



The Risk Assessment Scales are an Efficient Tool in the Prevention of Pressure Ulcers in Hospitalized Neonates

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Rec date: Apr 23, 2014; Acc date: July 09, 2014; Pub date: July 12, 2014

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Mini Review

In the last decade, the increase of new health technologies in Neonatal Intensive Care Units (NICU) -adapted from technological advances in adults- has led a significant increase in survival and prognosis of some neonates diseases with high-risk situations (premature) and critical conditions (respiratory distress). Some health technologies (mechanical ventilation, hemodiafiltration, Extracorporeal Membrane Oxygenation-ECMO) require that the infant remains sedated and maintain prolonged immobility. This situation favouring the occurrence of Pressure Ulcers (PU) in hospitalized neonates. In Spain in neonatal units the prevalence rates are from 50% in NICU, and 12.5% in hospitalization [1-3]. Epidemiological studies in neonates are scarce and usually with little sample.

All health organizations related to wounds, whether national (GNEAUPP) and international (EPUAP, EWMA, NPUAP) promote and enhance patient safety by preventing hospital adverse events [4]. In this line of the most relevant adverse effects, in 2008, a committee of experts from the Agency for Healthcare Research and Quality (AHRQ), after the evaluation of two million different health interventions in pediatrics and neonatology services in different hospitals, assessed that 50% of the PUs in the pediatric population (including neonatal) were preventable [5]. Then we can assert that the best approach to the problem of PUs is to prevent its occurrence. Other studies with less-power-statistics are warning that 85% of the PUs in neonatal units can be prevented. In this case, one hospital was implementing a strategy of preventive interventions based on risk assessment PUs, using validated scales to neonatal context [6].

According to the latest Clinical Practice Guideline for Pressure Ulcers by the National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel (EPUAP), a pressure ulcer is "a localized skin lesion or underlying tissue so usually over a bony prominence, as a result of pressure, or pressure in combination with the shear. A number of contributing or confounding factors are also associated with pressure ulcers; the importance of these factors has not yet been elucidated" [7].

The PUs can appear in any hospitalized person, who is immobile and either age whatever. Risk factors in neonatology are similar to those group of children admitted in critical units. Although due to

neonatal characteristics, there are some risk factors with a stronger relationship with the presence of PUs. Use diagnostic and therapeutic devices (electrodes, pulse oximeter, intravascular device) [8], hypotension and hypoxemia processes [9], using ECMO [10], prematurity [10], edema [11], gestational age [12,13], low birth weight [13], presence of non-invasive mechanical ventilation (NIV) [8,14] high-frequency oscillatory ventilation (HFOV) [15].

We must remember that the greatest risk factor for PUs between hospitalized neonates is the belief on the part of health professionals, that the PUs are not a problem in neonates [1,16].

The present communication aims to provide an opinion based on the latest published studies on the use of Risk Assessment Scales (RAS) for PUs in the neonatal population. A RAS is a tool for establishing a score according to a series of parameters considered to be risk factors.

In his review published in 2011, Dr. García-Fernández et al, assessed the use of RAS in childhood was not a very common intervention among health professionals. Even if health professionals use a scale, they use adult scales. This is a mistake, because does not consider the intrinsic characteristics of children at each age. If adults scales are used for neonates, even worse [17].

In his review, Dr. García-Fernández tells us that a RAS is useful, for the following reasons: optimizes human and material resources, can anticipate and determine necessary patient care, facilitates protocols and preventive interventions development.

For the general paediatric population there are 12 RAS, where some of them can also be used in neonate population. In their review, Dr. Garcia-Fernández et al., explain that only Neonatal Skin Risk Assessment Scale (NSRAS), Braden Q and Starkid Skin scales had a validation process. This last fact means that they are useful for clinical practice. In the Table 1, we can see the most important RAS for pediatric and neonatal patient.

All scales only one is aimed at the assessment of risk in neonates. This scale is the NSRAS. Although the authors validated this RAS with a small sample (32 neonatal patients). But in Spain, a research group is validating at the Spanish context in a multicenter study the NSRAS scale [17,18].

Year	Original name	Clinical Context	Country	Point Direction	Cut-off point
1993	Pediatric Risk Assessment Chart	ICU	United Kingdom	Direct	≥10
1996	Q Scale for Predicting Pediatric Pressure Ulcer Risk	ICU	EE. UU.	Invers	≤23
1996	Patient Assessment Tool for Assessing Patients at Risk for Development of Pressure Related Breakdown	ICU	EE. UU.	Direct	≥6
1997	Derbyshire Children's Hospital Paediatric Risk Assessment Score	Hospital	United Kingdom	Direct	≥6
1997	The Neonatal Skin Risk Assessment Scale	ICU	EE. UU.	Invers	≤5
1998	Paediatric Score	ICU	United Kingdom	Direct	No
1998	The Pattold Pressure Scoring System	ICU	United Kingdom	Direct	≥15
1998	Paediatric Pressure Sore Skin Damage Risk Assessment Form	Hospital	United Kingdom	No cut-off point	No
2004	Leicester Pediatric Risk Assessment Scale	Hospital	United Kingdom	Invers	No
2005	Starkid Skin Scale	Hospital	EE. UU.	Invers	No
2005	Pediatric Burn Pressure Ulcer Skin Risk Assessment Scale	Paediatric burn ICU	EE. UU.	Direct	No
2007	Glamorgan Paediatric Pressure Ulcer Risk Assessment Scale	Hospital	United Kingdom	Direct	≥10

Table 1: Risk Assessment Scales for Paediatric Patients.

But it is not the aim of this review to explain the validation process or future projects. In 2013, Dr Köttner et al. published a new systematic review about the validation and clinical impact to use RAS with paediatric patients. The revision concluded that there is little evidence about the use of RAS in paediatric population. None of them showed that, by themselves, caused a decrease in the PU frequency. Finally, they explained that, perhaps it was better to use clinical judgment than the use of RAS in PU risk assessment in the pediatric population [19]. The lack of this latest revision is that it is not taking into account the definition of RAS. It didn't appreciate the fact that RAS is not, in itself, a preventive intervention of PUs.

As regards, the review of Dr. García-Fernández et al., a RAS is used to manage preventive interventions per protocol, and facilitate the management of human and material resources. At this financial crisis it's so necessary. Other benefits are RAS facilitates education in prevention of PUs in neonatology (especially for health professionals, who are not interested in this topic), and RAS is a useful tool for novel health professionals (by their lack of experience, don't have developed clinical judgement) [17].

In our opinion, the review of Dr. Köttner et al., uses a limited prism. This only observes if a RAS can reduce -by itself- the incidence of PUs. It is true that have not been performed Randomized Clinical Trials (RCT) that have attempted to demonstrate the effectiveness of RAS. As we will relate later, there are already studies that have shown their efficacy when health professionals use a RAS for implementing preventive interventions.

The RAS also have been recommended by health institutions, in the context of a patient safety strategy. The most recognized case in Spain is the Health Department of the Valencia Community. This Institution, in 2012, published the first Clinical Practice Guideline (CPG) with a paediatrics and neonatology PU's prevention chapter. This CPG recommends the use of a RAS in hospitalized neonatal population [20]. This Institution has been linking, directly, economic

productivity of health professionals with daily risk assessment of PU in all patients admitted at hospitals. The chosen RAS, in its Health Departments for Neonatal Services, is the Spanish version of the NSRAS [21]. To achieve the goal of productivity, Neonatal Services should assess all infants admitted in a hospital. This allows know the risk level in Neonatal Services, and then to invest or distribute prevention resources.

In international context, the Institute for Healthcare Improvement (IHI) conducted a campaign called "5 Million Lives Campaign". They presented the document "How-to Guide: Preventing Pressure Ulcers, Pediatric Supplement". This recommends the use of six key components for preventing PUs. One of these is the use of validated RAS for the pediatric and neonatal population [22].

In 2009, another study was implementing a prevention strategy called SKIN. Braden Q scale was used as an assessment instrument. It was prospective, quasi-experimental study. It was conducted in order to determine whether the SKIN care bundle was associated with a significant reduction in PU development. When the nurse assessed a neonate with risk, the neonate should receive a SKIN care plan (surface, moisture monitoring, nutrition and turning frequency). They observed a reduction in the PU frequency between the control group (149 patients) and intervention group (250 patients). While in the control group the PU frequency was 18.8% (28 patients), in the intervention group was 6.8% (17 patients), maintaining a significant statistically difference ($p < .001$) [22].

In light of these studies, assess the RAS as useless tools, it's too simple asseveration. If we accept that the occurrence of PUs is a multifactorial process, the prevention of them is multifactorial too. Reject the use of an instrument which allows assessing a number of factors in a short time and also by nurses from different clinical experience, it's a luxury that, we cannot afford. Without RAS, the neonates are weaker.

The RAS can be improved with investigation of risk factors, new efficient scales may be able to appear, but every useful resource to organize, manage and provide the security environment should not be neglected or underestimated. Specifics RAS respond to the needs of patients according to each age group characteristics. They predict the risk for PUs in the neonatal and pediatric period.

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