

## Effect of Pressure Ulcer Preventive Nursing Interventions on Knowledge, Attitudes and Practices of Nurses among Hospitalized Geriatric Patients in Alexandria, Egypt

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**Abstract:** The utmost devastating somatic complications resulting from pressure sores were mainly identified amongst the aged in various health settings. Decubitus ulcer pain could postpone the restoration, discharge of geriatric patients, and lengthen their illness resulting in their debility and death. Pressure sores is primarily significant in evaluating nursing care, as well as it is considered vital nurse-sensitive concern. Consequently, nurses' poor knowledge, negative attitude, and low standard practices have its own major impact on greater incidence of decubitus ulcer specifically amongst the aged patients. This study aimed to examine the effect of pressure ulcer preventive nursing interventions on knowledge, attitudes, and practices of nurses among hospitalized geriatric patients in Alexandria, Egypt. The present study was conducted in two university hospitals in Alexandria; Medical-Surgical Units and Intensive Care Units in the main university hospital and orthopedic wards in El-Hadara hospital. Subjects: Forty nurses were enrolled into this research, aged from 21-60 years, had a full-time work, had experience in direct patient care for at least six months. Five tools were utilized in this research namely; nurses' socio-demographic structured interview schedule, structured nurses' pressure ulcer prevention knowledge questionnaire, nurses' preventive practices observational checklist for elders' pressure ulcers, nurses' attitude scale toward pressure ulcers prevention among geriatric patients, nurses' perceived barriers of pressure ulcers prevention scale. This current research revealed that the studied nurses' total mean post-test knowledge, attitude, practices scores were significantly higher than total mean pre-test scores regarding decubitus ulcer prevention. This study concluded that nursing staff's knowledge, practices and attitude regarding prevention of pressure sores among hospitalized geriatric patients were significantly improved after the application of this research interventions. The present research suggested that there is a necessity for constant learning plans and in-service training programs for staff of nursing in order to be competent in caring the geriatric patients.

**Key Word:** Pressure Ulcers, Geriatric Patients, Preventive Nursing Interventions, Knowledge, Attitude, Practices

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### I. Introduction

In the early 20th century, the pyramid of population in many nations was triangular. Conversely, it shifted to a constrictive figure as a result of the decrease in fertility, in combination with mortality rate, and the improvement of technology, and health sciences. These changes exhibited the population ageing <sup>(1)</sup>. In Egypt, the percentage of the aged was around 10.0% of the total population in 2017, and expected to be 20.8% in 2050. Therefore, by that time around 20 million Egyptian will be classified as older adults <sup>(2)</sup>. The rapid growth of ageing population all over the world contribute to the necessity of social and health services plans to be prepared <sup>(3)</sup>. Pressure sores (PSs) among hospitalized geriatric patients is considered common health problem in the acute and chronic health care settings. It influences the geriatric patients, their families and carers to a momentous load <sup>(4)</sup>. Nowadays, pressure ulcers (PUs) are worldwide well-known preventable patient safety problem. It is also one of the five utmost communal reasons of patient harm. The expenditure of managing pressure sores is 2.5 times higher than the prevention cost <sup>(5)</sup>. Considerable distinction in the incidence of PUs that occurs between advanced and emerging countries, with an estimated PUs incidence rate of 25.1 % in developed countries, and 31.3 % in developing countries <sup>(6)</sup>. Worldwide, around 70% of pressure sores happen in the ageing population who is over age 65 where 9-22% of PUs patients were among nursing home residents and 5-32% of geriatric patients were in hospitals <sup>(7)</sup>.

PUs is demarcated by the National Pressure Ulcers Advisory Panel and European Pressure Ulcers Advisory Panel (2016) as a "pressure injury which causes a localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device". PU development is a very

complex phenomenon and its risk factors could be extrinsic or/and intrinsic determinants<sup>(8, 9)</sup>. Ageing is a main internal determinant for developing PUs. With advancing age, numerous variations occur such as loss of subcutaneous tissues arteriosclerotic vascular changes, epithelial layers turn into trampled, and loss of skin elasticity. As well, the reduction in hormonal secretion, and sarcopenia increased the vulnerability of skin damage. Furthermore, decreased vascular oxygenation, and intradermal blood perfusion are significant age related aspects for the occurrence of pressure sores<sup>(10)</sup>. Additionally, high disability rates, geriatric syndromes such as delirium, incontinence, falls, and cognitive decline, as well as high incidence of associated illnesses as diabetes which not only situate seniors in risk to develop PUs, but also influence the wound healing<sup>(11)</sup>. Shearing forces, pressure, and increased ambient temperature are considered major well-known PUs extrinsic factors. Malnutrition among seniors is another contributing determinant for PUs development which causes numerous influences including postpone the process of healing, diminished synthesis of collagen, and loss of the immunity. Other risk factors for PUs as immobilization could causes reduced oxygen uptake, diminished peripheral blood flow, body fluid structure changes, and thrombogenic effects.<sup>(12, 13)</sup>

The process of physiologic PUs healing comprised of four dynamic corresponding phases; homeostasis, inflammation, proliferation and remodeling. The process of skin healing among seniors could be slowed down; particularly at the phases of inflammation or proliferation. Therefore, geriatric patients are at further threat for PUs occurrence, and to suffer from its complications<sup>(14-16)</sup>. PUs complications could initiated from bodily discomfort and pain to occurrence of various infections such as bacteremia cellulites, osteomyelitis, meningitis, endocarditis, and squamous cell skin malignancy specifically when the sores become at ultimate stage or when the wound persists for numerous months<sup>(17)</sup>. Romanelli et. al (2018) revealed that 84.0% of those with decubitus ulcers have described pain to be at an unbearable level even though at rest, and a lot of geriatric patients have reported fatigue related to sleep irritability as a result of the existence of the sores<sup>(18)</sup>. PUs have negative physical, psychological, and social consequences on the seniors. Functional limitations related to PUs could severely hinder elders' social life, and resulting in social isolation.<sup>(19)</sup> Psychological trauma including feelings of embarrassment is also resulted from PUs which arises when patients become preoccupied with healing of ulcers. Consequently, all dimensions of quality of life are adversely affected by the occurrence of PUs<sup>(20)</sup>. Most pressure ulcers might be debarred whether appropriate preventive strategies were executed<sup>(21)</sup>. The Canadian Association of Wound Care (2018) précised the resolution of pressure sores into various strategies including; the inspection of patients' skin, exchanging the patients' position in regular periods, monitoring nutritional status, and examining for a moisture-free environment. All interventions should be not only focused on PUs curative strategies, but also should be concentrated on rising and rationalizing health care professionals' knowledge and experience regarding PUs preventive measures<sup>(22)</sup>.

The fact is that seniors have several health disorders, which often form a vicious cycle leading to increase the necessity for health amenities<sup>(23)</sup>. Therefore, it is essential to ascertain how health care professionals perceive the aged. Knowledge, attitudes and skills are crucial to deliver efficient health care for elderly patients<sup>(24)</sup>. Attitude of nurses toward the elderly patients could affects the care quality which provided by them<sup>(25)</sup>. Kydd A, and Wild D (2013) revealed that negative attitudes of nurses can lead to higher prevalence of decubitus ulcers. Accordingly, the appraisal of the attitudes of health care providers towards the seniors would ease the performance of organizational facilities, and health care amenities which focused on preserving and promoting the older adults wellbeing<sup>(26)</sup>. Moreover, nurses' lack of knowledge, and poor skills regarding the ageing changes contributes significantly to the occurrence or deterioration of PUs amongst the elders<sup>(24)</sup>. Therefore, the necessity for educational programs on PUs prevention and treatment is crucial for all health care providers. Several studies documented that PUs prevention programs have significant decline in the occurrence of decubitus ulcer and the duration for treatment<sup>(27, 28)</sup>. Enriched nurses' knowledge on PU prevention and treatment improves patient's outcomes in terms of decreased pain level and human suffering, as well as reduced stay of hospital<sup>(29)</sup>. Although evidence-based strategies for PUs prevention have been established and maintained globally, the problem is still extensively common in health care facilities all over the world<sup>(20, 21)</sup>.

Because pressure sores are greatly preventable, the health care providers particularly, gerontological and medical surgical nurses play important roles through providing appropriate nursing care, monitoring, and treatment in order to reducing its development. Nevertheless, nursing care among hospitalized geriatric patients is lacking in PUs risk assessment, and documentation, as well as it is ineffective in applying the PUs prevention and treatment guidelines<sup>(30)</sup>. Additionally, researches on nurses' knowledge, practices, and attitudes regarding PUs prevention protocols among older population in Egypt is scattered, and inconsistent, as well as it is not considering the ageing changes that place older adults at great threat to develop PUs. Therefore, there is a growing need to identify the effectiveness of pressure sores nursing interventions on nurses' knowledge, practices, attitude among hospitalized geriatric patients.

## **II. Material And Methods**

**1- Aim of the Study :** The aim of this research is to evaluate the effect of preventive pressure ulcers nursing interventions on knowledge, attitudes, and practices of nurses caring hospitalized geriatric patients in Alexandria, Egypt.

**2-Research Hypotheses :**To fulfill the aim of the study, the following research hypotheses were tested:

H1: The total mean score of post-test PUs preventive knowledge of the studied nurses will be exhibited significantly improvement higher than total mean score of pre-test knowledge concerning PUs prevention.

H2: The total mean score of post-test PUs preventive practices of the studied nurses will be exhibited significantly improvement higher than total mean score of pre-test practices concerning PUs prevention.

H3: The total mean score of post-test nurses' attitudes toward PUs prevention will be exhibited significantly improvement higher than total mean score of pre-test nurses' attitude toward prevention of pressure ulcers.

**3-Research Design:** The study followed a pre-experimental research design (one group pre-test post-test).

**4- Settings:**The study was carried out in Medical-Surgical Units and Intensive Care Units at the Main University Hospital, which are the largest university hospital in Alexandria, and in orthopedic wards at El Hadara hospital in Alexandria. Selection of these settings was based on patients' hospital stay length, increased numbers of elderly patients in that settings, and these hospitalized patients had various risk factors to develop PUs as immobility, altered level of consciousness in conjunction with a longer hospital stay. All of that factors increased the vulnerability for the direct contact of studied nurses to PUs cases.

**5-Subjects:** Forty nurses were recruited into this study who were male and female nurses, aged from 21-60 years, had a full time work, had roles and responsibilities concerned with direct geriatric patient care, and had working experience for at least 6 months on that units, and approved to participate in this research. Every nurse who fulfill the previously mentioned criteria were included in the present study.

**6- TOOLS:** Five tools were used to collect the necessary data:

**Tool 1: Nurses' Socio-Demographic Structured Interview Schedule:** It was established by the researchers built upon related literature. It consisted of 7 items to assess the subjects' demographic data including age, gender, level of education, previous formal training regarding decubitus ulcers preventive measures, current areas of practice, and their work experience length in that setting.

**Tool II: Structured Nurses' Knowledge Pressure Ulcers Prevention Questionnaire :** It was utilized to measure the nurses' knowledge concerning PUs prevention. It comprised of 29 items which had been established by the researchers concerning pressure sores preventive guidelines by Islam 2010 <sup>(4)</sup>. These items covered knowledge regarding PUs; stages of pressure sores, risk assessment, and contributing factors for developing PUs, preventive, and curative measures in order to reduce pressure sores among hospitalized geriatric patients. The total score extended from 0-29. Every accurate response was yielded the score of one and the wrong or I do not know responses were yielded the score of zero. The higher scores indicated the higher level of knowledge. Total score is 29 (100%), score % = (the observed score / the maximum score) x 100. Then, score % was transferred into three classes as:

- Low: Score < 34%
- Moderate: Score 34% - <67%
- High: Score % ≥ 68%

**Tool III: Nurses' Preventive Practices Observational Checklist for Elders' Pressure Ulcers :** This observational checklist comprised of 22 items which had been established by the examiners guided by pressure sores preventive guidelines by Islam 2010 <sup>(4)</sup>. This checklist used a three point Likert rating scale, ranged from 0 (never) to 2 (always). The observational checklist including factors of pressure sores development, risk assessment, PUs preventive methods such as skin care, and proper nutrition to maintain healthy skin, guidelines for managing mechanical loads, and nurses' educational guidelines for patient, family regarding PUs. The possible scores ranged from 22-66. These scores were then converted into a percentage. The higher scores indicated the higher practices level. The total score was classified into three sets as:

- Poor: Score < 34%
- Satisfactory: Score 34% - <67%
- Good: Score % ≥ 68%

**Tool IV: Nurses' Attitude Scale toward Pressure Ulcers Prevention among Geriatric Patients:** This scale consisted of 24-items structured questionnaire established by the investigators. It involved two sections; the first section was adopted from Pressure Ulcers Attitude Questionnaire (PUAQ) <sup>(30)</sup>, and pressure sores' preventive guidelines by Islam (2010) <sup>(4)</sup> in order to evaluate nurses' attitude toward PUs prevention. It comprised of 16 questions. The second section involved 8 questions from 17 to 24 adopted from Kogan attitudes toward old people scale <sup>(31)</sup>. The responses evaluated by using five point Likert scale ranging from (1) strongly disagree to

(5) strongly agree. The total scores ranged from 24 to 120. The lower scores showed negative attitude toward pressure sores. Overall attitude scores were classified into three classes as:

- Negative < 71.70%
- Neutral 71.70% - 84.92%
- Positive > 84.92%

**Tool V: Nurses' Perceived Barriers of Pressure Ulcers Prevention Scale** : This scale consisted of 14 possible perceived barriers encountered the nurses which had been adapted from Etafa et al (2018) <sup>(24)</sup>. Nurses showed their agreement with these barriers using two-point Likert Scale which ranged from (1) disagree to (2) agree. The total scores ranged from 14 to 70. The lower score indicated the lower perceived barriers to implement PUs preventive nursing interventions.

### **Method**

#### **A- Preparation phase:**

- An official letter was issued from the Faculty of Nursing, Alexandria University, and sent to the director of the study settings to acquire their approval to perform this research. Then, the consent from responsible authorities was attained after clarifying the aim of the study to achieve their support and cooperation during the application of the study interventions. Then, the study tools were developed after a comprehensive relevant literature review.

-The study instruments were measured for internal reliability using Cronbach's alpha correlation coefficient. The results proved that tools were reliable with a correlative coefficient 0.716, 0.761, 0.760, 0.749 for tools II, III, IV, and tool V respectively. Arabic versions of the all instruments were utilized in this study. Tools' content validity ascertained by jury expertise from nursing staff members.

-A pilot study was conducted before embarking on the actual study to ensure the applicability, and clarity of the all study scales and to determine the time which needed in order to finish the questionnaire of this study. It was carried out on 5 nurses (10%) who were excluded from the study. In the light of the findings of the pilot study, modifications are done accordingly.

-The educative nursing interventions were established by the investigators after reviewing the related literature. PUs education program has been guided by National Institute of health and Care Excellence's (NICE) guidelines of PUs prevention and management (2014) <sup>(31)</sup>, and NICE pathway for pressure sores (2017) <sup>(32)</sup>. The investigators integrated the concepts to equip the nurses by the needed skills and knowledge such as: PUs definition, causes of aggregating the PUs development risk among the hospitalized geriatric patients, most areas which affected, stages, complications, the nursing role in treating and preventing PUs as providing skin assessment, risk assessment, providing the aged patients with adequate nutrition, eliminating shearing forces that contribute to PUs development. Also, the program encompassed particular session about the negative attitudes toward older adults and its effects on elders' care.

- An illustrated educational booklet guide namely "nursing interventions for pressure sores prevention among hospitalized older adults" was established by the investigators

#### **B- Implementation and evaluation phase:**

-The researchers started by introducing themselves, and explaining the aim of this research. Then, the researchers ensured that the place where the sessions had conducted is calm, with adequate lighting, well arranged, and comfortable. As well, every study subject was interviewed individually by the investigators, and to keep contact with them, the researchers registered their phone numbers, and gave them a written reminder with the time and date of the next session. Further, tools filling took about 30-45 minutes, and nurses were observed by the researchers during the night, evening and morning shifts. The program comprised of four sessions that implemented within 4 days per 2 weeks. The educational preventive interventions covered 2 hours per week. Data took two phases to be collected; the first phase was conducted prior conducting the program when investigators attained the baseline data regarding subjects' PUs knowledge, attitude, practices toward pressure sores, as well as PUs prevention perceived barriers. The second phase of assessment was done post-interventions to evaluate the effect of the preventive nursing interventions by using tools II, III, and IV in order to assess the studied subjects' knowledge, attitude, practices, and perceived barriers related to PUs prevention

- Before starting the program, the educational booklet guide for each nurse was given to help them to understand and remember all the program information, and skills. During sessions, the illustrative posters in conjunction with videos were used by the investigators in order to clarify knowledge, and skills which required in the PUs prevention such as turning the patient correctly and putting pillows under patient's leg. As well, the researchers encouraged the nurses to share their own experiences and feedback in all sessions. Before starting a new session, a summary of the previous session was given to revitalize subjects' information. Then, the subjects were asked questions related to the program to identify their level of understanding, and the missed or unclear points were re-emphasized by the examiners. At the end of each session, the researchers used to review the most

significant themes in each session. Data collection started in June 2019 and ended by the end of September 2019.

**Ethical considerations:** To implement the present study, the necessary official approvals were attained from the directors of the hospitals. Written informed consents were held from all the studied subjects to join after clarifying to them the aim, and objectives of this study. The investigators were assured from subjects' voluntary participation, privacy, and confidentiality in this study as well.

**Statistical analysis of the data :**Data were coded by the researchers and statistically analyzed via IBM SPSS software package version 20.0. The data was checked for correction of any errors during data entry. Cronbach's alpha correlation coefficient was utilized to measure the study's tools for internal reliability The range, total mean, and standard deviation were used to describe the quantitative data. The number and percent were utilized to describe the qualitative data as well. The results significance which attained was mediated at the 5% level. The used tests were McNemar and marginal homogeneity test which used to analyze the significance between the different stages. As well, paired t-test was used for normally distributed quantitative variables to compare between two periods. Additionally, Pearson correlation coefficient (r) was used to correlate between two normally distributed quantitative variables. Further, Pearson coefficient analysis (r) was used to test the nature of the relationship between nursing practice, knowledge and their attitudes. Student t-test was also utilized for normally distributed quantitative variables to compare between two studied groups. Moreover, F-test (ANOVA) was utilized for normally distributed quantitative variables to compare between more than two groups. Reliability statistics was assessed using Cronbach's Alpha test.

### III. Results

**Table (1)** revealed that nearly two-thirds of the study sample (60%) was females. The studied nurses aged between 21 to 30 of years constituted 55% of the total sample. More than one third of the study nurses were bachelor graduates (37.5%), whereas the least percentage were nurses with master degree and accounted for 10%. More than two-fifths (42.5%) of the study nurses had less than 5 years of experience whereas the lowest percentage (7.5%) of them had 20 years of experience. More than one half of the study subjects worked at ICU (52.5%). All of the study nurses had no previous attendance to training programs about PUs.

**Table (2)** illustrated that all of the study nurses stated that shortage of the staff, shortage of the available recourses, lack of written standards particularly, for PUs prevention, lack of nurses' independence in clinical decision making were the major barriers to preventing PUs among hospitalized geriatric patients. The majority (97.5%) of the study subjects also perceived PUs barriers as poor access to read PUs literature, heavy work load, Lack of in-service training on PUs prevention and Lack of multidisciplinary initiative respectively. While, the response of uncooperative geriatric patients was reported by 82.5% of the study subjects as perceived barriers to carry out pressure sores preventive interventions among hospitalized geriatric patients.

**Table (3)** revealed that prior the application of the study interventions; three quarter of the study subjects had a poor level of knowledge regarding PUs and its prevention among older adults. Post the study interventions, all of the study subjects had a high level of PUs knowledge. The total mean post-test PUs knowledge score ( $26.92 \pm 1.40$ ) is significantly higher than pre-test knowledge score ( $10.68 \pm 4.05$ ) among the study nurses ( $P < 0.001$ )

**Table (1):** Distribution of the study subjects according to their socio-demographic characteristics (n = 40)

Socio-demographic Characteristics of the study subjects	No.	%
<b>Sex</b>	16	40.0
Male	21	60.0
Female		
<b>Age</b>	22	55.0
21 – 30	8	20.0
31 – 40	9	22.5
41 – 50	1	2.5
51 – 60		
<b>Education</b>	9	22.5
Secondary school	15	37.5
Bachelor degree	12	30.0
Diploma of nursing	4	10.0
Master degree of nursing		

<b>Years of practices</b>	17	42.5
Less than five years	12	30.0
5 to less than 10 years	8	20.0
10 to less than 20 years	3	7.5
20 to more		
<b>Unit</b>	21	52.5
ICU	13	32.5
Medical surgical unit	6	15.0
Orthopedic unit		
<b>Have you receive any formal training on PUs</b>	40	100.0
No	0	0.0
Yes		

**Table (2):**Distribution of the study subjects according to their perceived barriers to carry out pressure ulcer prevention (n = 40)

Perceived barriers to carrying out pressure ulcer prevention*	Disagree		Agree	
	No.	%	No.	%
Poor access to literature and reading facilities about PUs	1	2.5	39	97.5
Heavy workload	1	2.5	39	97.5
Shortage of nursing staff	0	0	40	100
Lack of in-service training on pressure ulcer prevention	1	2.5	39	97.5
Uncooperative patients	7	17.5	33	82.5
Presence of other priorities than pressure ulcer	5	12.5	35	87.5
Shortage of resources	0	0.0	40	100
Lack of multidisciplinary initiative	1	2.5	39	97.5
Overcrowding in the wards	0	0.0	40	100
Lack of written standards for pressure ulcer prevention	0	0.0	40	100
Poor knowledge of an existent assessment tool	2	5	38	95
Lack of nurses' independence in clinical decision making	0	0.0	40	100
No commitment to pressure ulcer prevention by hospital management	2	5	38	95
I do not have any challenge	10	25	30	75

\*More than one answer

**Table (3):**Effect of preventive pressure ulcer educative nursing interventions on Nurses' Knowledge

Knowledge	Phases of the study interventions				p
	Pre the interventions		Post the interventions		
	No	%	No	%	
Low(0 - 9)	30	75.0	0	0.0	McN <sub>p</sub> <0.001*
Moderate(10 - 19)	10	25.0	0	0.0	
High(20 - 29)	0	0.0	40	100.0	
<b>Total score</b>					t <sub>p</sub> <0.001*
Mean ± SD	10.68 ± 4.05		26.92 ± 1.40		
% score					
Mean ± SD	36.81 ± 13.96		92.84 ± 4.84		

t: Paired t-test      McN: McNemar testp: p value for comparing between Pre the interventions and Immediately post the interventions\*: Statistically significant at p ≤ 0.05

**Table (4)** showed that 65.0 % of the study nurses had poor level of PUs preventive practices prior the application of the study interventions. More than two thirds (70 %) of the study subjects have a good level of practice post the study interventions. The total mean post-test PUs preventive practices score (30.60 ± 9.70) is significantly higher than pre-test PUs preventive practices score (11.70 ± 6.51) concerning prevention of pressure sores among the studied nurses (P=<0.001).

**Table (4):** Effect of preventive pressure ulcer nursing interventions on study nurses' practices .

Practices	Phases of the study interventions				p
	Pre the interventions		Post the interventions		
	No	%	No	%	
Poor (0 - 14)	26	65.0	2	5.0	MH <sub>p</sub> = <0.001*
Satisfactory (15 - 29)	14	35.0	10	25.0	
Good (30 - 44)	0	0.0	28	70.0	
<b>Total score</b>					

Mean ± SD	11.70 ± 6.51	30.60 ± 9.70	p= <0.001*
<b>% score</b>			
Mean ± SD	26.59 ± 14.79	69.55 ± 22.04	

t: Paired t-test McN: McNemar test: p value for comparing between Pre the interventions and immediately post the interventions\*: Statistically significant at p ≤ 0.05

Table (5) displayed that prior the application of the study interventions; More than two thirds (67.5%) of the study subjects had a negative attitude toward older adults, and PUs prevention and. Post the study interventions; 77.5 % of the study nurses had a good attitude scores towards PUs prevention and older adults. The total mean post-test attitude score (91.83 ± 11.54) is significantly higher than pre-test attitude score (66.63 ± 7.08) among the study nurses (P=<0.001).

Table (5): Effect of preventive pressure ulcer nursing interventions on study nurses' attitude

The study subjects' attitude	Phases of the study interventions				p
	Pre the interventions		Immediately post the interventions		
	No	%	No	%	
Negative (24 - 56)	27	67.5	0	0.0	MH p<0.001*
Neutral (57 - 88)	13	32.5	9	22.5	
Positive (89 - 120)	0	0.0	31	77.5	
<b>Total score</b>					
Mean ± SD	66.63 ± 7.08		91.83 ± 11.54		p<0.001*
<b>% score</b>					
Mean ± SD	44.40 ± 7.38		70.65 ± 12.03		

t: Paired t-test MH: Marginal Homogeneity Test  
p: p value for comparing between Pre the interventions and Immediately post the interventions  
\*: Statistically significant at p ≤ 0.05

Table (6) showed that the total mean score of the female nurses' knowledge was higher than the male nurses before (94.11 ± 3.29) and after (40.23 ± 14.79) the application of the study interventions. The difference is statistically significance. Concerning the educational level of the study subjects, the total mean score of knowledge of those who are highly educated (master and Bachelor degree) was higher than the other 2 categories. A significant relation was found between the level of education of the study nurses and their knowledge before (P=0.002) and after the execution of the study interventions (P=0.006).

Table (6): The relation between the study nurses' knowledge and their socio demographic data.

Socio demographic data	knowledge	
	Pre the interventions	Immediately post the interventions
	Mean ± SD.	Mean ± SD.
<b>Sex</b>		
Male	90.95 ± 6.15	31.68 ± 11.14
Female	94.11 ± 3.29	40.23 ± 14.79
<b>t(p)</b>	1.083(0.034*)	2.081*(0.044*)
<b>Age</b>		
21 – 30	32.13 ± 11.77	91.85 ± 5.38
31 – 40	53.88 ± 9.57	94.40 ± 4.10
41 – 50	34.10 ± 11.62	93.49 ± 4.02
51 – 60	27.59	96.55
<b>F(p)</b>	7.678*(<0.001*)	0.822(0.490)
<b>Education</b>		
Secondary school	29.60 ± 12.60	90.72 ± 6.49
Diploma of nursing	31.03 ± 8.27	91.49 ± 2.70
Bachelor degree	41.15 ± 13.94	93.10 ± 4.41
Master degree of nursing	55.17 ± 2.82	94.83 ± 1.99
<b>F(p)</b>	6.085*(0.002*)	3.944*(0.006*)
<b>Years of experience</b>		
Less than five years	30.83 ± 11.27	91.48 ± 5.60
5 to less than 10 years	47.99 ± 12.94	93.68 ± 5.06
10 to less than 20 years	33.19 ± 12.63	93.97 ± 3.06
20 to more	35.63 ± 13.94	94.25 ± 1.99
<b>F(p)</b>	4.944*(0.006*)	0.784(0.511)

t: Student t-test F: F for ANOVA test  
p: p value for comparing between the different categories \*: Statistically significant at p ≤ 0.05

**Table (7)** depicted that the total mean score of PUs preventive practices of those who are highly educated (master and beholder degree) is higher than the other 2 categories. A significant relation was found between the level of education of the study nurses and their practice before ( $F= 3.554, P=0.024$ ) and after the insertion of the study interventions ( $F= 2.585, P=0.068$ ). With reference to the years of the experience of the study subjects, the total mean score of PUs preventive practices for those who worked from 10 years to less than 20 years is higher than other categories. A significant relation was found between the years of experience of the study nurses and their PUs preventive practices before ( $F= 5.345, P=0.004$ ) and after the inserting the study interventions ( $F= 4.653, P=0.029$ ).

**Table (8)** illustrated that a significant relation is found between knowledge and practices of the study subjects, pre the study interventions (Pearson correlation coefficient = 0.467,  $P =0.002$ ). After the application of the interventions, knowledge and practices are correlated and the relation is statistically significant (Pearson correlation coefficient = 0.763,  $P = 0.001$ ). A significant relation was found between attitude and practices of the study subjects, pre the study interventions (Pearson correlation coefficient = 0.367,  $P =0.020$ ). After the application of the interventions, attitude and practices are correlated and the relation was statistically significant (Pearson correlation coefficient = 0.685,  $P <0.001$ ). A significant relation was found between Perceived barriers to carrying out pressure sores prevention and the study nurses' practice (Pearson correlation coefficient = -.0523,  $P <0.001$ )

**Table (7):** The relation between study nurses' practices and their socio demographic data

Socio demographic data	Self-care practices	
	Pre the interventions	Immediately post the interventions
	Mean ± SD.	Mean ± SD.
<b>Sex</b>		
Male	22.30 ± 13.18	66.00 ± 23.30
Female	29.45 ± 15.38	74.86 ± 19.51
<b>t(p)</b>	1.523 (0.136)	1.300(0.202)
<b>Age</b>		
21 – 30	21.28 ± 12.85	68.29 ± 23.81
31 – 40	36.36 ± 12.74	62.50 ± 24.66
41 – 50	32.07 ± 16.45	77.02 ± 13.98
51 – 60	15.91	86.36
<b>F(p)</b>	3.137 <sup>*</sup> (0.037 <sup>*</sup> )	0.824(0.489)
<b>Education</b>		
Secondary school	18.18 ± 9.51	50.00 ± 21.32
Diploma of nursing	22.35 ± 14.69	64.39 ± 26.58
Bachelor degree	31.36 ± 14.66	71.21 ± 21.21
Master degree of nursing	40.34 ± 12.64	82.32 ± 4.37
<b>F(p)</b>	3.554 <sup>*</sup> (0.024 <sup>*</sup> )	2.585 <sup>*</sup> (0.068 <sup>*</sup> )
<b>Years of experience</b>		
Less than five years	20.19 ± 12.18	65.53 ± 23.30
5 to less than 10 years	23.58 ± 14.52	69.12 ± 23.70
10 to less than 20 years	38.83 ± 13.16	85.61 ± 3.47
20 to more	21.97 ± 8.60	70.45 ± 20.65
<b>F(p)</b>	5.345 <sup>*</sup> (0.004 <sup>*</sup> )	4.653 <sup>*</sup> (0.029 <sup>*</sup> )

t: Student t-test

F: F for ANOVA test

p: p value for comparing between the different categories\*: Statistically significant at  $p \leq 0.05$

**Table (8):** Correlation between nurses' knowledge, practices and attitude pre and post the implementation of the study interventions

	Phases of the study interventions	Self-care practices	
		r	p
<b>Knowledge</b>	Pre the interventions	0.467 <sup>*</sup>	0.002 <sup>*</sup>
	Immediately after the interventions	0.763 <sup>*</sup>	0.001 <sup>*</sup>
<b>Attitude</b>	Pre the interventions	0.367 <sup>*</sup>	0.020 <sup>*</sup>
	Immediately after the interventions	0.685 <sup>*</sup>	<0.001 <sup>*</sup>
<b>Perceived barriers to carrying out pressure ulcer prevention</b>	Pre the interventions	-0.523 <sup>*</sup>	<0.001 <sup>*</sup>

\*: Statistically significant at  $p \leq 0.05$  r: Pearson coefficient

#### **IV. Discussion**

Pressure sores is still the chief consequence of lengthy hospitalization particularly among seniors <sup>(11)</sup>. The presence or absence of PUs has been generally regarded as a performance measure of quality nursing care and overall patient health <sup>(18)</sup>. Although, a multidisciplinary team approach plays a key role in the prevention of pressure sores, nurses remain at the cornerstone in this aspect <sup>(33)</sup>. Clay found that PUs prevention and management is beneficial not only to patients but also to the health care system, so education for healthcare professionals is an important factor in the prevention and management of pressure sores <sup>(34)</sup>. In this respect, this study aimed to improve the nurses' knowledge, attitude and practice towards the prevention and management of PUs among the hospitalized geriatric patients. Findings of the present study indicated that the majority of the study nurses aged between 20 to 30 years old. This might be due to almost of nurses were newly graduates. Supporting to these findings, studies done by Hefnawy and Abd El-Monem 2017 <sup>(35)</sup> in Saudi Arabia, Abou El Enein and Zaghoul <sup>(36)</sup>, Egypt 2011, Taha 2014 <sup>(37)</sup>, which stated the same age distribution of their study nurses. The present study revealed that the majority of the study participants had experience  $\leq 5$  years. In agreement with Hefnawy and Abd El-Monem 2017 <sup>(35)</sup> in Saudi Arabia, Abou El Enein and Zaghoul <sup>(36)</sup>. These findings give a prediction of low knowledge and practice of nurses regarding pressure sores management before the program. Supported by Seloma 2003 <sup>(38)</sup> who reported that more the years of working in ICUs and years of experience the higher efficiency of nurses' clinical practices. As years of experience were positively correlated to their knowledge and performance.

The results of the present study revealed that the majority of the study nurses had a low level of knowledge, before the application of the study program. This may be due to that, more than half of nurses in the age group of 20 to less than 30 years old, almost half of them had less than 5 year of experience and all of them didn't attend any training program about PUs prevention. Furthermore, there were several barriers that hinder the nursing care as shortage of nursing staff, heavy workload, lack of knowledge regarding risk Assessment Scale (RAS), and lack of pressure sores preventing devices. This is in accordance with Habiballah 2018 <sup>(39)</sup> and Tubaishat and Aljezawi 2014<sup>(40)</sup> who illustrated that nursing experience had a positive effect on nurses' knowledge, practices. Also, a study done in Belgian 2011 <sup>(41)</sup> indicated that knowledge of nurses about the prevention of pressure sores was low. Another study done in Jordan showed that the majority of nurses had inadequate knowledge about pressure sores prevention <sup>(42)</sup>. Another study done in Egypt 2014 revealed that the nurses had a poor knowledge throughout all of the departments under study in relation to risk assessment, skin care and management for mechanical loads <sup>(43)</sup>

Additionally, after the application of study interventions, the total mean score of knowledge of the studied nurses were improved and significantly higher than before the application of the study program. These improvements in total mean score the levels of is in agreement with Habiballah 2018 <sup>(39)</sup> who also evidenced that receiving training on PUs were the most influential on the nurses' performance. Similarly, Källman and Suserud, 2009 <sup>(44)</sup> and Nuru et al 2015 <sup>(45)</sup> clarified that nurses who took formal training on PUs were found to have good knowledge than those who had not. Also, Miyazaki et al 2010 <sup>(46)</sup> highlighted that the professional nurse who read articles or attend lectures on relevant theme had significantly higher level of knowledge. According to an international literature, it has been identified that nurses' knowledge of the prevention of pressure sores is poor, which is reflected in their practices as they do not comply with best practice guidelines <sup>(47)</sup>. Findings of the present study proved that and it showed that the majority of nurses who participated in this study had unsatisfactory practice level regarding PU prevention and management prior to the application of the study interventions. This in agreement with a study done by Taha 2014 <sup>(37)</sup> who found that more than half of nurses had poor practice regarding pressure sores management. Educational programs can bridge the gap between health information and health practices which could empower the gerontological and medical surgical nurses with the needed skills. The current study showed that the nurses' practice regarding pressure sores were improved after implementing of the program. Furthermore, the total mean score of practice of the studied nurses were significantly higher than before the application of the study program. Also this finding is congruent with a study conducted in Sweden on nurses' knowledge and practice of the current guidelines on prevention of pressure sores found that, most of them had inadequate knowledge and practice to implement guidelines <sup>(48)</sup>

The results of the present study revealed that the majority of the study subjects had a negative attitude toward PUs prevention and toward older adults before the application of the study interventions. Contrary to this a study in Iraq showed that the attitude of nurses towards bed sore prevention practice was 99% positive <sup>(7)</sup>. This may be due to that the majority of this study nurses had a less than five years of work experience. The absence of PUs guidelines could affect the neutral attitude shown. Knowledge influences the attitude, and the majority of the study participants had a low level of knowledge prior the study interventions. More than three quarters of the present study nurses had a high level of attitude scores towards PUs prevention and toward older adults post the study interventions. Similarly, in a study conducted in Swedish health care settings to assess knowledge, attitude and practice of nursing staff on pressure sores prevention; nurses who had training were more knowledgeable than those who did not <sup>(44)</sup>. This might be due to the fact that training increases the chance of the trainees to get

up to date information about pressure sores related preventions. In addition to that, knowledge can change a negative attitude towards positive attitude.

So, it isn't surprising that, the present study revealed that there was statistical significant positive relation between nursing knowledge, attitude and practice. This result is supported by, Pancorbo-Hidalgo et al., 2007<sup>(49)</sup> who highlighted the same relation between knowledge and practice of the studied nurses. Other studies found that inadequate practice was related to inadequate knowledge done by Halfens and Eggink 1995<sup>(50)</sup>, Fishbein and Ajzen 2005<sup>(51)</sup> explicated that attitude is learned and is affected by knowledge. The present study finding is contradicted by Moore and Patricia 2004<sup>(30)</sup> showed that nurses' positive attitudes were negatively correlated with nurses' practice. This may be due to preventive practices were demonstrated to be haphazard and erratic and were negatively affected by lack of time and staff. These barriers prevented their studied nurses' positive attitude from being reflected into effective clinical practice. Education, although poorly accessed, or made available, was rarely cited as impeding practice in this area. The present study revealed that significant relation between socio demographic data and knowledge and attitude where higher total mean difference found in female, age group (30-41), higher education, and more than 20 year of experience. This finding is in the same line with, Kaddourah et al 2016<sup>(7)</sup>, who highlight those younger age group participants significantly have higher total mean percent scores of knowledge than older age group. Furthermore, Rodgers 2000<sup>(52)</sup>, found that nursing knowledge on PU and treatment were known to be affected by certain individual and educational characteristics. This is contradicted by a study done Pieper and Mattern 1997 which revealed no association between educational level and knowledge<sup>(53)</sup>.

According to the results of the present study, the proposed hypotheses were confirmed and proven. The findings of this study can be baseline for nurses and health care professionals. Pressure injuries are recognized as an international patient safety problem they increase morbidity and mortality. So the study was done to improve the nurse's knowledge, practices and attitudes toward the prevention of PUs among hospitalized geriatric patients. The outcomes of this study will provide baseline data for nursing directors, head nurses and other higher authorities to plan for an initiation for staff development in order to improve quality of care provided for the geriatric patients. And to acknowledge the routine use and regular revision of pressure ulcer risk assessment sheet should be emphasized, barriers in relation to the application of pressure ulcer preventive measures should be addressed on routine basis to achieve a change in practice.

## V. Conclusion

Based on the findings of the present study, it can be concluded that preventive pressure sores nursing interventions had a positive significant effect on the knowledge, practice and attitude of the studied nurses among hospitalized geriatric patients. Most pressure sores can be prevented. Following simple steps that are based on best practice, the health professional can team up with the patient and other caregivers to create an environment where pressure sores are reduced or eliminated. Although there was an improvement in the level of knowledge, practice and attitude regarding pressure sores prevention of the study subjects post the implementations of the educative program, the lack of proper policies and guidelines, lack of evidence based practice and lack of in-service training made it difficult for nurses to exercise their knowledge.

## References

- [1]. Gadallah M. Draft Country Profile on Ageing: Egyptian Case Study. 2016; Available at: <http://www.un.org/esa/socdev/ageing/documents/workshops/Vienna/egypt.pdf>. Retrieved on 10/7/2018.
- [2]. Central Intelligence Agency. Egypt Demographics Profile.2018; Available at: [https://www.indexmundi.com/egypt/demographics\\_profile.html](https://www.indexmundi.com/egypt/demographics_profile.html) Retrieved on 12/7/2018.
- [3]. National institute of aging. Why population aging matters: global perspective. 2017; Available at: <https://www.nia.nih.gov/sites/default/files/2017-06/WPAM.pdf>. Retrieved on 11/9/2018.
- [4]. Islam S .Nurses' Knowledge, Attitude, and Practice Regarding Pressure sores Prevention for Hospitalized Patients at Rajshahi Medical College Hospital in Bangladesh . Published master thesis of Nursing Science. Prince of Songkla University. 2010.
- [5]. Boyko T, Longaker M, and Yang G. Review of the Current Management of Pressure sores .Journal of Advanced Wound Care (New Rochelle). 2018; 7(2): 57–67.
- [6]. Fletcher J, and Hall J .New guidance on how to define and measure pressure sores. Nursing Times.2018; 114: 10, 41-44.
- [7]. Kaddourah B, Abu-Shaheen A, and Al-Tannir M. Knowledge and attitudes of health professionals towards pressure sores at a rehabilitation hospital: a cross-sectional study. BioMedical central journal. 2016; 15(1):1–6.
- [8]. The National Pressure sores Advisory Panel (NPUAP) .Available at: <http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages>. Retrieved on 9/11/2018.
- [9]. European Pressure sores Advisory Panel (EPUAP). Available at: [www.epuap.org](http://www.epuap.org). Retrieved on 9/11/2018.
- [10]. Fillit M, Rockwood K, and Young J. Brocklehurst's text book of geriatric medicine and gerontology. 8th ed., Philadelphia: Elsevier Co., 2017; 747-57.
- [11]. Williams P. Basic geriatric nursing .6th ed., 2016. UK: Elsevier Co., 312-40.
- [12]. Thomas D, and Compton G. pressure sores in the aging population: A guide for clinicians (Aging medicine). USA: Human Press Co., 20-35.
- [13]. Brownie S. Why are elderly individuals at risk of nutritional deficiency? International Journal of Nursing Practice. 2006; 12 (2):110–8. The development of pressure sores is a very complex phenomenon and contributing factors can be related both to the patient's condition and to extrinsic factors

- [14]. Kimberly C, Cheryl H, Polly J, Michelle M, Molly M, and Misty O. PUPPI: The Pressure sores Prevention Protocol Interventions. *American Journal of Nursing*. 2007; 107(4):44–52.
- [15]. Gedamu H, Hailu M, and Amamo A: Prevalence and associated factors of pressure sores among hospitalized patients at Felegehiwot Referral Hospital, Bahir Dar, Ethiopia. *Advances in nursing journal* .2014:1-8.
- [16]. Rengin A, and Merdiye S. Pressure sores prevention and management strategies in Turkey. *Journal of Wound Ostomy and Continence Nursing*. 2005; 32 (4):230–7
- [17]. Lewis L, Bucher L. *Medical-Surgical Nursing: Assessment and Management of Clinical Problems*, 9th ed., Philadelphia: Elsevier Co., 2014; 172-87.
- [18]. Romanelli M, Clark M, Gefen A, Ciprandi G. *Science and Practice of Pressure sores Management* 2nd ed., London : Springer-verlag Co., 2018 ; 283-300.
- [19]. Jaul E. Assessment and Management of Pressure sores in the Elderly. *Journal of Drugs and Aging*. 2015; 27(4):311-25.
- [20]. Gorecki C, Brown J , Nelson A, Briggs M, Schoonhoven L Dealey C, Defloor T, and Nixon J. Impact of Pressure sores on Quality of Life in Older Patients: A Systematic Review on behalf of the European Quality of Life Pressure sores Project group. *Journal of American geriatric society*. 2009; 57(7):1175–83.
- [21]. Better health channel .Pressure sores. Available at: <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/pressure-sores?viewAsPdf=true>. Retrieved on 12/1/2019.
- [22]. Norton L, Parslow N, Johnston D, Ho S, Afalavi A, Mark M, O’Sullivan-Drombolis D and Moffat S. Best practice recommendations for the Prevention and Management of Pressure Injuries 2018. Canadian Association of Wound Care. Available at: <https://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/172-bpr-prevention-and-management-of-pressure-injuries-2/file>. Retrieved on 31/1/2019.
- [23]. -Rasero L, Simonetti M, Falciani F, Fabbri C, Collini F, and Dal Molin A. Pressure sores in Older Adults: A Prevalence Study. *Advanced Skin Wound Care journal*. 2015; 28 (10):461-4.
- [24]. Etafa W , Argaw Z, Gemechu E, and Melese B. Nurses’ attitude and perceived barriers to pressure sores prevention. *BioMedical Central Nursing Journal*. 2018; 17: 14.
- [25]. Kavlak Y, Yildiz S, and Tug O. Nurses’ Attitudes towards Older People: Report from a Single Institution Study. *International Journal of Physical Medicine and Rehabilitation* 2015; 3(5): 1-6.
- [26]. Kydd A, and Wild D. Attitudes towards caring for older people: Literature review and methodology. *Journal of nursing older people*. 2013; 25 (3):22-27
- [27]. Chamanga, E. Improving pressure sores care. *Journal of Community Nursing*. 2011; 25 (4):16-21.
- [28]. Reddy M, Gill S.S, and Rochon P.A. Preventing pressure sores: A systematic review. *Journal of American Medical Association* 2006; 29(6): 974-84
- [29]. Smith D, and Waugh S. Research study: an assessment of registered nurses’ knowledge of pressure sores prevention and treatment. *The Kansas Nurse journal* .2009; 84(1): 3-5.
- [30]. Moore Z, and Patricia I. Nurses’ attitudes, behaviors and perceived barriers towards pressure sores prevention. *Journal of clinical nursing*. 2004; 13(8):942-51.
- [31]. Kogan N. Attitudes toward old people: the development of a scale and an examination of correlates. *Journal of Abnormal Psychology*. 1961; 62:44-54.
- [32]. National Institute of health and Care Excellence .Guidelines of pressure sores prevention and management. Available at: <https://www.nice.org.uk/guidance/cg179>. Retrieved on 2/1/2018.
- [33]. 32 - NICE pathway for pressure sores 2017. Available at: <https://pathways.nice.org.uk/pathways/pressure-ulcers>. Retrieved on 12/1/2018
- [34]. Samuriwo R. Pressure sores prevention: the role of the multidisciplinary team. *British journal of nursing*.2012; 21(5):8-21.
- [35]. Clay M. Pressure sore prevention in nursing homes. *Nursing Standard journal*.2000; 14(44), 45-50.
- [36]. Hefnawy G, and Abd El-Monem D. Prevalence of Pressure sores with the Study of the Impact of Pressure sores Educational Program on Registered Nurses’ Knowledge and Practice in Prince Miteb Bin Abdul-Aziz Hospital, Sakaka City, Saudi Arabia . *Journal of Health, Medicine and Nursing*.2017; 43: 106–117.
- [37]. Abou El Enein N, and Zaghoul A. Nurses’ knowledge of prevention and management of pressure sores at a Health Insurance Hospital in Alexandria. *International Journal of Nursing Practice* .2011; 17: 262–68.
- [38]. Taha, S .Nurses knowledge and practices related to pressure sores at intensive care unit. *Journal of International Academic Research for Multidisciplinary*. 2014; 2(2):247-262.
- [39]. Seloma, Y.A. Hemodynamic monitoring: A relationship of Nurses knowledge and practices to patient’s outcome. Unpublished master thesis- surgical nursing, faculty of nursing, Cairo university.2003, 75-84.
- [40]. Habiballah L. Attitudes of intensive care nurses towards pressure sores prevention. *Journal of Clinical Nursing Studies*.2018; 6(3):1-7.
- [41]. Tubaishat A, and Aljezawi M. Exploring Pressure sores Care in Jordan Nurses’ Knowledge and Practice. *Dermatology nursing / Dermatology Nurses’ Association*.2014; 6(3):115-123.
- [42]. Beeckman D, Defloor T, Schoonhoven L, and Vanderwee K. Knowledge and attitudes of nurses on pressure sores prevention: a cross-sectional multicenter study in Belgian hospitals. *Journal of Worldviews Evidence Based Nursing*. 2011; 8(3):166–76.
- [43]. Qaddumi J, and Alkhawaldeh A. Pressure sores prevention knowledge among Jordanian nurses: A cross-sectional study. *BioMedical central journal*. 2014; 13(1):1–8
- [44]. Mohamed S, Weheida S. Effects of implementing educational program about pressure sores control on nurses’ knowledge and safety of immobilized patients. *Journal of Nursing Education and Practice*. 2014; 5(3):12–21
- [45]. Källman, U, and Suserud B. O. Knowledge, attitudes and practice among nursing staff concerning pressure sores prevention and treatment—a survey in a Swedish healthcare setting. *Scandinavian journal of caring sciences*. 2009; 23(2), 334-341.
- [46]. Nuru N, Zewdu F, Amsalu S, and Mehretie Y. Knowledge and practice of nurses towards prevention of pressure sores and associated factors in Gondar University Hospital, Northwest Ethiopia. *BMC nursing*. 2015; 14(1), 34
- [47]. Miyazakil M, Larcher M, and dos Santos B. Knowledge on Pressure sores Prevention among Nursing Professionals. *SciELO Journal*.2010; 18(6):1203-11.
- [48]. Gunningberg L, Lindholm C, Carlsson M, and Sjöden P. Risk. Prevention and treatment of pressure sores—nursing staff knowledge and documentation. *Scandinavian Journal of Caring Science*. 2001; 15(3):257–63.
- [49]. Clark MB, Defloor T: Summary report on the prevalence of pressure sores. EPUAP Review. 2012; 4, 49-57.
- [50]. Pancorbo-Hidalgo P, López-Medina I, García-Fernández F, and López-Ortega J. Pressure sores care in Spain: Nurses’ knowledge and clinical practice. *Journal of Advanced Nursing*. 2007; 58(4):327-38.

- [51]. Halfens R, and Eggink M. Knowledge, beliefs and use of nursing methods in preventing pressure sores in Dutch hospitals. *International Journal of Nursing Studies*. 1995; 32(1):16-26.
- [52]. Fishbein M, and Ajzen I. The influence of attitudes on behavior. In: Albarracín D, Johnson BT, Zanna MP, editors. *The Handbook of Attitudes*: Psychology Press. p. 2005.
- [53]. Rodgers S. E. A study of the utilization of research in practice and the influence of education. *Nurse Education Today journal*. 2000; 20(4), 279Y287.
- [54]. Pieper B, and Mattern JC. Critical care nurses' knowledge of pressure sores prevention, stating and description. *Ostomy/ Wound Manage*. 1997; 43(2):22-31.

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