

Application of measures for preventing pressure ulcers by the nursing team before and after an education campaign

Aplicação de medidas de prevenção para úlceras por pressão pela equipe de enfermagem antes e após uma campanha educativa

La aplicación de medidas de prevención de úlceras por presión por parte del personal de enfermería antes y después de una campaña educativa

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ABSTRACT

Objective: To evaluate the effectiveness of a campaign to promote the pressure ulcer prevention in a teaching hospital in Curitiba. **Methods:** This is an exploratory and descriptive research using a quantitative approach, aimed at evaluating preventive measures applied to patients in intensive and semi-intensive care units, by means of the bed-to-bed evaluation with a check list containing the recommended measures. **Results:** The increase in the adherence percentage was statistically significant for repositioning, lateralization angle and elevation of the head and calcaneus elevation. The sector that showed better adherence rates was the one whose team was more involved in discussions during the training activities. **Conclusion:** There was effectiveness of the campaign for the better discussed items in the training. The effectiveness of this approach is dependent on the active staff participation in the discussion of measures to be applied and available resources. A continuous and systematic approach is needed.

Keywords: Ulcer; Nursing; Health Education.

RESUMO

Objetivo: Avaliar a efetividade de uma campanha para prevenção de úlcera por pressão em um hospital de ensino de Curitiba. **Métodos:** Pesquisa exploratório-descritiva com abordagem quantitativa. Consistiu na avaliação de medidas preventivas aplicadas aos pacientes dos centros de terapia intensiva e semi-intensiva, por meio de avaliação leito a leito com checklist contendo as medidas recomendadas. **Resultados:** O aumento no percentual de adesão foi estatisticamente significativo para reposicionamento, angulação de lateralização e elevação de cabeceira e elevação de calcâneos. O setor que apresentou melhores índices de adesão foi o que teve a equipe mais envolvida nas discussões durante as atividades de capacitação. **Conclusão:** Houve efetividade da campanha para os itens melhor discutidos na capacitação. A efetividade deste tipo de abordagem é dependente da participação ativa da equipe na discussão de medidas a serem aplicadas e de recursos disponíveis. Faz-se necessária uma abordagem contínua e sistemática.

Palavras-chave: Úlcera por Pressão; Enfermagem; Educação em Saúde.

RESUMEN

Objetivo: Evaluar la efectividad de una campaña para prevención de úlceras por presión en un hospital universitario de Curitiba. **Métodos:** Estudio exploratorio, descriptivo, con enfoque cuantitativo. Se consistió a partir de la evaluación de medidas preventivas aplicadas a pacientes en unidades de cuidados intensivos y semiintensivos, a través de la evaluación cama por cama, con verificación de las medidas recomendadas. **Resultados:** El aumento del porcentual de adhesión fue estadísticamente significativo para el reposicionamiento, angulación de lateralización y elevación de la cabeza y los calcáneos. El sector que ha demostrado las mejores tasas de adhesión era el que tenía un equipo más involucrado en las discusiones durante las actividades de capacitación. **Conclusión:** Hubo efectividad de la campaña para los temas mejor abordados. La efectividad de este enfoque depende de la participación activa del personal en la discusión de medidas aplicadas y recursos disponibles. Se necesita un enfoque continuo y sistemático.

Palabras clave: Ulcera por Presión; Enfermería; Educación en Salud.

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INTRODUCTION

Pressure ulcers (PU) are localized lesions of the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure or a combination of this lesion and a shearing¹.

The development of a PU causes significant harm to the patient, because it hinders the functional recovery process, eventually causes pain, and leads to the development of serious infections, as it has been associated to prolonged hospitalization, sepsis and mortality². In addition to these losses, the PU results in a differentiated treatment, generating high cost to the institution and increased workload on the part of the health team³.

Publications have shown a 15% prevalence of PU and the incidence of 7% in American hospitals⁴. Approximately 600,000 patients evolve to death in US hospitals each year due to complications from this injury, generating an estimated cost of 11 billion dollars per year². In Brazil, a study in a university hospital showed a 39.81% incidence; and studies carried out in an Intensive Care Unit estimate incidences of 10.62% to 62.5%⁵.

In order to ensure patient safety in health institutions, the Ministry of Health (MOH) established the National Patient Safety Program (NPSP), which launched incident prevention protocols - including the PU. According to the MOH protocol, the main measures for prevention are the evaluation of patients at risk; the management of nutritional status including hydration, inspection and daily skin assessment; the management of moisture, and pressure redistribution².

The development, implementation and monitoring of continuing education programs should occur periodically and continuously for the professionals, patients and families involved, by means of prevention, injury formation mechanism, risk factors, and the treatment of existing lesions, etc⁶.

By assessing the knowledge of the nursing team in terms of the preventive measures to PU, results presented the following mentioned techniques: decubitus change; skin hydration with oil; egg crate mattress; use of cushions; and massage⁷. Another study demonstrated the use of gloves with water and hydration with sunflower oil⁸. It is observed that the teams have some knowledge in terms of best practices, but they also cite erroneous and outdated behaviors, highlighting the need for continuing education in order to incorporate new knowledge, technologies and alternatives available to use in their practices. Concomitantly the responsibility and role of each professional should be highlighted before the care related to PU^{7,8}.

Regarding prevention protocols, authors observed a incidence reduction of 41% to 23% PU on an intensive care unit service (ICU) of a university hospital in São Paulo that consisted of 20 beds. Thus, it was shown that these protocols are key tools and impact in reducing the incidence of pressure ulcers when used systematically⁹.

Given the above, considering the development of PU as an important indicator of care quality during hospitalization and in order to empower the nursing staff and motivate them

to implement the recommended measures, the Skin Care Commission of the studied hospital conducted a campaign relying on various educational activities. The research aimed to evaluate the effectiveness of this type of approach with regard to the accession of the team to the worked guidelines.

METHODS

This is a descriptive exploratory research using a quantitative approach, performed in intensive care units (ICU) and semi-intensive (CTSI) of a teaching hospital in Curitiba, where data collection took place between February and July 2014.

The study consists of evaluating the application of preventive measures to PU previously to a systematic campaign to prevent such injuries and a new evaluation after the end of the campaign.

The sample was composed of all the beds occupied in the days of data collection, and the ICU was composed of 14 beds and the CTSI of 15 beds.

To assess the measures we developed a checklist instrument type, built for this purpose based on the main measures recommended by NPUAP/EPUAP and the MOH, with some adjustments required by the reality of the institution. The guidelines concerning such measures were provided verbally and in writing to all the teams of these units during the prevention campaign.

The preventive measures assessed by means of the said instrument were the patient repositioning within three hours, elevation of the head with an angle smaller than 45°, patient lateralization with an angle smaller than 90°, heels lifting with support under the calves, use of a foam pillow under the head, use of a special mattress (static or dynamic air), pressure-free ear on the pillow or endotracheal tube clamp holder (TOT), oxygen masks, and the fixation of catheters and drains.

It is worth mentioning that the sectors studied work with all stages of the nursing process. The diagnosis impaired skin integrity risk includes requirements for preventive measures described above. At the time of the study, the ICU had eight nurses and 42 assistants or nursing technicians, and the semi-intensive care unit (SICU) with eight nurses and 37 assistants or technicians, and these ones divided between shifts (morning, afternoon and three nights).

The evaluation was conducted once in every shift in the two sectors, in the pre and post-campaign periods. The researcher walked into each box that was occupied, used a checklist sheet per room and pointed yes, no or not applicable for each of the items, observing, for example, if the patient was using pillows or if the head was elevated at an angle smaller than 45°. For evaluating the implementation of repositioning, the researcher marked the starting position and three hours later he returned to the room to see if it had been changed.

The PU prevention campaign consisted of news on the issue of PU and the main preventive measures in the widely distributed internal newsletter of the hospital; insertion of the campaign

schedule in the newsletter and increased presence of the invitation to teams; official opening of the campaign and release of the newsletter; scientific meetings of two hours called "Pressure Ulcers: Impact and prevention," repeated in different shifts; exhibition of illustrated banner containing preventive measures in hallways of elevators; in loco training with distribution, reading and discussion of an illustrated folder with preventive measures in all healthcare units and working shifts; and the attachment of posters illustrating the preventive measures in all healthcare units.

The evaluation of the preventive measures application carried out before the campaign was repeated after all teams have participated in the activities of the campaign, keeping the same evaluation system.

The study was approved by the Ethics Committee in Research with Human Beings of the institution (opinion: 32593914.9.0000.0096) and all the precepts of the Resolution 466/2012 of the National Health Council were properly followed.

The collected data were tabulated in an Excel spreadsheet. The results obtained for each variable were described by frequencies and percentages. For comparisons between units and between pre and post-prevention campaign, the chi-square test or Fisher's exact test were considered. The $p < 0.05$ values were considered statistically significant, and were analyzed with the v.20.0 SPSS Statistics program.

RESULTS

As shown in Table 1, before the Pressure Ulcer Prevention Campaign, 31.5% of the patients had been repositioned at an interval of three hours among the 127 reviews. This percentage increased to 50.4% in the post-campaign ratings ($p = 0.002$).

In the assessment of lateralization with angle smaller than 90°, patients who were in lateral decubitus during the evaluation (n. 23 pre, n. 31 post) were evaluated. Of these, 56.5% of patients were lateralized adequately in the pre-campaign evaluation; in the post-campaign review this percentage was 93.5% for ($p = 0.001$).

With regard to the fact that the head elevation was lower than 45°, the pre-campaign percentage was 79.4% and 100% post-campaigns ($p < 0.001$). The heels lifting percentage with support under the calf was 7.9% in the pre-campaign to 22.4% in the post-campaign ($p = 0.001$).

There was a small rise in terms of the percentage of pillows and special mattresses use and a small reduction in terms of ear protection, both not statistically significant. The correct fixing of catheters remained unchanged, with low percentage of compliance (27%).

Table 2 shows the difference between the percentage of application of preventive measures to PU before and after the prevention campaign, categorized by ICU and SICU sectors. It is possible to observe that the ICU had a percentage increase in terms of the application of preventive measures in seven of the eight items assessed, and of these, four were statistically significant. They were: repositioning, bedside elevation angle lower than 45°, heels lifting, and pillow use. It is noteworthy that the overall results of the campaign, without division by service, the use of pillow showed no significant increase in percentage.

Further Analyzing Table 2, it was observed that the SICU has presented a percentage increase in five of the eight items evaluated; however, only in two items the data showed statistical significance: lateralization with smaller angle than 90°, and head elevation lower than 45°. It is also noticed that some items in the server showed a reduction in the percentage of correct application of the measure, and they were they the use of foam pillow, pressure-free ear on the pillow or TOT lace fixing and the correct fixation of drains and catheters, highlighting the last value at $p = 0.08$.

Table 3, presented below, shows the working shifts in both evaluated services, which presented an increased percentage or reduction in terms of the application of preventive measures with statistical significance, even when evaluated separately, disregarding the general context.

Table 1. Overall percentage of compliance and p -value for each item evaluated in the pre and post-campaign. Curitiba, 2015.

Assessed item	Pre-campaign	Post-campaign	* p -value
Repositioning within three hours	31.5%	50.4%	0.002
Lateralization with angle smaller than 90°	56.5%	93.5%	0.001
Bedside elevation angle lower than 45°	79.4%	100%	0.001
Heels lifting with support under the calves	7.9%	22.4%	0.001
Use of foam pillows under the head	51.2%	56.5%	0.402
Pressure free ears	66.9%	57.6	1.127
Use of special mattresses (static or dynamic air)	14.2%	21.6%	0.124
Adequate fixation of catheters and drains	27.6%	27.2%	0.949

* Source: tabulated and statistically analyzed data from the checklist applied.

Table 2. Compliance percentage difference and value of p^* for each item evaluated in the pre and post-campaign in the ICU and SICU. Curitiba, 2015.

Assessed item	ICU	p -value $*p < 0.05$	SICU	p -value $*p < 0.05$
Repositioning within three hours	28.8%	0.001	8.6%	0.336
Lateralization with angle smaller than 90°	11.1%	0.290	42.1%	0.049
Bedside elevation angle lower than 45°	33.3%	0.001	7.9%	0.027
Heels lifting with support under the calves	18.3%	0.008	10.4%	0.072
Use of foam pillows under the head	18.2%	0.014	-5.8%	0.352
Pressure free ears	- 4%	0.643	-14.7	0.086
Use of special mattresses (static or dynamic air)	12%	0.137	1.9%	0.649
Adequate fixation of catheters and drains	10.6%	0.142	-11.4%	0.185

* Source: tabulated and statistically analyzed data from the checklist applied.

Table 3. Difference in terms of the compliance percentage and p -value ($*p < 0.05$) for each item evaluated in the pre and post-campaign in the ICU and SICU in morning, afternoon, and evening shifts (1, 2 and 3). Curitiba, 2015.

Assessed item	ICU					SICU					
	Shift	M	A	N1	N2	N3	M	A	N1	N2	N3
Repositioning within three hours				56%	44.10%						
				*0.03	*0.02						
Lateralization with angle smaller than 90°											
Bedside elevation angle lower than 45°	50%	40%	30.80%		35.70%						
	*0.006	*0.01	*0.03		*0.02						
Heels lifting with support under the calves	30.20%					38.0%					36.40%
	*0.07					*0.01					*0.01
Use of foam pillows under the head			40.9%								
			*0.03								
Pressure free ears	-37.1%						-37.1%				
	*0.05						*0.04				
Use of special mattresses (static or dynamic air)											
Adequate fixation of catheters and drains											

* Source: tabulated and statistically analyzed data from the checklist applied.

It is observed that, in the ICU, two night teams showed significant improvement in terms of the item repositioning; the item elevation of the head lower than 45°, with the exception of a night staff, showed a significant increase in that figure. The morning team and a night team showed percentage improvement in terms of heels lifting. As to the use of foam pillow under the head, the late team presented significance in the percentage increase. Unpressurized ears were the last index of significance in the percentage change for the ICU, with a negative change in terms of accession.

As for the SICU, only two teams have obtained results with statistical significance: a night team, with a percentage increase for proper heels elevation; and the afternoon staff, with

a percentage reduction in terms of ears positioned without pillow pressure or TOT lace.

DISCUSSION

The nursing team is highly responsible for the direct and continuous assistance in terms of PU prevention and treatment. Given that the PU is preventable in most cases, policies and preventive measures should be taken, since they can minimize suffering and additional costs to patients, families and institutions¹⁰. Nursing is responsible for setting goals, using risk assessment predictive scales and deploying measures for the prevention and treatment of PU through the use of its expertise,

thus establishing a continuous evaluation process, and thereby preserving the integrity of the skin¹¹.

As shown in the results, the increase in the percentage of staff accession to preventive measures was significant only in some of the items evaluated. In further discussion, it was noted that these were the most discussed items with the team during training activities, which brings to light the need for systematic and similar emphasis for all items developed in training.

A study conducted in a university hospital aiming to describe and analyze the knowledge of the members of the nursing staff on the prevention of PU showed knowledge deficit concerning this matter and it has also highlighted some areas that require greater focus on continuing education activities with professionals. Among them it is possible to include the use of massage, wheels and water or air gloves; patient positioning as to the elevation of the head of the bed; time period for repositioning when they are in seated position and in lateral position¹².

Another perception with the development of the study was that there was a more active participation of the teams in training activities in the sector with the highest adherence to the preventive measures in order to deeply discuss them and propose implementing strategies based on care practice and service particularities. Thus, it was noticed that the team's involvement in the proposed training activity is associated with better adherence rates to given orientation.

Also as part of team participation in preventing PU, authors state that, since they provide direct care to patients and remain by their side 24 hours a day, nursing professionals have been responsible for implementing preventive measures and systematic care⁹.

On the accession of the teams to the repositioning, one can observe a statistically significant increase in both the overall analysis as the analysis done separately, in the case of ICU. The SICU had no significant increase in the repositioning adherence percentage. This can be justified by the profile of patients since, unlike the ICU, some patients have mobilization autonomy in the SICU.

In a study conducted in a hospital in Minas Gerais, the repositioning of the patients was cited by 100% of staff evaluated as a preventive measure for PU⁷. Therefore, it is observed that there is knowledge in terms of the effectiveness in preventing PU in this item; however, its application through systematized protocols has yet to be reached.

The interval used in this study for the repositioning of patients was three hours, with one hour of tolerance in case of complications that prevented the repositioning in two hours. It was emphasized that the EPUAP and NPUAP recommends that every effort should be made to redistribute pressure on the skin, either by repositioning every two hours or by the use of pressure redistribution surfaces, in order to redistribute pressure and, consequently, maintain circulation in areas of the body at risk of PU¹.

In the lateralization with an angle smaller than 90°, it was observed that there was effectiveness in terms of adherence

when analyzed globally; however, when the sectors were analyzed separately, the ICU was the only sector that presented significance in terms of accession. This factor may be justified, once again, by the independent mobility presented by some SICU patients when they move sideways spontaneously at 90°¹.

As for the angle of lateralization and elevation of the head, authors state that the angle of 30° should be used in semi-Fowler position if the patient tolerates these positions and if their condition allows it, and a 30° inclination for lateral positions (alternately the right side, back and left side). Postures that increase pressure in the 90° side lying position should be avoided¹.

Moreover, studies recommend that the head of the bed is raised to a maximum of 30° and avoid direct pressure on the trochanters when in a lateral position, limiting the high bedside time as the patient's body tends to slip, causing friction and shear. It should be emphasized that, if the patient is sitting up in bed, it is important not to elevate the head at an angle greater than 30 degrees, avoiding the centralization and increased pressure on the sacrum and coccyx. Moreover, the authors explain that shear occurs when the patient remains motionless on the bed, while the skin layers move¹³.

From 15 nursing professionals evaluated in a study regarding knowledge in terms of preventive measures, only one cited "slightly elevate the head by 30 degrees" as a measure, demonstrating that, unlike the repositioning, the angle is an item still little known and applied by the teams⁷.

The MOH of the Protocol of 2013 makes an addition to such preventive measure stating that, although there was a reduction in terms of shear in positioning the head to 30° for patients on mechanical ventilation and tracheotomy with noninvasive ventilation, the decubitus position above 30° is recommended for the prevention of ventilator-associated pneumonia (VAP)².

Given the above, considering the characteristics of patients admitted in the study sites, it was decided to move the bedside to an elevation lower than 45°, not to 30°. The involvement of the staff in terms of the prevention of VAP may have influenced the adherence to reducing bedside elevation.

According to the MOH protocol, the main concern in preventing PU must be focused on the redistribution of pressure, especially over bony prominences where the repositioning of patients at risk will alternate or relieve pressure on sensitive areas, reducing the risk of developing pressure ulcers².

As for lifting heels, there was a significant adherence by the nursing staff, positive factor when compared with studies showing the incidence of calcaneus PU.

A study conducted in the ICU of a public hospital showed an incidence of calcaneal pressure ulcers by 32% in hospitalized patients¹³.

The Institute for Healthcare Improvement¹⁴ and EPUAP and NPUAP¹ explain that PU prevention devices for the heels should lift them so that the weight of the leg is distributed along its back, without putting pressure on the Achilles tendon. The knee should be slightly bent. It is preferable to use a cushion or pillow below the legs to completely raise the heels and keep them floating.

In the case of insignificant levels of improvement in the use of mattresses, pillows and adequate fixing of the TOT, it was found that the adherence of the preventive measures depends on available material resources, since this factor may have influenced directly in our results, due to the lack of suitable material in sufficient quantity in the hospital studied.

Authors state that the successful prevention of PU depends on the knowledge and skills of health professionals on the subject, especially the members of the nursing staff who provide direct and continuous patient care. However, it is necessary to understand individual and institutional factors that influence the knowledge and use of the evidences, so that strategies can be planned and used in hospitals¹⁶.

Regarding the use of pillows, it was found that in units where the study was conducted there was quantity available for all beds in the ICU and SICU, which may have negatively impacted on the results.

The MOH states that the use of pillows and cushions is of great importance, as they may expand the surface that withstands the weight when used appropriately. They are readily available materials that can be used to assist the pressure redistribution².

Furthermore, if the mobility of the patient is compromised and the pressure in this interface is not redistributed, pressure can damage the circulation, leading to the emergence of ulcers. In this case, we recommend the use of surfaces for specific support (such as mattresses, beds and pillows) as they redistribute the pressure that the patient's body has on the skin and subcutaneous tissues².

As regards the use of support surfaces (special mattresses), there was no significant increase in adherence, which once again is justified by the limitation of available resources.

EPUAP and NPUAP¹ claim that highly specific foam mattresses seem to be more effective in preventing pressure ulcers than the standard hospital foam mattresses. The use of a dynamic support surface (mattress or overlay) is also recommended for individuals with high risk of developing pressure ulcers when frequent manual repositioning is not possible, as these may vary load distribution properties.

Regarding item unpressurized ears, all devices that could cause some kind of pressure on the ears were evaluated. The most frequent were oxygen catheter, fixation lace for mist, and endotracheal tube. The percentage of adherence to such a preventive measure showed no significant increase that impact the overall results because there were no alternative forms or technologies available in terms of the device fixing service.

The significance of the accession to the preventive measure for fixing drains and catheters was not checked either, since, during the search, it was taken into account whether all devices attached to the patient, corresponding to drains and catheters were firmly secured (venous access, central venous catheter, catheter for mean blood pressure check, drains, urinary catheters, etc.). Among these, the most commonly observed problem was the non-fixation of the permanent bladder catheter in most patients, which can result in pressure sores at the urethral meatus or the peno scrotal angle.

Many different types of medical devices have been reported to cause pressure damage (catheters, oxygen tubing, ventilator tubing, semi-rigid cervical collars), emphasizing the importance of monitoring the skin as to the pressure damage caused by medical devices¹.

FINAL CONSIDERATIONS

The completion of the study showed that a campaign to prevent skin lesions (in this case, PU) can be an effective strategy to encourage staff to adhere to recommended measures.

It was observed that all items worked on a campaign need to be thoroughly discussed. The items addressed with greater attention during the training activities were the ones that showed the best post-campaign results.

We emphasize the need for active participation of the team in training activities, as the sector whose team was more involved in discussions during the training activities showed the most significant improvement results in terms of the adherence to the measures.

The availability of material resources needed for injury prevention should be considered in training approaches. The resource constraints may be a limiting factor for significant results and demotivating for the team, which may have their patients injured despite efforts.

Although the campaign has shown statistically significant results, the percentage of non-adherence to the recommended measures is still worrying. It is concluded that the campaign was effective; however, despite the fact that there are different activities, it cannot be the only strategy used to involve the staff in terms of the prevention of pressure ulcers and patient safety. A continuous and systematic approach, a periodic monitoring in order to strengthen the guidelines already worked, the provision of updates, and the work focused on the motivational factor are also necessary.

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