ANALYSIS OF AGREEMENT OF THE EVALUATION OF PRESSURE ULCER STAGING

ANÁLISE DA CONCORDÂNCIA DA AVALIAÇÃO DE ESTADIAMENTO DE ÚLCERA POR PRESSÃO

ANÁLISIS DE ACEPTACIÓN DE ESTADIFICACIÓN DE LAS ÚLCERAS POR PRESIÓN

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ABSTRACT

This study aimed to evaluate the consistency of the diagnoses, among nurses, of the staging of pressure ulcers based upon bi-dimensional images. This was a cross-sectional study with a diagnostic approach for staging of pressure ulcers, as measured by the overall rate of agreement and the Kappa Index. Training was conducted with 12 nurses and evaluation of the level of agreement in comparison to the diagnostic standard of an experienced investigator in the reading of ten digital images. Three applications of the test were necessary to obtain more than 80% agreement in the classification of the ulcers. The level of agreement obtained based on the evaluations of the bi-dimensional images was lower than those obtained in clinical practice. This study showed that in order to achieve agreement of greater than 85%, a high level of professional training is necessary, in large part, of the professionals who perform the evaluation.
Keywords: Pressure Ulcer; Diagnosis; Data Interpretation.

RESUMO

Este estudo teve como objetivo avaliar a consistência dos diagnósticos, entre enfermeiras, de estadiamento de úlcera por pressão a partir de imagens bidimensionais. Trata-se de um estudo transversal com abordagem diagnóstica de estadiamento de úlceras de pressão medido por meio da taxa global de concordância e índice Kappa. Realizou-se treinamento de 12 enfermeiras e avaliação do grau de concordância em comparação com o diagnóstico padrão de pesquisador experiente na leitura de 10 imagens digitais. Foram necessárias três aplicações do teste para obtenção de mais de 80% de concordância na classificação das úlceras Os níveis de concordância obtidos por meio da avaliação de imagens bidimensionais foram mais baixos que aqueles obtidos na prática clínica. Este estudo comprovou que para se atingirem concordâncias superiores a 85% é necessário, em grande parte, alto grau de capacitação dos profissionais que realizam a avaliação.
Palavras-chave: Úlcera por Pressão; Diagnóstico; Interpretação Estatística de Dados.

RESUMEN

Este estudio tuvo como objetivo evaluar la concordancia de diagnósticos entre enfermeras sobre estadios de ulceras de presión a partir de imágenes bidimensionales. Se trata de un estudio con enfoque de prueba diagnóstica de ulceras de presión por medio del cálculo de la tasa global de concordancia y el índice kappa. Fueron seleccionadas 12 enfermeras para evaluación de 10 imágenes digitales y sus diagnósticos comparados al de un investigador de mucha experiencia. Fueron necesarias tres aplicaciones de la prueba para obtener 80% de la concordancia global en relación al diagnóstico patrón. Los niveles de concordancia obtenidos por medio de la evaluación de imágenes bidimensionales fueron menores de aquellos obtenidos en la práctica clínica. Este estudio comprobó que para alcanzar altos niveles de concordancia en dichos diagnósticos los profesionales que realizan la evaluación deben estar muy capacitados.
Palabras clave: Úlcera por Presión; Diagnóstico; Interpretación Estadística de Datos.

INTRODUCTION

A pressure ulcer (PU) is damage to the skin or underlying tissue, or both, usually over a bony prominence, as a result of the action of pressure, shear, friction or the combination of these three forces. Other factors still to be elucidated are also associated with pressure ulcers.[1]

Shea described, in 1975, the first wound classification in accordance with the tissue layers, which was used in the evaluation of all types of wounds. In 1989, there was an advance in the classification scheme with four stages, based on the depth and tissues affected. This classification was developed to be applied to pressure ulcers, considering the stages of I to IV, and underwent testing and validation. [2]

Stage I ulcers are those in which hyperemia of intact skin is observed that does not blanch with pressure, which should be compared to an adjacent area or one on the opposite side of the body, and may include one or more of the following changes: skin temperature (warm or cool), tissue consistency (firm or soft upon palpation) and/or sensation (pain, itching). The ulcer presents itself as a reddened area, defined and persistent on clear skin. Reactive hyperemia should not be confused with the stage I PU. The identification of PUs in people with dark skin can be difficult, and may appear as skin that is persistently reddened, blue or with purplish hues. [1]

The Stage II ulcer is one that has partial loss of the dermis. The ulcer is superficial, whose bed presents as reddened and without slough. It can also present as an intact blister full of exudate, or one that has broken/opened. This phase should not be used to describe skin disruptions in general, such as burns induced by adhesive tapes, perineal dermatitis, maceration or excoriation.

The stage III ulcer presents total loss of skin thickness, and the subcutaneous fat can be exposed. However, bone, tendon or muscle are not directly visualized or directly palpated. The depth of the ulcer will vary according to the anatomical location. The ulcer with undermining and tunneling may be included in this stage. [1]

The definition of a stage IV ulcer is one which exhibits a total loss of skin thickness, and may have tendons, bones and muscles exposed. The depth of these ulcers will vary according to the anatomical location and, often, undermining and tunneling occurs associated with stage IV ulcers. The wound bed may present sloughing and eschar. Stage IV ulcers may extend to the muscles and other support structures such as, for example, fascia, tendon and joint capsule, making osteomyelitis possible. [1]

The classification of the stages provides uniformity of language and assessment criteria for care protocols. To do this, professionals need to adapt to the terminology and continuously conduct assessments.

For any inquiry of clinical diagnosis, it is necessary to evaluate the quality of diagnostic techniques to be used between observers, this being a subject of great interest in clinical practice.

One way to verify the agreement of results of the benchmarking of a clinical outcome, in this case the staging of PUs from the analysis of bidimensional images, is through the overall rate of observed agreement between the examiners and the Kappa index. This index takes into account the agreement due to chance and shows the proportion of agreement beyond that expected by chance. The value ranges from -1 (complete disagreement) to 1 (total agreement). The value 0 indicates that the concordance between readings was a result of chance. [3]

In the evaluation of these procedures, the concept of reproducibility refers to the agreement or consistency of results when a certain diagnostic technique is repeated.

This study aimed to evaluate the agreement between nurses in the staging of PUs after in-service education.

METHOD

The approval of the Ethics Committee in Research of the *Universidade FUMEC* (Opinion No. 265/2007) was obtained to develop this research.

This study was part of a research project conducted to analyze risk factors for the development of PU in adult patients admitted to ICUs. To this end, 12 nurses with healthcare and auditing experience received prior training to perform the clinical examination, identification, staging and localization of the PU and the application of the Braden scale. At the end of the training, the degree of concordance (Kappa index) was verified between the nurses and the supervisor (one of the researchers of the study), where it was hoped that all should obtain more than a 90% level of agreement to be considered suitable. The assessment conducted by the researcher was considered to be the standard of reference, based on her experience in classification of PUs.

To evaluate the results, we used the classification of Kappa agreement <0: bad; Kappa 0-0.20: weak; Kappa 0.21-0.4: poor; Kappa 0.41-0.60: regular; Kappa 0.61-0.80: good; Kappa 0.81-0.99: optimal; Kappa 1: perfect. [3]

Acceptable agreement was considered when the index was equal to or greater than 81% (Kappa agreement of optimal or perfect).

The initial training of nurses to acquire skills to establish the diagnosis of a PU and its staging consisted of theoretical and practical classes.

The lectures had a workload of ten hours, the content of which was related to the systematic assessment of risk for developing a PU. The definition, classification, etiology/pathogenesis and localization of PUs, risk assessment for development, as well as measures for their prevention and treatment, conforming to the United States directives for the prevention of PUs, were also presented. [4]

The classes had a workload of five hours, in which there was discussion of cases with projected digital images of PUs, as well as evaluation of bedridden, hospitalized patients, their PUs and staging.

Following the training, the first assessment of the degree of agreement between the nurses and the researcher regarding the staging of PUs was conducted. To this end, ten digital images were projected, which were: one stage I PU, four stage II PUs, two stage III PUs, and three stage IV PUs. Such images were classified by the nurses, who were placed at individual tables, distant from one another.

The results showed the need to conduct another test. Within a five day interval, the questions of the nurses in regard to the theme were identified and clarified. Once again, the nurses were placed at individual tables, separated from one another, and the same digital images of the ulcers used in the first test were projected.

The results of the second test were also not satisfactory. The strategy to improve the competence of nurses for the classification of PUs in the third step was a discussion of the literature relevant to the theme [5,] as well as case presentations, theoretical discussion and questions and evaluation of images of ulcers at different stages. Thereafter, 30 days following the application of the second test, it was applied for the third time. For this, we used 11 digital images of PUs, two of stage I, two of stage II, three of stage III and four of stage IV. We maintained the distribution of the nurses for conducting the test.

RESULTS AND DISCUSSION

In the first evaluation after the training of the 12 nurses, six (50.0%) achieved more than 80% agreement; one (8.3%) obtained 73%; four (33.4%) obtained between 58.3 to 59.5%; and, one (8.3%) obtained 45% (Figure 1). The values of agreement for each observer were nonrandomized in relation to the standard (p <0.011). As the whole group did not obtain 81% or more agreement, a new training strategy was established, as already explained.

The result obtained in the second evaluation (Table 1) showed that two (16.7%) of the nurses achieved more than an 80% agreement; two (16.7%) were between 70-80%; five (41.6%) were between 50-69%; two (16.7%) were between 40-49%; and one (8.3%) was 32%. Accordingly, in the second stage there was also no statistically significant agreement (p> 0.05).

As a consequence of the results not being satisfactory regarding agreement, a third test was scheduled after the new educational strategy, whose results are shown in Table 2.

As can be observed, in the third step, the entire group of nurses obtained more than 80% agreement in the classification of PUs.
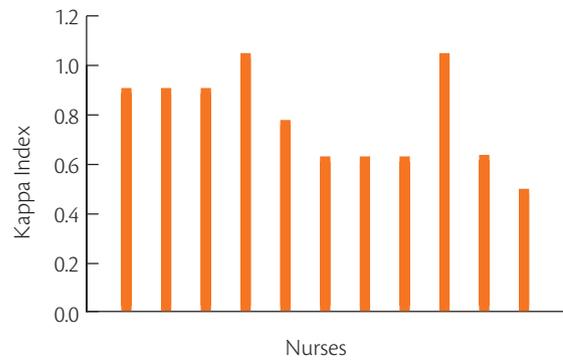

Figure 1 - Values of agreement (Kappa) between nurses and the classification of pressure ulcers compared to the reference standard – Belo Horizonte – 20/04/2007.

Table 1 - Values of the test of agreement (Kappa) and correlation coefficients of the nurses in relation to the standard, in two evaluations

Nurse	Kappa I *	Kappa II **	Spearman II
1	1	0,861	0,951
2	0,859	0,571	0,928
3	0,859	0,718	0,930
4	0,859	0,855	0,966
5	1	0,600	0,833
6	0,730	0,589	0,910
7	0,583	0,467	0,905
8	0,595	0,589	0,910
9	0,583	0,324	0,928
10	1	0,718	0,930
11	0,589	0,459	0,763
12	0,452	0,589	0,910

(*) All Kappa values were significant (p <0.011)
(**) All correlation coefficients were significant (p <0.003).

Table 2 - Values of the test of agreement (Kappa) and correlation coefficients of the nurses in relation to the pattern, in three evaluations

Nurse	Kappa I*	Kappa II*	Kappa III*
1	1	0,861	1
2	0,859	0,571	1
3	0,859	0,718	1
4	0,859	0,855	1
5	1	0,600	1
6	0,730	0,589	1
7	0,583	0,467	0,856
8	0,595	0,589	1
9	0,583	0,324	0,876
10	1	0,718	0,876
11	0,589	0,459	0,875
12	0,452	0,589	1

(*) All Kappa values were significant (p < 0,011).

Thus, the present study enabled the identification that in the first evaluations there was wide variability in the classification of the staging of wounds among the nurses. Only the third evaluation of interobserver variability, measured by the Kappa test, was considered optimal to perfect.

It was found, therefore, that only a highly qualified team to conduct staging of PUs with high levels of precision could achieve levels of agreement exceeding 85%.

However, the literature [5] indicated that levels of agreement obtained by means of evaluation of bi-dimensional images are lower than those reported in clinical practice, because it is difficult to judge the depth of the photographed wound. In this sense, different strategies should be used to minimize the variability of diagnosis when this is performed by visual tests [6], including the establishment of protocols, the measurement by more than one professional, and meetings and discussion among the team. These measures may reduce the occurrence of errors and improve the quality of the proposed interventions.

This study showed that the staging classification of wounds is a procedure that can be influenced by the level of experience and knowledge of the nursing team. Therefore, it becomes necessary that professionals have the experience and specific training in the area, since the bias in the evaluation may lead to inaccurate results, not arising from the method used, but due to inexperience and the clinical judgment of the professionals. [7]

CONCLUSION

This study identified that the adequate classification for staging of PUs depends, in large part, on the training of professionals that perform it.

This stresses the importance of using this criterion in clinical practice, in which professionals perform diagnosis and use instruments in a non-systematic manner and without adequate training. Therefore, this practice negatively interferes in the quality of diagnoses made, as well as the utilization of some work instruments.

This study reinforces the need and importance of in-service educational programs for nurses in health institutions.

REFERENCES

1. National Pressure Ulcer Advisory Panel – NPUAP. Pressure ulcer stages revised by NPUAP. Washington: National Pressure Ulcer Advisory Panel. [Cited 2007 Feb 2010]. Available from: http://www.npuap.org

2. Pieper B. Mechanical forces: pressure, shear, and friction. In: Bryant RA. Acute and chronic wounds: nursing management. 2nd ed. St. Louis: Mosby; 2000. p. 221-64.

3. Seigel DG, Podgor MJ, Remaley NA. Acceptable values of kappa for comparison of two groups. Am J Epidemiol. 1992; 135(5): 571-8.

4. Bergstrom N, Allman RM, Alvarez OM, *et al.* Treatment of pressure ulcer. Clinical practice guideline, n.15. Rockville: Public Health Service, Agency for Healt Care Policy and Reserch; 1994.

5. Healey F. Classificação das úlceras por pressão II. [Classification of pressure ulcers II]. Nursing. 1997; 109: 16-20.

6. Cerato MM, Cerato NL, Meurer L, Edelweissa MI, Pütten AC, Golbspan L. Variabilidade interobservador no diagnóstico histológico dos pólipos colorretais. [Interobserver variability in the histological diagnosos of colorectal polyps]. Rev Bras Coloproct. 2007; 27(1): 7-15.

7. Simão CMF. Úlcera por pressão em Unidades de Terapia Intensiva e conformidade das ações de Enfermagem [dissertação]. [Pressure ulcer in Intensive Care Units and conformity of the nursing actions]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo; 2010.