

Applying Interdisciplinary Team Approach for Pressure Ulcer Assessment, Prevention and Management

¹Dr. Kawther Abdel Ghafar Ali, ²Dr. Waffaa El Sayed Hassan Helal,
³Dr. Fatma Abbas Salem, ⁴Dr. Hoda Attia

¹Lecturer of Nursing Administration, Faculty of Applied Medical Science,
Misr University for Science and Technology, Egypt

²Lecturer of Nursing Administration, Faculty of Nursing, Helwan University, Egypt

³Lecturer of Medical Surgical Nursing, Faculty of Nursing, Tanta University, Egypt

⁴Lecturer of Medical Surgical Nursing, Faculty of Nursing, Beni-Sweif University, Egypt

Abstract: Pressure ulcer is a serious health problem on patients, reduction of pressure ulcer prevalence rate requiring patient centered care not only focus by individualized nurses management but also with an interdisciplinary team approach.

Aim: The study aimed to apply an interdisciplinary team approach for the prevention and management of pressure ulcer. **Method:** A Longitudinal study design was implemented to establish the study.

Setting: Dar Al Fouad hospital is a private hospital with JCI accreditation.

Sample: All available (83) nurses working at the inpatients units.

Tool of Data Collection: Organizational assessment tool aimed to assesses the organizational system of pressure ulcer risk assessment, prevention and management.

Results: The findings of the study revealed that the mean scores of cases with pressure ulcer were decreased after application of the interdisciplinary team approach respectively pre-implementation (2014 =1.4), during implementation (2015 = 0.9), after implementation (2016 = 0.6).

Recommendations: Facilitations and barriers of the application of interdisciplinary team approach should be analyzed to ensure effective patients outcome. Furthermore, evaluate the nurses' experience of interdisciplinary team co-management, Pursuing hospital management to engage patients and families in the care plan of pressure ulcer risk prevention and management.

Keywords: Pressure ulcer, Assessment, Prevention, Management, and Interdisciplinary team approach.

I. INTRODUCTION

Pressure ulcers (PUs) are defined as localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear (NPUAP, EPUAP and PPIA, 2014). PUs significantly limits many aspects of an individual's well-being, including general health and physical, social, financial, and psychological quality of life (Baranoski & Ayello, 2012). In United States nearly 1 million people develop pressure ulcers annually, while approximately 60,000 acute care patients die from related complications (Lyder, et al., 2012).

Hospital-acquired pressure ulcers/injuries (HAPU/I) result in significant patient harm, including pain, expensive treatments, increased length of institutional stay and, in some patients, premature mortality (Health Research & Educational Trust, 2017). The estimated cost of managing stage III/IV pressure injury per patient is \$70–150 thousand, and the total cost for treatment of pressure ulcers in the United States is estimated at \$9–11 billion per year (Padula, et al., 2011).

International Journal of Novel Research in Healthcare and Nursing

Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

In healthcare facility services, provision of patient care and patient health outcome ever been provided from individual discipline of a unique branch of knowledge and/or practice. Patients care awarded from semiautonomous teams providers representing various disciplines and multiple specialties working interdependently. Each discipline is important for recuperation of function capacity, yet none is adequate to stand alone. So, evaluating special commitments of every individual discipline is difficult. The emerged dependent, independent, and interdependent components of nursing practice add to these difficulties (**Doran, 2011**).

Interdisciplinary and multidisciplinary teamwork have been used in healthcare practice, although there is a pure difference between the two approaches as the two terms are used interchangeably. The substantial difference lies down in the collaborative care plan that is only developed in interdisciplinary patient interventions, as multidisciplinary care does not emphasize an integrated approach to care. Multidisciplinary teams are unable to develop a cohesive care plan as each team member uses his or her own expertise to develop individual care goals. In contrast, each team member in an interdisciplinary team builds on each other's expertise to achieve common, shared goals. Therefore, it is crucial to indicate that multidisciplinary teams work in a team; whereas, interdisciplinary teams engage in teamwork (**Ferguson Megan, 2014**).

An interdisciplinary approach involves team members from different disciplines working collaboratively, with a common purpose, to set goals, make decisions and share resources and responsibilities (**Department of Human Services, 2008**). Within the scope of nursing standards and nursing process, nurses are managing patient health problems, coordinating care activities and requirements within and across healthcare teams in addition to executing interventions dictated by other combined disciplines. As, there are some components of care that do not managed by nurses' hands, and so on some outcomes are not affected by nursing care manner (**Jones, 2016**).

A team is any group of people organized to work together interdependently and cooperatively to meet the needs of their customers by accomplishing a purpose and goals. Teams are created for both long-term and short-term interaction (**DuFrene & Lehman, 2015**). The five stages of team development namely as; forming (orientation), storming (conflict), norming (forming norms and structure), performing (working productively), and adjourning (disbanding) (**Wilson, 2010 and Fiorenza, 2012**).

Forming; is the first stage of team development process, during which members of newly formed team become oriented to the team and acquainted with one another as they explore issues related to their new job situation (**Fiorenza, 2012**).

Storming; is the second stage, characterized by conflict and disagreements as team members become more assertive in clarifying their individual roles. During this stage, the team seems lack unity because members are continually challenging the way the team function. Leaders encourage team members to feel free to disagree with any team issues and discuss their own views fully and honestly to help the team to deal with this stage (**Parrott, 2011**).

Norming; is the third stage, begins when the storming stage ends. It is characterized by agreement and consensus among team members on roles, rules, and acceptable behaviors while working on the team. The team discusses and develops its processes and working style. Conflicts generated during the storming stage are resolved (**Hurt & Trombley, 2007**).

Performing; is the fourth stage, at this stage the team is more strategically aware. Team members know clearly why they are doing and what they are doing. The team fully focuses on solving organizational problems and on meeting assigned challenges and objectives. The team makes most of the decisions against criteria agreed with the leader and has a high degree of autonomy (**McGregor, 2009**).

Adjourning; is the fifth and last stage, referred to as deforming and mourning stage. It is the break- up of the team when the task is completed successfully and its purpose is fulfilled. This stage normally occurs when the team was established for some special purpose to be accomplished in a limited time period. Team members generally feel disappointed that their team is being broken up. Managers recognize team members` sense of loss and disappointment as normal and assure them that other challenging and exciting organizational opportunities await them (**Fiorenza, 2012**).

The most important factors in the prosperity of great organizations are the creation of knowledge, innovation and using competitive advantages (**Dragomiroiu, Hurloiu & Mihai, 2014**). Education and training considered as a major element in achieving organizational objectives and the qualitative work of the organizational staff (**Khan, et al., 2011**). Although

International Journal of Novel Research in Healthcare and Nursing

Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

that the effectiveness of the quality of patient care is not documented through literature to be achieved by a specific training program (Fisher & William, 2011). Hence in-service training programs should be effective in recognizing the organizational defects, curing deficiencies and improve staff performance (Rahmati, Hoseeini & Alimadadi, 2014).

A lot of literature reviews handled the subject of pressure ulcer as a key indicator reflecting the quality of patient care and the level of organizational performance, searching findings on pressure ulcer algorithms or models for education revealed any of simplified materials that can induce the technical capacity and quality of care by the majority of nurses in different specialties (Jalali & Berlian, 2014).

Significance of the study

A retrospective secondary analysis of database studies had explicit that an estimated 3.5–4.5% of all hospitalized patients are developing potentially preventable, hospital-acquired pressure ulcers, despite heightened awareness (Lyder, et al., 2012).

Although the availability of huge literature review on assessment, prevention and management of pressure ulcer, still nurses cannot comply totally to provide a comprehensive care. Nurses are not alone responsible for the provision of such inclusive care. Other healthcare teams are also responsible for the commitment of patient health outcomes. The prevalence rate of pressure ulcer for the hospitalized patients in 2014 was (1.4). Therefore, the current study aimed at formulating an interdisciplinary team approach system for the management of pressure ulcer for all inpatients at the selected hospital.

II. BODY OF ARTICLE**Subjects and Methods****Aim of the study:**

The aim of this study was firstly; to apply an interdisciplinary team approach for the prevention and management of pressure ulcer, secondly, to conduct an organizational assessment related risk assessment and thirdly, to introduce an educational model for nurses in-service training of pressure ulcer assessment, prevention and management.

Research Design:

Longitudinal design was implemented to establish the study.

Sample: All available (83) nurses working at the inpatients units. The interdisciplinary team members weren't a part from the sample.

Setting: The selected setting was Dar Al Fouad hospital which is a private hospital performing open heart surgeries, liver transplantations and bone marrow transplantations. The hospital accredited for healthcare from Join Commission International (JCI) accreditation for 5 consecutive times.

Tool of Data Collection:**Organizational assessment tool**

One tool used in the study and aimed to assesses the organizational system structure of applied pressure ulcer risk assessment, prevention and management. It was adopted from the initiatives made by Gold STAMP Program Pressure Ulcer Resource Guide (www.goldstamp.org, 2014). This Program is guided by coordinating committee, which includes representation from the New York State Department of Health, cross-setting provider associations, health care quality improvement organizations, private healthcare organizations and academia.

The tool consisted of two parts; the demographic data of the study sample such as age, education, years of experience, and work place. The second part composed of 15 questions, some of these questions were more specified by extra items as in the 1st question contains 3 sub-items, the 5th question contains 7 sub-items, the 6th question contains 4 sub-items, and the 9th question contains 10 sub-items. All questions were submissive to organizational assessment related to pressure ulcer assessment, management and prevention. **Scoring System:** The studied sample were asked to response through a 3-points Likert scale of yes, no and don't know respectively. Numbers and percent were computed for each questions and sub-questions.

Research field work

The study established between February to June 2015 upon obtaining the approval for the initiation of the project, with a specified responsibility and authority, the researcher had set an action plan according to three main quality phases of system structure, process, and outcome; as described by **Donabedian (2003)**:

- **Structure: Gap analysis** was conducted for identifying organization’s system structure for pressure ulcers risk assessment prevention and management.
- **Process: Search the literature review** for advanced practices of pressure ulcer assessment, prevention and management (**NPUAP, EPUAP and PPIA, 2014**) and National Institute for Health and Care Excellence (**NICE, 2014**) guidelines.
- **Clinical Pathway**, a simplified model for pressure ulcer assessment, prevention and management was designed and introduced as an educational material to guide nurses in addition to writing new policy and procedures. The development of the model was guided by the National Pressure Ulcer Advisory Panel (**NPUAP, 2014**), European Pressure Ulcer Advisory Panel (**EPUAP, 2014**), and Pan Pacific Pressure Injury Alliance (**PPPIA, 2014**), International Pressure Ulcer Guideline (2014) and National Institute for Health and Care Excellence (**NICE, 2014**) guidelines on pressure ulcer prevention and management.
- **Pressure Ulcer Prevention and management Care Plan**, was formulated to cover a bundle formed from; skin reassessment, preventive skin care, minimize friction and shear, managing moisture, repositioning, and use of redistribution devices.
- **Measuring Tape**, was designed on a clear white paper (only 10 cm length) and printed several times, then distributed to all inpatients units for individualized single use for measuring length and width of ulcers by nurses.
- **On-job Training**, all the nurses working at the inpatients units were educated to undertake a comprehensive skin assessment that includes the techniques for identifying blanching response, localized heat, edema, and indurations, application of Braden scale, and use of the measuring tape to estimate the length and width of presser sores, the technique of changing position and use of distribution devices, in addition to the technique of wound dressing and application of topical medication. The on-job training extended for 2 months in specific orders for the hospital units respectively (intensive care, coronary care, and wards). New nurses' orientees were included in the training during their perceptorship period.
- **Formation of Interdisciplinary Team**, a group members of healthcare professionals are constituted by the researcher to initiate an interdisciplinary team comprised of general surgery physician, clinical pharmacist, dietitian, physiotherapist, nurse educator, nurse supervisor, quality specialist, nurse allied supervisor.

▪ **The Development of the Interdisciplinary Team:**

			Team Performing	Team Adjourning
Team Forming	Team Storming	Team Norming	Team Performing	Team Adjourning
The project of launching an interdisciplinary team was obtained from top management. The team members were acquainted for the purpose and goal set for the project	The team members were encouraged to discuss the optimal benefits they can draw to patients at risk for pressure ulcer	The team members were agreed on the role of each one and the time frame for implementation	The operational team members launched morning round on all patients who were assessed with risk for pressure ulcer and documented in a special log book	For 2 month the incidence rate of pressure ulcer was decreased. 83 nurses were educated on: ~ Proper patient turning, ~ Proper use of weight distribution devices, ~ Using of a paper measuring tape for measuring length and width of pressure ulcer, ~ Stages of pressure ulcer, ~ Changing patient position according to standardized time pattern, ~ Adjusting the bed angle to 30 degree, ~ Following a standardized nursing care plan, ~ Formulating pressure ulcer policy, ~ Wound care & dressing technique, ~ Body mechanics

▪ **Assigning the roles and responsibilities of the interdisciplinary team members** was adopted from (NPUAP, EPUAP and PPIA, 2014) and National Institute for Health and Care Excellence (NICE, 2014) guidelines on pressure ulcer prevention and management which described as following:

a) Physician:

- Skin assessment was conducted for normality or abnormality and documented in the history & examination sheet.
- Plan of care script for patients identified at risk for developing pressure ulcer or those with skin tears, should be documented in the primary physician plan of care for planning actions and interventions of other multidisciplinary team.
- If patient developed stage IV pressure ulcer, plastic surgery consultation is must.
- Promoting healing and treating skin tears through care management and treatment modalities.

b) Clinical Pharmacist:

- The clinical pharmacist was informed about the patients with pressure ulcer from the pressure ulcer logbook and the nursing flow sheet.
- The clinical pharmacist audited the prescribed treatment related to each stage of pressure ulcer.
- Followed up patient's outcome as a response for therapy and recommend other substitution of treatments.

c) Clinical Dietitian:

- Nutritional assessment was conducted for newly admitted patients.
- Check the dietary needs that highlighted by the primary physician in the multidisciplinary plan of care.
- Plan and implement dietary interventions according to the primary physician instructions and the dietitian assessment in the multidisciplinary plan of care.
- Nutritional reassessment and follow up was performed and documented.
- Managing nutrition and hydration through;
 - Screening and assessing the nutritional and hydration status of every patient at risk of pressure ulcers (according to nutritional screen and assessment policy).
 - Providing nutritional support to each patient with nutritional risk and pressure ulcer risk.
 - Estimating nutritional requirements.
 - Comparing nutrient intake with estimated requirements.
 - Providing appropriate nutrition intervention, based on appropriate feeding route.
 - Monitoring and evaluation of nutritional outcome, with reassessment of nutritional status at frequent intervals while a patient is at risk.
 - Description of each patient with nutritional risk and pressure ulcer risk a minimum of 30-35 kcal per kg body weight per day, with 1.25-1.5 g/kg/day protein and 1ml of fluid intake per kcal per day (unless contraindicated due to medical problems).
 - Descript high-protein mixed oral nutritional supplements and/or tube feeding, in addition to the usual diet, to individuals with nutritional risk and pressure ulcer risk because of acute or chronic diseases, or following a surgical intervention.

d) Physiotherapist:

- Physiotherapist participated to train staff nurses and allied staff in proper patient positioning techniques and the correct use of the redistribution devices.

International Journal of Novel Research in Healthcare and Nursing

Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

- Participated to train staff nurses and allied for proper body mechanics.
- Participated in daily round on patients at risk and those with pressure ulcers.

e) Head nurse or charge nurse of the shift:

- Responsible for performing daily round on patients who have high risk for developing pressure ulcer and those with pressure ulcer to ensure the right positioning of patients and maintaining assessment of competent practice.

f) Nurses:

- The nurse was assigned to perform a full-body skin assessment within 6 hours of admission and every shift (12 Hours) to prevent pressure ulcer development (guided by pressure ulcer assessment, prevention and management model).
- The nurse should plan for nursing interventions through accomplishing the following goals; early recognition of pressure ulcers development/skin changes; identification of patient at risk for skin tears; prevention of pressure ulcers; and promoting healing of pressure ulcer.

g) The Researcher:

The researcher (educator) conducted review of literature from 2000 to 2015 related pressure ulcer including guidelines, bundles, algorithm, and posters.

- The first process was updating pressure ulcer policy and procedure, the second process was formulating standardized nursing care plan, the third process was designing simple measuring tape from paper to be easy use by the nurses for measuring the length and width of pressure ulcer wound for single use with affordable cost, the fourth process was developing a comprehensive poster to illustrate the stages of pressure ulcer wounds. The fifth process focused on the revision and validation of the developed documents by the interdisciplinary team combined with the policy and procedure committee of the hospital which approved them in addition to other two external expert professors of medical surgical nursing working at Ain Shams University and Mansoura University.
- **Operational team**, this team emerged from the interdisciplinary team, the operational team composed of 4 members (unit supervisor, clinical pharmacist, physiotherapist, and nurse educator). At this process the function of the operational team focused on; monitoring patients in correct position, emphasizes and educates the nurses for the proper patient positioning and use of redistribution devices and mattress in case of noncompliance (physiotherapist), evaluating the response of pressure ulcer treatment, dressing techniques, and healing processes (clinical pharmacist), documenting new cases, monitoring patients at risk and monitoring nurses compliance with clinical pathway of pressure ulcer assessment, prevention and management, furthermore providing needful training (unit supervisor and nurse educator). A log book for documenting this process was located in each inpatients unit.
- **Outcome:** the prevalence rate of pressure ulcer was calculated by the quality specialist as an indicator for improvement in addition to monitoring and evaluation of the overall process of the applied project.

Validation of the developed documents:

- Face and content validity of the developed documents were examined by the interdisciplinary team combined with the policy and procedure committee of the hospital in addition to other two external expert professors of medical surgical nursing working at Ain Shams University and Mansoura University in Egypt.

Ethical Consideration

As a result of increasing the events of hospital acquired pressure ulcer at the mentioned hospital, the chairman of the medical council asked for the researcher experience in providing nurses with more focused education on pressure ulcer. Upon this permission, the researcher submitted and obtained a project approval for utilization of interdisciplinary team approach and introducing an educational model for pressure ulcer assessment, prevention and management in order to increase nurses' compliance for a standardized practice.

Study Limitations

Despite the presence of strength points such as the existence of well structured nursing education department, management support in providing supplies and devices in addition to the commitment of the interdisciplinary team with their roles and responsibilities. Some limitations were appeared during the study. The major one was the longitudinal time (3 years) in assessment, reassessment, planning, implementation and evaluation of the outcomes. Other problems revealed such as shortage of staff, workloads, high ratio of patients census which made burden on the educators and researchers to involve all available nurses working at the inpatients units in the in-service training on pressure ulcer risk prevention and management.

Statistical Analysis

Descriptive statistics were used to analyze the data through SPSS version 20 in computing the frequency distribution of variables related organization assessment, prevention and management of pressure ulcer. The prevalence rate of pressure ulcer in the form of mean score was calculated on a monthly base.

III. STATISTICAL RESULTS

TABLE I: Distribution of the demographic characteristics of the study nurses (n=83).

Items		No. (83)	(100%)
Age	< 25	20	24.0
	25 - < 35	47	56.7
	35 - <40	13	15.7
	≥ 40	3	3.6
Gender	▪ Female	69	83.0
	▪ Male	14	17.0
Qualifications	▪ BSN	81	97.5
	▪ Associate in Nursing	2	2.5
Job title	▪ Staff nurse	69	83.1
	▪ Charge nurse	7	8.4
	▪ Head nurse	2	2.4
	▪ Supervisor	5	6.0
Work place	▪ ICU	28	33.7
	▪ CCU/MICU	33	39.8
	▪ Wards	22	26.5
Hospital years of experience	▪ 1 - < 5	73	87.9
	▪ 5 - < 10	7	8.4
	▪ > 10	3	3.6
Nursing years of experience	▪ 1 - < 5	16	19.3
	▪ 5 - < 10	64	77.1
	▪ ≥ 10	3	3.6
Previous training on pressure ulcer	▪ Yes	83	100
	▪ No	0	00
Previous training in the last 3 months	▪ Yes	17	20.5
	▪ No	66	79.5

Table 1: Displayed the personal data of the study sample. The majority had range of age from 25 – < 35 years. Regarding the gender, job title and level of education, most of them were females, in staff position, with baccalaureate degree respectively (83.0, 83.1, and 97.5). The majority of them (87.9) had hospital years of experience ranged from 1 – < 5 years and also (77.1) had nursing experience ranged from 5 – < 10 years

Table: II: The number and percent of organizational assessment survey of the study nurses (n=83).

Organizational Assessment Survey Questions	Yes No. (%)	No No. (%)	I don't know No. (%)
1. Does your organization’s policy related to pressure ulcers include the following?			
a. A statement regarding your organization’s commitment to pressure ulcer prevention and management	16 (19.28)	7 (8.43)	60 (72.29)
b. A requirement that all consumers receive a comprehensive skin inspection and risk assessment by a registered nurse at the time of initiation of services by your organization	38 (45.79)	27 (32.53)	18 (21.68)
c. A requirement that all consumers receive a comprehensive skin inspection and risk assessment by a registered nurse at regular, set intervals during the time they receive services from your organization	38 (45.79)	24 (28.91)	21 (25.30)
2. Is a standardized risk assessment tool (such as the Braden or Norton) used by the Registered Nurse conducting the risk assessment?	61 (73.50)	21 (25.30)	1 (1.20)
3. If a change in the consumer’s clinical condition is noted, is a skin reassessment and risk assessment completed by a registered nurse?	83 (100.00)	0 (0.00)	0 (0.00)
4. Are efforts to prevent pressure ulcers directly related to risk factors noted on the scale and subscales of the risk assessment tool used at your organization?	79 (95.19)	0 (0.00)	4 (4.81)
5. Does your interdisciplinary team consider and communicate all contributing risk factors not captured on your risk assessment tool as the consumer transitions between nursing units and receiving healthcare settings outside of your organization ,including but not limited to the following:			
a. Persistent refusal of interventions	2 (2.41)	77 (92.78)	4 (4.81)
b. Nutrition and hydration status	17 (20.49)	56 (67.47)	10 (12.04)
c. Medical devices (i.e., oxygen tubing, splints, orthotics, Foley catheter tubing, feeding tubes, endotracheal tubes)	18 (21.68)	56 (67.47)	9 (10.85)
d. Co-morbidities (i.e., diabetes, end-stage renal disease, obesity, hypotension, anemia hemodynamic instability, prolonged or multiple operations/procedures, intolerance to turning, spinal cord injury)	18 (21.68)	65 (78.32)	0 (0.00)
e. Bowel and bladder incontinence	18 (21.68)	65 (78.32)	0 (0.00)
f. Pain (with non-pharmacological interventions considered and premedication prior to ulcer care emphasized)	7 (8.44)	45 (54.22)	31 (37.34)
g. Bony deformities (ex. arthritic changes, kyphotic spine, “hammer toe”, Charcot deformities of the foot)	0 (0.00)	81 (97.59)	2 (2.41)

Table 2: Revealed the frequency distribution of organizational assessment survey questions. All the study sample (100.00) agreed that “if a change in the consumer’s clinical condition is noted, a skin reassessment and risk assessment is completed by a registered nurse”, and (95.19) recognized “the efforts to prevent pressure ulcers directly related to risk factors”. Meanwhile, the majority of nurses reported that interdisciplinary team does not communicate all contributing risk factors about patients' condition.

More than two third of the study sample (72.29) did not know about presence of “a statement regarding their organization’s commitment to pressure ulcer prevention and management”, conversely, about the same percent (73.50) recognized the presence of “a standardized risk assessment tool”. Meanwhile less than half of them (45.79) recognized “a requirement that all consumers receive a comprehensive skin inspection and risk assessment by a registered nurse”.

Table: III: The number and percent of organizational assessment survey of the study nurses (n=83).

Organizational Assessment Survey Questions	Yes No. (%)	No No. (%)	I don't know No. (%)
6. Are all of the following interventions considered for each consumer as part of a “needs assessment” related to pressure ulcer prevention and management?			
a. Pressure reduction, off-loading, pressure redistribution, the need for special mattress/seating/footwear positioning devices	72 (86.75)	7 (8.44)	4 (4.81)
b. Frequency of routine inspection of the skin	79 (95.19)	4 (4.81)	0 (0.00)
c. Consults for challenging cases	4 (4.81)	73 (87.96)	6 (7.23)
d. Consumer and family education on pressure ulcer risk, prevention and management	4 (4.81)	79 (95.19)	0 (0.00)
7. Do the direct care staff have input into care planning related to pressure ulcer prevention and treatment?	33 (39.75)	27 (32.54)	23 (27.71)

8. Does your organization have a policy regarding the identification of pressure ulcer characteristics and is the frequency of this assessment clarified in the policy?	53 (63.87)	6 (7.22)	24 (28.91)
9. Does your organization’s pressure ulcer tracking and assessment documentation address all of the following characteristics?			
a. Location (using anatomical sites)	83 (100.00)	0 (0.00)	0 (0.00)
b. Stage	83 (100.00)	0 (0.00)	0 (0.00)
c. Size (length X width X depth)	83 (100.00)	0 (0.00)	0 (0.00)
d. Undermining/tunneling	0 (0.00)	55 (66.26)	28 (33.74)
e. Wound bed	0 (0.00)	55 (66.26)	28 (33.74)
f. Drainage or type of exudates	0 (0.00)	55 (66.26)	28 (33.74)
g. Periwound tissue	0 (0.00)	55 (66.26)	28 (33.74)
h. Presence of odor	0 (0.00)	55 (66.26)	28 (33.74)
i. Treatment	0 (0.00)	55 (66.26)	28 (33.74)
j. Pain	0 (0.00)	55 (66.26)	28 (33.74)

Table 3: Displayed the frequency distribution of organizational assessment survey questions, the majority of nurses (86.75) reported about interventions considered for each consumer as part of a “needs assessment” related to pressure ulcer, except for “consumer and family education on pressure ulcer risk, prevention and management”. More than two thirds of them (63.87) knew that “their hospital have a policy regarding the identification of pressure ulcer characteristics and the frequency of this assessment clarified in the policy”. All the nurses (100.00) knew about “organization’s pressure ulcer tracking and assessment documentation that addressing some pressure ulcer characteristics as “location”, “stage” and “size”, meanwhile the same percent of nurses weren’t aware about other pressure ulcer characteristics.

Table IV: The number and percent of organizational assessment survey of the study nurses (n=83).

Organizational Assessment Survey Questions	Yes No. (%)	No No. (%)	I don't know No. (%)
10. Does your organization have protocols to follow if the wound is found to be non-healing ?	0 (0.00)	75 (90.36)	8 (9.64)
11. Do you incorporate current guidelines (i.e., NPUAP, EPUAP, WOCN Guidelines for Pressure Ulcer Prevention and Treatment) into your organization’s policies/protocols related to pressure ulcer prevention and treatment?	3 (3.62)	0 (0.00)	80 (96.38)
12. Do you educate newly hired and current interdisciplinary staff on your organization’s policies and procedures regarding pressure ulcer prevention and management on an on-going basis?	83 (100.00)	0 (0.00)	0 (0.00)
13. Does your organization designate and support a “ Clinical Expert ” to work with the interdisciplinary team to ensure current standards of practice for pressure ulcer prevention and management?	3 (3.61)	73 (87.96)	7 (8.43)
14. Is measurement of the effectiveness of your pressure ulcer prevention and management program part of your organization’s routine continuous quality improvement processes and do you involve direct care staff in that process?	62 (74.70)	0 (0.00)	21 (25.30)
15. Is your facility engaged in a cross-setting collaborative or partnership related to pressure ulcer management and prevention?	0 (0.00)	44 (53.02)	39 (46.98)

Table 4: Displayed that the majority of nurses (90.36) did not recognize the presence of “protocols for wound care”, most of them (96.38) did not know about presence of “current guidelines for pressure ulcer prevention and treatment, all the study sample (100.00) were knew about “educating newly hired and current interdisciplinary staff on organization’s policies and procedures regarding pressure ulcer prevention and management on an on-going basis”. The majority of nurses (87.96) did not recognize that their organization designate and support a “clinical expert” to work with the interdisciplinary team to ensure current standards of practice for pressure ulcer prevention and management”. Oppositely about three thirds of them (74.70) recognized that “pressure ulcer prevention and management program is a part of organization’s routine continuous quality improvement processes”, more than half of nurses (53.02) did not recognize “if the hospital engaged in a cross-setting collaborative or partnership related to pressure ulcer management and prevention”.

International Journal of Novel Research in Healthcare and Nursing

Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

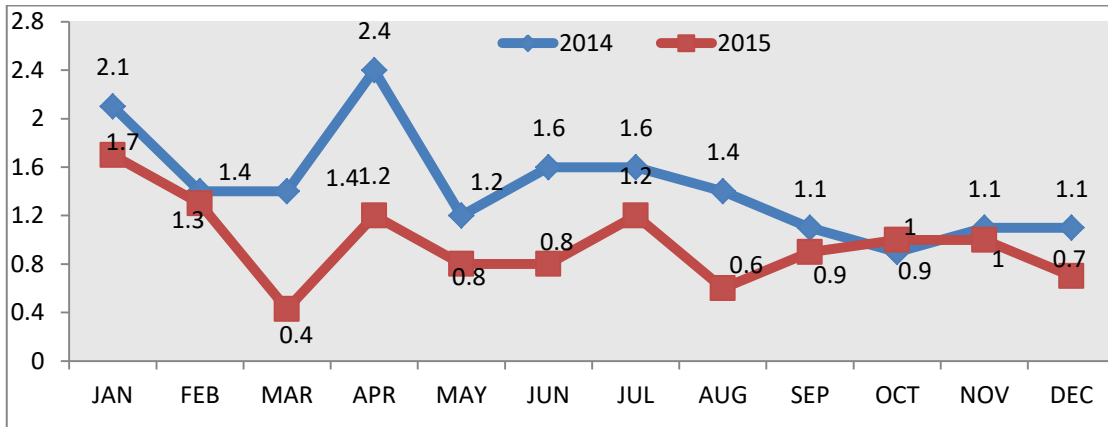


Figure 1: Percent of pressure ulcer one year before and the year during project implementation.

Figure 1 illustrated comparison between the prevalence rate of pressure ulcer for one year before and the year during project implementation.

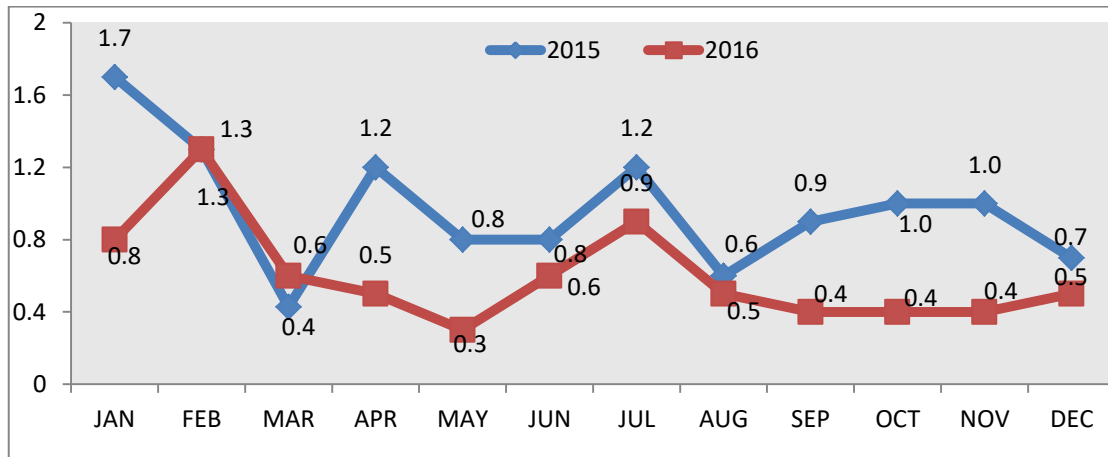


Figure 2: Percent of pressure ulcer during project implementation and one year after implementation.

Figure 2 illustrated comparison between the prevalence rate of pressure ulcer during the year of project time and one year after implementation.

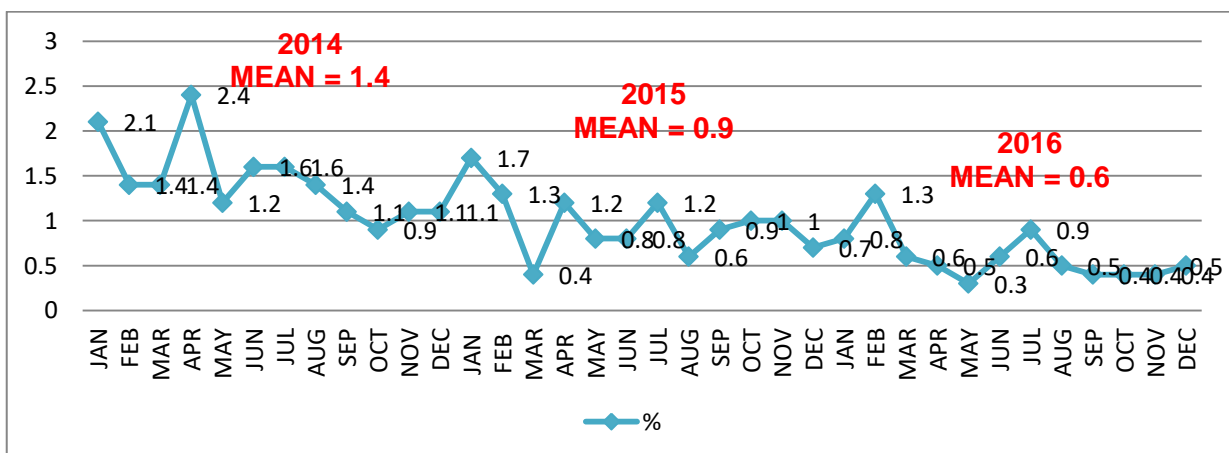


Figure 3: Percent of pressure ulcer over three consecutive years.

Figure 3 revealed comparison among prevalence rate of pressure ulcer within 3 years duration. The prevalence rate was decreased respectively (2014 = 1.4), (2015 = 0.9), (2016 = 0.6).

Pressure Ulcer Risk Assessment, Prevention & Management Model

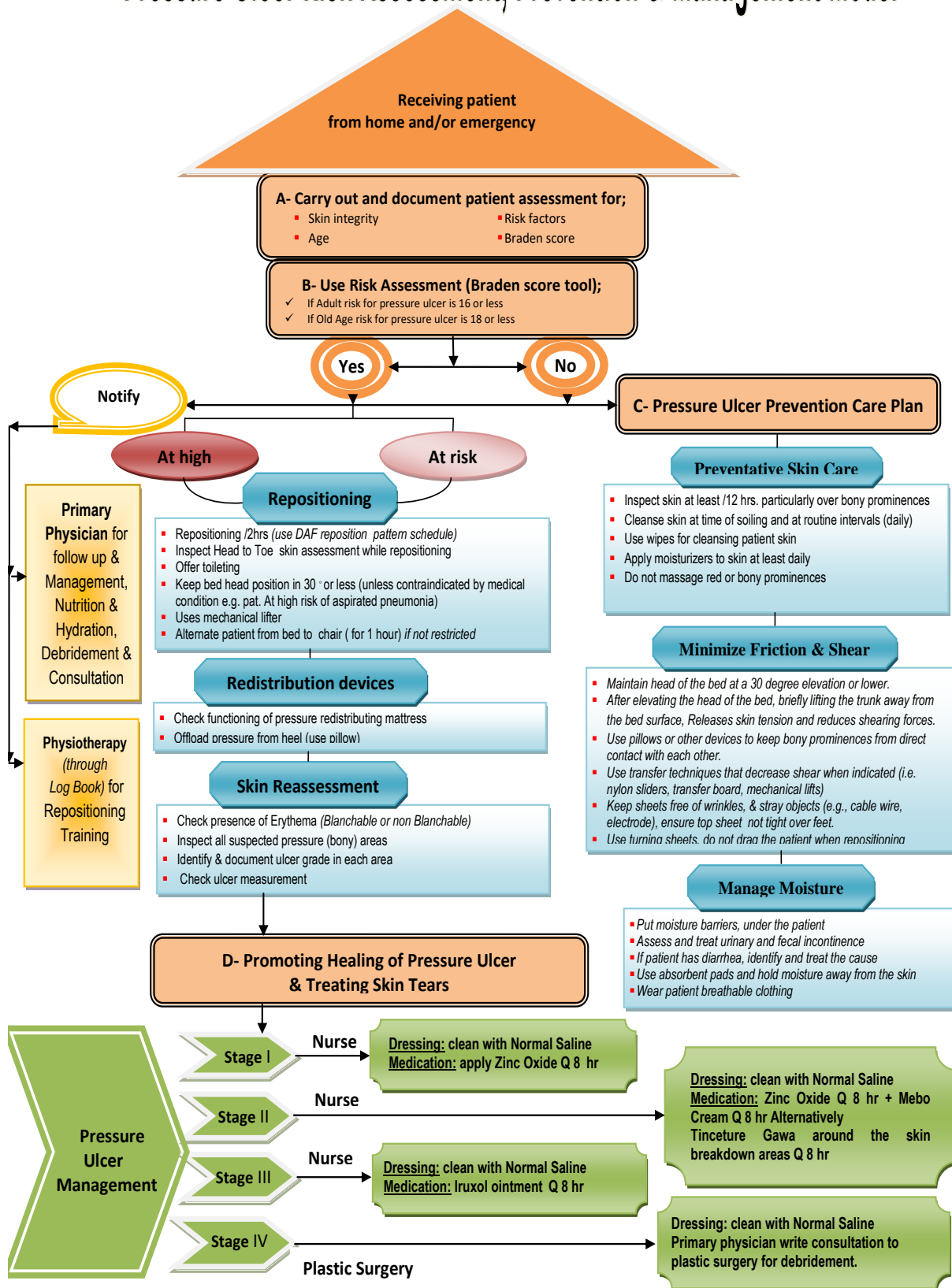


Figure 4: Educational Model of Pressure Ulcer Assessment, Prevention and Management.

STAGING PRESSURE ULCERS

Pressure ulcer is defined as intact skin with nonblanchable redness of a localized area, usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. The area may be painful, firm, soft, warmer, or cooler as compared to adjacent tissue (EPUAP/NPUAP, 2009).

Stage I			
<p>Nonblanchable erythema (redness) of the intact skin indicates that tissue damage has already occurred.</p> <p>Discoloration of the skin, warmth, Oedema, induration or hardness may also be used as indicators, particularly on individuals with darker skin.</p>			
Stage II			
<p>Partial thickness loss of dermis presenting as a shallow open ulcer with a red-pink wound bed, without slough. It may also present as an intact or open/ruptured serum-filled blister or as a shiny or dry shallow ulcer without slough or bruising.</p>			
Stage III			
<p>Full-thickness tissue loss, meaning the damage extends completely through the dermis to the subcutaneous layer. Subcutaneous fat may be visible, but bone, tendon, or muscle is not exposed. Slough and/or eschar may be present but does not obscure the depth of tissue loss.</p>			
Stage IV			
<p>Full-thickness tissue loss with exposed bone, tendon, or muscle. Slough or eschar may be present on some parts of the wound bed. It often includes undermining and tunneling.</p> <p>Exposed bone or tendon is visible or directly palpable.</p>			
<p>Eschar is black or brown necrotic tissue. It can be loose or firmly adherent; hard, soft, or boggy; and look like a scab, although there is no healing occurring beneath it.</p>		<p>Slough is a soft, moist, avascular tissue. It may be white, yellow, tan, or green; loose or firmly adherent; and described as resembling "chicken fat." Bruising indicates deeper tissue injury.</p> <p>This stage should not be used to describe skin tears, tape burns, perineal dermatitis (incontinent associated dermatitis), maceration, or excoriation.</p>	

Figure 5: Poster of pressure ulcer staging

IV. DISCUSSION

The sample enrolled in this study was 83 nurses including nurses' supervisors, head nurses, charge nurses and staff nurses. The main idea of this project was the application of integrated interdisciplinary team approach to set outputs for elimination of hospitalized pressure ulcer throughout effective assessment, prevention and management which launched by quality activities of measuring the organizational assessment of pressure ulcer to make problem visible and advance the actual and the potential quality problems of pressure ulcer in the consciousness of healthcare professionals which in turn lead to improving the quality of care (Farquhar, Kurtzman & Thomas, 2010).

The personal data of the studied nurses portrayed that their age had range from 25 – < 35 years, most of them were females and had baccalaureate degree. Also, their majority had hospital years of experience range from 1 – < 5 years that seems to be short experience and may be one of the reasons of increasing the prevalence rate of pressure ulcer. Tubaishat, et al. (2013) had reported that longer years of experience among Jordanian nurses indicated positive relationship and attitude of nurses. The nursing experience ranged from 5 – < 10 years which context with sample of (Hefnawy & Abd El-Monem, 2017). The majority of nurses had received training on pressure ulcer in previous year which predict on the recognition of continuous education for nurses which asserted by Nuru, et al. (2015) that nurses who received formal training on pressure ulcer prevention were found to be more knowledgeable than other without training.

The Organizational assessments of pressure ulcer elevated the following findings; about three quarters of the studied nurses were not aware about the presence of a statement regarding their organization's commitment to pressure ulcer prevention and management but they were aware of the hospital policy regarding the identification of pressure ulcer characteristics and the frequency of patient assessment clarified in that policy. At the meantime the same percent of nurses recognized the presence of a standardized risk assessment tool (such as the Braden scale). In this regard, Samuriwo & Dowding (2014) believed that, individual nurse decision making considered the key factor in pressure ulcer prevention and management, In the study of same authors that was aimed to synthesize the literature on the judgment and decision making of nurses in relation to the assessment, prevention, grading and management of pressure ulcers in six selected public hospitals, the nurses perceived that the formation of a pressure ulcer is an indicator of inadequate quality of nursing care. The results also revealed that nurses trust their own knowledge and experience rather than research evidence to determine what skin care to deliver, moreover, assessment tools were not routinely used to identify pressure ulcer risk.

All the nurses knew about organization's pressure ulcer tracking and assessment documentation that addressing some pressure ulcer characteristics as "location", "stage" and "size". Meanwhile the same percent of nurses weren't aware about other pressure ulcer characteristics. From other side, only less than half of them recognized a requirement that all consumers receive a comprehensive skin inspection and risk assessment by a registered nurse at the time of initiation of services by their organization, also at regular, set intervals during the time they receive services from the organization. These current findings predict the improvement of the hospital quality system. In this regards, Lyder & Ayello (2005) reported that, reductions of the prevalence and incidence rate of pressure ulcers have been demonstrated by healthcare facilities which act as early as possible and implement educational programs focused on protocols related skin care and nutrition assessment to prevent pressure ulcers.

Most of nurses reported that the interdisciplinary team does not communicate all contributing risk factors about patients' condition which reflected the neediness of the hospital to conceptualize the paradigm of interdisciplinary team approach to delineate standards of care and other innovative measures. Whereas, Nancarrow, et al., (2013) were identified ten characteristics underpinning effective interdisciplinary team work: positive leadership and management attributes; communication strategies and structures; personal rewards, training and development; appropriate resources and procedures; appropriate skill mix; supportive team climate; individual characteristics that support interdisciplinary team work; clarity of vision; quality and outcomes of care; and respecting and understanding roles.

Regarding interventions considered for each consumer as part of a "needs assessment" related to pressure ulcer, around two third of nurses reported about "pressure reduction, off-loading, pressure redistribution, the need for special mattress/seating/footwear positioning devices" and "frequency of routine inspection of the skin" and "consults for challenging cases". Also the use of the redistribution devices should be based on an overall patients' assessment and use of specialized support surfaces such as mattresses that may reduces or relieves PU (McGough, 2009 and Hampton & Pemberton, 2011). Most pressure ulcers are thought to be a preventable adverse events (Latimer, et al., 2016; Webster,

et al., 2011 and Winters, et al., 2016) if the appropriate measures are implemented to maintain skin integrity (**Jordan-O'Brien & Cowman, 2011 and Moore & Van Etten, 2011**). Indeed, the Patient safety strategies that aimed to prevent pressure ulcers may be consisted of multiple interventions or a series of interventions and include changes of hospital system-level (**Reddy, Gill & Rochon, 2006**).

In this regard, the Clinical Practice Guideline from the American College of Physicians; recommended that clinicians should choose advanced static mattresses or advanced static overlays in patients who are at an increased risk of developing pressure ulcers. (Grade: strong recommendation, moderate-quality evidence). This recommendation and other similarities draw the attention to the responsibility of the healthcare organizations in the provision of advanced devices that should be used by the clinician to patients at risk for pressure ulcer, in turn, providing the necessary training for the proper use in addition to quality monitoring (**Qaseem, et al., 2015**).

Also, two third of nurses were not recognize their inputs in consumer and family education on pressure ulcer risk, prevention and management. This result was document because the concept of administration in the current study setting won't encourage both patient and family to participate in routine patient's care despite that the guidelines of the international clinical practice recommends patients to understand the strategies for their pressure ulcer risk and prevention. These guidelines also recommend patients to actively work with nurses and other providers to develop individualized plans for pressure ulcer prevention (**EPUAP, et al., 2014**).

The majority of nurses were not recognize the presence of either protocols to follow if the wound is found to be non-healing, or the presence of guidelines for pressure ulcer prevention and treatment (NPUAP, EPUAP, PPIIA Guidelines). In reality, indeed one policy expressed care of bed sores was documented at the hospital and more than half of nurses were acquainted about it. This result was supported with (**Aasen Kvangarsnes & Heggen, 2012; Soban, et al., 2011 and Vanderwee, et al., 2011**) as mentioned that realization of pressure ulcer prevention (PUP) guidelines is suboptimal for healthcare providers especially when hospitals do not embraces evidence based guidelines for PUP. **Padula, et al. (2011)** stated that hospitals adhering to PU updates had significant pressure injury reductions and \$500,000+ savings per year.

All the study subjects were acquainted about educating newly hired staff because it was part of staff training. But there were no presence of current interdisciplinary staff shared work executes clinical practice strategies for ulcer prevention and management on an on-going basis. In turn, the majority of nurses acquainted that their organization doesn't designate and support a "clinical expert" to work with the interdisciplinary team to ensure current standards of practice for pressure ulcer prevention and management" which may be explained due the existence of quality improvement program and nursing education program.

Approximately three quarters of nurses recognized that pressure ulcer prevention and management program is a part of organization's routine continuous quality improvement processes which supported by **Arenetz & Arnetz, (2009)** that hospital acquired pressure ulcer are recognized as an indicator of the quality of nursing. Meanwhile more than half of nurses recognized that their hospital didn't engage in a cross-setting collaborative or partnership related to pressure ulcer management and prevention.

Likewise the current work, **Vélez-Díaz-Pallarés, et al. (2016)** constituted a multidisciplinary panel this panel was successfully able to develop nine recommendations for endorsing non-pharmacological interventions such as alternating pressure and constant low pressure devices and regular repositioning to geriatric patients with, or at risk of developing, pressure ulcers.

The results from the application of the interdisciplinary team approach lead to decreases the prevalence rate of pressure ulcer during the year of project initiation and the year after system stability respectively, (0.9, and 0.6) compared to the prevalence rate (1.4) of pressure ulcer during the year before these initiatives. These results indicated that the application of the interdisciplinary team approach had a positive effect and improved the quality care system for the assessment, prevention and management of pressure ulcer to patients with or at risk of developing pressure ulcer. Contrasting with another comparative study conducted by **Gunningberg & Stotts (2017)** compared the prevalence of pressure ulcers and prevention before and after a quality improvement program on a large sample of 612 hospitalized patients in 2002 and 632 in 2006; the prevalence rate of pressure ulcer did not decreased, despite a comprehensive quality improvement program.

The current findings are supported with the study of **Shahin & Lohrmann (2015)**, that assessed the period prevalence (PP) of Austrian hospital-and nursing home-acquired pressure ulcers, and of pressure ulcer quality indicators in both settings between 2009 and 2012 (n= 13,438), their results illustrated that the PP of pressure ulcers was 6.4% in hospitals and 6.3% in nursing homes, while the PP of hospital-acquired pressure ulcers was 2.4% in hospitals and 4.6% in nursing homes. Six quality indicators for PUP were existed in the study settings (PUP committee, PU agreement guidelines, management protocol/guidelines for PUP products, information brochures).

Research studies revealed that PU prevalence varied according to the country. About Egypt, no prevalence rate of pressure ulcer have found to be published yet, but other countries have for example, Jordan (12%), Nigeria (3.22%), Irish (9%), Wales (8.9%), USA between 14% and 17% , and Germany (8.3%), as evident by **Tubaishat, Anthony & Saleh (2011); Clark, et al. (2017) and Wann-Hansson, Hagell & Willman (2007)**.

The application of the interdisciplinary team approach in the current study seems that it overcome obstacles fronting nurses for the provision of pressure ulcer prevention and management protocols. Similarly, **Etafa, et al. (2018)**, their study revealed many barriers of pressure ulcer prevention (PUP) such as heavy workload and inadequate staff (lack of tie) (83.1%), shortage of resources/equipment/facilities (67.7%), (59.8) of participants reported lack of universal guideline for PUP and inadequate training (63.2%), Lack of job satisfaction (56.2%) could be a reason for not practicing in PU prevention care. The authors also reported that majority of the nurses (n = 116) had negative attitude towards pressure ulcer prevention. **Tubaishat, et al. (2013) and Uba & Kever (2015)** identified that, lack of time; staff and uncooperative patient are the major barriers for nurses' to comply with PU prevention practice.

All the study subjects agreed that when a change in the consumer's clinical condition is noted, a skin reassessment and risk assessment is completed. They also recognized that the efforts to prevent pressure ulcers are directly related to risk factors including advanced age, previous or current PU, multiple comorbidities and nursing home residence (**Baumgarten, et al., 2006; Coleman, et al., 2013 and Nonnemacher, et al., 2009**). In addition to other risks factors related to patient health problems for the development of pressure ulcers/injuries included immobility, incontinence, inadequate nutrition and hydration, neurosensory deficiency, device-related skin pressure, and circulatory abnormalities (**VanDenKerkhof, Friedlberg & Harrison, 2012**).

Focused on the application of an integrated interdisciplinary team approach, the trajectory for pressure ulcer prevention and management is believed to be the responsibility of healthcare organizations, physicians, nurses, and the other healthcare professionals respectively, every one of them have clear path to do many things for prevention and avoidance of adverse outcome of care. So, the need for interdisciplinary care is increasing as a result of growing aging population with chronic and complex needs, increasing knowledge and skills required to provide comprehensive care to patients, increasing specialization in healthcare fields, growing encouragement to develop multi-faceted teams in healthcare, and increased emphasis on continuity in care planning (**Ferguson Megan, 2014**).

V. CONCLUSION

Elimination of pressure ulcer in healthcare facility is one of the quality indicators of patient safety. Many evidence-based measures for preventing hospital-acquired pressure ulcers are published in the literature review but these preventable measures are not consistently applied by nurses. Preventing hospital-acquired pressure ulcers and healing cases which presented on patients admission, required a patient centered care committed by an interdisciplinary team approach of healthcare professionals. A group of the interdisciplinary team comprised of the physiotherapist, nursing supervisors, quality specialist, head nurse or charge nurse of the shift, in addition to health allied, were formed and congruent to do autonomous work group. All team members were working with alacrity for alleviation of patients' suffering.

VI. RECOMMENDATIONS

The current study recommended the following issues;

- Exploring nurses' perspectives and compliance of pressure ulcer protocol, policy and nursing care plan in the provision of a standardized care for patients at risk and/or with pressure ulcer.
- Assess the level of nurses' satisfaction towards the co-management of the interdisciplinary team.
- Examine facilitations and barriers of the application of interdisciplinary team approach.

International Journal of Novel Research in Healthcare and Nursing

Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

- Assess the nurses' knowledge and practice of pressure ulcer assessment, prevention and management.
- Consolidates, strengthen and empower the role of nursing educator as learner, researcher, teacher, leader, project manager, practitioner, councilor, decision and policy maker.

Further study is recommended for;

- Evaluating the work process of the interdisciplinary team on patient outcome with testing other modalities of pressure ulcer treatment.
- Evaluating the effectiveness of the proposed educational model for the pressure ulcer assessment, prevention and management in another setting.

REFERENCES

- [1] Aasen, E.M., Kvangarsnes, M. & Heggen, K. (2012): Perceptions of patient participation amongst elderly patients with end-stage renal disease in a dialysis unit. *Scand. J. Caring Sci.* 26 (1), 61–69.
- [2] Arnetz, J. E. & Arnetz, B. B. (2009): Gender differences in patient perceptions of involvement in myocardial infarction care. *Eur. J. Cardiovasc. Nurs.* 8 (3), 174–181.
- [3] Baranoski, S. & Ayello, E. A. (2012): *Wound care essentials: practice principles*. 3. Springhouse PA: Lippincott Williams & Wilkins.
- [4] Baumgarten, M., Margolis, D. J., Localio, A. R., Kagan, S.H., Lowe, R. A., Kinosian, B., Holmes, J. H., Abbuhl, S. B., Kavesh, W. & Ruffin, A. (2006): Pressure ulcers among elderly patients early in the hospital stay. *J. Gerontol. Ser. A Biol. Sci. Med. Sci.* 61(7), 749–754.
- [5] Clark, M., Semple, M. J., Ivins, N., Mahoney, K. & Harding, K. (2017): National audit of pressure ulcers and incontinence-associated dermatitis in hospitals across Wales: a cross-sectional study. *BMJ Open.* 2017;7(8) [PMC free article] [PubMed].
- [6] Coleman, S., Gorecki, C., Nelson, E. A., Closs, S. J., Defloor, T., Halfens, R., Farrin, A., Brown, J., Schoonhoven, L. & Nixon, J. (2013): Patient risk factors for pressure ulcer development: systematic review. *Int. J. Nurs. Stud.* 50 (7), 974–1003.
- [7] Department of Human Services (2008): *Health independence programs guidelines*, State Government, Melbourne.
- [8] Donabedian, A. (2003): *An introduction to quality assessment in health care*. New York, NY: Oxford University Press.
- [9] Doran, D. M. (2011): *Nursing outcomes; State of the science*, (2nd ed); Studbury, MA: Jones & Bartlett Learning.
- [10] Dragomiroiu, R., Hurloiu Ion-Iulian, Mihaia G. (2014): Induction Staff Training. 21st International Economic Conference 2014, IECS 2014, 16-17 May 2014, Sibiu, Romania. *Procedia Economics and Finance* 368 – 373. Science Direct. Available online at www.sciencedirect.com 2212-5671 © 2014 Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>). Selection and/or peer-review under responsibility of Scientific Committee of IECS, doi: 10.1016/S2212-5671(14)00815-6.
- [11] DuFrene, D. & Lehman, C. (2015): *Building High-Performance teams*. 16th ed.: CengageBrain.com. Amazon.com.<http://books.google.com/eg/books?id>.
- [12] Etafa, W., Argaw, Z., Gemechu, E. & Melese, B. (2018): Nurses' attitude and perceived barriers to pressure ulcer prevention, *BMC Nurs.* 17: 14. doi: 10.1186/s12912-018-0282-2.
- [13] European Pressure Ulcer Advisory Panel (EPUAP) (2014): Accessed at (www.epuap.org).
- [14] Farquhar, M., Kurtzman, E. T., & Thomas, K. A. (2010): What do nurses need to know about the quality enterprise? *Journal of Continuing Education in Nursing*, 41(6), 246-256. doi:10.3928/00220124-07.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

- [15] Ferguson Megan (2014): Multidisciplinary vs. Interdisciplinary Teamwork: Becoming a More Effective Practitioner, <https://www.socialworkhelper.com/multidisciplinary-vs-interdisciplinary-teamwork-becoming-effective-practitioner/>.
- [16] Fiorenza, P. (2012): Building effective teams through the Tuckman Model. Is it useful? <http://www.govloop.com/profiles/blogs/building-effective-teams-through-the-tuckman-model-is-it-useful?>
- [17] Fisher, C. & William, A. S. (2011): Comparing student learning and satisfaction between learning environments in continuing medical education. *International journal of Instructional technology and distance learning*. 8(5):29-41.
- [18] Gold Stamp Program (2014): Accessed at (www.goldstamp.org).
- [19] Gunningberg, L., Stotts, N. A. (2017): Tracking quality over time: what do pressure ulcer data show? *International journal for quality in health care*, Volume 20, Issue 4.
- [20] Hampton, S. & Pemberton, M. (2011): Why are bedsores not being prioritized in nursing care?. *British Journal of Nursing*, Vol.20, Iss.15-Supplement, pp. 27-28.
- [21] Health Research & Educational Trust (2017): Hospital acquired pressure ulcers/ injuries (HAPU/I). Chicago, IL: Health Research & Educational Trust. Accessed at <http://www.hret-hiin.org/>.
- [22] Hefnawy, G. & Abd El-Monem, D. (2017): Prevalence of Pressure Ulcers with the Study of the Impact of Pressure Ulcer Educational Program on Registered Nurses' Knowledge and Practice in Prince Miteb Bin Abdulaziz Hospital, Sakaka City, Saudi Arabia, *Journal of Health, Medicine and Nursing* , Vol.43.
- [23] Hurt, A. C., & Trombley, S. M. (2007): The Punctuated-Tuckman: Toward a new group development model. Retrieved from <http://www.eric.ed.gov/PDFS/ED504567.pdf>.
- [24] International Pressure Ulcer Guideline (2014): Accessed at (www.internationalguideline.com).
- [25] Jalali, G. & Berlian, A. R. (2014): The effect of technical training courses to improve the skill level of after sale services staffs of automotive industry. *Journal of engineering education in Iran*. 16 (64): 117-34. Persian.
- [26] Jones, T., (2016): "Outcome Measurement in Nursing: Imperatives, Ideals, History, and Challenges" *OJIN: The Online Journal of Issues in Nursing* Vol. 21, No. 2, Manuscript 1.
- [27] Jordan O'Brien, J.A. & Cowman, S. (2011): An exploration of nursing documentation of pressure ulcer care in an acute setting in Ireland. *Practice: Journal of Wound Care (J W C)*. Vol. 20, No. 5. Published Online: <https://doi.org/10.12968/jowc>.
- [28] Khan, R. A. G., Khan, F. A., & Khan, M. A. (2011): Impact of training and development on organizational performance. *Global Journal of Management and Business Research*. 11 (7): 63-8.
- [29] Latimer, S., Gillespie, B. & Chaboyer, W. (2016): Pressure injury prevention strategies in acute medical patients: an observational study. *Contemp. Nurse* doi:<http://dx.doi.org/10.1080/10376178.2016.1190657>.
- [30] Lyder, C. H. & Ayello, E. A. (2005): Pressure Ulcers: A Patient Safety Issue. In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. 268-299).
- [31] Lyder, CH. WY. Metersky, M. CM. Kliman, R. VNR. & Hunt, DR. (2012): Hospital-acquired pressure ulcers: results from the national Medicare patient safety monitoring system study. *J Am Geriatr Soc*. 60 (9): 1603–1608. doi: 10.1111/j.1532-5415.2012.04106.x. [PubMed] [Cross Ref].
- [32] McGough, A. J. (2009): A systematic review of the effectiveness of risk assessment scales used in the prevention and management of pressure sores; MSc Thesis; University of York.
- [33] McGregor, C. (2009): A Framework for the Design of Web Service Based Clinical Management Systems to Support Inter and Intra Organizational Patient Journeys, *Medical Informatics: Concepts, Methodologies, Tools and Applications*, Hershey, PA: IGI Global, Chapter 2.6.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 5, Issue 3, pp: (640-658), Month: September - December 2018, Available at: www.noveltyjournals.com

- [34] Moore, Z., Johanssen, E., & Van Etten, M. (2011): A review of PU prevalence and incidence across Scandinavia, Iceland and Ireland (Part I) Education. *Journal of Wound Care (J W C)*. Vol. 22, No. 7 Published Online: 29 Sep 2013 <https://doi.org/10.12968/jowc.22.7.361>.
- [35] Nancarrow Susan A, Andrew Booth, Steven Ariss, Tony Smith, Pam Enderby, and Alison Roots (2013): Ten principles of good interdisciplinary team work; *Hum Resour Health*; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662612/>.
- [36] National Institute for Health and Care Excellence (NICE) (2014): guidelines accessed at <https://www.nice.org.uk/guidance/cg179/resources/pressure-ulcers-prevention-and-management-pdf-35109760631749>.
- [37] National Pressure Ulcer Advisory Panel (NPUAP) (2014): Accessed at (www.npuap.org).
- [38] National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (2014): *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide*. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Australia.
- [39] Nonnemacher, M., Stausberg, J., Bartoszek, G., Lottko, B., Neuhaeuser, M. & Maier, I., (2009): Predicting pressure ulcer risk: a multifactorial approach to assess risk factors in a large university hospital population. *J. Clin. Nurs.* 18 (1), 99–107.
- [40] NPUAP, EPUAP and PPPIA (2014): *Prevention and treatment of pressure ulcers: quick reference guide*. Haesler E, editor. Osborne Park: Western Australia, Cambridge Media. Accessed at <https://www.npuap.org/wp-content/uploads/2014/08/Updated-10-16-14-Quick-Reference-Guide-DIGITAL-NPUAP-EPUAP-PPPIA-16-Oct-2014.pdf>.
- [41] Nuru, N., Zewdu, F., Amsalu, S. & Mehretie, Y. (2015): Knowledge and practice of nurses towards prevention of pressure ulcer and associated factors in Gondar University Hospital, Northwest Ethiopia. *BMC nursing*, 14(1), 34.
- [42] Padula, W. V., Mishra, M. K., Makic, M. B. & Sullivan, P. W. (2011): Improving the quality of pressure ulcer care with prevention: a cost-effectiveness analysis. *Med Care.* 49 (4): 385–392. doi: 10.1097/MLR.0b013e31820292b3. [PubMed] [Cross Ref].
- [43] Parrott, R. L. (2011): Four strategies for building confidence in team. <http://www.seizeyourlife.com/four-strategies-for-building-confidence-in-your-team>.
- [44] Qaseem, A., Mir, TP., Starkey, M. & Denberg, TD. (2015): Risk Assessment and Prevention of Pressure Ulcers: A Clinical Practice Guideline from the American College of Physicians. *Annals of Internal Medicine*, Volume 162.
- [45] Rahmati, M. H., Hosseinifard, S. M. & Alimadadi, A. (2014): Investigating Effectiveness of In-Service Training in the Public Sector: Case study. *Iranian Journal of Management Studies (IJMS)*. Vol. 7, No. 2, pp: 305-327. DOI: 10.22059/IJMS.2014.36619.
- [46] Reddy, M., Gill, SS. & Rochon, PA., (2006): Preventing pressure ulcers: a systematic review. *JAMA.* 296: 974-84. PMID: 16926357 <http://dx.doi.org/10.1001/jama.296.8.974>.
- [47] Samuriwo, R. & Dowding, D. (2014): Nurses' pressure ulcer related judgments and decisions in clinical practice: A systematic review, *International Journal of Nursing Studies*, Volume 51, Issue 12, pages 1667-1685. <https://www.sciencedirect.com/science/article/pii/S0020748914000911>.
- [48] Shahin, E. S.M. & Lohrmann, C. (2015): Is There Relationship between Quality Indicators and Acquired Pressure Ulcers in Austrian Hospitals and Nursing Homes; *Journal of Surgery*, 3(2-1): 1-7. (<http://www.sciencepublishinggroup.com/j/js>) doi: 10.11648/j.js.s.2015030201.11, ISSN: 2330-0914 (Print); ISSN: 2330-0930 (Online).
- [49] Soban, L.M., Hempel, S., Munjas, B.A., Miles, J. & Rubenstein, L.V. (2011): Preventing pressure ulcers in hospitals: a systematic review of nurse-focused quality improvement interventions. *Joint Comm. J. Qual. Patient Saf.* 37 (6), 245–252.

- [50] Tubaishat, A., Aljezawi, M., Al Qadire, M. & Mohammad (2013): Nurses' attitudes and perceived barriers to pressure ulcer prevention in Jordan. *Journal of wound care*. 22: 490–497. doi: 10.12968/jowc..22.9.490. [PubMed] [Cross Ref].
- [51] Tubaishat, A., Anthony, D. & Saleh, M., (2011): Pressure ulcers in Jordan: a point prevalence study. *J Tissue Viability*. 20 (1): 14–19. doi: 10.1016/j.jtv.2010.08.001. [PubMed] [Cross Ref].
- [52] Uba, A. & Kever, L. (2015): Knowledge, attitude and practice of nurses towards pressure ulcer prevention. *Int J Nurs and midwifery*. 7 (4): 54–60. doi: 10.5897/IJNM2014.0155. [Cross Ref].
- [53] VanDenKerkhof, EG. Friedlberg, E. & Harrison, MB. (2012): Prevalence and risk of pressure ulcers in acute care following implementation of practice guidelines: annual pressure ulcer prevalence census 1994-2008. *J Healthcare Quality*. 2012; 33 (5): 58–67. doi: 10.1111/j.1945-1474.2011.00127.x. [PubMed] [Cross Ref]
- [54] Vanderwee, K., Defloor, T., Beeckman, D., Demarre, L., Verhaeghe, S., Van Durme, T. & Gobert, M. (2011): Assessing the adequacy of pressure ulcer prevention in hospitals: a nationwide prevalence survey. *BMJQual. Saf.* 20 (3), 260–267.
- [55] Vélez-Díaz-Pallarés, M., Lozano-Montoya, Correa Pérez, A., Abraha, A., Cherubini, O'Mahony, D., Montero-Errasquín, B. & Cruz-Jentoft A. J. (2016): Non-pharmacological interventions to prevent or treat pressure ulcers in older patients: Clinical practice recommendations. *European Geriatric Medicine*. Volume 7, Issue 2, Pages 142-148.
- [56] Wann-Hansson, C., Hagell, P. & Willman, A. (2007): Risk factors and prevention among patients with hospital-acquired and preexisting pressure ulcers in an acute care hospital. *J Clin Nurs*, 17: 1718–1727.
- [57] Webster, J., Coleman, K., Mudge, A., Marquart, L., Gardner, G., Stankiewicz, M., Kirby, J., Vellacott, C., Horton-Breshears, M., & McClymont, A. (2011): Pressure ulcers: effectiveness of risk-assessment tools. A randomised controlled trial (the ULCER trial). *BMJ Qual. Saf.* 20 (4), 297–306.
- [58] Wilson, C. (2010): Team development model "Bruce Tuckman's". Forming, storming, norming, performing and adjourning. http://www.performancecoachtraining.com/resources/docs/pdfs2/BruceTuckman_Team_Development_Model.pdf.
- [59] Winters, B. D., Bharmal, A., Wilson, R. F., Zhang, A., Engineer, L., Defoe, D., Bass, E. B., Dy, S. & Pronovost, P.J. (2016): Validity of the agency for health care research and quality patient safety indicators and the centers for medicare and Medicaid hospital-acquired conditions: a systematic review and meta-Analysis. *Med.Care* 2 (2) 9000, Publish Ahead of Print.
- [60] Wound Ostomy and Continence Nurses Society (2016): WOCN Guideline for Prevention and Management of Pressure Ulcers. [https://c.ymcdn.com/sites/www.wocn.org/resource/resmgr/Publications/Pressure_Ulcer_Eval_CRG_\(201\).pdf](https://c.ymcdn.com/sites/www.wocn.org/resource/resmgr/Publications/Pressure_Ulcer_Eval_CRG_(201).pdf).