ABSTRACT

Objective: To identify recommendations on measures for the pressure ulcer prevention with a view to update the clinical protocol. Methodology: an integrative review aimed to answer the question << What are the best clinical evidence for prevention of pressure ulcers present in the productions of the scientific community? >> The search was conducted in Medline and Cochrane Library from 2011 to 2014. The sample consisted of 16 articles. Results: studies published in the United States, 2011, by nurses in magazines qualis A1 prevailed. In the synthesis of the evidence for pressure ulcer prevention were identified recommendations related to the identification of risk factors, risk assessment instruments for pressure ulcers, use of care protocols, repositioning, support surfaces and topical product. Conclusion: the maintenance of evidence-based care protocols provides the provision in the healthcare practice of this evidence and strength with a view to quality care and safety before clinical uncertainties and best practices. Descriptors: Nursing; Prevention & Control; Pressure Ulcer; Protocols.

RESUMO

Objetivo: Identificar recomendações sobre as medidas de prevenção de úlceras por pressão com vistas à atualização de protocolo assistencial. Metodologia: revisão integrativa com vistas a responder a questão << Quais as melhores evidências clínicas para prevenção de úlceras por pressão presentes nas produções da comunidade científica? >> A busca foi realizada na Medline e Biblioteca Cochrane, de 2011 a 2014. A amostra foi constituída por 16 artigos. Resultados: predominaram estudos publicados nos Estados Unidos, ano de 2011, por enfermeiros em revistas qualis A1. Na síntese das evidências para prevenção de úlcera por pressão identificaram-se recomendações referentes à identificação de fatores de risco, instrumentos de avaliação de risco para úlcera por pressão, utilização de protocolos assistenciais, reposicionamento, superfícies de suporte e produto tópico. Conclusão: o manutenção de protocolos assistenciais baseados em evidências proporciona a disponibilização na prática assistencial dessas evidências e sua força com vistas à assistência de qualidade e segurança diante de incertezas clínicas e práticas recomendadas. Descriptors: Enfermagem; Prevenção & Controle; Úlcera por Pressão; Protocolos.

RESUMEN

Objetivo: Identificar las recomendaciones sobre las medidas de prevención de úlceras por presión con el fin de actualizar el protocolo clínico. Metodologia: revisión integradora destinada a responder a la pregunta << ¿Cuál es la mejor evidencia clínica para la prevención de úlceras por presión presente en las producciones de la comunidad científica? >> La búsqueda se realizó en Medline y Cochrane Library, de 2011 a 2014. La muestra estuvo constituida por 16 artículos. Resultados: predominaron los estudios publicados en los Estados Unidos de 2011, por las enfermeras en revistas Qualis A1. En la síntesis de la evidencia para la prevención de úlceras por presión se identificaron recomendaciones relativas a la identificación de factores de riesgo, los instrumentos de evaluación del riesgo de úlceras por presión, el uso de los protocolos de atención, reposicionamiento, superficies de apoyo y producto tópico. Conclusión: el mantenimiento de los protocolos de atención basadas en la evidencia proporciona la disposición en la práctica de la salud de esta evidencia y la fuerza con miras a la atención de calidad y seguridad antes de incertidumbres clínicas y las mejores prácticas. Descriptores: Enfermería; Prevención y Control; Úlceras por presión; Protocolos.
INTRODUCTION

Evidence refers to the information based on historic or scientific evaluation of a practice which is accessible to the people who make decision in the health care system. This practice emphasizes the use of research for decision-making, combining it with clinical expertise and patient preferences. Consists in the evaluation of the best search results, in order to guide the professional expertise in the pursuit of scientific knowledge and promotion of quality care.¹

Prevention of pressure ulcers (PPU) is considered a clinical challenge in the face of hemodynamic instability, limited immobility and nutrition in critically ill patients. Recommendations based on strong evidence can direct the clinical practice of health professionals.²

Nowadays, however, studies have found prevention of PPU insufficient in hospitals, even in carrying out the risk assessment. The establishment of risk assessment policy in all health care facilities is an important recommendation for the hospital routine establishment structured care plans for patient prevention with/at risk for PPU. Evidence-based protocols favor the multidisciplinary team to have the knowledge and skills for the prevention of PPU, knowledge concerning the time and embodiment and scientific visibility.³⁴⁶

The need to create specialized groups linked to institutions and health services, and to develop care protocols for the prevention and treatment of tissue damage meets the constant pursuit of nursing professionals by qualifying from its praxis.

After a partnership between the Federal University of Piauí - UFPI and a large Philanthropic Hospital, through the actions linked to the Notice n.5 PROEXT 2010 “Integral Promotion of Care to Patients with Wounds: Relief Protocols and Clinical Evidence“ was designed clinical protocol for five types of wounds, including prevention and treatment of pressure ulcers, which was based on the assumptions of evidence-based nursing. The project was developed between clinical nurses from the dressing group and the participating team of the project: teachers, masters and nursing students.

In 2010 an integrative review of research was carried out by searching studies in electronic databases using specific descriptors for each type of wound, from 2000 to 2010. The selected studies were classified according to level of evidence and grade of recommendation, aiming at quality and reliability of the evidence collected to base the clinical protocol practices.

The result was announced through the publication of the technical report in book form in 2012 and the guidelines present in the publication are used in the health institution partner in the project. The present study, included in the update protocol, also focus program funded by public notice PROEXT 2013.

Given the strengthening of evidence-based practice for patient prevention with/at risk for PPU, the present study raises the question: What are the best clinical evidence for prevention of pressure ulcers present in the current scientific community productions? In order to answer it, this study aims to identify recommendations on ulcer prevention measures pressure with a view to updating the clinical protocol.

METHOD

The integrative review allows previous research to be summarized and to obtain conclusions from the critical evaluation of various methodological approaches, aiming to synthesize and analyze this data to develop a broader explanation of a particular phenomenon from other studies, with theoretical or interventional purposes.⁷

Publications searches were conducted in the period 2011-2014 in Medline and Cochrane Library through CAPES Portal. The searches occurred independently by four trained reviewers: one graduate student and three academic scholarship extension program: “Nursing Practice in promoting health of children, men and the elderly: art, simulation and technology - Second stage“ which has as one of its objectives the update of the protocol focused on this study.

The following key terms were used: systematic review + pressure ulcer, systematic review + decubitus ulcer, controlled trials + pressure ulcer, randomized controlled trial + pressure ulcer, randomized controlled trial + prevention + pressure ulcer, randomized controlled trial + prevention + decubitus ulcer, systematic review + pressure ulcer prevention, systematic review + dressing + pressure ulcer, dressing + pressure ulcer dressing + prevention. 733 articles were found.

In this study, we chose to receive secondary study type systematic review, since the rigorous methodology of these revisions analyzes randomized trials with clinical motivation for therapeutic, diagnostic and
others that are evaluated for methodological consistency and strength of the recommendations evidence, resulting in the best practices recommendations for various clinical uncertainties. Noteworthy is also the update focused protocol consists of systematic reviews publications, and educational level 1 in the pyramid of evidence gathered for the preparation of the protocol in order to implement, in the practice, useful information from the clinical point of view, through consistent studies and high reliability validity of recommendations.

It started from reading the titles, abstracts and methodologies. The following inclusion criteria were adopted: applied studies in humans and adults over 19 years, performed in a hospital setting, with full text available in English, Portuguese or Spanish, that addressed the subject prevention of pressure ulcers, including any study methodology, especially systematic reviews and randomized clinical trials, which reduced the sample to 19 selected articles.

The four reviewers met to discuss the analysis of the selected studies. Publications that have not been selected by more than one reviewer, were re-evaluated by the group before the inclusion criteria. Remained 16 for further analysis.

After reading the full text, data extraction tool, was filled with information: country, year of publication, professional identification and category of the researcher, journal, qualis, methodological design, clinical question, the study objectives, results and limitations.

Bibliographic analysis was performed to characterize the studies found. Later, the evidences from the studies were extracted and synthesized, in order to classify them according to level of evidence and grade of recommendation.

In the classification the evidence are divided into seven levels, namely: level I: will be those from systematic reviews/meta-analysis of randomized controlled clinical trials; Level II: at least one clinical trial randomized controlled well defined; Level III: clinical trial non-randomized; Level IV: cohort studies and case-control; Level V: systematic reviews of descriptive and qualitative studies; Level VI: a single descriptive qualitative study and level VII the opinion or report of expert committees.

As regarded to the strength of evidence, the degree of recommendation A is supported by direct scientific evidence from well-designed studies and implemented on pressure ulcers in humans (or human at risk of PPU) and provide statistical results that support the recommendation order consistent. In B, the recommendation is supported by direct scientific evidence from properly designed clinical studies and implemented in PPU cases in humans; their statistical results support the recommendation consistently. Finally at grade C recommendation is supported by indirect evidence and/or expert opinion.

RESULTS

It was found that all articles (16) were published in foreign journals: United States (USA) 37,5% (6), United Kingdom 18,7% (3), Canada 12,5% (2), Belgium 12,5% (2), Japan, 6,3% (1) 6,3% Spain (1), Germany 6,3% (1) 6,3% the Netherlands (1), Australia 6,3% (1 ) and 6,3% Ireland (1), with some countries in more than one study.

For the years of publication: 37,5% (6) were published in 2011, 31,3% (5) in 2012, 25% (4) in 2013 and 6,3% (1) in 2014. With regard to category professional group of authors of each study, 62,3% (10) were nursing and 37,5% (6) of medicine.

As qualis magazines: 50% (8) of the articles were published in journals of qualis A1, 12,5% (2) in A2, 31,3% (5) in B1 and 6,3 (1) magazine without qualis defined by CAPES. The International Journal of Nursing Studies obtained the highest number of published articles, with 18,7% (3).

The systematic review prevailed as the methodological design of the study 37,5% (6), followed by randomized clinical trial 18,8% (3) and case series 12,5% (2). Other items consisted of integrative review, cohort study, theoretical reflection, experience report and expert opinion, with 6,3% (1).
### Interventions and Recommendation

<table>
<thead>
<tr>
<th>Risk Factors Identification: the most common emerging risk factors for the development of pressure ulcers include three main areas: mobility/activity, infusion (including diabetes) and status of skin/pressure ulcers. Skin moisture, age, hematological measures, nutrition and general health are considered, but are less frequent than the mentioned areas. Risk factors as body temperature, immunity, race or sex require more research.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk assessment tools for preventing pressure ulcers: studies on risk assessment instruments for pressure ulcers commonly used (Braden, Norton and Waterlow) suffer from significant methodological flaws that threaten the validity of the results and the statistical accuracy, therefore, there is evidence that its use, with or without an intervention strategy reduces the risk of pressure ulcers, however, their usefulness depends on the availability of effective subsequent interventions.</td>
</tr>
<tr>
<td>Moore ZEH, Seamus C.</td>
</tr>
<tr>
<td>Walsh B, Dempsey L.</td>
</tr>
<tr>
<td>Implementation of protocols and study groups on PPU prevention: the simplification and standardization of specific pressure ulcer and documentation interventions, the involvement of multidisciplinary teams, leadership, training of permanent staff, audit and feedback to implement a protocol provides reduction of costs and the prevalence, incidence and severity of pressure ulcers in the service.</td>
</tr>
<tr>
<td>Clark F, Pyatak EA, Carlson M et al;</td>
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<tr>
<td>Aemour-Burton T, Fields W, Outlaw L, Deleon E.</td>
</tr>
<tr>
<td>Repositioning every two hours to prevent PPU: despite the absence of randomized controlled trials that support this intervention, it is considered a practice with good value, since a pressure in vascular compromised area undoubtedly leads to a decreased flow capillary blood. The frequency of repositioning also depends on the hospital policy.</td>
</tr>
<tr>
<td>Levine SM, Sinno S, Levine JP, Saadeh PB et al.</td>
</tr>
<tr>
<td>Use of the topical product IPARZINE-4A-SKR: Cannot confirm whether there are differences between the study product and the placebo treatments for the prevention of pressure ulcers. It is suggested a study with a larger sample of patients to settle the clinical question. The result was similar to studies on pressure ulcer prevention using products based on essential fatty acids.</td>
</tr>
<tr>
<td>Verdú, J.; Soldevilla, J.</td>
</tr>
<tr>
<td>Use of Mercury DYNAPFORM mattress Advance: It is suitable for patients with high risk of development of pressure ulcers and also for promoting the healing of superficial ulcers. It has the advantage of being a static mattress combined with an alternating dynamic system.</td>
</tr>
<tr>
<td>Rafter, L.</td>
</tr>
<tr>
<td>Use mattress Softform Premier Active: It is suitable for the prevention of PPU in patients with high risk of developing. It is a foam mattress with dynamic system.</td>
</tr>
<tr>
<td>Rafter, L.</td>
</tr>
<tr>
<td>Use of hydrocolloid coverage: prevent nasal pressure ulcers after nasotracheal intubation. The tip of the cover must be inserted in the nostril and between the pipe nose, and an adhesive plaster is then placed on the skin of the nasal alar region.</td>
</tr>
<tr>
<td>Iwai T, Goto T, Maegawa J, Tohna S et al.</td>
</tr>
<tr>
<td>A poor quality test concluded that the use of REMOIS pad (covering consisting of a layer of hydrocolloid adhesive, other polyurethane film holder and outer layer of nylon multilaminates) on the bigger trochanter. There was a</td>
</tr>
<tr>
<td>Chou R, Dana T, Bougatsos</td>
</tr>
</tbody>
</table>

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**Author(s)**

- Moore ZEH, Seamus C.
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**Level of Evidence**

- 1
- 1
- 1
- 6
- 1
- 4
- 2
- 4
- 6

**Degree of Recommendation**

- A
- A
- A
- B
- A
- B
- A
- B
- C
In systematic reviews prevailed studies from countries whose language spoken is English, published by nurses in 2011 in magazines qualis A1, which US and Canada accounted for 50% of the publications and the United Kingdom and other European countries totaled 50,1%. In these countries, especially the United States, United Kingdom and other European countries, there is considerable concern and funding for research on the subject, represented respectively by the National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP), independent professional organizations dedicated to the prevention and treatment of pressure ulcers.

In 2009, in order to formulate comprehensive guidelines on the subject, have come together to update and identification of evidences for the organization's main guideline on the subject prevention and treatment of pressure ulcers, composed of seven topics: etiology, risk assessment, skin assessment, nutrition, repositioning, support surfaces and special populations: patients in the operating room.3

The pressure ulcers, usually lesions located on bone prominence, has an etiology directly influenced by factors such as reduced mobility, by providing direct exacerbation of extrinsic factors pressure, friction and shear. The decreased perfusion facilitates the tissue damage and hinder wound healing, and skin status influences the fact that, when excessively dry or humid, has a predisposition for the development of lesions. In general there is no single factor that can explain the risk of pressure ulcers, but a complex interaction of factors that increase the likelihood of its development.10

Based on this, risk assessment scales for pressure ulcer should consider more frequent emerging risk factors for its development. The mobility/activity is present in the Braden scale, Norton and Waterlow, however, skin status/perfusion pressure ulcers and, specifically peripheral vascular disease and diabetes, are present only in the latter.10,2

The moisture of the skin (or continence) and nutrition are risk factors present in the three mentioned ranges, despite being the nutrition, in Norton, just as influential in the general physical condition. These, including the age and hematological measures (anemia) present only in Waterlow scale, are considered less frequently than those already mentioned. Factors such as body temperature and sex, present in the Norton and Waterlow respectively, have proven influence on the development of ulcers and require further investigation.10

The risk assessment for PPU can occur through the application of specific tools or by professional clinical reasoning. Assessment tools for preventing pressure ulcers offer a structured approach and, thus, help professional practice, despite studies conducted by randomized controlled trials conclude that there are significant methodological flaws.11,12

When comparing the use of the Waterlow scale, risk assessment tool Ramstadius or clinical judgment alone, there was no statistically significant difference in the incidence of pressure ulcers, as well as using the Braden risk assessment tool compared...

### Table 1

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Risk Assessment Tool</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahoney J, Teague L, Merrick T, Drumm B, LeMaster T, VanGilder C</td>
<td>overlays of dry viscoelastic polymer on operating table</td>
<td>B</td>
</tr>
<tr>
<td>Jackson M, McKenney T</td>
<td>Use of therapeutic bed with air fluidized: in patients in cardiothoracic and vascular intensive care unit, who made use of vasopressors for at least 24 hours and/or requiring mechanical ventilation for at least 24 hours postoperative. Prevention with therapeutic bed demonstrates better outcome and cost-effective than treatment of pressure ulcers resulting from non-use.21</td>
<td>B</td>
</tr>
<tr>
<td>Pham B, Teague L, Mahoney J, et al.</td>
<td>Use of therapy bed with air fluidized: in patients in the operating room, who made use of vasopressors for at least 24 hours and/or requiring mechanical ventilation for at least 24 hours postoperative. Prevention with therapeutic bed demonstrates better outcome and cost-effective than treatment of pressure ulcers resulting from non-use.21</td>
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DISCUSSION

In systematic reviews prevailed studies from countries whose language spoken is English, published by nurses in 2011 in magazines qualis A1, which US and Canada accounted for 50% of the publications and the United Kingdom and other European countries totaled 50,1%. In these countries, especially the United States, United Kingdom and other European countries, there is considerable concern and funding for research on the subject, represented respectively by the National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP), independent professional organizations dedicated to the prevention and treatment of pressure ulcers.

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When comparing the use of the Waterlow scale, risk assessment tool RamstADIUS or clinical judgment alone, there was no statistically significant difference in the incidence of pressure ulcers, as well as using the Braden risk assessment tool compared...
with those who received risk assessment unstructured.13

Studies that experimentally prove the efficacy and safety risk assessment tools through experimental research group are not consistent. Therefore, there is no reliable evidence to suggest that the use of structured or systematic tools of pressure ulcers for risk assessment reduces the incidence of PPU (12). However, it appears that the structured approach as guides the guideline of NPUAP / EPUAP (2009) is effective, although it depends on the clinical expertise of the professional who evaluates and the availability of effective later interventions. 5

The Waterlow scale uses as predisposing factors: body mass index (BMI), continence, skin type, mobility, sex, age, and power. It also has a special risk category, divided into malnutrition, neurological deficit, large/trauma surgery, and medication. An example of scale evaluated, by validation studies, of high sensitivity, poor reliability and poor specificity, however, a structured approach is widely used by specialists.14

With regard to protocols and curative groups, a randomized clinical trial with the goal of applying a protocol of interventions to prevent pressure ulcers in spinal cord injuries observed that there was a reduction in the incidence and costs related to this disease after its implementation.15

Reporting experience and review study emphasize that the creation of study groups, the formation of permanent staff, involvement of multidisciplinary teams, simplification and standardization of specific pressure ulcer interventions and correct documentation, audit, leadership and feedback between staff provide reducing the incidence and prevalence of PPU in the service.16,17

Publications during the study period did not include new evidence relating nutrition for the prevention of PPU. However, the wounds protocol in update has recommendations with strong evidence “1A”, related to a high-protein diet with arginine, associated with high calorie and micronutrients, zinc and vitamin C, as well as this vitamin in an amount of 500 mg twice daily for preventing bad nutrition, which predisposes the wound and stimulate the healing process.25-28

The recommendation for the repositioning each two hours is an intervention widely used as a preventive strategy of PPU, despite the low level of evidence in studies and the difficulty of conducting methodologically reliable research to back that Recommendation. Its effectiveness is certified by analyzing the etiology of the disease, this is considered standard recommendation to reduce these wounds in the guidelines and other studies on prevention of PPU, and is a key part in building preventive consciousness Nurses.18,19

There are few studies on the use of topical products for the prevention of PPU. In a randomized double-blind clinical trial, the galenic formula IPARZINE-SKR-4A showed a topical product which, compared to placebo treatment in a period of two weeks for the prevention of ulcers grade I, had no difference. You cannot know if the product is ineffective or if the study requires larger sample of patients. The results were similar to other studies using products based on essential fatty acids.19

The support surfaces are specialized devices for pressure redistribution and feature various types of mattresses and seat cushions. In a study of several cases, assessing the use of two beds: Dyna-Form Mercury Advance and Softform Premier Active in patients at high risk of developing PPU, it was observed that the first one prevents the development and promotes superficial healing pressure ulcers, and the second only prevents the development of PPU. Study with a larger sample is needed for further findings.20

The DYNAFORM Mercury Advance has the advantage of being a static mattress combined with an alternating dynamic system. This mattress design is unique given that the foam is actually in alternate cells, the pump has a cycle of ten minutes and has two adjustable modes, one for patient comfort (static) and other dynamic in which the cells alternating mattress are driven by an electric pump air bags that inflate and deflate sequentially to relieve pressure for a short period in the patient.20

The Premier Softform Active consists of a foam mattress dynamic system which operates by switching of the two cells in each ten minute cycle. The pump is able to evaluate the patient’s weight and adjusts the supply of adequate air to provide an alternating surface. In both a static system mattress can be used alternately when the surface is not necessary.20

Also regarding to surface protection, the use of a hydrocolloid as a barrier is evidence of low level and low recommendation to prevent nasal pressure ulcer after nasotracheal intubation. Experts advise to adapt it well to the nose, forming a thin cover and lower course than conventional nasal packing.21
A clinical trial of poor quality was found the effectiveness of REMOIS pad covering the adhesive layer consisting of a hydrocolloid, other polyurethane film holder and outer layer of nylon multifilaments on the greater trochanter, preventing grade ulcers I.\textsuperscript{10} Even with the low level of recommendation, the hydrocolloid is widely used in clinical practice for the prevention of PPU in patients at high risk for its development.\textsuperscript{10}

In an experimental study with a control group investigated the effectiveness of the use of intermittent electrical stimulation (IES) compared the effects of voluntary muscle contractions and conventional pressure relief maneuvers. The ERA provides reduced surface pressure in the ischial tuberosity to sit, increases oxygen levels in the gluteus maximus muscles, provides relief from the discomfort produced by long time in a sitting position and prevents deep tissue injury (DTI) when playing natural repositioning contractions in intact individuals.\textsuperscript{22}

Relating to the demand for special populations, two studies, a number of cases, another cohort study, patients in the perioperative period, especially during surgery, one using fluidized air therapy in patients undergoing cardiac surgery, and the other to test dry polymer overlays and viscoelastic operating table with simulated patients undergoing surgery in the supine position or lithotomy showed that prevention of pressure ulcers in intraoperative and postoperative provides quality of life for the patient, reduces the incidence of wound and offers better value for money for the institution.\textsuperscript{23, 24}

The previously produced protocol on the prevention of ulcers pressure consisted of twenty-seven items come from thirteen studies. After update, nine new items were included and three reformulated or ratified. The updated protocol consists of 36 items, coming from 28 studies in total.

The item on the use of risk assessment tools and on the use of electrical stimulation to prevent ulcer were reformulated, the first keeping the level of evidence “1A” and the second went from “5A” to “1A”, the item about changing positions with repositioning was ratified, remaining “1A” and on the topical IPARZINE-4А-SKR was not included in the updated protocol by not conclude effectiveness of the recommendation.

**CONCLUSION**

The recommendations concerning the identification of risk factors, risk assessment tools, use of care protocols and its influence on the incidence and prevalence of PPU in hospital were those who had higher levels of evidence and grades of recommendation. With the update was possible to outline recommendations for more stringent levels of evidence and summarize new research on the subject of prevention for patients with/at risk of pressure ulcers. We emphasize the scarcity of national studies in the period considered indexed in high quality selected databases.

The review of studies included in the sample of analyzed articles can be understood as a limitation, but the reliable analysis of randomized clinical studies for systematic reviews direct practices by rigorous treatment recommendations in test and greatly serve for the development of evidence-based protocols, to settle clinical uncertainties and fill in gaps in healthcare practice and encourage the continuation of studies by the scientific community.

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