

Nursing Education, Training and Practice in the Prevention of Ulcers in Adults over 60 Years of Age: A Quasi-Experimental Study

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Abstract: The purpose of this article is to evaluate the effectiveness of the implementation of the methodology of NANDA NIC NOC Nursing, and the effectiveness of the Norton Scale in the prevention of ulcers in patients 60 years or older admitted by the emergency room area in a hospital in Puerto Rico and suggest the implementation of a protocol of a preventive nature on from the professionals in Nursing with the support of relatives and caregivers. Our research was completed applying a quasi-experimental methodology. The population and the sample are two hospitals (Hospital A-Experimental Group and Hospital B-Control Group). For each hospital a sample of 20 nurses (Total 40) and 40 patients (Total 80) were included, for a general total of 120 participants. The design is quasi-experimental. The analysis was performed with SPSS-version 20 for descriptive and inferential statistics. The GE Nursing staff reflected optimal use of the NANDA NIC NOC and Norton Scale methodology for the prevention of PPU in a 24-hour period in patients admitted to the emergency room. The process of documentation of interventions for skin assessment; postural change, examination and skin hygiene and pressure relief device was evident. No development of pressure ulcers was reported in patients with EG. The GC protocol for Staging Ulcer Management integrates valuable information; however, the results show that it is not consistently used by nursing staff to document interventions with patients admitted to the emergency room.

Key-words: Nursing Competencies, Nursing Education; Ulcer Prevention Family; Continuing Education; Nursing Professionals.

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1. Introduction

The development of ulcers in bedridden patients 60 years of age or older, waiting to be treated, has become a serious health problem in emergency rooms. As this can be worse than the disease that leads to a hospital in search of health services.

The study addressed four (4) objectives, which obey the prevailing need to demonstrate in practice the effectiveness of evidence-based nursing interventions to prevent the development of pressure ulcers (PUFA) in patients 60 years or older. The issue has been researched globally for many years; however, the problem continues to present ethical, moral and economic repercussions for hospital institutions as well as the suffering for patients and families. Hibbs (1987) described the effects of pressure ulcers as "an epidemic under the sheets".

Nursing staff are called upon to assess the risk of developing pressure ulcers through an individualized and effective preventive and care plan. Nursing staff has NANDA diagnostics, NIC interventions and NOC results. All this constitutes a fundamental tool to function as a starting point for the establishment of a quality program focused on the improvement of outpatient care, to facilitate teamwork and to allow the objective practice of care.

The objectives of the study include: 1) Analyze if there is a significant difference in the development of pressure ulcers (PPU) among a group of patients 60 years or older admitted to the emergency room area of Hospital A (GE) exposed to the skin assessment intervention based on the NANDA NIC NIC and Norton Scale methodology and another group of patients over 60 years old of Hospital B (GC) exposed to the protocol established at the institution for the care of the skin Ulcer Management by Stages; 2) Analyze if there are significant difference in the development of pressure ulcers (PU) among the patients of the GE whose relatives and / or caregivers receive instructions from the nursing staff on the care of the patient's skin to prevent the development of pressure ulcers (PU) based on the parameters of the NANDA NIC NOC and Norton Scale methodology and the CG patients whose family members and / or caregivers receive instructions from the Nursing staff based on the protocol established by the institution, Management of Stage Ulcers; 3) Analyze if there are significant difference in the development of pressure ulcers (PU) among GE patients exposed to periodic skin titration rounds in intervals of between 2 to 3 hours for a term of 24 hours according to the methodology NAND NIC NOC and the Norton Scale and GC patients exposed to skin titration rounds for a 24-hour term based on the protocol established by the institution for skin care Ulcer Management by Stages; and 4) Analyze the effectiveness of the NANDA NIC NOC Nursing methodology in reducing and preventing development of pressure ulcers (PU) in patients 60 years and older admitted by the emergency

room area of the EG versus the provided Nursing intervention In the Stage Ulcer Management GC.

Four questions were raised following the quasi-experimental design of the study. The first research question addressed the difference in the development of PPU between the SG patients and the CG patients from the assessment construct and skin care plan. The second research question addressed the difference in the development of PPU between the patients of the EG and the patients of the GC from the construct instructions of the nursing staff on the care of the patient's skin to relatives and caregivers. The third question addressed the difference in the development of PPU between the SG patients and the CG patients from the construct exposure to periodic rounds of skin titration. The fourth question was aimed at evaluating the effectiveness of the intervention methodology used with the patients of the EG versus the methodology of intervention used with the patients of the CG in the decrease and prevention of the development of UPP.

The results provide evidence of the effectiveness of the systematic use of the NAND NIC NOC and Norton Scale methodology in the prevention of PU in patients over 60 years old admitted to the emergency room and of the importance of involving family members and caregivers in the interventions from a preventive approach. The results of the study are presented for each question posed and are discussed fundamented on the revised literature on the subject. It summarizes the implications of the results for the hospital and care institutions of people over 60 years of age, higher education institutions (HEIs) that offer Nursing Science preparation programs, family and caregivers, and leaders in charge of Public policy in Puerto Rico.

This study can be replicated in other hospitals and care facilities for elderly people in Puerto Rico and in other countries with the objective of carrying out comparative studies aimed at establishing protocols of nursing interventions based on proven effective methodologies.

2. Methodology

2.1 Instruments and Participants

2.1.1 Instruments

The instruments implemented in our study are presented below followed by the description of their structure and approach concerning data collection. The principal investigator used secondary data collected from Instruments I and II of 40 patients admitted to the emergency room at Hospital A (GE) and 40 patients admitted to the emergency room of Hospital B (GC), respectively, in the period between Wednesday, June 1, 2016 and Friday, July 29, 2016, once approved from the Institutional Review Board of

the Sistema Universitario Ana G. Méndez (IRB-SUAGM, for its acronym in Spanish).

Instrument I. Registry of Skin Assessment and Nursing Interventions by the Professional Nursing Staff of Hospital A (Experimental Group). It collects the information required to assess the effectiveness of the implementation of NANDA, NIC and NOC Nursing methodology, education to family members and / or caregivers as well as the integration of systematic rounds at intervals of between 2 and 3 hours in the reduction and prevention of the development of pressure ulcer (PU) in patients 60 years or older admitted to the emergency room area. Instrument I consists of three (3) parts: Part I - Socio-demographic Data; Part II Norton Scale to assess risk; Part III - NANDA NIC NOC to evaluate nursing interventions. The alphanumeric code sequence of the instrument is: HAGE-I 001; up to HAGE-I 040.

Instrument II. Skin Evaluation and Nursing Interventions Registry by Hospital B Nursing Staff: The Management of Stage Ulcers (Control Group) is based on the Hospital Stage B Ulcer Management protocol. Instrument II consists of three (3) parts: Part I - Socio-demographic and health characteristics; Part II - Nursing Interventions by Stages; Part III - Comments. The alphanumeric codes sequence of codes of the instrument is: HBGC-II 001; to HBGC-II 040.

Instrument IIIa. Emergency Room Nursing Personnel Data Registry of the Three (3) Hospital Shifts. It is designed to collect the following information: years in the profession, academic preparation, a question to know if they had participated in courses of skin management; another that asks to identify the main focus of the course (s) you have taken, the topics covered and if you have helped in your professional practice; it concludes with a space for staff to express their training needs on the subject of skin management. For Instrument IIIa of Hospital A - Experimental Group the sequence of alphanumeric codes is: HBGCIIIa-001; To HBGCIIIa-020.

NANDA NOC NIC Training Module / NORTON Scale for Nursing Staff of Hospital A. This Module was developed by the researcher based on parameters of the Andalusian Guide for Patient Caregivers, the NANDA NIC NOC methodology and the Norton Scale. It was created with the purpose of providing the professional Nursing staff of the GE with training on the implementation of the proposed methodology for the prevention of pressure ulcers in patients over 60 admitted through the Emergency Room. The training was provided by the doctor in the training facilities of hospital A.

We highlight the following data related to the NANDA NIC NOC methodology and the Norton Scale. The Norton Scale sets a maximum score of 20 and specifies that a score of 14 or less represents risk of ulcers; 13-14 mean risk; 10-12 high risk; 5-9 very high risk. The intervention of the nursing staff was based on activating the following parameters of the methodology NANDA NOC NIC: NANDA-Code 0047 Risk of deterioration of skin

integrity; NOC (NANDA Outcome Code) Code 1101 Tissue integrity of skin and mucous membranes; NIC Intervention Codes - Code 3540 Prevention of PPU, Code 3590 Skin Surveillance and Code 3500 Pressure Management Nursing interventions 2 through 8 included: postural change, skin examination and hygiene, and pressure relief device.

2.1.2 Participants

The study was concluded in two hospitals: Hospital A (GE) and Hospital B (GC). In each hospital, a sample of 20 nurses (40) and 40 patients (80) were used, for a total of 120 participants.

The selection of study participants was for convenience (Teddle & Yu, 2007). The inclusion criteria corresponds to secondary data of patients accompanied by family or caregiver, admitted by different medical conditions, whose stay or hours in the emergency room is 24 or more. Exclusion criteria corresponds to secondary data from patients who have suffered from ulcers or who suffer from them at the time of admission to the emergency room and patients with less than 24 hours in the emergency room.

The intentional or intentional sampling technique used was based on the investigators' judgment as to who could provide the best information to achieve the study objectives and were willing to participate (Teddle & Yu, 2007). According to Teddle & Yu, "Purist sampling techniques can be defined as units of selection (eg individuals, groups of individual institutions) based on specific purposes associated with responding to the questions of a research study" (2007, p.77). This sampling was extremely appropriate since one of our main objectives was to evaluate and describe the effectiveness of the implementation of NAND NIC NIC and Norton Scale in the prevention of pressure ulcers in a hospital facility in Puerto Rico.

Hospital A (GE), is located outside the metropolitan area of San Juan, capital of Puerto Rico. It complies with the Regulation Secretary of the Department of Health Number 117 for Licencing Regulations, Operation and Maintenance of Hospitals in the Commonwealth of Puerto Rico, the hospital has 16 beds for the admission of patients in the emergency room and 20 professional nurses.

Hospital B (GC) is located in the metropolitan area of San Juan, Puerto Rico. It complies with the Regulation of the Health Department Number 117 to Regulate the Licencing, Operation and Maintenance of Hospitals in the Commonwealth of Puerto Rico and with the accreditation of the Joint Commission Accreditation Hospital for more than 13 years. The hospital does not have beds in the emergency room, it has 27 stretchers for the admission of patients in the emergency room and 20 professional nurses. These hospitals offer medical services for patients whose condition requires a surgeon.

2.1.2.1 Socio-demographic profile of GE and GC nursing staff

The total frequencies for both hospitals in terms of years of nurses' experience are presented in Figure 1. There is no statistically significant difference between the years of experience of nurses in hospital A (GE) and B (GC): $\chi^2 = 16.1333$, $GL = 14$ and $P = 0.3053$.

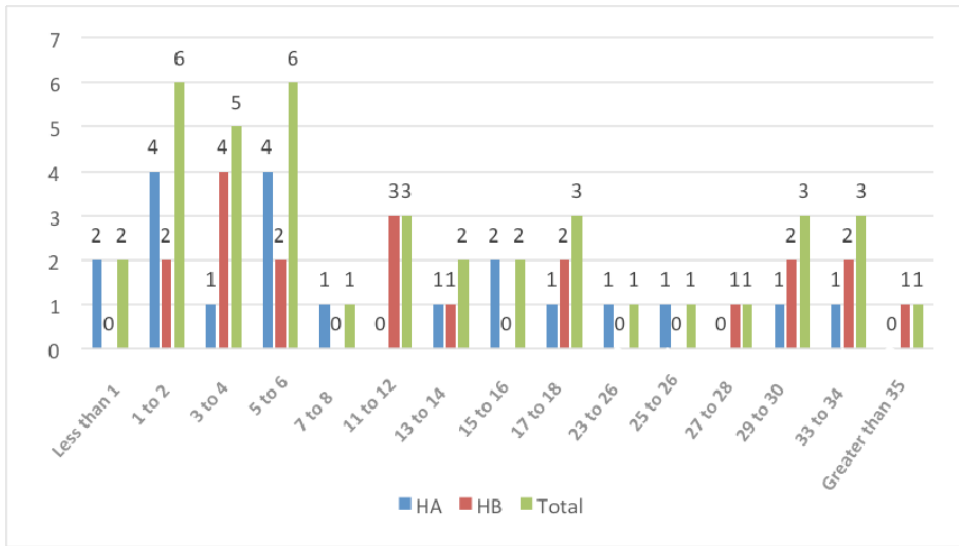


Figure 1 Frequencies in the ranges of years of experience of HA and HB nurses

The second variable corresponds to academic degree: Associate Degree or Baccalaureate. There is no statistically significant difference between the academic preparation of the nurses of the Experimental Group and the Control Group (Snedecor Test $F = 1$; $tStat = 0$; $CI = 95\%$).

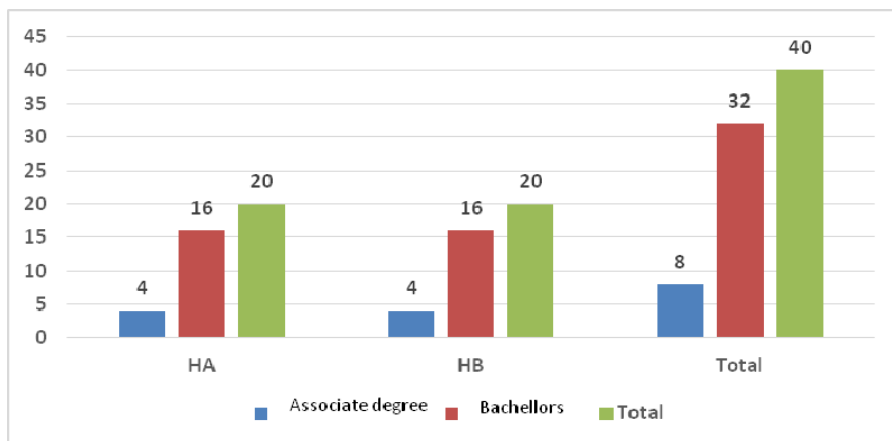


Figure 2 Frequencies for the variable "Academic Degree" of nurses

In the variable "participation in courses", there was no statistically significant difference between the participation in courses of the nurses of the GE and of the CG ($X^2 = 1.457$, $GL = 2$, $P = 0.43$)

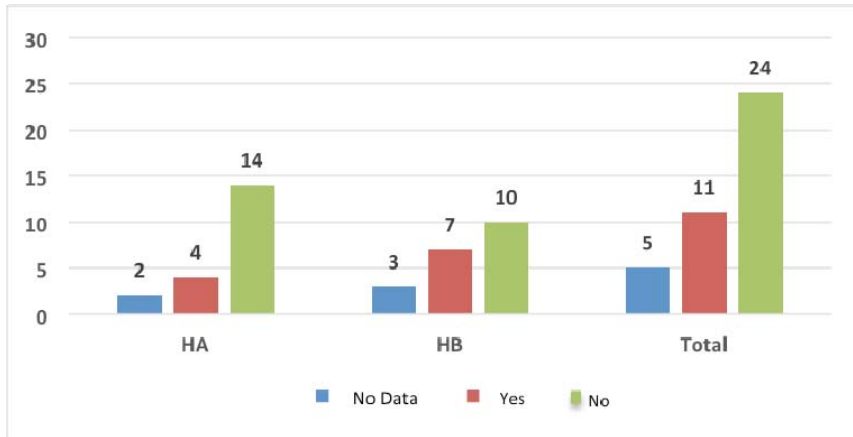


Figure 3 Frequencies for the variable "Has participated in courses"

In the variable "Main focus of the course that took or courses": Preventive, Curative or No data, no statistically significant difference was found between the main focus of the course taken by the nurses of the GE and those of the CG ($X^2 = 2.8$, $GL = 2$, $P = 0.2427$)

Figure 4 shows the frequencies of the variable "main focus of the course or courses taken by the nursing staff of the GE and the GC (31/40 = 78% did not provide the data, 5/40 = 12% preventive approach and 4 / 40 = 10% curative approach)

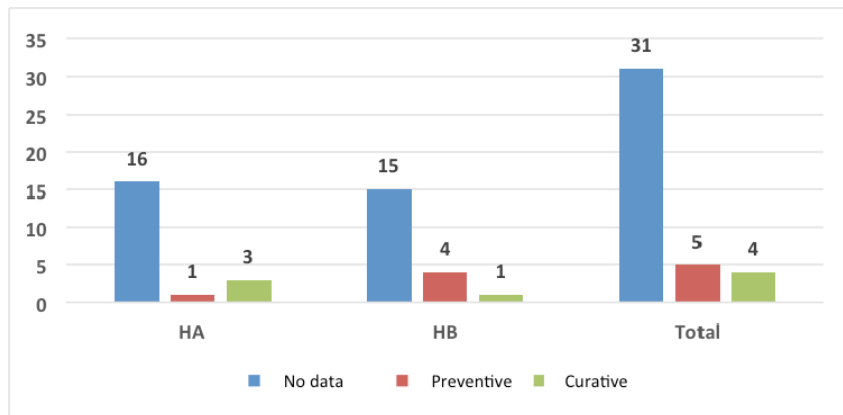


Figure 4 Frequencies for the variable "Main focus of the course or courses taken"

The results of the administered pre-test and post-test to the nurses of the A (GE) hospital show a statistically significant difference between the results of pretest (5.60) and post-test (9.90) administered by the doctoral student to the nursing staff of the GE during training in the NANDA NIC NOC methodology and the Norton Scale (Paired Wilcox test = -3.868; P = 0.000).

	Mean	Standard deviation	Variance
Pre-test	5.60	1.635	2.674
Post-test	9.90	.447	.200
Difference	4.4	1.191	2.474

Table 1 Descriptive statistics of pre and post-test results administered to nurses

2.1.2.2 Demographic and epidemiological profile of the patients of the EG and GC

The profile was respectively compiled through instruments I and II.

Rango de edad	HA (GE)		HB (GC)		Total	
	Age range		<i>f</i>	%	<i>f</i>	%
60-65	6	15.0%	9	22.5%	15	18.75%
66-71	3	7.5%	6	15.0%	9	11.25%
72-76	7	17.5%	6	15.0%	13	16.25%
77-82	5	12.5%	5	12.5%	10	12.50%
83-87	5	12.5%	5	12.5%	10	12.50%
88-93	11	27.5%	5	12.5%	16	20.00%
94-99	3	7.5%	4	10.0%	7	8.75%
Total	40	100.0%	40	100.0%	80	100.00%

Table 2 Age ranges for HA patients and HB patients

The T-Student test was used, the type of nominal variable (age range) was coded to numerical (60-65 = 1, 66-71 = 2, 72-76 = 3, 77-82 = 4, 83-87 = 5, 88-93 = 6 and 94-99 = 7); we found the averages (\bar{x}) for each set of data; the Snedecor F test (0.758) was performed; Student's t-test (tStat = 1.2852) was performed with P = 0.2025. There is no statistically significant difference between the age ranges of hospital A (GE) and B (GC) patients.

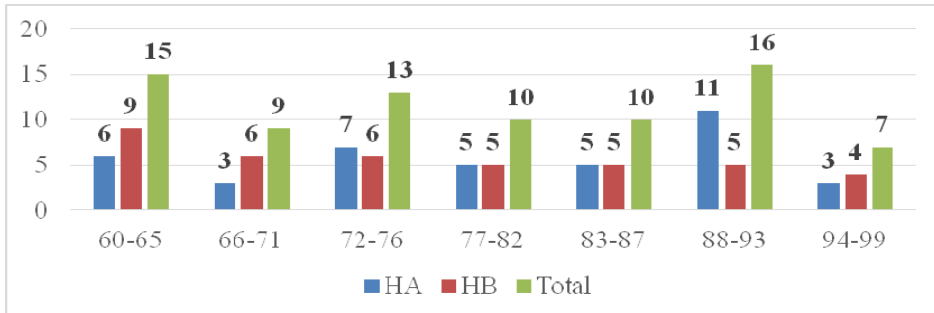


Figure 5 Frequencies for the age ranges of the participants

The variable "gender distribution" of the patients of hospital A (GE) can be seen in Figures 4 and 6.

Gender	HA (GE)		HB (GC)		Total	
	f	%	f	%	f	%
Masculine	17	42.5%	7	17.5%	24	30.0%
Femenine	23	57.5%	33	82.5%	56	70.0%
Total	40	100.0%	40	100.0%	80	100.0%

Table 3 Distribution by gender of patients in hospital A and hospital B

There is a statistically significant difference between the gender of the EG and GC patients ($t\text{-Stat} = -2.504$; $P = 0.0143$).

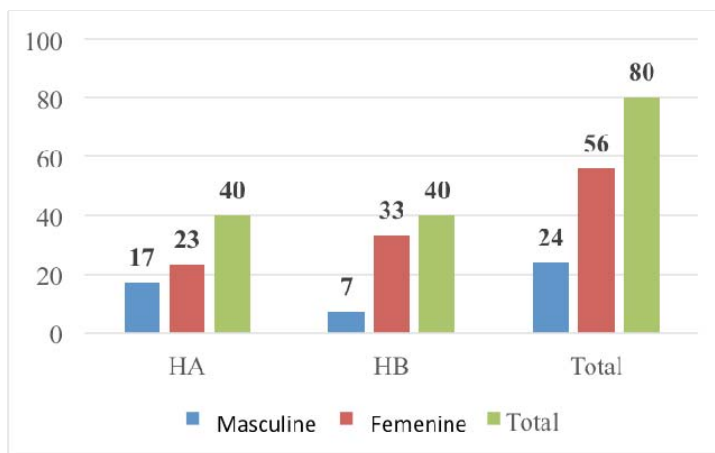


Figure 6 Gender frequencies in patients in hospital A and hospital B

For the variable "body mass" of Hospital A (GE) and B (GC) patients, no statistically significant differences were found ($F = 0.115$; $t\text{Stat} = 1.3215$; $P = 0.1902$).

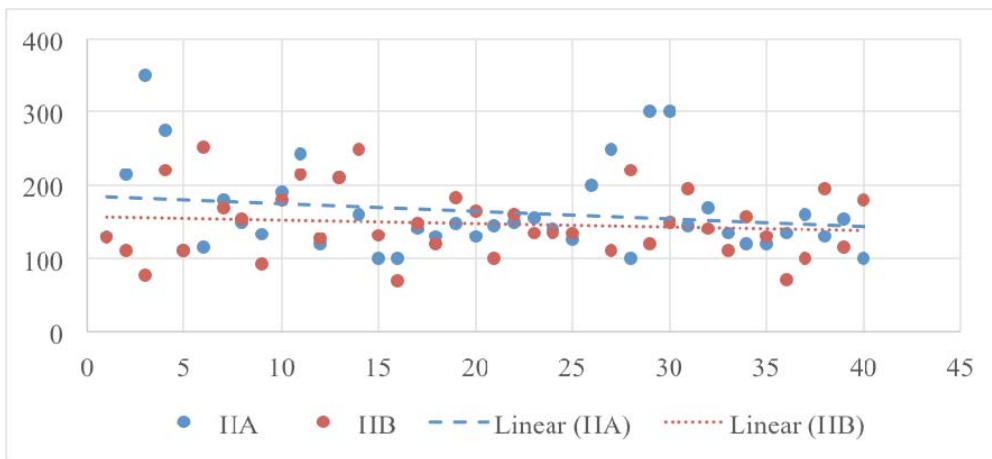


Figure 7 Dispersion of body mass of patients from hospital A (GE) and hospital B (GC)

The chi-square test (X^2) was used For the "Patient Disposition" variable. Figure 8 shows the frequencies of this variable.

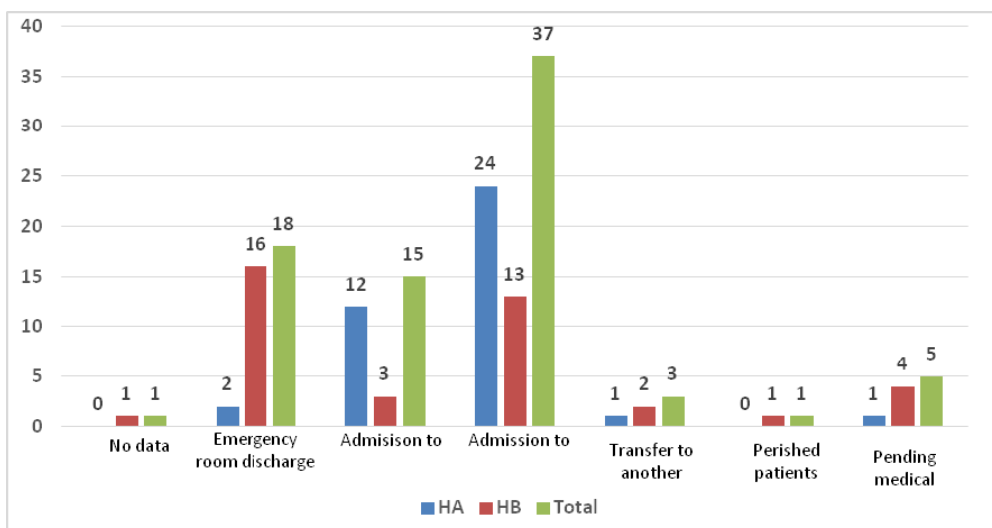


Figure 8: Frequency of patient disposition

It was determined that there is a statistically significant difference between the patient's disposition of hospital A (GE) and B (GC) ($X^2 = 23.6925$; $GL = 6$; $P = 0.0006$). For the variable "Condition of the patient", the X^2 test was performed with the purpose of validating whether or not there is interdependence between the data sets for patients in hospital A (GE) and patients in hospital B (CG) with a confidence of 95% ($X^2 = 10.8731$; $GL = 7$;

P = 0.14425). We found statistically significant difference between the SG and the GC this variable.

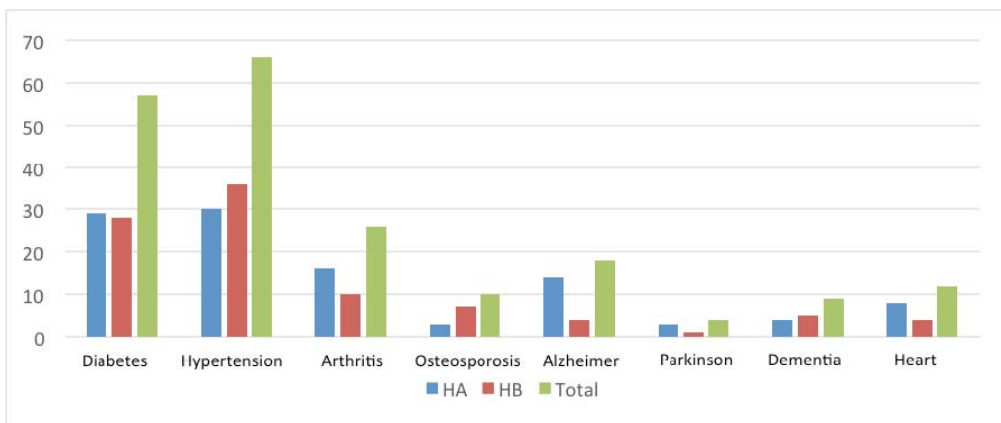


Figure 9 Frequencies for the variable "Condition of the patient"

2.2 Design

The research corresponds to a quasi-experimental design: 1) An Experimental Group (Hospital A) with a sample of 20 nurses trained by the researcher in the NANDA NOC NIC methodology and the Norton Scale for the prevention of pressure ulcers (PU) and secondary data provided by of 40 patients admitted by emergency room; 2) A Control Group (Hospital B) constituted by 20 nurses who did not receive the training who used the protocol of Stage Sores Management prescribed by the hospital and secondary data provided by 40 patients admitted to the emergency room. In the study we collected quantitative and qualitative data (Hernández, Fernández & Baptista, 2006), which were triangulated to integrate the interpretation of the results into the form of inferences to comply with the goal defined by Tashakkori & Teddlie as "construction by an investigator of the relationships between people, events, and variables, as well as their construction of the respondents' perceptions, behaviors and feelings, and how they relate to each other in a coherent and systematic way "(Handbook of Mixed Methods in Social & Behavioral Research, Chapter 1 , Page 27, 2010). The analysis of the data provided the basis for establishing the effectiveness of the use of the Norton Scale and the NAND NIC NOC methodology implanted in the GE on the GC Staging Ulcer Management protocol. The Statistical Package for the Social Sciences was used for data analysis.

2.3 Procedure

Table 4 summarizes the research procedure for (GE and GC).

Investigation Procedures	Experimental Group Hospital (GE) Procedures	Control Group Hospital B (GC) Process
	Part I	Part I
	20	20
	Professional Nurses	Professional Nurses
	<ol style="list-style-type: none"> 1. The principal investigator will conduct the Training session requested by the Director of Nursing Department or Hospital A emergency room personnel on the NANDA NIC NOC Methodology and the NORTON Scale on June 1, 2016. 2. The training will last 4 hours. 3. The first part of the training session will be devoted to the presentation and discussion of the Information Sheet corresponding to Hospital A. This part will be extended between 20 and 30 minutes. 4. Once the principal investigator has answered all the questions and clarified the doubts expressed by the participants, will proceed with the training in the order established in the Module. 5. At the end of the training, they will receive a sealed envelope from the principal investigator with 10 copies of <i>Instrument I - Registry of Skin Assessment and Nursing Interventions</i> by Hospital Professional Nursing Staff A (Experimental Group A), coded in sequence with the corresponding alphanumeric code. 6. Nurses will use <i>Instrument I - Registry of Skin Assessment and Nursing Interventions</i> by Hospital A Professional Staff (A-Experimental Group) to document their interventions with patients admitted to the emergency room during the period comprised Between 1 June and 31 July 2016. 7. Participating nurses will receive another envelope with <i>Instrument III-a - Demographic Data Record of Emergency Room Nursing Personnel of the Three (3) Shifts of Hospital A</i>, which will complete and deposit before leaving the training room in a 	<ol style="list-style-type: none"> 1. The principal investigator will NOT provide training to the nursing staff related to the skin care of patients admitted to the emergency room to the Control Group. 2. The Director of Nursing Services at Hospital B will indicate to the Emergency Room Nursing staff that the Hospital is participating in a study on the care of the skin to admitted patients and will request the 20 nurses of the three shifts to answer the Instrument III-b - Recording the Demographic Data of Emergency Room Nursing Personnel from the Three (3) Turns of Hospital B and depositing the same in the box that will be placed beside the space assigned to the principal investigator at the nurses station. 3. The principal investigator will check the box one (1) time per week and transport the instruments to his residence in a sealed envelope until the 20 are completed.

box located next to the exit door of the training room.

8. Nurses will receive a second envelope with a copy of the Fact Sheet and the contact information of the principal investigator who will be available to offer "coaching" to the Nursing staff during the period from June 1 to July 31, 2016.

40 Patients meeting the inclusion criteria	40 Patients meeting the inclusion criteria
<p>1. The nurses will document the interventions with the patients admitted to the emergency room through <i>Instrument I</i> - Registration of Skin Evaluation and Nursing Interventions by the Hospital Nursing Staff of Hospital A (Experimental Group A) and deposit the instruments in a box that will be located in the nurses station.</p> <p>2. The principal investigator will check the box one (1) time per week and transport the instruments deposited to his residence in a sealed envelope until 40 are completed.</p>	<p>1. The principal investigator will compile the secondary data of patients admitted to the emergency room through <i>Instrument II</i> -Registration of Skin Assessment and Nursing Interventions by Hospital Nursing Staff of Hospital B: (Control Group) to review the information contained in the clinical file of the patients that meet the inclusion criteria until completing 40.</p> <p>2. The principal investigator will collect the the data in a private cubicle that will be located in the nurses station until completing 40.</p>
20 Professional nurses 40 Patients meeting the criteria	20 Professional nurses 40 Patients meeting the inclusion criteria
<p>1. The nurses will document the interventions with the patients admitted to the emergency room through <i>Instrument I</i> - Registration of Skin Evaluation and Nursing Interventions by the Hospital Nursing Staff of Hospital A (Experimental Group A) and deposit the instruments in a box that will be in the nurses station.</p> <p>2. The principal investigator will check the box one (1) time per week and transport the instruments deposited to his residence in a sealed envelope until 40 are completed.</p>	<p>1. Análisis de los datos por la 1. The principal investigator will compile the secondary data of patients admitted to the emergency room through <i>Instrument II</i> -Registration of Skin Assessment and Nursing Interventions by Hospital Nursing Staff of Hospital B: (Control Group) to review the information contained in the clinical file of the patients that meet the inclusion criteria until completing 40.</p> <p>2. The principal investigator will collect the the data in a private cubicle that will be located in the nurses station until completing 40.</p>

Table 4 Summary of Research Procedure: Experimental Group & Control Group

The principal investigator will store all the research documents for the Experimental Group (Hospital A and B) for a term of five (5) years in a locked file in his residence. He will proceed to shred the documents of the investigation and the data stored in an electronic device will be erased permanently at the end of the specified term.

3. Results

3.1 Results per research question

3.1.1 Research Question 1:

In this section we present the results of the variables analyzed to establish statistically significant differences in the reduction and prevention of the development of pressure ulcers (PU) between the methodology of intervention of assessment of the skin provided to the Experimental Group versus the methodology provided to the Control Group based on the protocol of a care plan of the institution focused on the care of the skin.

3.1.1.1 Experimental Group (Hospital A)

The Norton Scale sets a maximum score of 20 and specifies that a score of 14 or less represents risk of ulcers; 13-14 moderate risk; 10-12 high risk; 5-9 very high risk. Assessment 1, performed by the Nursing staff at the time of admission to the Emergency Room, reflected one (1) patient at medium risk, eight (8) high risk patients and thirty (30) patients at very high risk of developing PPU . During the 24 hours of intervention at very high risk indicator, there were 29 (72.5%) patients of the sample; at high risk there were 8 (20%); at the moderat risk there were 2 (5%) and 1 (2.5%) with a score of 16. Notice that 95% of the sample reflected the same result as at the time of admission through the assessment period and interventions. The intervention of the nursing staff was based on activating the following parameters of the methodology NANDA NOC NIC: NANDA - Code 0047 Risk of deterioration of skin integrity; NOC (NANDA Outcome Code) - Code 1101 Tissue integrity of skin and mucous membranes; NIC Intervention Codes - Code 3540 Prevention of PPU, Code 3590 Skin Surveillance and Code 3500 Pressure Management Nursing interventions 2 through 8 included: postural change, skin examination and hygiene, and pressure relief device.

	Int. 2		Int. 3		Int. 4		Int. 5	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Postural change	40	100.0%	38	95.0%	38	97.4%	34	97.1%
skin examination and hygiene	39	97.5%	24	60.0%	20	51.3%	15	42.9%
pressure relief device	39	97.5%	37	92.5%	35	89.7%	34	97.1%
	Int. 6		Int. 7		Int. 8			
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
Postural change	26	96.3%	24	100.0%	19	90.5%		
skin examination and hygiene	15	55.6%	10	41.7%	19	90.5%		
pressure relief device	26	96.3%	24	100.0%	15	71.4%		

Table 5 Nursing Interventions: Instrument I Part IV Experimental Group

In GE Instrument I, nursing staff documented interventions that assessed patients' skin status; and documented "postural change", "skin examination and hygiene" and "pressure relief device" every two to three hours for 24 hours. The information collected is included in Table 5 and Figure 11. As the period of Nursing interventions (2-8) elapsed, the number of patients gradually decreased as available, as the percentages vary from one intervention to another .

As for "Postural change", the data collected reflected the following frequencies in each of the Nursing interventions: intervention # 2: frequency 40 (100%), intervention # 3: frequency 38 (95%); Intervention # 4: frequency 38 (97.4%); Intervention # 5: frequency 34 (97.1%); Intervention # 6: frequency 26 (96.3%); Intervention # 7: frequency 24 (100%); And in intervention # 8 the frequency was 19 (90.5%).

In relation to "skin examination and hygiene" the results in each nursing intervention are: 2 (97.5%) 3 (60%) 4 (51.3%) 5 (42.9%) 6 (55.6%) 7 (41.7%) and 8 (90.5%). In the Nursing intervention related to "Pressure relief device" the data for each intervention reflected: 2 (97.5%); 3 (92.5%); 4 (89.7%); 5 (97.1%); 6 (96.3%); 7 (100%) and 8 (71.4%). Figure 11 summarizes interventions 2 to 8 of the Nursing staff in the GE at intervals of 2

to 3 hours for postural change care, skin examination and hygiene and pressure relief device.

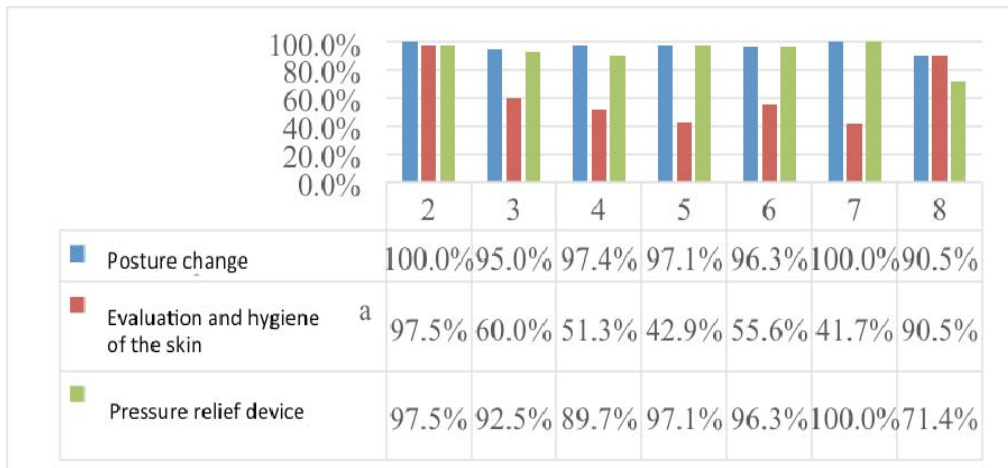


Figure 11 Percentage Distribution of Nursing Interventions: Experimental Group

Nursing staff interventions at Hospital A (GE) reflects consistency in the use of the NANDA NIC NOC and Norton Scale methodology for the prevention of PPU in a 24-hour period of time in patients admitted to the Emergency Room. The process of documentation of interventions performed for skin assessment; postural change, examination and hygiene of the skin and pressure relief device are evident. Although 24 (72.5%) of the patients in the sample showed a very high risk of developing PPU 8 (20%) of the high-risk patients, 2 (5%) of the moderate risk patients and 1 (2.5%) patient, did not report the development of pressure ulcers during the stay in the Emergency Room. One patient reflected a skin assessment of 16 through their stay in the Emergency Room of Hospital A. Note that 95% of the sample maintained the same skin evaluation results from their admission to the emergency room through the period of 24 hours. 100% of patients in the Experimental Group sample received Nursing interventions based on the NANDA NIC NOC methodology and periodic skin evaluations using the Norton Scale.

The Control Group (Hospital B) used their Stage Ulcers Management protocol. The results of the data obtained through Instrument II, Part II "Nursing Interventions by Stages" are presented in the following Tables 6, 7, 8, 9 and in Figures 13, 14, 15 and 16.

Nursing Intervention Treatment Protocol for Stage Ulcers: Control Group									
STAGE GRADE I		Yes		No		No data		Total	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
1	All patients had beds with “Gel” mattresses assigned.	0	0%	33	82.5%	7	17.5%	40	100.0%
2	Incontinence care is offered daily in the mornings and P.R.N with saline and skin protection cream.	0	0%	33	82.5%	7	17.5%	40	100.0%
3	Change of position and / or repositioning every 2 hours.	0	0%	33	82.5%	7	17.5%	40	100.0%
4	Consult with Nutrition Services to determine nutritional status.	0	0%	33	82.5%	7	17.5%	40	100.0%
5	Educate the patient, family or significant person about the changes of positions in the bed.	0	0%	33	82.5%	7	17.5%	40	100.0%
6	Teach, if possible, the patient to change position by him/herself.	0	0%	33	82.5%	7	17.5%	40	100.0%
7	Evaluate the skin on each shift.	0	0%	33	82.5%	7	17.5%	40	100.0%
8	Document all of the above interventions, treatment and at least the weekly progress and / or changes in ulcers.	0	0%	33	82.5%	7	17.5%	40	100.0%

Table 6 Nursing Interventions: Grade I Stage

In Grade I, 82.5% (33) of the patients reflect that they did not receive the services and in 17.5% (7), the Nursing staff did not record the information in the protocol.

Nursing Intervention Treatment Protocol for Stage Ulcers: Control Group										
STAGE GRADE II		Yes		No		No data		Total		
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
s	1	Evaluate the need for a surface that helps reduce pressure for bedding, heel protectors, elbows.	0	0%	6	15.0%	34	85.0%	40	100.0%
	2	Care is given to the incontinence area every morning and as needed.	0	0%	6	15.0%	34	85.0%	40	100.0%
	3	Make a change and reposition the patient every two hours.	0	0%	7	17.5%	33	82.5%	40	100.0%
	4	Use sheets to move the patient in bed.	0	0%	7	17.5%	33	82.5%	40	100.0%
	5	Use pillows to position the patient and to avoid skin-to-skin contact.	0	0%	6	15.0%	34	85.0%	40	100.0%

Nursing Intervention Treatment Protocol for Stage Ulcers: Control Group									
STAGE GRADE II		Yes		No		No data		Total	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
6	Consult with Nutrition Services to determine the nutritional status of the patient.	0	0%	6	15.0%	34	85.0%	40	100.0%
7	Educate the patient, family or significant person about the change of position in bed. If possible, teach the patient to change positions by themselves.	0	0%	6	15.0%	34	85.0%	40	100.0%
8	Evaluate the ulcer once a day. Document location, stage, treatment and progress.	0	0%	6	15.0%	34	85.0%	40	100.0%

Table 7. Using Interventions: Grade II Stage

For Grade II, it was found that between 15% and 17.5% did not receive the services and for the other patients the information was not recorded (82.5% - 85%).

Nursing Intervention Treatment Protocol for Stage Ulcers: Control Group									
STAGE GRADE III		Yes		No		No data		Total	
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
1	Talk with your doctor to evaluate alternatives for chemical or surgical debridement.	0	0%	0	0.0%	40	100.0%	40	100.0%
2	I evaluated the need for pressure reduction / relief surface for bed, heel protectors.	0	0%	0	0.0%	40	100.0%	40	100.0%
3	Gives incontinence care in the morning and whenever necessary. (With each change of Diaper)	0	0%	0	0.0%	40	100.0%	40	100.0%
4	Change and reposition the patient every two hours.	0	0%	0	0.0%	40	100.0%	40	100.0%
5	Use sheets to move with pillows to position the patient in bed.	0	0%	0	0.0%	40	100.0%	40	100.0%
6	Consult Nutrition Services to determine the patient's nutritional status.	0	0%	0	0.0%	40	100.0%	40	100.0%
7	Educate the patient, family or significant person about the change of position in bed. If possible, teach the patient to change positions on his or her own.	0	0%	0	0.0%	40	100.0%	40	100.0%
8	Evaluate the ulcer at each change of dressing and document the procedure.	0	0%	0	0.0%	40	100.0%	40	100.0%

Table 8 Nursing Interventions: Grade III Stage

In the Grade III Stage, no data was documented, so it is not possible to determine if the patients of Hospital B received or not the services related to this Stadium.

<i>Nursing Intervention Treatment Protocol for Stage Ulcers: Control Group</i>									
<i>STAGE GRADE IV</i>		<i>Yes</i>		<i>No</i>		<i>No Data</i>		<i>Total</i>	
		<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
1	Talk with your doctor to evaluate alternatives for chemical or surgical debridement.	0	0%	3	7.5%	37	92.5%	40	100.0%
2	I evaluated the need for pressure reduction / relief surface for bed, heel protectors.	0	0%	3	7.5%	37	92.5%	40	100.0%
3	Gives incontinence care in the morning and whenever necessary. (With each change of Diaper).	0	0%	3	7.5%	37	92.5%	40	100.0%
4	Use sheets to move with pillows to position the patient in bed.	0	0%	3	7.5%	37	92.5%	40	100.0%
5	Consult Nutrition Services to determine the patient's nutritional status.	0	0%	3	7.5%	37	92.5%	40	100.0%
6	Educate the patient, family or significant person about the change of position in bed. If possible, teach the patient to change positions on his or her own.	0	0%	3	7.5%	37	92.5%	40	100.0%
7	Evaluate the ulcer on each change of dressing and document the procedure.	0	0%	3	7.5%	37	92.5%	40	100.0%

Table 9. Nursing Interventions: Grade IV Stage

At Grade IV Stage, staff did not document the interventions in 92.5% of the patients (37) and for the remaining 7.5% (3) patients reflected that they did not receive the services.

The data in Tables 7, 8, 9 and 10 are graphically summarized in Figures 13, 14, 15 and 16.

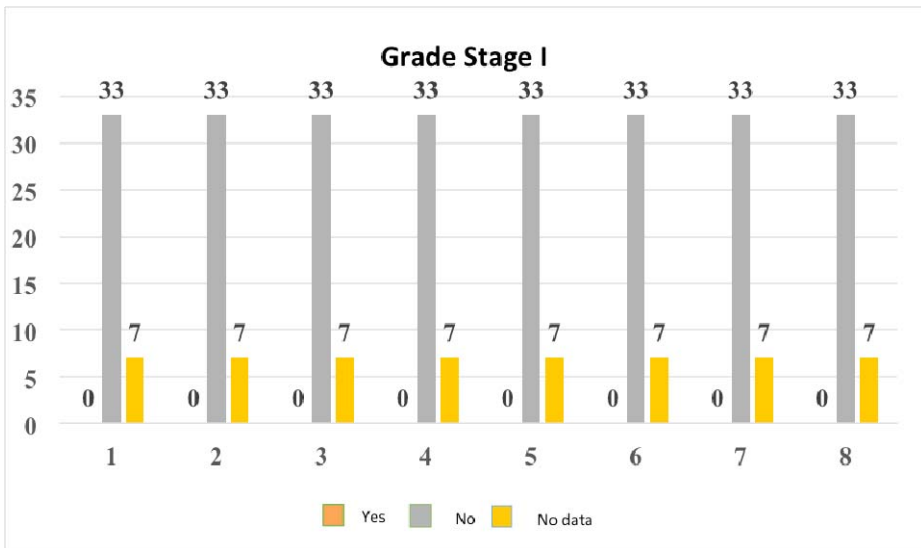


Figure 13 Frequencies for Stage I

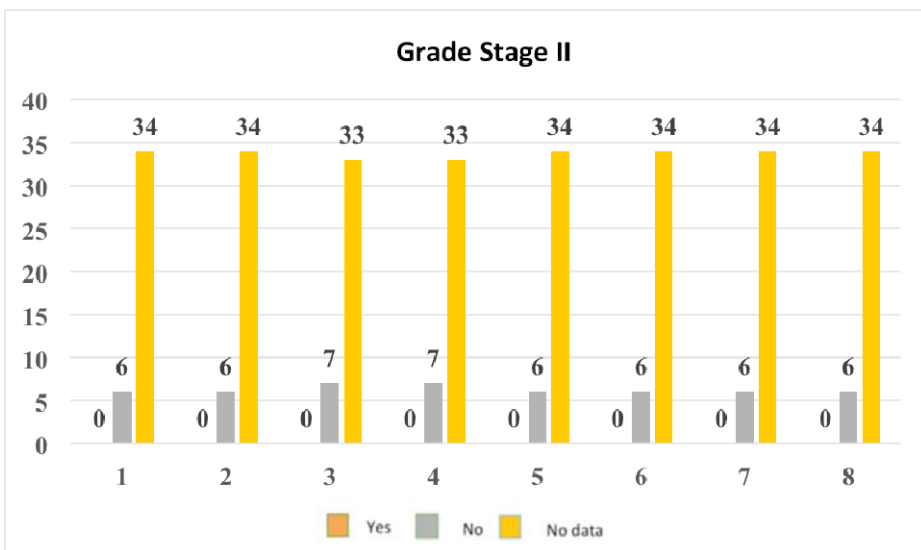


Figure 14 Frequencies for the Grade II Stage

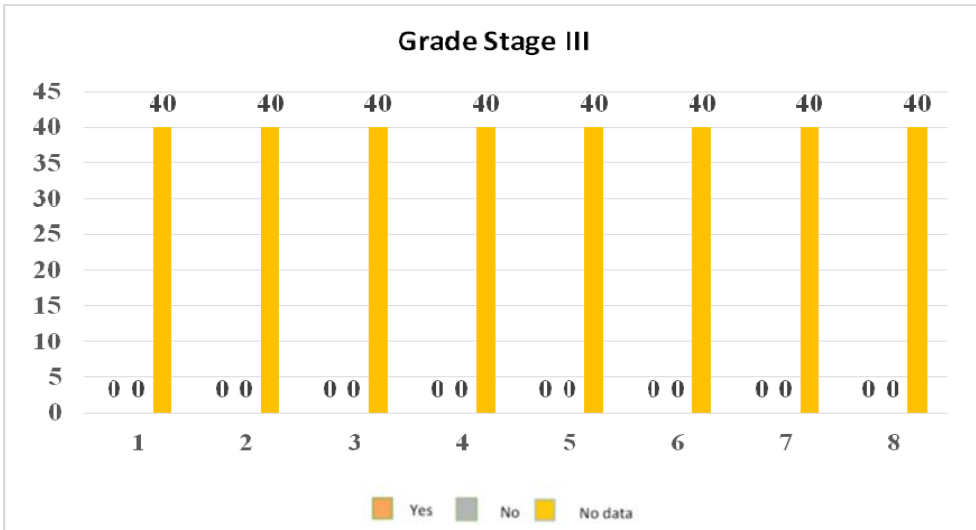


Figure 15 Frequencies for Stage III

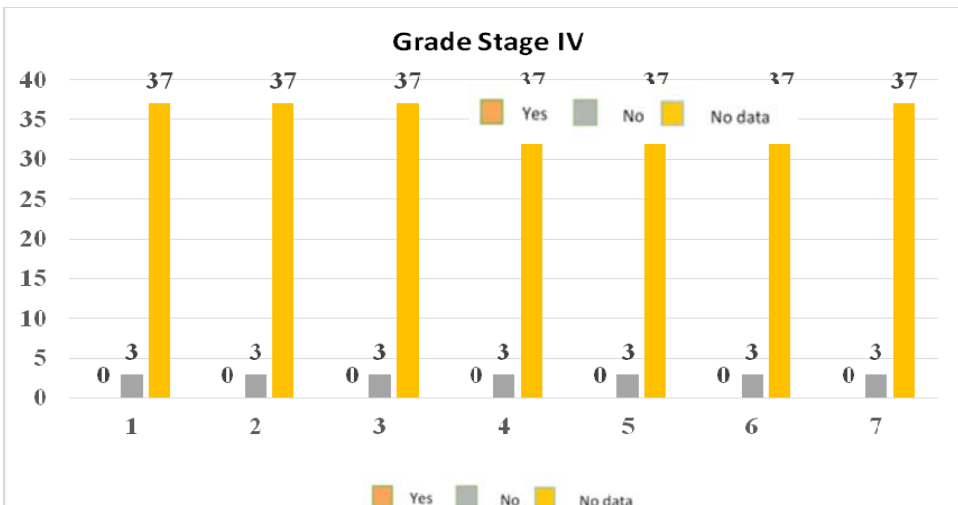


Figure 16 Frequencies for the Grade IV Stage

3.1.2 Research Question 2.

The variables analyzed to establish statistically significant differences between Nursing staff instructions on the patient's skin care to relatives and caregivers of Hospital A (GE) versus Nursing staff instructions on the care of the patient's skin to relatives and caregivers of the Hospital B (GC) in the decrease and prevention of the development of pressure ulcers (PPU) in patients 60 years or older admitted by the Emergency Room area included: in-

terest of family members and / or caregivers, / or caregivers on postural changes and questions from family and / or caregivers about skin care.

As shown in Figure 17, the results indicate that 55% (n = 22) of the relatives of Hospital A (GE) patients participated actively in interventions for the prevention of ulcers; Consistent with the importance of involving and educating family members and caregivers in the patient care protocol by the Nursing staff regarding the prevention of PU in people older than 60 years.

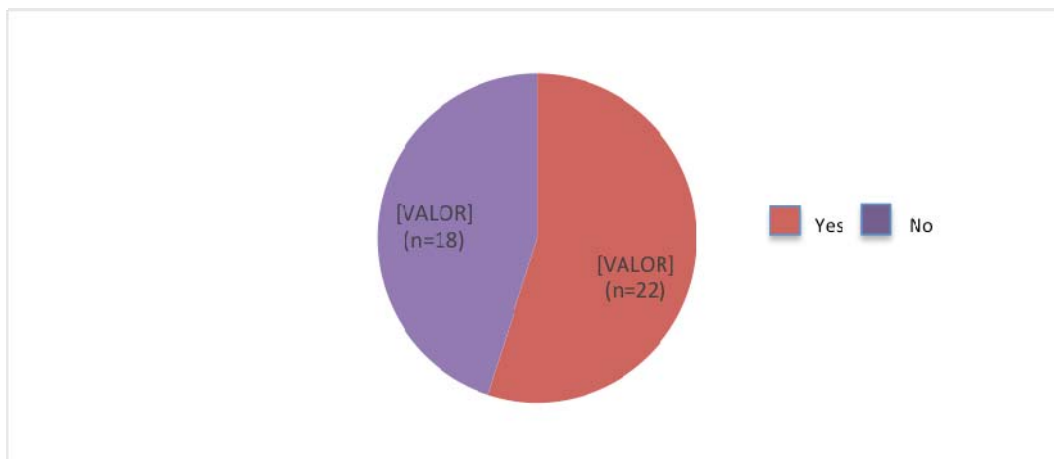


Figure 17. Percentage distribution of Hospital A (GE) patients whose relatives were actively involved in interventions for the prevention of ulcers

Hospital B data (CG) is related to the interest and participation of family members and / or caregivers in postural changes and to ask questions about skin care are reflected in the results of the interventions in Stages. Criterion 5: Educates the patient, family or significant person about the change of position in the bed (No = 82.5%); Stage II. Criterion 7: Educates the patient, family or significant person about the change of position in bed. If possible, teach the patient to change positions by themselves (No = 15%, Not documented = 85%), Stage III. Criterion 7: Educates the patient, family or significant person about the change of position in bed. If possible, teach the patient to change position by themselves (Not documented = 100%) and Stage IV. Criterion 6: Educates the patient, family or significant person about the change of position in bed. If possible, teach the patient to change position by themselves (No = 7.5%; No documented = 92.5%).

3.1.3 Research Question 3.

The variables analyzed to establish statistically significant differences between the development of pressure ulcers (PUU) in patients 60 years or older admitted by the Emergency Room area and the periodic rounds of skin evaluation of the nursing staff of Hospital A (GE) versus patients 60 years or

older admitted to the Emergency Room area and the periodic rounds of skin evaluation of Hospital B (GC) nurses included: time and outcome of the level of risk in each round of assessment of the skin made by the nursing staff.

Figure 10, included in the section corresponding to the results of research question 1, summarizes the result of the assessment of the risk of suffering from UPP according to eight (8) skin assessment interventions performed by the Nursing staff in the Hospital A (GE) and compiled through Instrument I created by the doctorate based on the methodology NANDA International, Inc., NIC NOC and the Norton Scale.

The periodic rounds of skin assessment were at intervals of 2 to 3 hours of GE showed to be NANDA NIC NIC NOR and Norton Scale interventions appropriate for the prevention of the development of pressure ulcers. The consistency and systematization of the assessment of patients certainly prevents the development of PPU since the nursing staff is attentive to changes in the condition of the skin and ready to perform the interventions required to prevent the development of PU as postural change, examination and hygiene of the skin and use of devices to relieve the pressure.

On the other hand, the CG results point to poor documentation of nursing interventions related to periodic skin titration rounds at specific intervals as shown in Table 6 (pp. 23-24).

In Grade I Stage, 82.5% (33) of the patients reflect that they did not receive the services and 17.5% (7) of the patients reported that the Nursing staff did not document their intervention. Criteria 3 and 7 of the interventions required in the Grade I Stage reflect results contrary to the expectation of periodic rounds of skin assessment. In criterion 3, 82.5% (33) of the patients were not changed or repositioned every 2 hours as required by the Hospital B protocol. The same result was obtained in criterion 7, where the skin of 82.5% of the patients was not evaluated at each round.

3.1.3 Research Question 4.

The variables analyzed to study the effectiveness of the NANDA NIC NOC Nursing methodology and the Norton Scale in reducing and preventing the development of pressure ulcers (PPU) of the Experimental Group (Hospital A) versus the protocol of the Care Management Plan Ulcers for Stages of the Control Group (Hospital B) included: calibrating the results of the presence or absence of ulcers in the patients of both groups within 24 hours of being admitted to the Emergency Room, analyzing the nursing interventions and establishing the profile Epidemiology of groups.

For the variable "Ulcer at bedtime", the frequencies described below and presented in Figure 18: 0 for the "No data" alternative and 40 for the "No" alternative were found in the EG. In the GC 40 were documented for "No data" and 0 for "No". In sum, the total frequencies for both hospitals were: 40 for the "No data" (GC) alternative and 40 for the "No" (GE) alternative.

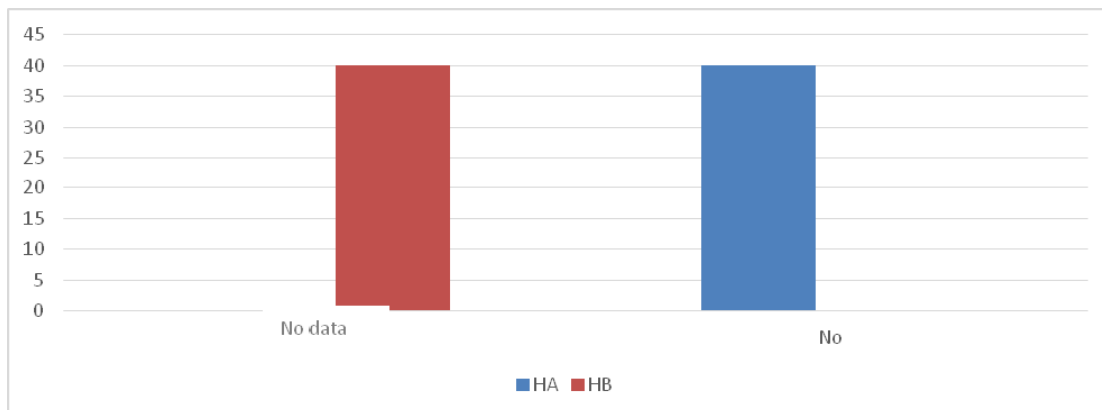


Figure 18 Frequencies for the variable "Sleeping ulcer" of patients in hospital A (GE) and hospital B (GC)

There is a statistically significant difference between the ulcers at bedtime between SG and GC ($X^2 = 80$, $GL = 6$, $P = 3.74e-19$). The 40 GE patients did not show ulcer at bedtime.

Nursing staff interventions in the GE reflect consistency in the use of the NANDA NIC NOC and Norton Scale methodology for the prevention of PPU in a 24-hour period in patients admitted to the Emergency Room. The process of documentation of interventions performed for skin assessment; postural change, examination and hygiene of the skin and pressure relief device were evident. Despite the fact that during the 24-hour intervention, 29 (72.5%) of the patients in the sample showed a very high risk of developing PU; 8 (20%) high irrigation; 2 (5%) mean risk and 1 (2.5%); the development of pressure ulcers (PPU) was not reported during the stay in Emergency Room in the 40 patients of the EG. One patient reflected a skin assessment of 16 through their stay in the Hospital A Emergency Room. 95% of the sample (GE) maintained the same skin evaluation result from their admission to the emergency room through the period Of 24 hours of study until its disposition. 100% of the patients in the GE sample received nursing interventions based on the NANDA NIC NOC and Norton Scale methodology. As shown in Figure 19 none of the patients in the SG developed PU during their hospitalization in the Emergency Room of Hospital A.

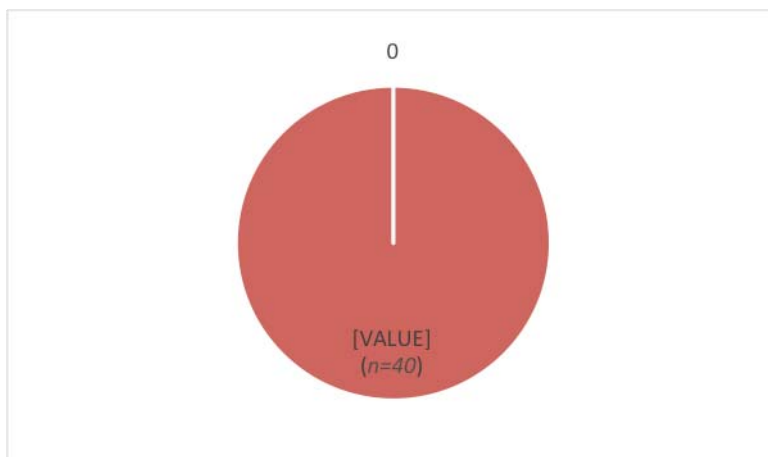


Figure 19. Percentage distribution of Hospital A patients who developed ulcers

The results of our study show that there is a difference between the development of UPP in patients exposed to the protocol that establishes the NANDA NIC NOC methodology and the Norton Scale under the health care of Nursing professionals whose interventions were based on measurement, evidence, systematization And documentation and the implanted Management of Stage Ulcers protocol of the GC.

Figure 20 demonstrates the results of the risk symptoms of developing ulcers presented by the Control Group sample (Hospital B). Of these, 8% presented erythema, 2% frequent urination and 90% no symptoms.

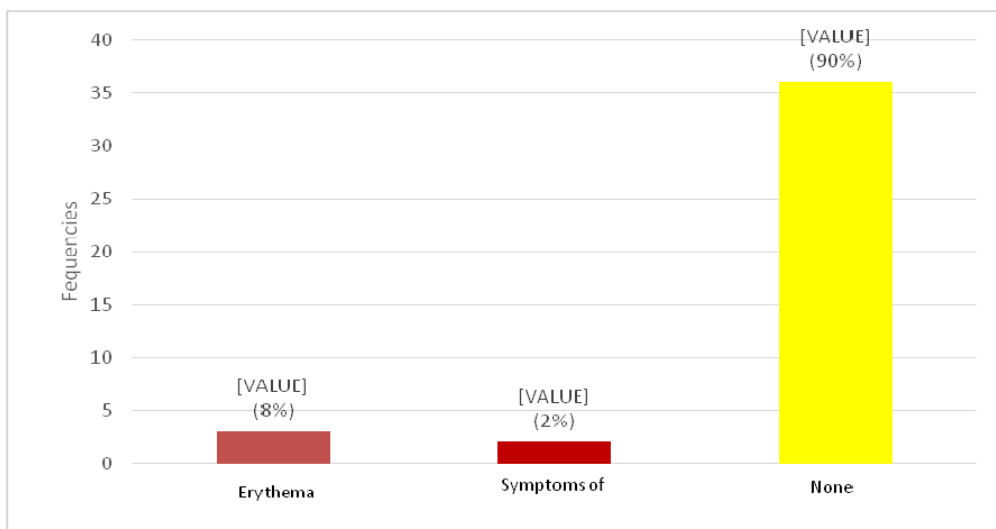


Figure 20. Distribution of ulcer symptoms in Hospital B patients

The Control Group of Stage Ulcers Management protocol integrates valuable information, however, the results of our study show that it is not used, by nursing staff, to document their interventions with patients.

The poor documentation of GC nurses in the Stage Ulcer Management protocol is a significant finding of our research. This finding is consistent with the results reported by Thoroddsen et al., 2013 that attempted to compile information on the progress or deterioration of patients with Grade I ulcers and confronted the problem of poor documentation of information from patients at risk of developing ulcers by the staff.

Among the limitations of the study the following were highlighted: 1) the poor documentation of the nursing interventions provided by the CG staff; 2) results related to the effectiveness of the NANDA NIC NOC methodology and the Norton Scale, although proven, will require future research in which all parties provide the necessary documentation to be in a position to make strong generalizations.

4. Discussion and Conclusions

The development of pressure ulcers (PPU) can be prevented. The literature on management and prevention of pressure ulcers (PPU) is robust. However, this problem continues to grow with ethical, moral and economic repercussions for hospital institutions worldwide, and Puerto Rico is no exception. A lot remains to be done to counteract the effects of pressure ulcers, which Hibbs (1987) termed as an epidemic under the sheets. According to Necul (2011), pressure ulcers developed in hospitals are a problem worldwide and argue that the staff is silent witness to the issue. According to the author, 95% of the patients present ulcers that were avoidable.

The natural behavior of the skin, development of pressure ulcers (PUU), its prevention, equipment and materials for healing, scales of measurement, intervention guides, "Triage", family and caregiver intervention, advances in the practice of the profession, use of technology in the emergency room, communication and team work in emergency room, documentation of interventions, intervention methodologies (Anguera, Colodrero, García, Mateo, Roca, & Velasco, 2009, Bautista And Bocanegra, 2009, Bavaresgo & Lucena, 2012, Beinlich & Meehan, 2014, Berman & Snyder, 2013, Eng & Chan, 2013, Gonzalez, Cardona, Murcia, & Matriz, 2014, Guerrero, 2013, Martinez & Ponce, 2011, Meddings, Reichart, Hofer & McMahan, 2013, Myer, 2000, Necul, 2011, Pancorbo, García, López & Álvarez, 2006, Rangel, Hernández & García, 2010, Rogers, 2013, Schuetz, Hausfater, Haubitz, Fassler, Grolimund & Mueller, 2013, Se (2005), Shek & Hoyt, 2012, Thoroddsen, Sigurjónsdóttir, Ehnfors & Ehrenberg, 2013, Vallarejo, 2011, Watkins & Patrician, 2014, Zapico, 2005).

Beinlich and Meehan (2014) indicate that Nursing should put aside ritualism, and start an evidence-based practice using prevention, as well as assess the potential complications of the patient with the potential to develop ulcers. This is precisely the conceptual framework on which our research is based.

In a study by Guerrero (2008), completed in the emergency services of the Hospital San Jaume de Calella, shows that there is an autonomous role in the emergency room nurse related to the prevention of ulcers. He indicated that 51.6% of ulcers occur inside the hospital itself and that 95% of these are preventable and associated with the existing pathology. In his study, he explains that the first two hours of waiting in the emergency room are key to preventing the development of ulcers. A pressure of 60 to 70 mm HG is sufficient for two hours to develop pressure areas. According to Berman & Snyder (2013) the thinner the skin, the greater the risk of developing ulcers. On the other hand, Segovia et al., 2012 indicate that exposure to poor hygiene followed by evacuation or urine develops an irritating wet chemical medium that increases skin permeability by lowering the barrier of skin protection, making it more fragile and avid for breakage. Moisture-related injuries are not an inevitable consequence of incontinence, but can be preventable and improve the patient's dignity (Segovia et al., 2012).

González et al., 2014 in a research on the prevalence of ulcers in Colombia indicate that this is a problem attributable exclusively to nursing care. Myer (2000) emphasizes that skin management is subject to the knowledge that health professionals have when working with elderly patients. Bautista & Bocanegra (2009) concur with Myer (2000) pointing out that health professionals must possess the necessary knowledge to work with skin management especially with older patients.

Betty Neumann (1972) establishes that Nursing actions include primary, secondary and tertiary prevention. Primary prevention is one of the pillars of the theoretical basis of our research. Primary prevention strengthens the normal defense line by identifying factors in the "Triage" area associated with current and potential risks that may affect the patient; and ensures the implementation of a protocol of nursing interventions focused on attacking identified stressors before the development of ulcers and family integration (Nursing Theories, 2012).

In the language of the emergency room, "Triage" means to discern and classify patients according to their health condition for prompt attention. Schuetz et al., 2013, point out the serious problem that emergency rooms are presenting with regard to patient screening. Researchers mention that the current "Triage" system is an initial system that underestimates health care and nursing decisions (Schuetz et al., 2013); one of the recommendations of our study.

Shea and Hoyt (2012) express that the traditional "Triage" model is not being effective. Researchers are invited to create innovative strategies that expedite the patient's medical treatment from the initial screening in Triage. Treatment of the patient is delayed in the emergency room when there is no effective communication (Watkins & Patrician, 2014). Larner (2013) emphasizes that nursing knowledge deficit does not contribute to patient safety in preventing the development of ulcers.

Rogers (2013) points out that the documentation that the nursing staff has should be adequate, correct and consistent. This article discusses how the lack of documentation between doctor and nurses, and the care directed to the patient, are not coordinated, and stresses that education on the level of the emergency room should be continuous and of interest in the management of ulcers. Our study shows similar results, reflected by the almost null GC documentation. Rogers (2013) used the Norton scale as a skin assessment mechanism; recommends that the doctor consider the same.

The clinical documentation process is meritorious to know the progress or deterioration of patients, as it measures the quality of nursing care. The correct documentation on the condition of the skin is today one of the major problems for the hospital industry. This result is evident in the GC of our research. Meddings et al. (2013) emphasize the need to have the necessary equipment and the preparation of nursing staff in the prevention of the development of ulcers. The PPU prevention-training module used in our study is a tool that remains at the service of hospitals in Puerto Rico and programs for the preparation of nursing professionals.

The National Institute for Health and Care Excellence (NIHCE, 2014) offers guidance for the prevention and management of ulcers. The NIHCE (2005) identified key parameters that should be assessed in the initial contact and periodically by the Triage Nursing staff: health status, acute, chronic illness and terminal comorbidity, e.g. diabetes, malnutrition, state of postural mobility, sensory impairment, level of consciousness, systemic signs of infection, nutritional status, blood pressure damage, pain status, psychological factors, social factors, continence status, medication, cognitive status and blood flow, among others.

Nursing professionals have screening tools that consistently and systematically facilitate the "Triage" process and prevent the development of PPU. The Norton Scale is a measurement instrument that contemplates five aspects in the prevention of ulcers: (a) the patient's physical condition, (b) the patient's mental condition, (c) his level of activity, (d) his level of Mobility, and (e) factors associated with incontinence (Eng & Chan, 2013). Pancorbo et al., 2006, studied the use of the Norton and Braden risk measurement scale in clinical practice. In their study they reviewed thirty-three cases. The results showed a reduction in the risk of ulcers when using the Norton and Braden scale as an indicator.

In a study carried out in Brazil in 2012 on nursing interventions using the classification of Nursing NIC, nursing interventions were found for patients at risk of suffering from pressure ulcers. This study validates the NAND, NIC and NOC classification as an effective methodology in the prevention of pressure ulcers, to implement specific interventions and to relate risk factors to the development of the lesion with implications for practice, teaching and research in Nursing. Dr. Steven Kronick, MD, an adult emergency services specialist, points out that the patient deserves the respect of being attended promptly and with excellence. The study concluded that nursing staff did not distinguish between ulcer stages, as documented between 1995 and 2014 (University of Michigan Health System, 1995-2014). This result is consistent with the lack of documentation from the CG of our study.

Anguera et al. (2009) studied the factor of education in the prevention of pressure ulcers and concluded that the training of nursing professionals in the application of standardized preventive measures decreases the incidence of PU. In a study conducted by the Faculty of Nursing at the University of Antioquia on an educational program for caregivers of poly traumatized patients, Rangel et al. 2010, found that the intervention program was effective in positively impacting the level of knowledge of caregivers as the evolution and prevention of complications in the patient with a variety of traumas. This is the case of the results of our GE research whose family members became more actively involved in patient care. It is not the case of the relatives of the GC. The education of the adult patient as a topic of discussion is and will be the key to the transformation of ideas and attitudes regarding the management and prevention of the development of skin ulcers in hospitalized patients (Martínez & Ponce, 2011). A well-educated caregiver on prevention of ulcer development will be vigilant and will implement the measures learned.

Zapico (2005) argues that the Nursing profession is a discipline that builds its own body of knowledge based on the interpretation of the reality that surrounds it; that the analysis of the tasks and their evolution, will guide on the present competences and the capacity of the group to face the challenges of the 21st century. According to the researcher, new strategies and new processes must be put into practice for the sake of preventing the development of ulcers. It also points out that hospital institutions must restructure the concept of "Triage" as a private place, not open to the public, and maintain privacy for a screening capable of detecting the risk of developing ulcers (p.261).

The National Pressure Ulcer Advisory Panel (NPUAP, 2009) presented guidelines for quality inpatient services, including guidelines and elements related to skin management: skin care and protection, positioning and pressure relief device, nutrition, condition of the patient, caregiver and the nursing professional.

The NPUAP and the European Pressure Ulcer Advisory Panel (EPUAP, 2009) emphasize proper skin management through regular care of this system, keeping skin clean and free of irritants, use of emollients on dry skin, They could behave like friction. The Pan American Health Organization (PAHO) (s.f.), in its guide for diagnosis and management of pressure ulcers, developed four global objectives: 1) Identify the risk factors that contribute to the appearance of ulcers; 2) Identify the stages of pressure ulcer formation; 3) Recognize prevention and initial treatment measures; 4) Determine when a patient should be referred.

The World Health Organization (WHO) notes that treatment begins by identifying patients at risk for developing ulcers and preventing them. The prevention aspects in patients at risk include, as a priority: preventing ulcers, avoiding patient suffering and avoiding a greater burden on caregivers. Work with formal and informal caregivers should be narrow, with emphasis on educational aspects. The cooperation of caregivers in the monitoring of ulcers and the prevention of complications are essential.

Hospitals in Puerto Rico are full capacity with a waiting time for bed availability, from 10 hours to four days on average. The wait may fluctuate between five, ten or more days in hospital settings for adult patients with prolonged stays and these remain lying on a metal stretcher with a thin cover for damping bony prominences (Planning Board, 2015).

Our results are consistent with the literature reviewed. They provide data that strengthens and supports our position regarding the need to continually educate nurses in the emergency rooms of our hospitals to refine the Triage process by integrating a preventive approach in a systematic and evidence-based manner and educate family members and caregivers to create allies in the care of admitted patients. Education is key to ensuring quality nursing health services guided by proven effective intervention methodologies in the profession. The conclusions of our research:

1. Patients aged 60 and over admitted to the emergency area exposed to the NAND NIC NOC methodology protocol, who received interventions based on measurement, evidence, systematization and documentation, did not develop PPU during their stay in an emergency room.

2. Nursing staff interventions in the EG with patients admitted by emergency room area reflect consistency in the use of the NANDA NIC NOC and Norton Scale methodology for the prevention of UPP in a 24-hour period compared to the protocol Of Ulcers Management by GC Stages.

3. The CG, in general, did not adequately document their nursing interventions through the Staging Ulcer Management protocol.

4. The results indicate that the active participation of family members and caregivers of the EG patients in interventions for the prevention of ulcers was significant, the participation and training of family members and caregivers by the Nursing staff in the CG was practically nul.

5. Periodic rounds of skin titration at intervals of 2 to 3 hours of EG, postural change, skin examination and hygiene, and use of pressure relief devices, proved to be a Nursing intervention of the NANDA NIC NOC methodology, very suitable for the prevention of the development of pressure ulcers.

6. The CG results reflect poor documentation of nursing interventions related to periodic skin titration rounds at specific intervals described in the Stage Ulcers Management protocol.

7. The NANDA NIC NOC Nursing Methodology for the reduction and prevention of development of pressure ulcers (PPU) in patients 60 years or older admitted by the emergency room area was effective whenever the GE staff implemented the same Systematically and documented the interventions made.

8. The Hospital Stage B (GC) protocol for Staging Ulcer Management represents a nursing methodology, but it is not used by nurses systematically for the prevention of PPU.

9. It is essential to restructure the Triage procedure. It should be based on a solid theoretical and methodological basis, such as NANDA NIC NOC as well as integrate recognized risk measurement scales of PPU development such as the Norton Scale and / or other available scales.

10. Nursing training curricula should include the preventive approach to ulcer development, from a proven theoretical and methodological foundation.

11. Nursing Schools should train and strengthen cooperative practice agencies in ulcer prevention and promote the importance of family and caregivers in the health services team.

12. It is a duty to impact the public policy of the country through the discussion of the results of the study in different forums to raise awareness about the problem and propose solutions to attack the development of PPU in hospital and care facilities government and private in Puerto Rico.

References

- Anguera Saperas, L., Colodrero Díaz, E., García Grau, N., Mateo Zapata, E., Roca Biosca, A., & Velasco Guillen, M. (2009). La educación como pieza clave en la prevención y buena evolución de las úlceras de presión. *Enfermería Intensiva*. 20 (1), 19 -26.
- Bautista Montana, I., & Bocanegra Vargas, L. (2009). *Prevalencia y factores asociados de las úlceras por presión en los pacientes hospitalizados en los servicios de medicina interna, neurología y cuidados intensivos de una institución prestadora de salud de III nivel de la ciudad de Bogotá en el año 2009*. Retrieved from Pontifica Universidad Javariana: <http://www.javeriana.edu.co/biblos/tesis/enfermeria/20092/DEFINITIVA/tesis02.pdf>

- Bavarego, T., & Lucena, A. (2012). Intervenciones de la Clasificación de Enfermería NIC validadas para pacientes en riesgo de úlcera por presión. *Latino-Americana de Enfermagem*, 20(6), 1-8. Retrieved from http://www.scielo.br/pdf/rlae/v20n6/es_13.pdf
- Beinlich N., Meehan, A. (2014). *Evidence and Wounds*. Retrieved from http://evidenciasyheridas.blogspot.com/2014_04_01_archive.html
- Berman, A., & Snyder, S. (2013). *Fundamentos de Enfermería: Conceptos, proceso y práctica* (Vol. 9na ed). Madrid: Pearson Education.
- Campbell, D. T. & Stanley, J. C. (1966). *Experimental and Quasi-Experimental Designs for Research*. Boston: Houghton Mifflin,
- Eng, J., & Chan, C. (2013). Norton Measure. Retrieved from Scireproject: <https://scireproject.com/outcome-measures/outcome-measure>
- Gonzalez-Consuegral, R., Cardona-Mazol, D., Murcia-Trujillo, P., & Matriz-Veral, G. (2014). *Prevalencia de úlceras por presión en Colombia*. Retrieved from Universidad Nacional en Colombia: <http://www.revistas.unal.edu.co/index.php/revfacmed/article/viewFile/43004/50099>
- Guerrero Miralles, M. (2008). Pressure ulcers: A potential problem in collapsed emergency services. *Gerokomos*, (2), 55. doi: 10.4321/s1134-928x2008000200006
- Hernández, R., Fernández, C., & Baptista, P. (2006). *Metodología de la investigación*. (4ta. Ed.). México: MCGraw-Hill Interamericana.
- Hibbs, P. (1987). *Pressure area care for the city and Hackney Health Authority: Prevention plan for patients at risk for developing pressure sores; policy for the management of pressure sores*. London: City and Hackney Health Authority.
- Larner, S. (2013). Smartphones and tablets in the hospital environment. *British Journal of Healthcare Management*, 404-405.
- Martínez López, R. & Ponce Martínez, D. E. (2011). Valoración de los conocimientos del cuidador principal sobre úlceras de presión. *Enfermería Global*, 10(24), 61-62
- Meddings, J. A., Reichart, H., Hofer, T. y McMahon, L. F. (2013). Hospital report cards for hospital-acquired pressure ulcers: how good are the grades? *Annals of Internal Medicine*, 159(8), 505-513. doi: 10.7326/0003-4819-159-8-201310150-00003
- Myer, A. H. (2000). The effects of aging on wound healing. *Topics in Geriatric Rehabilitation*, 16(2), 1-10.
- Nanda International, Inc. (2016). *Nanda Knowledge Based Terminology Defining Nursing*. Retrieved from <http://www.nanda.org/nanda-i-noc.html>
- National Institute for Health and Care Excellence. (2014). *Pressure ulcers: Prevention and management of pressure ulcers*. Retrieved from

- <http://www.nice.org.uk/guidance/cg179/resources/guidance-pressure-ulcers-prevention-and-management-of-pressure-ulcers-pdf>
- National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel. (2009). Pressure ulcer treatment recommendations. In *Prevention and treatment of pressure ulcers: clinical practice guideline* (pp. 51-120). Washington, DC: National Pressure Ulcer Advisory Panel.
- Necul Beltran, C. I. (2011). *Úlceras por presión en pacientes hospitalizados*. Retrieved from <http://www.monografias.com/trabajos91/úlceras-presion-pacientes-ospitalizados/úlceras-presion-pacientes-hospitalizados.shtml>
- Norton, D., McLaren, R. & Exton-Smith, A.N. (1962). *An Investigation of Geriatric Nursing Problems in Hospital*. London: Churchill Livingstone.
- Nursing Theories. (2012). Betty Neumann's System Model. Retrieved from http://currentnursing.com/nursing_theory/Neuman.html
- Organización Panamericana de Salud. (s.f.). *Úlceras por presión*. Retrieved from <http://www.sld.cu/galerias/pdf/sitios/gericuba/guia30.pdf>
- Pancorbo Hidalgo, P. L., García Fernández, F. P., López Medina, I. M., & Álvarez Nieto, C. (2006). Risk assessment scales for pressure ulcer prevention: A systematic review. *Journal of Advanced Nursing*, 54(1), 94-110.
- Suplemento Económico de Puerto Rico. *Suplemento Especial: Mortalidad. Informe de la Junta de Planificación al Gobernador*, Hon. Alejandro García Padilla Noviembre 2013 Retrieved form <http://www.miprv.com/wp-content/uploads/2013/12/Suplemento-Mortalidad-2013-final.pdf>
- Rangel Flores, Y. Y., Hernández Flores, M. M., & García Rangel, M. (2010). Enseñar a quien cuida el arte de cuidar: Un programa educativo con cuidadores de pacientes politraumatizados. *Investigación y Educación en Enfermería*, 28(1), 73-82
- Rogers, C. (2013). Improving processes to capture present-on-admission pressure ulcers. *Advances in Skin & Wound Care*, 26(12), 566-572.
- Schuetz, P., Hausfater, P., Amin, D., Haubitz, S., Fassler, L., Grolimund, E. & Mueller, B. (2013). Optimizing "Triage" and hospitalization in adult general medical emergency patients: The "Triage" project. *BMC Emergencia Medicine*, 13 (12), 2-11. Retrieved from <http://www.biomedcentral.com/1471-227X/13/12>
- Segovia-Gómez, T., Bermejo Martínez, M., & García-Alamino, J. M. (2012). Úlceras por humedad: Conocerlas mejor para poder prevenirlas. *Gerokomos*, 23(3), 137-140. Retrieved from <http://dx.doi.org/10.4321/S1134-928X2012000300009>

- Shea, S. S., y Hoyt, K. S. (2012). “RAPID” team “Triage”: One hospital’s approach to patient centered team “Triage”. *Advanced Emergency Nursing Journal*, 34(2), 177-189.
- Tashakkori, A. & Teddlie, C. (2010). Overview of Contemporary Issues in Mixed Methods Research. *Handbook of Mixed Methods in the Social and Behavioral Research*. (2nd Ed.). Sage Publications, Inc. 1-41.
- Teddlie, C. & Yu, F. (2007). Mixed Methods Sampling: A Typology with Examples. *Journal of Mixed Methods Research*, 1(1), 77-100.
- Thoroddsen, A., Sigurjónsdóttir, G., Ehnfors, M. & Ehrenberg, A. (2013). Accuracy, completeness and comprehensiveness of information on pressure ulcers recorded in the patient record. *Scandinavian Journal of Caring Sciences*, 27(1), 84-91. doi:10.1111/j.1471-6712.2012.01004.x
- Villarejo Aguilar, L. (2011). Interrelaciones NANDA-NOC-NIC en los planes de cuidados registrados en los informes de alta. *Nursing*, 29, 58-64. doi:10.1016/S0212-5382(11)70272-2
- Watkins, L. M., & Patrician, P. A. (2014). Handoff communication from the emergency department to primary care. *Advanced Emergency Nursing Journal*, 36(1), 44-51.
- Zapico Yáñez, F. (2005). *Avances en la práctica de la profesión de Enfermería. Visión de una misma realidad*. Universidad de Barcelona, Retrieved from <http://enferlic.blogspot.com/2010/11/proceso-de-atencion-en-enfermeria-pae.html>
- University of Michigan Health System. (1995-2014). *Adult emergency*. Retrieved from <http://medicine.umich.edu/dept/emergency-medicine/patient-care-services/adult-emergency>



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