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### RESEARCH ARTICLE

#### IMPACT OF THE PHYSIOTHERAPEUTIC PREVENTIVE PROTOCOL ON THE REDUCTION OF PRESSURE ULCERS IN HOSPITALIZED PATIENTS.

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#### Abstract

**Introduction:** Pressure ulcer (PU) has ceased to be an invisible and underrated health problem, now they represent a complication of the first order, whose magnitude, both for patients, as for health services and society in general, is considered as a public health problem, so it requires all the means and resources necessary to combat them. The objective is to evaluate the relationship between the impact of the physiotherapeutic preventive protocol and the risk of PU in hospitalized patients. Answering the question What is the impact of the physiotherapeutic preventive protocol in reducing the frequency of pressure ulcers in hospitalized patients? Hypothesis. There is a relationship between the implementation of the physiotherapeutic preventive protocol and the risk of PU in hospitalized patients. **Materials and methods:** Quasi-experimental design, the Braden scale was used, design and application of a physiotherapeutic preventive protocol, 170 hospitalized patients participated from September 1, 2018 to June 30, 2019.

**Results:** Inpatients do not present significant statistical differences. After the intervention, it was found that in group 2 without caregivers they developed pressure ulcers in category 1 and 2. Not so, in the caregiver group where the highest frequency was without ulcer development.

**Discussion:** The indications in the IMSS Nursing Clinical Practice Guide are proved, the research hypothesis is accepted, it is confirmed the usefulness of a physiotherapeutic intervention in the management of patients at risk of presenting pressure ulcers, avoiding complications.

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#### Introduction:-

Pressure ulcer (PU) is a health problem that affects different patients and deteriorates the quality of life if preventive measures are not exercised, so it is important to design and implement a physiotherapeutic preventive protocol, through the application of changes postural obtaining a better quality of life for people during their hospital stay. This study has a general objective and five specific ones, as follows: To evaluate the relationship between the impact of the physiotherapeutic preventive protocol and the risk of pressure ulcers in hospitalized patients at the General

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Hospital of Zone No.1 (HGZ No.1) of Campeche. The specific objectives are: 1. Describe the sociodemographic variables of the patients (gender, age, pathology and hospitalization service, relationship of the caregiver). 2. Know the raw prevalence of patients with PU the year before starting the application of the protocol and the year of application. 3. Identify the degree of PU before and after the investigation protocol for hospitalization services. 4. Determine the frequency of PU risk in hospitalized patients. 5. Analyze the direct costs of the hospital stay in relation to the average patient-day.

This research has as a research question: What is the impact of the physiotherapeutic preventive protocol in reducing the frequency of Pressure Ulcers in hospitalized patients in the HGZ No. 1 of Campeche?

We worked with two types of hypothesis one research and one null, which are presented below:

H<sub>1</sub> There is a relationship between the implementation of the physiotherapeutic preventive protocol and the risk of pressure ulcers in hospitalized patients.

H<sub>0</sub> There is no relationship between the implementation of the physiotherapeutic preventive protocol and the risk of pressure ulcers in hospitalized patients.

The issue of pressure ulcers was feasible because the team of researchers is composed of physiotherapy professionals, a researcher with knowledge in the field of medicine and experience in the clinical field and obtained permission to work directly with hospitalized patients from the clinic. The issue is interesting because if the PUs are not treated immediately, so their complications can cause death; it is novel because so far there is no physiotherapeutic management in the hospital for the prevention of Pus. The ethical principle is fulfilled by taking care that the personal data is confidential, the objectives of beneficence, respect and autonomy of the patient were met, it is guaranteed that the information obtained will only be used for the purposes of the study, always attached to the regulations of the General Law of Health in the matter of research for Health, of the ethical aspects of research in human beings, in Chapter One, Article 13 prevails the criterion of respect, dignity, protection of their rights, Article 16 will protect the privacy of the researched individual and Article 17 is a research with minimal risk since only health education will be conducted and surveys will be used without intervention in the physiological, psychological and social variables of individuals.

The issue of quality and patient safety in the last 20 years has been relevant in shaping health policies. The World Health Organization (WHO, 2012) mentions studies conducted by the Harvard Institute of Medicine.

It was estimated that 4% of patients suffer some type of damage in the hospital, 70% of adverse events cause temporary disability and 14% of the incidents are fatal. Also, medical errors cause between 44,000 and 98,000 deaths per year in hospitals in the United States of America.

A relevant fact was the Latin American study of patient safety and health accreditation (IBEAS) that involved the participation of several countries, including Mexico, the IBEAS study resulted in the identification of the three most frequent adverse events: nosocomial pneumonia, surgical wound infections and thirdly pressure ulcers (PU). Based on the foregoing, the Mexican Government, through the National Health Program 2007-2012, determined five objectives in health care, which were related to the provision of health services with quality and safety, for this it took in consideration the prevention of adverse events.

One of these indicators monitored since 2006, was the level of compliance with nursing actions to prevent PUs. From the results obtained, proposals for improvement have emerged, such as the standardization of the use of a rating scale, a protocol for the prevention, management, implementation and standardization of wound clinics. Although there was knowledge of the level of prevention, there were no data on the magnitude of the PU problem or information needed to develop strategies aimed at reducing the high costs of patient care that entered the long line of patients with chronic wounds, since they represent an important social expense for the costs generated by the treatment, as well as the emotional cost of those who suffer a chronic injury.

The PUs not only represent a condition that negatively affects the physical, mental and emotional well-being of those who suffer from them, but also lead to the prolongation of the hospital stay of patients, deteriorate the image of health institutions and contribute to increased workload of nursing professionals. The objective of measuring the prevalence of PUs at national, state, jurisdictional and local levels was relevant to address specific action strategies

in the country. Undoubtedly, establishing new policies on the subject will allow to offer a safe and, therefore, quality assistance. In the National Health System, a change is needed that points towards transformation, to move from a curative system to a preventive one, which integrates the promotion of a culture of quality among professionals and patients, all this through the development of behaviors and attitudes aimed at minimizing the risk in medical practice, avoiding the presence of adverse events.

Pressure ulcers (PU) have ceased to be an invisible and underestimated health problem, now they represent a major complication, whose magnitude, both for patients and for health services and society in general, makes it a must consider as a public health problem, so it requires all the means and resources necessary to combat them (EPUAP, 2009).

They are conceptualized as a lesion of ischemic origin located in the skin and in the underlying tissues with skin loss, which is caused by prolonged pressure or friction between two hard planes, one belonging to the patient and another external to it. Two mechanisms are combined in its development; vascular occlusion due to external pressure and endothelial damage at the microcirculation level. Three types of forces participate in its formation: pressure, friction and shearing (J, 2014) (Arango, 2006) (Patron, 2013).

They are classified according to the International Classification System for Pressure Ulcers of the American National Pressure Ulcer Consultative Group (NPUAP) and the European Pressure Ulcer Consultative Group (EPUAP) in:

Category / Stage I: Non-bleaching erythema on intact skin. Intact skin with non-bleaching erythema from a localized area, usually on a bony prominence. Skin discoloration, heat, edema, hardening or pain may also be present. Dark skin may not show visible paleness. Other features: The area can be painful, firm, soft, hotter or colder compared to adjacent tissues. This category / stage is difficult to detect in people with dark skin tones. It can indicate people "at risk" of developing a pressure ulcer.

Category / Stage II: partial loss of skin thickness or blister. The loss of partial thickness of the dermis is presented as a shallow open ulcer with a bed of the wound between pink and reddish, without slough. It can also be presented as an intact or open / broken blister filled with serum or bloody serum. Other features: It presents as a bright or dry superficial ulcer without slough or bruising. This category / stage should not be used to describe skin tears, burns caused by adhesive plaster, dermatitis associated with incontinence, maceration or excoriation.

Category / Stage III: total loss of skin thickness (visible fat). Complete loss of tissue thickness. Subcutaneous fat may be visible, but bones, tendons or muscles are not exposed. Sloughs may occur. It can include cavitations and tunneling. Other characteristics: The depth of pressure ulcers of this category / stage varies according to their location in the patient's anatomy. The bridge of the nose, ear, occipital and malleolus have no subcutaneous (adipose) tissue and the ulcers may be shallow. On the contrary, areas with significant adiposity can develop pressure ulcers of extremely deep. The bone or tendon are not visible or directly palpable.

Category / Stage IV: total loss of tissue thickness (visible muscle / bone). Total loss of tissue thickness with exposed bone, tendon or muscle. Sloughs or bedsores may appear. It often includes cavitations and tunneling. Other characteristics: The pressure ulcer depth of this category / stage varies according to its location in the patient's anatomy. The bridge of the nose, ear, occipital and malleolus have no subcutaneous (adipose) tissue and these ulcers may be shallow. Category IV / stage ulcers can extend to the muscle and / or support structures (for example, the fascia, tendon or joint capsule) and can cause osteomyelitis or osteitis. The exposed bone / muscle is visible or directly palpable. (Pancorbo, 2014)

Approximately 18% of hospitalized patients have a pressure ulcer (EPUAP, 2002) and although some may have them from admission, most occur during hospitalization for acute illness. Several studies worldwide have underlined the important economic impact that PUs represent for health systems around the world. A study published in 2004 by Bennett et al., carried out in several hospitals in the United Kingdom, determined that the cost of treatment of a PU ranged between 1,080 sterling pounds (£) and £ 15,000, while a study conducted in Spain by Soldevilla et al., in 2006, it showed figures ranging from \$ 211 to \$ 16,600 per episode. In Mexico, a study published in 2013 by Vela et al., which was conducted in 14 first-level care units, indicated that the unit cost of PU care amounted to 687 Mexican pesos (\$) per capita per week and 2,748 (\$) per capita per month (Soldevilla T. V., 2011).

That is why health authorities in Mexico, conducted the First National Study of the prevalence of PU in 175 units of second level of care throughout the country, whose results reported an average prevalence of 20.1%, finding the highest proportion of the cases in the following anatomical locations: sacrum (27%), heel (27%), ischium (10%), head (4%) and elbows (35%). Regarding the severity of the injuries, most of them were considered as category 1 (39% of total injuries), they developed in approximately 6 days from the date of admission to the institution. It should be noted that in the country there is information at national level about some epidemiological aspects of the PUs (prevalence, incidence, anatomical location and categorization of lesions); it is necessary for each health unit to evaluate the behavior of the PUs and their impact according to their own resources and the characteristics of the population to which they provide their services (RNAO, 2005).

The Ibero-Latin American Society of Ulcers and Wounds (SILAHUE) points out that up to 95% of cases of PU are preventable, a fact that invites reflection on the factors that condition the appearance of these lesions. One of them is the care provided by nursing professionals, since PUs are "an adverse event, resulting from interventions performed or not performed on patients", including both preventive measures and focused actions to the treatment of said injuries.

The treatment of patients with pressure ulcers includes different interventions, such as: nutritional care, reduced pressure and relief surfaces, as well as skin and wound care. The change of position of patients is also an important component of the treatment of pressure sores. Pressure derived from the position of recumbency or sitting on a specific area of the body causes oxygen deprivation of the affected area. This shortage usually causes pain and discomfort that stimulates the individual to move. Not changing position decreases oxygen supply, poor wound healing and causes additional tissue damage. Patients who cannot change their position themselves require assistance (Connie, 2004).

International best practice recommends changing position, as an integral component of a pressure ulcer treatment strategy. Although the change of position is indicated, there is confusion regarding the exact frequency and method of position change required. The Agency for Health Care Policy and Research of the United States (USA) suggests changing positions every two hours (AHCPR 1992), while the European Pressure Ulcer Advisory Panel and the National Institute for Clinical Excellence of the UK recommend changing positions when requested by each patient. The intervention of the physiotherapist is of great importance by having an adequate knowledge about pressure ulcers, as well as the therapeutic approach for its prevention and treatment, since they constitute one of the causes that frequently slow down or hinder the execution of a rehabilitation program, and therefore influence the fulfillment of the objectives set in it. PUs can also increase the intensity of symptoms such as the spasticity of certain patients, which may increase their disability (Soldevilla T. , 1999).

The assessment of the PUs implies: 1. Initially assess and reassess it again at least every week, documenting its findings. A period of two weeks is recommended to be able to assess the progress made towards healing. However, weekly assessments provide an opportunity for healthcare professionals to detect complications early as well as the need to change the treatment plan. 2. With each dressing change, observe the evolution of the PU that may indicate the need to change the treatment (for example, wound improvement, wound deterioration, major or minor exudation, signs of infection, or other complications). 3. Faithfully assess and document physical characteristics such as location, Category / Stadium, size, type (s) of tissue, wound bed and the condition of the perilesional skin of the wound, the edges of the wound, fistulous paths, cavitations, tunneling, exudate, necrotic tissue, odor, presence / absence of granulation tissue, and epithelialization. 4. Place the individual in a neutral position that allows measuring the wound. 5. Length and width: Choose a reliable and uniform method to measure the length and width of the wound to facilitate the comparison of the wound measurements clearly over time. 6. The depth of the wound, tunneling and cavitation: Choose a reliable and uniform method to measure the depth. Be careful not to cause injuries when measuring the depth of the bed of a wound or determining the extent of a cavity or tunnel. 7. Use the findings made during the assessment of pressure ulcer to plan the most suitable interventions for healing. (Soldevilla T. , 1999)

The treatment needs of a pressure ulcer change over time, both in terms of healing and deterioration. Treatment strategies should be continually reassessed based on the current state of the ulcer. (Torra, 2003) (Soldevilla T. V., 2006).

In the review of studies related to the topic of physiotherapeutic mobilizations for the prevention of pressure ulcers, no articles were found that contained the information that the physiotherapeutic intervention in a preventive and timely manner performing the technique of postural changes that are necessary in the hospital of second level and that reduce the risk of PUs, as well as the importance of the physiotherapist in preventing them.

### **Materials and methods:-**

This research has a quantitative approach, an analytical scope and an experimental design of the quasi-experiment type. The population was made up of 283 hospitalized people, but the sample consisted of 200 people who met the inclusion criteria; 100 subjects distributed in each group in a 1:1 ratio.

It was divided into two groups:

1. Group 1 with caregiver: person who accompanies and assists the hospitalized patient performs the protocol.
2. Group 2 without caregiver: the physiotherapist performs the protocol.

The selection criteria were: All patients hospitalized in the Internal Medicine and General Surgery service of the General Hospital of Zone No.1, Campeche, Mexico, in the period from September 1, 2018 to June 30, 2019. Each of these selection criteria is described below: Inclusion: Inpatient hospitalization services (general surgery and internal medicine), classified according to the Braden scale in high risk and moderate risk, that accepts to participate and with caregiver (group 1) and without caregiver (group 2); Exclusion: Patients with pressure ulcers, patients with a history of having been hospitalized in less than 48 Hours; Elimination: Those who do not wish to continue and patients who die.

The research protocol is authorized by the research and health ethics committee (CLIES 401) with the issuance of registration number **R-2019-401-013**, subsequently informed and requested access to the Director of the General Hospital of Zone No.1 of Campeche.

The tools used in the research protocol were:

1. Braden-Bergstrom scale: Measures the risk of PU and consists of 6 categories or subscales focused on the 2 main etiological factors in the development of the ulcer: intensity - duration of pressure and tolerance of tissue to pressure. It has a sensitivity that ranges between 27 and 98%; a specificity with values between 26% and 92%.
2. The turn clock tool is used to alert staff that this patient has been identified as at risk of pressure ulcers. It serves as an important reminder to replace the patient every two hours, a key component of care for patients at risk.
3. As a resource to transmit health education:
4. 4-minute video, which shows the postural changes step by step. (Fig. 1).
5. Brochure that contains the turn clock as a reminder, describes the PU, its classification, actions that the caregiver must perform to avoid future risks in the hospitalized patient (Fig. 2).

The preventive protocol procedure, which highlights the physiotherapist's expertise and the continuity of care with the caregiver for group 1, and not just the routine care of professional health personnel in group 2.

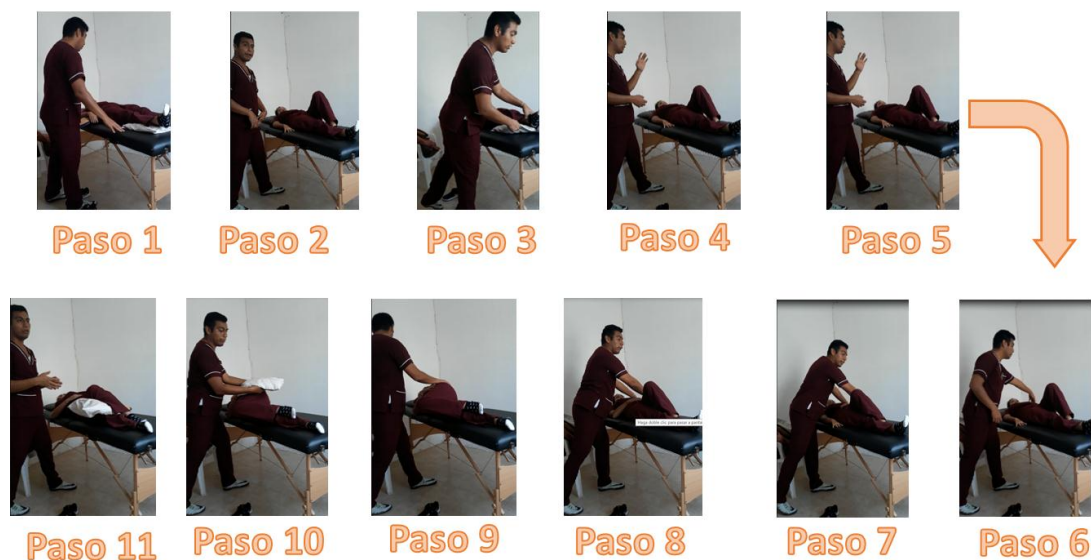
Group 1 intervention was carried out in four phases: Phase 1. Education, Phase 2. Mobilization, Phase 3. Caregiver evaluation, Phase 4. Reevaluation, at the time of pre-discharge.

1. Education Phase, in a session of approximately 40 minutes, the physiotherapist provides information on the concept of pressure ulcer, the risks, the measures that the caregiver should take to manage and prevent the PU; then the risks of immobility, their classification, risk areas and positions to prevent them are specifically disclosed. The caregiver is asked for pillows as support material in the next session to perform a correct postural change technique.
2. With the support of the technological resource, a video (in Tablet) is shown where the appropriate form of the postural changes is visualized, according to the anatomical region and subsequently, the caregiver is guided and taught the technique of postural change without pillows in patients hospitalized with the correct steps that are nine: The position of the patient is observed, we take care that the form taken by the caregiver to make the changes is correct, before the postural changes the contralateral knee should be flexed to where the postural change will be directed to the family member's initial position ( feet parallel to the body), later the caregiver places the legs in a square for greater stability in the spine, the posterior clamp is placed on the shoulder contralateral to the movement that we are going to perform, the second clamp will be placed on the hip contralateral to the movement that we are going to perform, the caregiver flexes the knee in front of him during

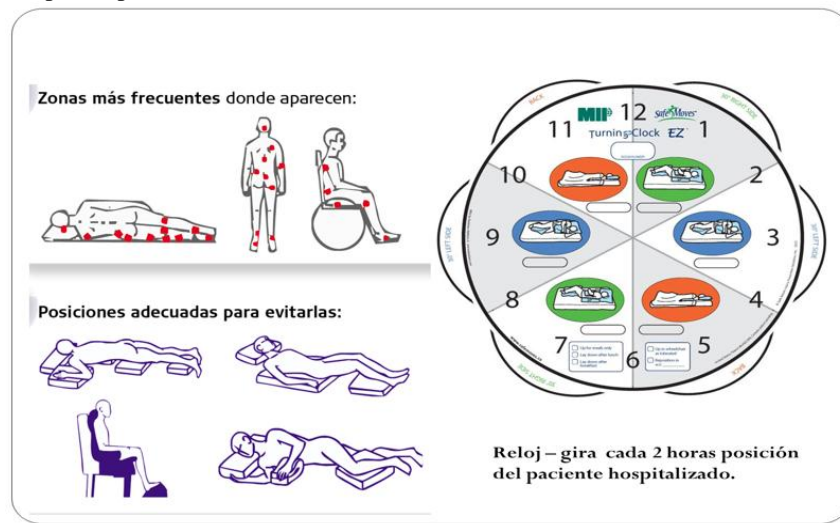
the performance of the square to perform the patient's postural change, the caregiver stretches both legs at the same time that he is making the transition movement of the patient from supine to lateral or vice versa; the time at which the postural change should be made again is mentioned, regularly every 2 or 3 hours. Finally, the risk of pressure ulcer is evaluated.

3. Mobilization phase. Every 2 hours (turning clock tool), the following is done: postural change techniques are taught with pillows, if you bring them, if you did not bring them, the previous step is reported in Phase 1. In hospitalized patients the steps are 11, which are described below: The position of the patient is observed and what pillows he has in place, take care that the position taken to make these changes is correct, prepare the pillows that will be used on one side of the patient, before the postural changes the contralateral knee should be flexed to where the postural change will be directed to the initial position of the physiotherapist (feet parallel to the body), subsequently the physiotherapist places the legs in a square for greater stability in the spine, the clamp is placed, posterior to the shoulder, contralateral to the movement that we are going to make, the second clamp is placed on the hip contralateral to the movement that we are going to make, the knee in front of it is flexed during the completion of the square to make the patient's postural change, stretch both legs at the same time as the transitional movement of the supine to lateral recumbency patient or vice versa, proceed to the placement of pillows depending on the position, mention where the pillows should go in areas susceptible to generate pressure ulcers; the periodicity of the postural change is every 2 to 3 hours.
4. Practically, the physiotherapist asks the caregiver to perform the technique of postural changes without or with a pillow. The caregiver performs all the steps shown with the patient, the physiotherapist corrects and guides.
5. Evaluation phase to the caregiver, at the end of the theoretical and practical session, the caregiver is evaluated in order to verify that the correct technique is performed using a checklist (Table 1), return after 2 hours in order to verify that periodicity was understood.
6. During the hospital stay, the caregiver is given feedback, with emphasis on those who obtained a regular or bad score.
7. Reevaluation Phase, at the time of pre-registration a 30-minute feedback session is granted with support from resources (video and brochure), the technique is reevaluated with or without pillows, it is returned at two hours to verify the understanding of the periodic mobilization and finally, the risk of ulcer is reassessed.
8. In addition, the anatomical regions of risk are ratified, making clear the points on patient education and the care plans that the caregiver should carry out on the management and prevention of PUs at home, the risks of immobility are disclosed, classification, risk areas and positions to prevent them.

**Figure 1:-Steps of the physiotherapeutic video**



Source: Own Creation

**Figure 2:-**Physiotherapeutic protocol brochure

Source: Own Creation

**Table 1:-**Mastery of preventive measures to prevent pressure ulcers

| Aspect to evaluate in the implementation of the preventive physiotherapeutic protocol for pressure ulcer.   | Fist Practice |    | After 2 hours |    |
|---|---------------|----|---------------|----|
|   | Yes           | No | Yes           | No |
| <b>Valor</b>  | 1             | 0  | 1             | 0  |
| 1. It has support material (such as pillow (s)).  |               |    |               |    |
| 2. Identify anatomical area of risk of generating pressure ulcer according to the evaluation of the hospitalized patient.                               |               |    |               |    |
| 3. Observe the patient's position before making the postural changes.   |               |    |               |    |
| 4. Ergonomics adopted by the caregiver to make the postural change.   |               |    |               |    |
| 5. Flex the contralateral knee where the postural change is going to be directed.   |               |    |               |    |
| 6. Correct position when starting the caregiver (feet parallel to the body).  |               |    |               |    |
| 7. Placement of the tweezers in the patient.  |               |    |               |    |
| 8. The clamp posterior to the shoulder contralateral to the movement we are going to perform.   |               |    |               |    |
| 9. The second clamp on the hip contralateral to the movement we are going to make.  |               |    |               |    |
| 10. The caregiver bends the knees in front of him during the completion of the square to make the postural change in the patient.                       |               |    |               |    |
| 11. The caregiver stretches both legs at the same time that he is performing the transition movement of the supine to lateral recumbency or vice versa. |               |    |               |    |
| 12. Pillows are placed in areas susceptible to UPP.   |               |    |               |    |
| 13. Has the knowledge of the time that postural changes should be made (every 2 hours)  |               |    |               |    |
| 14. Perform all steps properly in the correct order.  |               |    |               |    |
| Total points  |               |    |               |    |
| Observations:   |               |    |               |    |
| 10 to 14 points= Good, 5 to 9 points= regular, 0 to 4 = bad.  |               |    |               |    |

Source: Own Creation

Interpretation: This checklist was made for the evaluation of postural changes in hospitalized patients where it is included from the technique to the position that the caregiver must adopt in order to take care of their position during the transition movement and thus avoid suffering injuries, and to see if there was an optimal learning of the people involved about teaching.

The score of 10 to 14 points is taken as good and no action will be provided. If the score is 5 to 9 as regular, it is reinforced at points that fail and is reported back, from 0 to 4 points the entire phase 1 mentioned above of the physiotherapeutic actions towards the caregiver is repeated and reinforce the points good ones.

For the database, the SPSS® version 20 program was used, the statistical analysis was carried out through descriptive statistics for the univariate, for the bivariate analysis t student was applied for the difference of groups and for the association chi-square was used, with 95% confidence interval.

### Results:-

Of the total of patients included in the study, the median age was 58 years (range 18 to 95 years), male frequency in 56%, the predominant service was surgery in 52% and the median in-hospital stay was 10 days (range 6 to 84 days). The risk of ulcers of hospitalized patients in the internal medicine and surgery services did not show significant statistical differences when applying t student, which implies the homogeneity of the groups. After implementing the four-phase physiotherapeutic preventive protocol, it was found that in group 2 without caregivers they developed pressure ulcers in category 1 and 2. Not so, in the group with caregiver where the highest frequency was without development of ulcers. (Table 2).

**Table 2:-**Frequency of ulcers in groups with and without caregiver

|           |                   | Ulcer Stadium |            |                | Total |
|-----------|-------------------|---------------|------------|----------------|-------|
|           |                   | Category 1    | Category 2 | No development |       |
| Caregiver | With caregiver    | 0             | 1          | 99             | 100   |
|           | Without caregiver | 31            | 10         | 59             | 100   |
| Total     |                   | 31            | 11         | 158            | 200   |

Source: Own Creation

To determine the association between the variables (with and without caregiver with respect to the stage of ulcers), the Pearson's chi-square statistic is 48.49 and the value  $p = 0.000$ , therefore, it can be concluded that the association between the variables is statistically significant.

Likewise, the frequency of extrinsic and intrinsic factors in all hospitalized patients is very high, with the necessary immobility and the presence of devices prevailing in extrinsic; in intrinsic prevailed oxygen perfusion abnormalities. (Table 3)

**Table 3:-**Frequency of extrinsic and intrinsic factors for the development of pressure ulcers.

| Extrinsic Factor                                   |     | Fr       | %    |
|--|-----|----------|------|
| Caregiver change                                   | Yes | 107      | 53.5 |
|  | No  | 93       | 46.5 |
| Shear friction                                     | Yes | 163.81.5 | 81.5 |
|  | No  | 37       | 18.5 |
| Necessary Immobility                               | Yes | 169      | 84.5 |
|  | No  | 31       | 15.5 |
| Surgical intervention                              | Yes | 110      | 55   |
|  | No  | 90       | 45   |
| Medication   | Yes | 114      | 57   |
|  | No  | 86       | 43   |
| Devices (probe, etc.)                              | Yes | 30       | 15   |
|  | No  | 170      | 85   |
| Oxygen devices (tracheal gold cannula, CPAP, etc.) | Yes | 20       | 10   |
|  | No  | 180      | 90   |



| Intrinsic Factor                   |     | Fr  | %  |
|------------------------------------|-----|-----|----|
| Cognitive sensory disorders        | Yes | 24  | 12 |
|                                    | No  | 176 | 88 |
| Alterations of perfusion of oxygen | Yes | 105 | 52 |
|                                    | No  | 95  | 47 |
| Metabolic Nutritional Alterations  | Yes | 21  | 10 |
|                                    | No  | 179 | 90 |
| Alterations of Hydration           | Yes | 16  | 8  |
|                                    | No  | 184 | 92 |
| Incontinence                       | Yes | 18  | 8  |
|                                    | No  | 184 | 92 |

Source: Own Creation

With the results obtained in the physiotherapeutic preventive protocol, a reduction in the number of patients susceptible to generate ulcers was achieved through strategies with which it was possible to obtain notable benefits in hospitalized patients, indicating that there is a benefit in the application of a physiotherapeutic preventive protocol for the prevention of pressure ulcers.

### Discussion:-

According to the Nursing Clinical Practice Guide, Volume Two, the intervention of a multidisciplinary team is necessary, consisting of: Physician, Nurses and Physiotherapists, which in this article demonstrates the importance of the physiotherapist's work in managing the prevention of PU.

The numerous studies conducted with less or greater effectiveness in the management of pressure ulcers involve action plans for the implementation of prevention strategies with health professionals, where the nurse has an important role. However, this study demonstrates the benefit of the intervention in the two groups, but where the responsibility of the caregiver is strengthened is much greater, especially due to the continuity of the care actions. This study specifies the actions of the caregiver and ergonomic positions of the patients, which are evaluated by the physiotherapist considering the position of both. Unlike Bradford (2016), who conducts a study with the purpose of knowing the effects of changes in position, knowing the best interval and associating them with costs and consequences. Being different from the study, because it concludes that there is still more evidence to know what the optimal position and frequency is.

Similarly, Groach, Sladen, Pineda, et al. (2015) concluded that there is a lack of evidence to know the best position of the bedridden patient and the best frequency of position changes, because they do not include the physiotherapist in the multidisciplinary team. Also, Gillespie, Chaboyer, McInnes, et al. (2013), concluded in their study that more research is needed to know what the ideal frequency of the changes is, a variable that is attended in the domain of this study when the caregiver receives advice from the physiotherapist and employ technological resources that serve as reminders in the management of the bedridden patient, such is the case with the turn clock.

Likewise, Velez, Díaz, Pallarez, Lozano Correa, et al. (2016) in their systematic review point out the importance of non-pharmacological interventions to prevent PUs, even in older adults. This is similar to Demarre, Van Lanker, Van Hecke, et al (2015) who point out the impact on hospital stay and cost reduction with the implementation of preventive measures in patients at risk of PU. As well as, as indicated by Chou, Dana, Bougatsos, et al. (2013) that evaluated the clinical utility of instruments and the effectiveness of preventive interventions in people at risk.

### Conclusion:-

Finally, it is concluded that more scientific evidence is needed from randomized clinical trials and not only from quasi-experimental studies in order to evaluate the benefit of physiotherapeutic technical interventions in the prevention of PUs, this is because hospitalized patients present high frequency of extrinsic and intrinsic factors to develop PU, and if we add the assistance factors such as entrusting nurses with this action plan, which is additional to the nurse process; therefore, this leads to a serious health problem with an impact on the patient's condition of life, the family and the health system.

For future research it is recommended to perform an assessment of the patient every 24 hours using the Braden scale, since this will allow a better control of the progress of each of the patients, and thus be able to obtain the data

of how many patients admitted with a high risk of PU and then passed to moderate or low risk of PU and how many of the patients who entered with moderate risk managed to pass to low risk of PU. It is also proposed to know the data of the average cost of treatment for patients with PU in a second-level hospital stay and thus be able to compare whether the physiotherapeutic intervention achieved a reduction of that expense, which would verify the importance of a physiotherapist in the hospital environment.

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