripheral blood flow with the development of risks for pressure ulcers (Sharp & McLaws, 2005).

Malnutrition is another risk factor for pressure ulcers, because bed rest decreases appetite, increases constipation for long periods of time and leads to malnutrition. The effects on the dermal system include reduced capillary circulation and age-related skin changes such as epidermal thinning, loss of elastic fibers, loss of sweat and sebaceous glands, all of which may influence pressure ulcer development (Sharp & McLaws, 2005). Other factors include age, infection, urinary or fecal incontinence, fever, perspiration, increased white blood cell count, diabetes mellitus, low body weight, loss of sensory perception due to sedation and analgesia with oxygenation, dehydration and male gender. In addition, winter seasonal conditions represent a new concept in the etiology of pressure ulcer because pressure ulcer incidence rates are 4-fold higher in the winter than in the summer (Leijon, Bergh, & Terstappen, 2013; Manzano et al., 2010; Sharp & McLaws, 2005; Tweed & Tweed, 2008).

1.1.4 Incidence and prevalence of pressure ulcers: The prevalence of pressure ulcers in developed countries is as follows:

United States - hospitalized elders (15%), nursing homes (24%), rehabilitation facilities (25%) and home health-care settings 6-9% (Brain & Lyder, 2004; Park-Lee & Caffrey,2009).

Other developed countries: Australia (26%) (AWMA, 2012), Sweden (23%) (Leijon et al., 2013), Canada (26%) and New Zealand (38.5%) (Casey**,** 2013). The European countries among another survey found rates of 8.3% in Italy, 12.5% in Portugal and 21% to 22.9% in Belgium (Leijon et al., 2013).

Middle East: A study in Taharan shows the prevalence of pressure ulcers in hospitals to vary from 24% to 69%, and the incidence rate in hospital settings ranges from 3% to 30% (Abdolrahimi et al., 2013).

Asia: A number of studies has revealed pressure ulcer incidence to be very high in Asian countries, ranging from 2.1% to 31.3% in ICU settings (Suriadi et al., 2007). In Hong Kong, the rate is 21% in rehabilitation settings, In Singapore the rate in acute care settings ranges from 9 to 14% (AWMA, 2012).

Thailand: Similar statistics are found where the occurrence of pressure ulcers among orthopedic patients aged more than 60 years is 28% (Ngamprasert, 2002).

Bangladesh: There is no available research in Bangladesh where the author found only one study conducted by Hoque, Grangeon and Reed (1999) among paralyzed patients. According to the findings, 94 persons out of 247 patients (38%) developed pressure ulcers.

The information aforementioned demonstrates ulcers among the prevalence of pressure ulcers are relatively high in developing countries including Bangladesh. The measures for effective prevention are therefore required.

1.1.5 Impact of pressure ulcers

Hospitalized patients have lots of statistics on increased risks for pressure ulcers (Sharp & McLaws, 2005). The impact of pressure ulcers is generally intolerable and incurs huge expenses for patients, families, caregivers, and organizations. On the national scale, pressure ulcers are widely recognized as an important quality indicator in nursing (Cherry et al., 2012).

Health Impact: Hospitalized patients usually suffer with pain, thereby causing patients a great deal of suffering with diminished activities of daily living (ADL), feelings of despair and altered body image (Cherry et al., 2012). Pressure ulcer are associated with infection**,** delayed healing, mortality and morbidity. In a mortality analysis performed by using a logistic regression model, data were collected from Skaraborg Hospital (KSS) in Sweden where the researcher identified 66% of patients as having died within 21 months with increased risk at 3.6 times higher risk for death ($P < .001$) as compared to patients without pressure ulcers (Leijon et al., 2013).

Organization Impact: Pressure ulcers destroy the reputations of organizations as well as accreditation. Pressure ulcer has a direct impact on health care institutions and a significant burden on length of hospital stay. A German university hospital conducted a study from 2007 to 2009 in patients aged 75 and over; the study showed that 7.1% patients admitted to the hospital with pressure ulcer had a statistically significant ($p = 0.0011$) increased length of hospital stay (Lindgren et al., 2004; Theisen et al., 2011)). Hoque, Grangeon, and Reed (1999) conducted a study

among paralyzed patients in Bangladesh and found that out of 247 patients, 34% remained in hospital more than five months in comparison to 14% of the patients without pressure ulcer. Furthermore, pressure ulcer increased the length of hospital stay. The new Centers for Medicare & Medicaid (CMS) nonpayment policy announced on 1 October 2008 that they would not pay the hospital in acute care settings for hospital-acquired pressure ulcer that were not present at admission (Jenkins & O'Neal, 2010).

Financial Impact: Pressure ulcer is a financial burden in health economists and society around the world (Cherry et al., 2012). In 2007, Medicare estimated that every pressure ulcer added $43,180 to costs for hospital stay (AHRQ, 2011). The cost of pressure ulcer escalates with pressure ulcer Grade from £1214 (Grade I) to £14108 (Grade IV) because more time is required to heal severe cases (Dealey, Posnett, & Walker, 2012). Annual treatment for these cases amounts to a total cost of £1.4–£2.1 billion in the UK (4% of total NHS expenditures). Furthermore, more than 90% of these costs are incurred by nursing care (Bennett et al, 2004). In a study in England, the routine cost of pressure ulcer $37 800 in 2006 (Armour-Burton, Fields, Outlaw & Deleon, 2013) and managing a single full-thickness of pressure ulcer is $70,000" (Reddy, 2006). The cost of every wound was $2,000 to $70,000 (Brain & Lyder, 2004; Courtney, Ruppman, & Cooper, 2006).

Legal Impact: Every year, more than 17,000 lawsuits are related to pressure ulcers in the US (AHRQ, 2011) where pressure ulcers are the second-most regular claim followed by criminal death and more frequently reported than falls or emotional distress (Brain & Lyder, 2004). A study conducted by the Society of Actuaries reported pressure ulcer the most expensive medical error in the USA (Asimus, MacLellan, & Li, 2011).

Impact on Nursing Professional Image: A pressure ulcer destroys the nursing image. In fact, the prevention of pressure ulcer has been a nursing concern for many years. During the Crimean War, Florence Nightingale warned that a patient might die of bedsores if the nurse did not know how to change patient positions (Casey, 2013). In 1859, Florence Nightingale wrote, "If he has a bedsore, it's generally not the fault of the disease, but of the nursing" (p. 8). Others view pressure ulcers as a visible mark of care giving connected with poor or absent nursing.

National Impact: The United Kingdom's National Health Service (NHS) framework for 2013/14 recently found acquired stage 2-4 pressure ulcers to be one of the harms listed in national health services (Casey, 2013). In the Netherlands, costs range from a low of $362 million to a high of $2.8 billion, thereby accounting for approximately 1% of the total Dutch healthcare budget (Brain & Lyder, 2004). The high rate of incidence and prevalence of pressure ulcers affected the length of hospital stay, the country's standard quality health care service, and the image of health care delivery service and the standard of health care profession of the nation.

1.1.6 Core concepts in managing pressure ulcers in hospital settings: Pressure ulcers can be fully prevented if the risk factors are detected early and proper preventive measures are performed. The following are core concepts utilized for the management of pressure ulcer in the hospital settings.

Assessment of risk factors: Pressure ulcer risk assessment includes determining a person's risks for pressure ulcer development and inspection of skin condition, particularly over bony prominences. Identifying indications of pressure ulcer include erythema, localized heat, blanching response, edema, indurations and skin breakdown, nutritional assessment, age, gender, mobility, moisture and assessment of extrinsic risk factors. Uses of standard and validated risk assessment instruments (e.g., Braden scale) after assessment keep the documentation in patient records. To identify patients at risk, a mark needs to be made on the patient's bedside chart (AWMA, 2012; Costa, 2013; NPUAP, 2009).

Reassessment of risk factors: It is very important that patients at risk have daily reassessments for pressure ulcer development to identify any alterations in body image such as temperature, surgery, transfer from the intensive care unit, changes in nutritional status or level of mobility (Costa, 2013; NPUAP, 2009; Queensland Health, 2008).

Using accurate risk assessment instruments: Patients should be assessed by a risk assessment tool. A good assessment tool must be valid and reliable. The Braden Scale is highly recommended for predicting pressure ulcer risk (AWMA, 2012). It is also important for professionals to use the Braden score as a guideline in developing routine interventions, and it is very easy to use in the field of pressure ulcer

prevention (NPUAP, 2009). The Braden Scale was developed and tested for the adult population (AWMA, 2012) and it consist with six subscales; sensory perception, moisture, activity, mobility, nutrition, friction and shear (Braden & Bergstrom, 1988).

Effective skin assessment: Keep records about inspection to prompt daily skin assessment, documentation of findings and initiation of prevention strategies as needed. Teach all levels of staff to examine the skin any time they are assisting the patient, which can be performed during bathing and moving from one place to another. If any changes in skin integrity are observed, notify nursing staff to ensure that appropriate interventions can be taken (AWMA, 2012; Queensland Health, 2008).

Providing good skin care: Excellent skin care can prevent pressure ulcers. Rubbing and messaging is contraindicated in the presence of acute inflammation. Moreover, skin emollients can be used to hydrate dry skin in order to reduce the risk of skin damage (AWMA, 2012; NPUAP, 2009; Queensland Health, 2008).

Preventing skin moisture: Clean the patients' skin properly and keep it dry, because showering, wetness and moisture can immediately damage skin. Therefore, moisture from feces and urine must be avoided because the aforementioned are irritating substances that make patients suffer from perineal dermatitis. Look for opportunities to plan procedures for intermittent behavior such as movement, assessment for wet skin, application of blockade agents, contribution to toilet opportunities and sufficient oral fluids, all of which can prevent pressure ulcers (Cynosure Health, 2012; NPUAP, 2009; Perry et al., 2012).

Redistributing interface pressure: Use pressure support surfaces to redistribute pressure as indicated for beds and chairs. Beds should be selected as suitable for the patients' weight and height with assessment of needs for bariatric beds/appropriately sized support surfaces. Pillows, air beds and two-hourly position changes with appropriate nursing intervention should be used to reduce pressure on bone prominences (AWMA, 2012; Cynosure Health, 2012; Queensland Health, 2008).

Repositioning patients: Repositioning is an important component for reducing pressure ulcers and these factors should be considered for all at-risk persons. High pressures over bone prominences over short periods of time with low pressure over bony prominences for long periods of time are equally damaging. In order to

lessen the individual's risk for pressure ulcer development, it is important to reduce the time and amount (Cynosure Health, 2012; NPUAP, 2009) of pressure.

Providing adequate nutritional support: Monitor and evaluate patients' nutritional status, particularly among patients at risk for pressure ulcers in every health care setting. Early diagnosis and treatment of under nutrition is very important for pressure ulcer prevention (Cynosure Health, 2012; NPUAP, 2009).

Early detection: Early detection and appropriate skin assessment guides lead to proper diagnosis. Assessment should be done on admission, at 6 hours and every day before discharge from the hospital (Perry et al., 2012; Queensland Health, 2008).

Early treatment: Early assessment and diagnosis helps to guide appropriate treatment for pressure ulcers. Immediate treatment, monitoring, nursing care, good nutritional support and wound management reduce the infection of pressure ulcers. Appropriate support by the health personnel decreases the burden and reduces costs while preventing the occurrence of pressure ulcers (Perry et al., 2012; Queensland Health, 2008).

1.1.7 Overview of the guidelines on pressure ulcer management: Pressure ulcers can be effectively reduced and prevented, if the evidence-based practice guidelines are applied in practical settings. Preventive actions should be based on evidence-based practices guidelines to identify vulnerable patients. The use of risk assessment tools such as the Braden Scale is highly recommended. Furthermore, these tools are reliable indicators of the major risk factors of pressure ulcer development: sensory perception, moisture, activity, mobility and nutrition (Jenkins & O' Neal, 2010). Swedish guidelines also emphasize the use of assessment tools for clinical judgment by both the Braden and Norton scales (Leijon et al., 2013). Moreover, the aforementioned is an integral and widely utilized component of pressure ulcer prevention in clinical practice (Moore & Cowman, 2014; Armour-Burton, Fields, Outlaw, & Deleon, 2013). Pressure ulcer prevention guidelines identify risk factors while providing scientific and evidence-based clinical practice (Langemo et al., 2008). Educational programs according to the guidelines, early signs of detection, use of assessment tools, repositioning, nutrition and pressure-relieving equipment can be

applied for pressure ulcer prevention to decrease the hazards of pressure ulcers while diminishing pressure ulcer-related morbidity and mortality (Costa, 2013).

According to the findings of a study conducted at Sharp Grossmont Hospital in California, application of the guidelines showed a remarkable decrease in pressure ulcer (Armour-Burton et al., 2013). In Australia, a study on the prevalence of Pressure ulcer was conducted by Prentice, Stacey, and Lewin, (2003). According to the findings after applying prevention guidelines, the prevalence rate was found to decrease from 26.5% to 22% ($p<0.002$). German studies have supported the necessity of pressure ulcer prevention guidelines, analyzing that 60 nursing homes and 82 acute care hospital prevalence rates in hospitals dropped from 26.3% to 11.3% in the first year and from 13.7% to 6.4% in nursing homes (Kwong, Lau, Lee, & Kwan, 2012) is significantly lower in the institutions where the prevention guidelines were used. Once study was conducted in Bangladesh by Hoque, Grangeon & Reed (1999) who identified need to develop guidelines as a significant landmark in the prevention of pressure ulcers.

All over the world, many guidelines are available such as Prevention and Treatment of Pressure Ulcers: A Quick Reference Guide; European Pressure Ulcer Advisory Panel & National Pressure Ulcer Advisory Panel (2009). The aforementioned have been formulated as the best guideline for evidence-based practice and another guideline also contains very good evidence on the Australian Wound Management Association which was completed in 2012 with the Pan Pacific Guideline for the Prevention and Management of Pressure Injury. Pressure ulcer prevention guidelines have an effect on reducing the occurrence of pressure ulcers. It is a universal truth that prevention is always better than treatment, makes life easier for patients and families, is not costly, shortens hospital stays, involves medical staff less, involves safe and sound procedures, does not require prescriptions and prevents recurrence. Pressure ulcer prevention requires an interdisciplinary approach to care. If nurses and health care workers follow the guidelines, cost effective benefits will be yielded in the field of best practice. Hence, it is very important to adopt an effective guideline which is applicable in a practical setting in Bangladesh to enhance changes in the field of pressure ulcer.

1.2 Clinical problem of the study

The author's workplace is the National Institute of Traumatology & Orthopaedic Rehabilitation Center (NITOR), Dhaka, Bangladesh. It is the first rehabilitation institute in Dhaka, and the biggest orthopedic hospital in Southeast Asia with 500 beds, a total of 293 nursing personnel, 90,208 yearly OPD visits, 40,783 emergency visits, and 19,343 admissions, a mortality rate of 15.67% and a bed occupancy rate of 87.96% in 2013. The majority of the patients have suffered road traffic accidents (46%) and other diseases (40%) (Ministry of Health and Family Welfare, Health Bulletin, 2013). Since 1976, approximately 248 studies were conducted by doctors concerning orthopaedic-related diseases. Nevertheless, no nursing research or academic work has been conducted on pressure ulcer prevention and management.

In the author's clinical experience, many patients suffer with pressure ulcers due to hospitalized immobility for aliments such as fracture, spinal cord injury, surgery, and treatment regimens. Inappropriate schedules for position changes and the absence of proper nutritional support also increase the development of pressure ulcers. Most of the patients do not receive appropriate nursing care due to a shortage of resources, a shortage of nurses, inadequate nursing practice and the limited patho-physical knowledge of nurses. Preventive measures performed in the author's clinical setting have included routine position changes and the use of support devices such as pillows and air mattresses. There is no guideline for the institution or nation, and nurses are not utilizing any assessment instruments or scales to screen for pressure ulcer risks. While nurses need proper guidelines, resources, education, in-service training and appropriate organizational leadership support, there are no training programs or resources. If evidence-based guidelines were available, they could be used as a source for best practice and ensure high quality of care.

Pressure ulcer prevention guidelines refer to professional activities aimed at decreasing the incidence and prevalence of pressure ulcers. Many pressure ulcer prevention and management guidelines are available as best evidence. Those guidelines include the American National Pressure Ulcer Advisory Panel (NPUAP), the European Pressure Ulcer Advisory Panel (EPUAP) a "Quick Reference Guide", which provide best practice recommendations for pressure ulcer prevention and

treatment. Moreover, the aforementioned should be considered for the present study and match the author's own clinical setting. Hence, the author would like to search those practice guidelines, analyze the guidelines for reliability, validity and applicability and synthesize the essential contents to use for implementation in clinical settings in Bangladesh.

1.3 Purposes of the study

To summarize current evidence-based guidelines for the prevention of pressure ulcers for hospitalized adult patients.

1.4 Expected benefits of the study

The recommendations from the evidence can be used to develop an appropriate nursing practice guideline for the prevention of pressure ulcers and lead to best nursing care for hospitalized adult patients in Bangladesh.

CHAPTER II
METHODOLOGY

The study was proposed with the objective to summarize current evidence-based guidelines for the prevention of pressure ulcers for hospitalized adult patients. The method of this study comprised four main steps; evidence selection, evidence appraisal, evidence analysis, and evidence synthesis to summarize the recommendations on pressure ulcer prevention. Details are described as following;

2.1 Search Strategy

In this chapter, the author described search strategy and appraisal method as follows. The pressure ulcer prevention for hospitalized adults' patients many expert consensuses articles, and synthesis of national and international guidelines are supported to formulate the conclusive recommendations. A systematic search was conducted to find the best evidence.

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2.1.1 Search framework: The author searched and chose pressure ulcer prevention guidelines for hospitalized adult patients, by using the PICO framework (Melnyk & Fineout-Overholt, 2005) with the following details:

P (Population) = Hospitalized adult patients
I (Intervention) = Pressure ulcer prevention
C (Comparison) = Usual activities
O (Outcome) = Pressure ulcer

2.1.2 Scope of searching: The pressure ulcer prevention guideline for hospitalized adult patients based on validated evidence-based practice was searched from the following scope:

2.1.2.1 Keywords used in the search according to the PICO:
For each PICO element, the author collected synonyms by linking terms with "OR", then located citations that are relevant to all the PICO elements by linking with "AND''

P (Population) = hospitalized adult patients / adult Patients'/ hospitalized patients'/ elderly Patients.

I (Intervention) = pressure ulcer prevention / bed sores prevention / pressure sores prevention / pressure injury prevention / decubitus ulcer prevention

C (Comparison) = none

O (Outcome) = pressure ulcer / pressure sores/ Skin ulcer /bed sores / decubitus ulcer

2.1.2.2 The databases/sources used for the search: The author searched from the electronic databases from Mahidol University library System. The Cumulative Index to Nursing and Allied Health (CINAHL), Ovid Full Text, Pub Med, Science Direct, and Springer Link were used to search the related evidence. In addition, the author searches guidelines from websites of National Institute for Health and Care Excellence, National guidelines clearing houses, and Register Nurses Association of Ontario.

2.1.2.3 Type of evidence: The evidence–based clinical practice guideline. The guideline published full text in English from 2008 to 2014.

2.2. In general process to appraise the guideline

2.2.1 A brief appraisal strategy for guideline: This strategy considers the validity; reliability and applicability of the evidence, and author find it more efficient for judging. These strategies follow the questions and answers before applying; whether the guideline can trust or not. In this criterion meet the step one, step two, and step three, if answer 'one' is satisfactorily or yes, then, go to steep two,

if “Two” is meet the criteria then go to step “Three” for formulate the clinical practice guideline (Grace, 2013).

2.2.1.1 Step one: This step considers; does the guideline make any recommendations that would change in practical setting? The guideline summarized the characteristics and the recommendation is potential in real clinical setting and using criteria, objective, methodology is match with evidence-based practice; then it is valid**.**

2.2.1.2 Step two: This step is considered that the author can trust the guideline and who was wrote it, and what were their interests. This step also considers whether the evidence objective was clearly stated, appropriate methodology, and highly quality in the field of best practice. The author rate the strength of each recommendation that will change the practical setting and considered the patients values. Evidence is adequate and tries to reduce bias, and produce the greatest constructive impact on patients’ health; so it is reliable.

2.2.1.3 Step three: This step considers whether the guideline can apply in real practical settings, its language, values, and resources are relevant to the recommendations. The outcomes are assess by considering the effective care, feasibility, resources, and match with the unit about the pressure ulcers prevention setting, the study find any recommendation that is suitable for clinical setting and the colleagues could follow this information. This study is applicable in clinical setting with other study and will helps to bring the cost effective benefits and make differences in health care setting; so it is applicable.

2.2.2 Appraisal method and evaluations the guideline with AGREE II: In this study author used AGREE II for appraisal the guidelines. The author selected the guidelines for appraisal that were scientific, evidence-based, and published from 2008 to 2014. The guidelines were appraised by following the AGREE II appraisal method. This appraisal method consists of 23 key items categorized in 6 domains as follows.

Domain 1. Scope and Purpose,

Domain 2. Stakeholder involvement,

Domain 3. Rigor of Development,

Domain 4. Clarity of Presentation,

Domain 5. Applicability,

Domain 6. Editorial independence**.**

In this whole appraisal includes score for quality of the guideline and whether the recommendation would be suggested for used in practical setting. The key items were rated on a position scale 1 to 7, 1= (Strongly Disagree) and 7= (Strongly Agree). A score of 1 is given when there is no information on that item or if it is weakly reported. A score of 7 is given if the quality of coverage is excellent and when full criterions have been met (in the User's Manual). This appraisal refers to validity, reliability and applicability of the guidelines. The principle of the tool is to differentiate between higher and lower quality of guidelines (Brouwers et al., 2010).

2.2.2.1 Appraisal Method of Guidelines in Using the AGREE II assessment Tool (Brouwers et al., 2010).

Domain 1. Scope and Purpose

1**.** The guideline was specifically described the overall objectives

2. The health question was covered and specifically described

3. The guideline was described specific population, patients, or public.

Domain 2. Stakeholder Involvement

4. The guidelines development committee includes from all related professional.

5. The preferences and views of the guideline for target population.

6. The guideline was clearly defined for target users.

Domain 3. Rigour of Development

7. The guideline has been used to pilot.

8. Systematic methods used for searching the evidence.

9. Authors ware clearly described the strengths and limitation of evidence.

10. The recommendations were clearly described in the evidence.

Domain 4. Clarity of Presentation

11. The side effects, risks, and health benefits, have been measured for making the recommendations.

12. There is any link between supporting evidence and the recommendations

13. The guideline was reviewed by experts before publication.

14. Authors were followed the process for updating the guideline.

15. The recommendations were unambiguous and specific.

16. The health issue was clearly presented in the different options of management.

17. Easily identify the Key recommendations.

Domain 5. Applicability

18. The guideline provides advice for recommendations how to apply and change in domain.

19. The facility and barriers was describes to its application.

20. Implications of the possible resource and applying the recommendations have been measured.

21. The guideline was presents the monitoring or auditing criteria.

Domain 6. Editorial Independence

22. The content of the guideline have not influenced by funding body.

23. The guideline development group members have been competing interests recorded and addressed.

CHAPTER III
FINDINGS

The author searched for the best available evidence–based practice guidelines on the prevention of pressure ulcers for hospitalized adult patients at electronic data bases of Mahidol University and other credible websites. In this chapter, the author identifies the findings of the search, a brief summary of each guideline and a conclusion in answer to the clinical problem.

3.1 Search results

The author found 25 guidelines from relevant databases and websites. The author excluded 11 guidelines with the following details: 4 guidelines for wound prevention and management that were not applicable to the context of pressure ulcer prevention; 3 guidelines that were only for hill ulcer prevention that did not cover the purpose of the study; 3 guidelines on the management of pressure ulcers only for spinal cord injury patients and 1 guideline for pediatric patients. After appraisal according to AGREE II, the author selected a total of 14 guidelines containing very scientific recommendations compatible with real practical settings. Only 14 guidelines remain relevant to this study.

Table 3.1 - List of Evidence

No	Title/Author/Year	Type of Evidence
1.	Prevention and treatment of pressure ulcers: quick reference guide/European Pressure Ulcer Advisory Panel & National Pressure Ulcer Advisory Panel (EPUAP & NPUAP)/2009.	International guideline.
2.	Implementation Guide to the Prevention of Hospital Acquired Pressure Ulcers/Cynosure Health /2012.	National guideline.

Table 3.1 - List of evidence (cont.)

No	Title/Author/Year	Type of Evidence
3.	Pressure Ulcer Prevention & Management/Tissue Viability Service Clinical Practice Guidelines/2010.	National guideline.
4.	Pressure Ulcer prevention & Management/ Queensland Health/2008.	National guideline.
5.	Pressure Ulcer Prevention Policy/Tobey and Southern Devon Health and Care NHS Trust/2010.	International guideline.
6.	Risk Assessment and Prevention of Pressure Ulcers/ Registered Nurses' Association of Ontario/2011.	National guideline.
7	Pan Pacific Guideline for the Prevention and Management of Pressure Injury/Australian Wound Management Association /2012.	International guideline**.**
8	Preventing Pressure Ulcers in Hospitals: A Toolkit for Improving Quality of care/Agency for Healthcare Research and Quality /2011.	International guideline.
9	Pressure Ulcer Prevention and Treatment Protocol. Health Care Protocol/Institute for Clinical System Improvement/2012.	International guideline.
10	Prevention and Management of Pressure Ulcers / NHS Quality Improvement Scotland/2009.	International guideline.
11	Pressure Ulcers: Prevention and Management of Pressure Ulcers/National Institute for Health and Clinical Excellence (NICE)/2014.	International guideline.
12	Pressure Ulcer Assessment, Prevention & Management/RN.com/2012.	International guideline.
13	Pressure Injury Prevention and Management/Clinical Excellence Commission/2014.	National guideline**.**
14	Pressure Ulcer Prevention and Treatment Clinical Practice Guideline/Winnipeg Regional Health/2012.	National guideline.

3.1.1 Brief summary of the Evidence

The summary of each guideline for pressure ulcer prevention is provided as follows:

Evidence Number 1:

1.1 Title: Prevention and Treatment of Pressure Ulcers: Quick Reference Guide.

1.2 Author/year: European Pressure Ulcer Advisory Panel & National Pressure Ulcer Advisory Panel (EPUAP & NPUAP)/2009.

1.3 Publication source: National Pressure Ulcer Advisory Panel /2009.

1.4 Type of evidence: International guideline (current guideline).

1.5 Objective: To develop evidence-based recommendations for the prevention and treatment of pressure ulcers for potential use by health care professionals worldwide.

1.6 Methodology: The author searched in electronic databases and conducted manual searches from literature, reviewing 13 sets of pressure ulcer-related guidelines and nearly 3,000 available manuscripts. A rigorous and scientific methodology was utilized to identify available research articles published in the journal on the prevention and treatment of pressure ulcers in human subjects for the development of this guideline.

Main contents extracted from the evidence

1. Assessment: A comprehensive assessment should be performed by-
    - 1.1 Risk Assessment Policy.
    - 1.2 Risk Assessment Practice.
    - 1.3 Skin Assessment.
    - 1.4 Use of a Risk Assessment Tool
2. Moisture Management
    - 2.1 Keep skin dry and prevent moisture.
    - 2.2 Use emollients for skin to dry and hydrate.
    - 2.3 Prevent excessive skin moisture.
    - 2.4 Avoid vigorous massage and rubbing.

3. Nutritional support: Provide sufficient calories.

3.1 Patients' nutritional status needs to be assessed and screened.

3.2 Give suitable nutrition via the right feeding route.

3.3 Monitor and evaluate nutritional outcome.

3.4 Offer a daily minimum of 30-35 kcals per kg. of body weight.

3.5 Provide sufficient protein for positive nitrogen balance.

3.6 Provide 1.25-1.5 gm protein/kg/day

3.7 Be certain that high protein levels are appropriate for patients.

3.8 Provide oral nutritional supplementation or tube feeding.

3.9 Offer oral supplements between meals and provide adequate fluid.

3.10 Watch for signs and symptoms of dehydration; skin changes, urinary output, weight and turgor; calculate serum osmolality or elevated sodium.

3.11 Give sufficient vitamins and minerals.

4. Minimize pressure, shearing and friction

4.1 Change position to reduce periods.

4.2 Utilize an appropriate support surface.

4.3 Use mobility aids to reduce shearing and friction.

4.4 Avoid changes in position on the bony prominence or drainage/medical devices.

4.5 Ask whether patients feel any discomfort or pain.

4.6 Skin needs to be observed for damage caused by medical. devices.

4.7 Document every repositioning.

5. Outcomes

5.1 Outcome was measured by observing pressure ulcer incidence and prevalence rates, length of hospital stay, readmission rates, hospital charges, infection, morbidity and mortality rates.

Evidence Number 2:

2.1 Title: Implementation Guide for the Prevention of Hospital-Acquired Pressure Ulcers.

2.2 Author/year: Cynosure Health/2012

2.3 Publication source: Cynosure Health.

2.4 Type of evidence: National guideline (current guideline)

2.5 Objective: To decrease the occurrence of hospital-acquired pressure ulcers at Stage II or higher by 50% in December of 2013.

2.6 Methodology: The researchers followed related national and international guideline recommendations.

Main contents extracted from the evidence

1. Assessment

    1.1 Assessment of skin.

    1.2 Assessment of risk (using tools).

2. Moisture management

    2.1 Skin wetness and moisture should be avoided.

    2.2 Use topical agents to hydrate the skin.

    2.3 Set specific timeframes or create reminder systems for repositioning.

    2.4 Develop a skin care cart.

    2.5 Give interventions together with other actions.

3. Nutritional support

    3.1. Give patients' food/liquid preferences.

    3.2. Provide nutritional supplementation.

    3.3. Check weight, food and juice intake.

    3.4. Support the patient with food.

4. Minimize pressure, shearing and friction

    4.1. Use a chart or melodic cues, e.g. a clock, bell and alarm.

    4.2. Time rules need to be established for positioning.

    4.3. Use special mattresses, beds, foam wedges and pillows.

5. Outcomes

5.1 The percentage of monthly audit patients who are at risk require assessment and skin evaluation on admission.

Evidence Number 3:

3.1 Title: Pressure Ulcer Prevention & Management.

3.2 Author/year: Tissue Viability Service Clinical Practice Guideline 2010.

3.3 Publication source: NHS Foundation Trust.

3.4 Type of evidence: National guideline (current guideline).

3.5 Objective: To raise awareness of pressure ulcer prevention.

3.6 Methodology: Synthesis of wound management guideline.

Main contents extracted from the evidence

1. Assessment

1.1 A comprehensive assessment.

1.2 Check skin

1.3 Social assessment.

2. Nutrition support

2.1 For accurate assessment and dietary supplementation, the patients were referred to a dietician.

3. Minimize pressure, shearing and friction

3.1 Use hoists, sliding sheets, pillows, bed cradles and other aids.

3.2 Avoid positioning directly on a bony prominence.

3.3 The 30º tilt should be use.

4. Outcomes: Minimize the risk for pressure ulcer development.

Evidence Number 4:

4.1 Title: Pressure Ulcer Prevention and Management

4.2 Author/year: Queensland Health/2008.

4.3 Publication source: Queensland Health.

4.4 Type of evidence: National guideline.

4.5 Objective: to assist evidence based clinical intervention for diagnostic management and pressure ulcer prevention.

4.6 Methodology: Synthesis of related pressure ulcer prevention standard guidelines with expert consensus.

Main contents extracted from the evidence

1. Assessment:

1.1 Patient assessment.

1.2 Risk assessment.

1.3 Skin assessment.

1.4 Nutritional assessment

2. Moisture management:

2.1 Decrease skin exposure to feces, urine and extreme perspiration.

2.2 Keep the skin dry; avoid chemical injury.

2.3 Maintain proper skin temperature.

2.4 Utilize pH neutral cleansers to manage moisture.

2.5 Apply the right moisturizing creams.

2.6 No massaging over the skin.

3. Nutritional support:

3.1 Support with balanced, high protein diet and energy for tissue maintenance and repair.

3.2 Help patients with feeding.

3.3 Give food to the patients at meal times.

3.4 Apply screening tools to identify malnutrition and risk factors.

4. Minimize pressure, friction and shearing

4.1 Change positioning to re-distribute pressure.

4.2 Apply the right aids to prevent shearing and friction.

4.3 Raise the head of the bed up to thirty degrees.

5. Outcomes: Organizational and clinical monthly incidence reports, medical coding and audits of the best practice area.

Evidence Number 5:

5.1 Title: Pressure Ulcer Prevention Policy

5.2 Author/year: Tobey and Southern Devon Health and Care NHS Trust/2010.

. 5.3 Publication source: Tobey and Southern Devon Health and Care NHS Trust.

5.4 Type of evidence: International guideline (Current guideline).

5.5 Objective: To Prevent the development of pressure ulcers.

5.6 Methodology: Summary and synthesis of prevention policy from related standard guidelines.

Main contents extracted from the evidence

1. Assessment

1.1 Risk assessment.

1.2 Skin assessment.

2. Moisture management

2.1 Excessive moisture needs to avoid such as urine and perspiration.

2.2 Use hydrating cream to minimize irritation and dryness.

2.3 Emollients, e.g., Dipro-bath or moisturizers.

2.4 Talcum powder should be avoided.

3. Nutritional support

3.1 Enhance calorie intake as needed.

3.2 Make use of universal screening tools for malnutrition.

3.3 Apply risk screening tools for nutrition.

4. Minimize pressure, shearing and friction

4.1 Reposition at appropriate times.

4.2 Use excellent turning techniques for position changes.

4.3 Make use of a 30-degree tilt.

4.4 Keep rising to full ninety-degree turns from one to the other.

4.5 Use pillows to avoid contact between bony prominences.

5. Outcomes: Decreased pressure ulcer occurrence, early detection of skin injury and achievement of sufficient preventative strategies.

Evidence Number 6:

6.1 Title: Risk Assessment and Prevention of Pressure Ulcers.

6.2 Author/year: Registered Nurses' Association of Ontario/2011.

6.3 Publication source: Registered Nurses' Association of Ontario.

6.4 Type of evidence: National guideline (update guideline).

6.5 Objective: Help in making decisions for individualized client care in addition to ensuring that appropriate support is provided for the best possible care.

6.6 Methodology: Evidence obtained from electronic database about pressure ulcer risk assessment.

Main contents extracted from the evidence:

1. Assessment
    - 1.1 Skin assessment.
    - 1.2 Risk assessment: documentation of skin changes
2. Moisture management
    - 2.1 Give adequate fluid to ensure hydration.
    - 2.2 Employ a pH balanced, and hot water keep away from for non-sensitizing skin
    - 2.3 Throughout cleansing, reduce force and rubbing on the skin.
    - 2.4 Applying pH balanced non-sensitizing skin hydration.
    - 2.5 Alcohol can be used by lubricating moisturizers and creams.
    - 2.6 Protect skin from excessive moisture and incontinence.
    - 2.7 Gently cleanse the skin after soiling.
3. Nutritional support
    - 3.1 Discuss nutrition with a dietitian.
    - 3.2 Provide a nourishing diet.
    - 3.3 Help with eating.

3.4 Consider alternative nutritional support.

3.5 Provide adequate nutritional support for critically ill patients.

4. Minimize pressure, shearing and friction

4.1 For vulnerable patients, reposition at least every two hours.

4.2 Make use of pillows to avoid contact between bony prominences.

4.3 Use a support surface to reduce heel pressure.

4.4 Avoid straight positioning; turn 30 degrees to the side.

4.5 Reduce shearing force by maintaining 30-degree elevations.

4.6 Move weight each 15 minutes.

5. Outcomes: Use of documentation interventions and outcomes should be monitored by using prevalence and incidence studies, surveys and focused audits

Evidence Number 7:

7.1Title: Pan Pacific Guideline for the Prevention and Management of Pressure Injury.

7.2 Author/year: Australian Wound Management Association/2012.

7.3 Publication source: AWMA collaboration with the New Zealand Wound Care Society, Hong Kong Enterostomal Therapists Association and the Wound Healing Society (Singapore).

7.4 Type of evidence: International guideline (Current guideline).

7.5 Objectives: To increase awareness of pressure ulcers among health care professionals. The primary objectives are to promote the prevention and optimal care of patients at risk for pressure ulcers.

7.6 Methodology: Formation of an international multidisciplinary guideline for the recognition and appraisal of applicable existing clinical guidelines with current levels of evidence and synthesis of original evidence.

Main contents extracted from the evidence:

1. Assessment

1.1 Comprehensive risk assessment.

2. Moisture management

2.1 Avoid vigorous rubbing of the skin.

2.2 For continent patients, make a plan for management.

2.3Avoid moisture and dry the skin.

2.4 Apply the right pH balance for clean-up.

2.5 Dry the skin to prevent excessive moisture.

2.6 For hydration, use skin emollient with water.

3. Nutritional support: provide regular high protein diet.

3.1 Minimum of 30 to 35 kcals /kg body weight/day.

3.2 Protein at 1.25 to 1.5 grams per kg of body weight/day.

3.3 Fluid intake of 1 ml per kcals daily.

3.4 For paraplegic patients, offer 29.8 ±1.2 kcals/kg of body weight daily.

3.5 For tetraplegic patients, offer 24.3 ± 1.1 kcal/kg of body weight daily.

3.6 Provide vitamin supplements.

3.7 Provide pressure ulcer risk patients' with enteral feeding.

4. Minimize pressure, shearing and friction:

4.1 Position should be change suitably.

4.2 Utilize appropriate support surfaces to minimize shearing and friction.

4.3 While moving, apply appropriate handling techniques.

4.4 Apply transfer assistance devices while transferring.

5. Outcomes: Pressure ulcer risk assessment, documentation and prevention of occurrence.

Evidence Number 8:

8.1 Title: Preventing Pressure Ulcers in Hospitals: A Toolkit for Improving the Quality of Care.

8.2 Author/year: Agency for Healthcare Research and Quality /2011.

8.3 Publication source: Agency for Healthcare Research and Quality.

8.4 Type of evidence: International guideline (current guideline).

8.5 Objective: To apply a successful plan to the development of pressure ulcer prevention on a constant base.

8.6 Methodology: The instrument was developed by a core team from Boston University School of Public Health with skills in pressure ulcer with an organizational alteration by an expert advisory panel and six participating medical centers that provided input.

Main contents extracted from the evidence:

1. Assessment: Skin condition: intactness, color, sensation.

2. Moisture management

2.1 Immediate cleansing for urinary incontinence.

2.2 Make good plans for toileting.

2.3 Checks patients for wetness.

2.4 Assist with hygiene.

2.5 Utilize skin barriers as protection against ants.

2.6 Fecal incontinence: Make plans for toileting.

3. Nutritional support

3.1 Improve sufficient food and nutrition with a supplementary diet.

3.2 Maintain sufficient food and juice intake.

3.3 Consult a dietitian as needed.

4. Minimize pressure, shearing and friction

4.1 Enhanced mobility, assist with turning, increase positions; encourage movement and limit static sitting to two hours per time.

4.2 Pressure relief: By support surfaces and beds.

5. Outcomes: Monitoring sustainability, improvement process, validated tool and documentation.

Evidence Number 9:

9.1 Title: Pressure Ulcer Prevention and Treatment Protocol. Health Care Protocol.

9.2 Author/year: Institute for Clinical System Improvement/2012

9.3 Publication source: Institute for Clinical System Improvement

9.4 Type of evidence: International guideline (currently released guideline).

9.5 Objectives: To reduce the development of pressure ulcer incidence and identify the risks for pressure ulcers; to provide standard practice and consider current gaps in care.

9.6 Methodology: The method used to conduct the search from electronic databases was aimed at finding the best evidence. It was developed by discussions with the work group leader to consider changes in standard practices, current gaps in care and current literature reviews. The literature reviewed included systematic reviews and meta-analyses.

Main contents extracted from the evidence:

1. Assessment: Risk assessment by skin inspection and documentation

2. Moisture management

2.1 Regularly apply hypoallergenic creams, lotions and lubricating oils.

2.2 Maintain healthy hydrated skin.

2.3 Keep the skin away from excessive moisture.

2.4 Check for incontinence every two hours.

2.5 Cleanse the skin with water or pH-balanced solution after each incontinence.

3. Nutritional support: Consider nutritional necessities and apply recommendations as appropriate; continue sufficient nutrition and hydration.

3.1 Measure nutritional requirements, protein, calories, fluids, vitamins and minerals.

3.2 Ensure sufficient oral intake.

3.3 Keep record of weight history.

4. Minimize pressure, shearing and friction: Use support surfaces to redistribute pressure, limit the number of linen, enhance activity, free-float heels and keep pillows on bony prominences.

4.1 Elevate the head of the bed to no more than thirty degrees.

4.2 Sit the patient at a 90-degree angle.

4.3 Use a surgical mattress, surgical slip sheets and mechanical lifts.

4.4 Use skin sealants on bony prominences.

5. Outcomes: Major prevention of pressure ulcers in health care facilities and effectiveness of treatment.

Evidence Number 10:

10.1 Title: Prevention and management of pressure ulcers.

10.2 Author/year: NHS Quality Improvement Scotland/2009

10.3 Publication source: NHS Quality Improvement Scotland 2009.

10.4 Type of evidence: International guideline (current guideline).

10.5 Objectives: To promote improvement in the quality of healthcare for the people of Scotland and to provide guidance and advice on effective clinical practice, including setting standards and delivering care that is patient-centered.

10.6 Methodology: Review the literature and update information from other applicable sources in addition to broad discussion with consensus.

Main contents extracted from the evidence:

1. Assessment:

1.1 Holistic assessment.

1.2 Regular skin examination.

2. Moisture management

2.1 Prompt changes after incontinence.

2.2 Avoid soap and water use.

2.3 Avoid allergies to creams.

2.4 Minimize chemical irritation.

2.5 Provide training and education about skin care.

3. Nutritional support

3.1 Offer sufficient dietary intake for patients.

3.2 Provide food supplements.

4. Minimize pressure, shearing and friction

4.1 Change position every two hours.

4.2 Educate patients about regular weight redistribution.

4.3 Inspect skin after each position change.

4.4 Use positioning at a thirty-degree tilt.

4.5 Encourage independent movement.

4.6 Use mobility and handling aids such as hoists and slings.

4.7 Apply pillow and mattresses for support.

5. Outcomes: Regularly inspect the skin and document the results in health records.

Evidence Number 11:

11.1 Title: Pressure Ulcers: Prevention and Management of Pressure Ulcers.

11.2 Author/year: National Institute for Health and Clinical Excellence (NICE) / 2014.

11.3 Publication source: NICE Clinical Guideline 179.

11.4 Type of evidence: International guideline (current guideline).

11.5 Objectives: To prevent and treat pressure ulcers.

11.6 Methodology: This guideline was developed by a review of the National Clinical Guidelines.

Main contents extracted from the evidence:

1. Assessment:

1.1 Skin assessment: have patients check their own skin with a mirror.

1.2 Risk assessment

2. Nutritional support:

2.1 Offer age-related nutrition.

2.2 Provide adequate nutrition.

2.3 Drink enough water.

2.4 Take supplements.

2.5 Consult a dietitian for special advice.

3. Minimize pressure, shearing and friction:

3.1 Correct sitting and lying positions at least every 2 hours.

3.2 Change position.

3.3 Use high specification foam mattresses.

3.4 Promote self-care.

3.5 Teach pressure redistribution.

4. Outcomes: Relief of pressure shearing and friction to reduce pressure ulcers.

Evidence Number 12:

12.1 Title: Pressure Ulcer Assessment, Prevention and Management.

12.2 Author/year: RN.com/2012.

12.3 Publication source: RN.com.

12.4 Type of evidence: International guideline.

12.5 Objectives: To provide guidelines for the prevention with benchmark data and tools for early detection.

12.6 Methodology: Review of related articles and expert experience.

Main contents extracted from the evidence:

1. Assessment

1.1 Skin assessment.

1.2 Risk assessment by with validated tools.

2. Moisture management

2.1 Cleanse incontinence as soon as possible.

2.2 Use natural moisturizers for cleansing.

2.3 Make use of skin barriers to protect the skin.

2.4 Rubbing should be avoided during cleaning and drying.

3. Nutritional support:

3.1 Patients should consult a dietitian for nutritional assessment.

3.2 Provide better foods.

3.3 Provide oral supplements between meals.

3.4 Give nutritional support by enteral or parenteral feeding.

3.5 Educate patients about fluid support for hydration.

3.6 Provide protein at 1.25-1.5gm protein/kg of body weight/daily.

4. Minimize pressure, shearing and friction

4.1 Frequently change position.

4.2 Avoid direct positioning onto medical devices.

4.3 Positions should not be changed on bony prominences.

4.4 Positions should be changed on 30-degree tilted side-lying.

4.5 Apply aides during repositioning to decrease friction and shearing.

4.6 Mattresses and seat cushions can be used a support surfaces.

4.7 Teach patients and care-givers about positioning.

5. Outcomes: Pressure ulcer prevention and positive outcomes concerning needs with daily skin assessment, risk assessment, mobility assessment and nutritional assessment as the components of management and prevention of pressure ulcers.

Evidence Number 13:

13.1 Title: Pressure Injury Prevention and Management.

13.2 Author/year: Clinical Excellence Commission/2014.

13.3 Publication source: Clinical Excellence Commission http://www.health.nsw.gov.au/policies.

13.4 Type of evidence: National guideline (current released).

13.5 Objectives: To provide best practice for pressure injury prevention and management; to minimize the incidence of pressure-related injuries.

13.6 Methodology: Revision of the Pan Pacific Clinical Practice Guidelines for the Prevention and Management of Pressure Injury, 2012.

Main contents extracted from the evidence:

1. Assessment

1.1 Timely risk assessment to identify risk factors.

1.2 Risk assessment tools used according to guidelines.

1.3 Skin assessment based on visual inspection.

2. Nutritional support

2.1 Adequate nutrition and hydration.

2.2 Provide high protein supplements where indicated.

2.3 Offer oral supplements between meals.

2.4 Give nutrition support by enteral or parenteral feeding.

2.5 Hydrate with fluids.

3. Minimize pressure, shearing and friction:

3.1 Mobilize and reposition routinely.

3.2 Avoid positioning on bony prominences.

3.3 During repositioning use aides to decrease friction and shearing.

3.4 Use support surfaces such as mattress and seat cushions.

3.5 Provide training in positioning for care-givers and patients.

4. Outcomes: Monitoring systems and implementation of relevant quality improvement activities for analyzing pressure injury data.

Evidence Number 14:

14.1Title: Pressure ulcer prevention and clinical treatment practice guidelines.

14.2 Author/year: Winnipeg Regional Health Authority/2012.

14.3 Publication source: Winnipeg Regional Health Authority.

. 14.4 Type of evidence: National guideline (current update).

14.5 Objectives: Prevention and management of pressure ulcer from evidence-based care and recommendations.

14.6 Methodology: comprehensive literature review.

Main contents extracted from the evidence

1. Assessment

1.1 Set up risk assessment policy in all health care settings.

1.2 Educate health care professionals about risk assessment.

1.3 Document all risk assessments.

1.4 Skin assessment.

2. Moisture management

2.1 If possible, do not turn patients onto a body surface.

2.2 Administer no massage for pressure ulcer prevention.

2.3 Avoid vigorous rubbing of the skin.

2.4 Use skin emollients to hydrate the skin and prevent skin damage.

3. Nutritional support

3.1 Assess patients' nutritional status.

3.2 Establish nutritional policy.

3.3 Refer patients' to a licensed dietician.

3.4 Provide appropriate nutritional support.

3.5 Follow evidence-based guidelines for nutritional support.

4. Minimize pressure, shearing and friction

4.1 Reposition routinely.

4.2 During repositioning, consider support surfaces for use as aides.

4.3 Educate patients and care-givers about positioning.

4.4 Avoid medical devices such as drainage tubes when re-positioning

.

4.5 Provide education and training about positioning.

Appraisal of the guidelines

All 14 guidelines were appraised with AGREE II by using six domains and the principles of brief appraisal strategy. After critical appraisal and confirmation with the author's thesis advisor, the author discovered that the National Pressure Ulcer Advisory Panel and European Pressure Ulcer Advisory Panel (NPUAP & EPUAP) formulated a quick reference guide as a credible evidence-based guideline, which is the most appropriate for implementation in a clinical setting in Bangladesh. It is a comprehensive international guideline published in 2009. The guideline is available in 14 languages with 146 organizations as stakeholders in 63 countries. It was developed by using scientific and rigorous methods by experts in wound care. The scope is

relevant to the clinical issues and is feasible for implementation in a clinical setting. The guideline was based on large RCTs and the recommendations were clearly graded to show the evidence level. The guideline was published in an electronic data base online and can be retrieved without incurring any fees.

Hence, the author sought approval from a thematic paper advisor in selecting this guideline as the main guideline for clinical practice for the organization of the National Institute of Traumatology and Orthopedic Rehabilitation Center, (NITOR) Dhaka, Bangladesh. However, the author has also included another 13 guidelines for making the strongest evidence-based practice recommendations for supporting a quick reference guide.

3.2 Conclusion

The following interventions are more effective at reducing risks for pressure ulcers, and contains five main essential topics for the prevention of pressure ulcers.

3.2.1 Assessment: A comprehensive and holistic assessment should be performed by applying a validated standard measurement tool, evaluating the health condition as acute, constant and fatal illness with aspects including psychological and social factors with co-morbidity (e.g., malnutrition and diabetes mellitus), mobility and level of consciousness. Risk assessment was performed with skin assessment within 4 hours after admission as well as daily skin assessment for vulnerable patients. Risk assessment for pressure ulcers should be complete within 24 hours of admission and daily.

3.2.2 Moisture management: Excessive moisture puts patients as high risk for exacerbating the effects of pressure ulcers. Appropriate management of urinary and fecal incontinence is a valuable guide for pressure ulcer prevention. On the other hand, minimizing skin irritation and dryness of the skin requires the use of moisture cream. Appropriate cleansing solutions with a mild pH- balance should be used. Moreover, toileting plans, wet checks, treatment of causes, support with hygiene,

use of skin barriers and use of underneath pads and diapers with avoidance of talcum powder and rubbing when cleaning and drying the skin can prevent the occurrence of pressure ulcers.

3.2.3 Nutritional management: Manage the patients with adequate nutrition. Malnutrition can rapidly reduce patients' weight. It is essential that independent risk factors for the progress of pressure ulcers be identified. Provide energetic foods and increase sufficient protein with 1.25-1.5grams of protein/kg of body weight/daily with Vitamins A, C and E, zinc. Give support by enteral and parenteral nutrition with high protein oral supplements between meals in addition to a regular diet for patients with pressure ulcers. Provide adequate hydration by fluids and improved support; consult with a licensed dietitian.

3.2.4 Minimize pressure, shearing and friction: Improve patients' movements by supporting with repositioning, encouraging ambulation, limiting continued settings of no more than 2 hours at any time. Avoid changing the position over bony prominences and use pillows under bony prominences. Raise the patients' bed to 30 degrees. Apply pressure and release support surfaces such as high-specification foam mattresses, chairs and cushions with other pressure-relief devices. Keep proper documentation on the chart about positioning and repositioning. Patients should be observed very closely for skin changes. Training should be provided for nurses, care-givers, patients and families about minimizing pressure, shearing and friction. Apply specific guidelines for the prevention of pressure ulcers.

3.2.5 Outcome measurement process: Outcome may be calculated by regular skin inspection, risk assessment, mobility assessment and nutritional assessment. It can also done by simultaneous audits, admission and discharging skin examination; evaluation prevention documentation, monitoring sustainability, improvement processes, documented incidence and prevalence rates, survey studies, use validated tools as part of the measurement process. People at-risk for pressure

ulcer development screening should keep records with monthly audits for the percentage that can be measured for pressure ulcers.

It can be concluded that all essential aspects are covered by the most comprehensive guidelines for pressure ulcer prevention, namely, the EPUAP and the American NPUAP because the aforementioned include proper documentation and is easy to use as a quick reference guide. Others guidelines also contained include systematic documents and the use of rigorous methodology for guideline development. The guidelines provide new information and current technology that can result in changes in the field of pressure ulcers. Most of the guidelines were developed by health care societies, wound management organizations and nurse associations in collaboration with other institutions. It is expected that application of the evidence-based guidelines in clinical practice can reduce costs and complete the task for pressure ulcer prevention in Bangladesh.

The recommendations synthesized from the evidence-based guidelines are as follows:

1. Assessment

1.1 Assessment should be conducted when the patients are admitted to the hospital (AWMA, 2012; International guideline; Clinical Excellence Commission [CEC], 2014; National Guideline Cynosure Health, 2012; National Guidelines; NPUAP, 2009; International Guidelines; RN.com, 2012; National Guidelines; Registered Nurses' Association of Ontario [RNAO], 2011; National Guidelines; Tissue Viability Service Clinical Practice Guidelines [TVSCPG], 2010; National Guidelines; Tobey & Southern Devon Health & Care NHS Trust [TSDHCNHST], 2014; National Guidelines; Queensland Health, 2008; National Guidelines).

1.2 Comprehensive risk assessment should be performed by using the: Braden Scale, Norton Scale, and Waterlow Scale (AHRQ, 2011; International Guidelines; AWMA, 2012; International Guidelines; CEC, 2014; National Guidelines; Cynosure Health, 2012; National Guidelines; ICSI, 2012; National Guidelines; Queensland Health, 2008; National Guidelines; NPUAP, 2009;

International Guidelines; RNAO, 2011; National Guidelines; TVSCPG, 2010; National Guidelines; TSDHCNHST, 2014; National Guidelines). In clinical practice, the Braden Scale is the most widely used due to its simplicity and comprehensiveness. Hence, the Braden Scale should be applied for the prevention of pressure ulcers among hospitalized adult patients.

1.3 Record the risk assessment and re-assessment on the risk assessment charts (AWMA, 2012; International Guidelines; NPUAP, 2009; International Guidelines; RNAO, 2011; National Guidelines; TVSCPG, 2010; National Guidelines).

1.4 Every patient's skin should be inspected within four hours of admission and re-inspected every 8-24 hours or sooner, depending on the condition of the patient (Cynosure Health, 2012; National Guidelines; ICSI, 2012; National Guidelines; NPUAP, 2009; National Guidelines; TSDHCNHST, 2014; National Guidelines; Queensland Health, 2008; National Guidelines).

1.5 All bony prominences such as the sacrum, hips, elbows, occiput, ankles, heels and buttocks should be examined (TVSCPG, 2010; National Guidelines Queensland Health, 2008; National Guidelines).

1.6 Documentation tools should be developed to improve daily skin inspections to assess individual risks (AHRQ, 2011; International Guidelines; Cynosure Health, 2012; National Guidelines; ICSI, 2012; National Guidelines; NHS Quality Improvement Scotland, 2009; National Guidelines; Queensland Health, 2008; National Guidelines; RN.com, 2012; National Guidelines; RNAO, 2011; National Guidelines; TVSCPG, 2010; National Guidelines).

1.7 A prevention plan should be developed when patients have been identified as being at risk for pressure ulcers (AWMA, 2012; International Guidelines; NPUAP, 2009; International Guidelines; RNAO, 2011; National Guidelines).

2. Moisture management

2.1 Moisture should be managed by minimizing irritation, skin dryness and cleansing with a mild pH- balanced cleanser by regular monitoring and

use of a hydrating cream (Cynosure Health, 2012; National Guidelines; NPUAP, 2009; International Guidelines; Queensland Health, 2008; National Guidelines; RNAO, 2011; National Guidelines; TVSCPG, 2010; National Guidelines).

2.2 Avoid massage, vigorous rubbing, soapy water and talcum powder when cleaning and drying the skin (NPUAP, 2009; International Guidelines; NHS Quality Improvement Scotland, 2009; National Guidelines; Queensland Health, 2008; National Guidelines; TSDHCNHST, 2014; National Guidelines).

2.3 The following should be done to protect the skin: Toileting plans, wet checks and assistance with hygiene, use of topical agents, skin barriers and pads under diapers (Cynosure Health, 2012; National Guidelines; Queensland Health, 2008; National Guidelines; RNAO, 2011; National Guidelines; TSDHCNHST, 2014; National Guidelines).

3. Nutritional support

3.1 Nutritional status and screening should be assessed by a valid tool for every health care settings among patients at risk for pressure ulcers (AWMA, 2012; International Guidelines; AHRQ, 2011; International Guidelines; CEC, 2014; National Guidelines; NPUAP, 2009; International Guidelines).

3.2 Adequate nutrition and hydration should be maintained with support by enteral and parenteral nutrition with high protein and oral supplements between meals (AWMA, 2012; International Guidelines; CEC, 2014; National Guidelines; Cynosure Health, 2012; National Guidelines; NPUAP, 2009; International Guidelines, 2014; National Guidelines; RN.com ,2012; National Guidelines; RNAO, 2011; National Guidelines; TSDHCNHS, 2014; National Guidelines).

3.3 Patients at risk for pressure ulcers require a minimum of 30-35 kcals/kg/body weight/day with 1.25-1.5 g/kg/day protein and fluid intake of 1 ml of/kcals/day (NPUAP , 2009; International Guidelines; RN.com , 2012; National Guidelines).

4. Minimize pressure, shearing and friction

4.1 Pressure, friction and shearing should be minimized by changing position every two hours (AHRQ, 2011; International Guidelines; CEC, 2014; National Guidelines; Cynosure Health, 2012; National Guidelines; NICE, 2011; National Guidelines; NHS Quality Improvement Scotland, 2009; National Guidelines; RNAO, 2011; National Guidelines; TSDHCNHS, 2014; National Guidelines).

4.2 Musical or visual cues such as a timer, alarm, or bell should be used at the nurses' station as a reminder to change the position of patients (Cynosure Health, 2012; National Guidelines).

4.3 Position should not be changed over bony prominences. Furthermore, foam wedges or pillows should be used to avoid contact with bony prominences such as the knees and heels. Moreover, a pillow should be put in place to elevate the heels for protection (Cynosure Health, 2012; National Guidelines; CEC, 2014; National Guidelines; NPUAP, 2009; International Guidelines; Queensland Health, 2008; National Guidelines; RN.com, 2012; RNAO, 2011; National Guidelines; Tissue Viability Service Clinical Practice Guidelines, 2010; National Guidelines; TS DHCNHST, 2014; National Guidelines).

4.4 Medical devices such as drainage systems or tubes should be avoided while positioning individuals (AWMA, 2012; International Guidelines; NPUAP, 2009; International Guidelines; RN.com, 2012; RNAO; 2011; National Guidelines).

4.5 Pressure should be redistributed by providing the following support surfaces: A high-specification foam mattress, cushions, pillows and chair (AWMA, 2012; International Guidelines; Cynosure Health, 2012; National Guidelines; RN.com ,2012; National Guidelines; RNAO, 2011; Queensland Health, 2008; National Guidelines).

4.6 Patient beds should not be elevated more than 30 degrees in order to reduce shearing and friction forces while keeping the head of the bed at the lowest elevation (Australian Wound Management Association, 2012/International Guidelines; RN.com, 2012; RANO, 2011; National Guidelines; TSDHCNHST, 2014; National Guidelines).

4.7 Lifting devices or breathable glide sheets should be used to reduce shearing and friction (Cynosure Health, 2012; National Guidelines; Queensland Health, 2008; National Guidelines; RNAO, 2011; National Guidelines).

4.8 When changing position, 90-degree full turns from one side to the other side such as from one hip to another should be avoided (RN.com, 2012; National Guidelines; TSDHCNHST, 2014; National Guidelines).

4.9 Documents should be kept on positioning and repositioning. Furthermore, patients should be kept under very close observation and monitoring for skin changes (Cynosure Health, 2012; National Guidelines; NPUAP, 2009; International Guidelines; RNAO, 2011; National Guidelines; TSDHCNHST, 2014; National Guidelines).

4.10 Education and Training should be provided on repositioning (AWMA, 2012; International Guidelines; CEC, 2014; National Guidelines; NPUAP; 2009; International Guidelines; TSDHCNHST, 2014; National Guidelines).

4.11 Specific guidelines should be used to prevent pressure ulcers (RNAO, 2011; National Guidelines; AWMA, 2012; International Guidelines).

5. Outcome measurement process

5.1 Outcome should be calculated by regular skin inspection, risk assessment, mobility assessment and nutritional assessment, documented incidence and prevalence rates, survey studies, use validated tools as part of the measurement process (AWMA, 2012; International Guidelines, Cynosure Health, 2012; National Guidelines; RNAO, 2011; National Guidelines; RN.com, 2012; TSDHCNHST, 2014; National Guidelines).

CHAPTER IV
CONCLUSION AND SUGGESTIONS

4.1 Conclusion

Pressure ulcers are caused by skin damage due to insufficient blood supply from direct pressure or a combination of shearing forces. Pressure ulcer is a significant cause of death globally. Furthermore, hospitalized patients are suffering more due to pressure ulcers in many health care settings. The pressure ulcer incidence rate is very high worldwide in addition to the author's own clinical setting. The following methods were applied to the search for evidence from the electronic databases of the Mahidol University Library system. The author mainly searched for guidelines from authorized websites. The evidence was published in English from 2008 to 2014. This study analyzed all types of evidence related to guideline on pressure ulcer prevention among hospitalized adult patients; with the proposing of conclusive guidelines on pressure ulcer prevention for hospitalized adult patients. The author identified 25 guidelines and 11 articles were excluded for not matching with the study. The remaining 14 guidelines were included in this study. The author evaluated the quality of the guidelines by using the AGREE II as appraisal tool in line with principles of evidence appraisal (Brouwers et al., 2010; Grace, 2013).

After appraisal, the author found the most comprehensive clinical practice guideline formulated through four years of collaboration by the European Pressure Ulcer Advisory Panel and the American National Pressure Ulcer Advisory Panel in 2009, "Quick Reference Guide" the guideline reviewed nearly 3,000 articles and 13 sets of guidelines. Furthermore, 146 organizations are registered as stakeholders and the guidelines can be used by health care professionals worldwide. The author also found another 13 guidelines capable of supporting the most comprehensive guidelines. The contents from these guidelines which are applicable to the clinical setting also included in the summary as recommendations to prevent pressure ulcers.

The main contents included the following: 1) Assessment: A comprehensive assessment; 2) Moisture management; 3) Nutrition support: Provide sufficient calories; 4) Pressure, shearing and friction minimization and repositioning to reduce the duration.

4.2 Suggestions

4.2.1 Nursing Practice

Nursing practice is essential to pressure ulcer prevention. The best practice is effective management of these recommended guidelines for pressure ulcer prevention with a clear understanding about application to nursing practice. In this regards, nurse‘s require education with short course and long course training programs to increase knowledge and practice the use of evidence-based clinical practice guidelines to reduce the incidence and prevalence of pressure ulcers. According to the findings, the following recommendations presented below:

1. Above all, the recommendations can be included in diploma and B.sc nursing curriculum.

1. In-service and short course training programs should be designed for Bangladeshi nurses to improve the quality of care.

2. Training needs to be provided for hospital administrative and nurse leader and nurse teacher to understand the importance of pressure ulcer prevention.

3. After participating in service training programs, interventional research should be conducted to study and analyze the incidence rate of pressure ulcers as well as nurses’ knowledge and practice.

4. The guidelines need to include hospital policy in relation to preventing pressure ulcers.

5. This study should be submitted to stakeholders such as the Secretary of the Ministry of Health, nursing administrators, nursing researchers, nursing clinicians and hospital administrators, to clarify the problem. Furthermore, the guidelines need to be applied at the policy level with additional need for financial support.

6. Conclusive guidelines need to be formed for Bangladeshi nurses and distributed nationwide.

4.2.2 Nursing Research

4.2.2.1 A pilot study should be conducted in order to evaluate the feasibility of the guidelines among hospitalized patients in clinical settings in Bangladesh.

4.2.2.2 Experimental research should be conducted to evaluate the effectiveness of the guidelines in the prevention of pressure ulcers among hospitalized patients.

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