Pain assessment in the Emergency Department. Correlation between pain rated by the patient and by the nurse. An observational study

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Abstract. *Background and aim of the study:* Pain is always present in the Emergency Department (ED), but is often underestimated. The primary purpose of this study is to analyze the degree to which the intensity of pain is underestimated or overestimated in the perception of the nurse and the patient in the ED. The secondary objective of this research is to study possible factors that lead to these discrepancies in assessment. *Methods:* The observational study was carried out in two Hospitals in Central Italy. The sample population was based on 130 patients and 26 nurses. A questionnaire was given to the patients who provided personal data followed by information regarding their pain, including an assessment of the intensity of pain on a scale from 0 to 10. A similar questionnaire was given to the nurses. *Results:* The average score based on the numeric rating scale (NRS) to assess the intensity of pain perceived by the patients is 6.16, while the numerical average estimated by the nurses based on their assessment is 5. Using the t test we found that the average between nurse and patient assessments was very significant. The analysis of the nurses' characteristics and professional experiences, age, years of employment and years of service in the ED are all significant variables affecting the discrepancy between the nurses' and patients' assessments of pain. As previous studies have shown, nurses tend to underestimate the degree of pain. In fact, in only 55.5% of the cases was there a correspondence in the evaluations of the intensity of pain done by nurses and patients, and in no case did the nurses' evaluation exceed that of the patients. *Conclusions:* This study reveals the persistent difficulty in pain management, while attempting contemporaneously to communicate the importance of the assessment, since adequate understanding of pain renders it possible to recognize and treat it.

Key words: Emergency Department, nurse, pain, pain management

Introduction

Pain, whether sudden, acute, or chronic, is defined as "*an unpleasant sensory and emotional experience associated with actual or potential tissue damage.*" (1). The occurrence of pain is one of the main reasons for patients to seek aid from the Emergency Department (ED) (2, 3). As much as 70% of ED cases are due to pain (4). Despite these statistics, pain is not always properly treated and is sometimes underestimated (5). Though there are many campaigns and training programs to sensitize health care providers to the correct assessment of pain, this symptom is sometimes inadequately considered, resulting in oligoanalgesia of the patient (6).

The reasons why pain is not immediately managed with medication or recognized by caregivers in the ED may be explained by adverse effects which may result

from the use of some medications; the risk of masking signs and symptoms, thus leads to misdiagnosis, and lack of trust in the patients' own expression of pain (7).

Furthermore, EDs are often subject to overcrowding which results in long waiting time before patients receive specialized ambulatory treatment or diagnostic exams. Overcrowding may prevent the nurse from providing correct pain management, adequate assessment and timely treatment (8, 9). Crowding in the ward is the main cause of mistaken pain assessments: the nurse is unable to focus on a correct evaluation of pain intensity due to the disorderly atmosphere typical of emergency wards, characterised by long waiting lines. This pushes the nurse to base assessments more on objective symptoms rather than on pain, a highly subjective and personal factor which is underestimated and not considered as a fifth vital sign. A proper assessment of pain is the first step towards alleviating and treating pain (10), yet this fundamental truth is often underestimated by doctors with respect to the patients' expressed degree of pain (11). Underestimation of pain occurs even among nurses responsible for triage as they accept patients into the ED (12, 13). This may result in many negative outcomes for the patient who foremost is not receiving analgesic medication, or experiences delay in receiving medication (14). A major recognition of pain by the nurse derives from a greater sensitivity to pain and the importance of its treatment, starting from a greater awareness of the great gap between the nurse's assessment and what the patient feels.

Objectives

Nurses have to undergo pain sensitivity training in order to be aware of the big difference that exists between their assessments and those of the patients so as to be able to minimise it. The aim of this study is to determine the congruence between patients' and nurses' assessments of pain intensity in two Italian EDs.

Materials and methods

Data was collected from October to December 2015 in two EDs in the hospitals in Foligno (Perugia)

and in Assisi (Perugia), second-degree and third-degree level facilities, respectively, in Central Italy.

Design

The methodology adopted for this study was a descriptive cross-sectional study of a purposive sample of ED patients who came to the department with a primary complaint of pain, and a convenience sample of emergency nurses.

Sample

In order to select a sample population, criteria of inclusion and exclusion used in previous studies were applied (12.13). The criteria of inclusion for participation of patients in the study are as follows:
1. Age ≥18;
2. Subjects whose lives are not in immediate danger or in such critical condition as to require immediate recovery and urgent care;
3. Patients capable of understanding and using the NRS.

The criteria of exclusion that prevent participation of patients in the study are:
1. Subjects whose lives are in immediate danger or in such critical condition as to require immediate recovery and urgent care;
2. Patients incapable of using the NRA due to difficulty in communicating, mental disabilities, learning disabilities or those suffering from dementia;
3. Prisoners or young offenders.

The only criteria for inclusion of nurses was at least six months of service completed in the ED, applicable as well to the nursing coordinator in the emergency unit.

The nurse-patient ratio is 1:5 while in previous studies the ratio was 1:4; however, the number of nurses and patients was greater in previous studies (12, 13).

Furthermore, in order to avoid potential errors in the selection of the available sample and to maintain the greatest possible objectivity, the researcher was not permitted to deliberately choose participants.

Instruments

Data gathering was done with two tools: two specifically designed datasheets, one for the patient and another for the nurse. Particularly, two data sheets were completed: one by patients seeking assistance from the hospital and one by nurses responsible for triage. The patient's data sheet includes a personal section followed by a part concerning pain, which describes what kind of pain it is, and if it is a referred pain or localized pain – in this case the exact origin is required (for example musculoskeletal, abdominal, or chest pain, etc.). The duration of the pain is established, and if the pain is acute or chronic, the patient evaluates his level of pain. Pain was calculated on a horizontal numerical scale, therefore, measurement of pain intensity was added to the study-specific protocol and the numerical rating scale (NRS), with the endpoints 0="no pain" to 10="worst possible pain," was used (NRS categories are 1-4 mild pain, 5-6 moderate pain and 7-10 severe pain). The NRS has been validated and is a reliable instrument to use in an active setting (15) and its use in EDs is preferable to the VAS (Visual Analog Scale). Though results often overlap between the two measurement instruments, the former is better known and easier to use (16). The tool used for pain assessment, that is, the NRS, is already being used in the aforesaid hospitals.

The nurse's data sheet is the usual triage record for the patient's admission in the Emergency Department. In fact it is composed of personal data of the nurse that includes information about post-university education, working years, years of service in the ED, and participation in training courses on assessment and treatment of pain. The second part concerns the pain evaluation that the nurse makes concerning the same patient, using the NRS. It was not necessary to obtain the Research and Ethics Approval because the triage record was already in use in the two hospitals.

Procedure

Upon access to the ED, a third party informed the patients of the procedure of the research and asked if they were willing to participate. Consent to provide data was equivalent to consent to participate in the research project. After obtaining the consent, the nurse asked the patient to give the information on pain and drafted the corresponding data sheet. Therefore, the patient access the triage area and is evaluated by the triage nurse who completes the data sheet concerning the pain of the same patient. However, the nurse decides the score of the NRS in advance, without knowing the rating given by the patient to the nurse stationed upon access to the ED.

Planning and development of the study

The compilation of the questionnaire and collection of data, which contained a series of questions regarding the educational and professional background of the interviewee, was designed in such a way as to ensure anonymity and respect Italian laws on privacy. The data sheet forms an integral part of the triage record that each nurse has to fill out for the patient's admission in the triage area. That is why the Research and Ethics Approval was not required since the triage record was already in use in the two hospitals.

Statistical analysis

The data was organized on an Excel 2007® spreadsheet (Microsoft Corporation, WA, USA) then elaborated according to the statistical program Stata 14.1 (Copyright 1996–2015 StataCorp LP, 4905 Lakeway Drive, College Station, TX 77845 USA) applying the Pearson χ^2 Test, and the Fisher Exact Test, with an expected significance level of 0.05. "Pwcorr" command was used to obtain pairwise correlation coefficients between the variables (p<0.05).

Results

From October to December 2015 there were 255 pain-related accesses in the ED in the hospitals in Foligno and in Assisi (Italy). Particularly, 85 took place in the ED in Assisi and 170 in Foligno, differentiating 16 red codes, 59 yellow codes, 80 green codes and 100 white codes. In accordance with the criteria of inclusion and exclusion, only the pain-related green and white codes were taken into account for this research survey: there were a total number of 180, and were excluded the patients with difficulty in communicating

Table 1. Differences between nurse and patient average (SD) NRS Scores

	n	Mean - (IC)	Min	Max
Nurse	126	5 [4.688 - 5.312]	2	9
Patient	130	6.16 [5.825 - 6.445]	2	10
Diff.	126	0.913 - 1.357] *		

*p<0.0001
Legend:
- n=number of observations of the pain;
- Min=the minimum score observed by nurse/patient using the NRS;
- Max=the maximum score observed by nurse/patient using the NRS;
- Diff.=difference between the observations of the nurse and patient
Note: there is a difference between the number of observations of the nurse and patient because there are four cases of "pain not observed."

and cognitive deficits. Among all these accesses, 130 cases were selected randomly that were then submitted to the statistical analysis.

A total of 130 patients and 26 nurses participated in providing data. The mean regarding data on the NRS to assess intensity of pain perceived by patients was calculated at 6.16 (SD 1.74) while the average assessed by the nurses was 5 (SD 1.77). Furthermore, while the minimum numerical value attributed to intensity of pain was 2 for both nurses and patients, the maximum value expressed on the NRS was 10 for the patients and 9 in the assessment of the nurses (Table 1).

With the use of the t test it was possible to determine the average difference between the assessments of the nurse and patient, thus showing that the difference between the two assessments was significant (p<0.0001).

The observation of the assessment of pain by patients and nurses (Table 2) reveals that 18.25% (23 cases) of patients were confirmed to suffer mild pain, 30.95% (39 cases) moderate pain and 50.79% (64 cases) severe pain. Nurses assessed 45.24% (57 observations) as mild pain, 30.95% cases (39 observations) as moderate pain, and 23.81% cases (30 observations) as severe pain. Thus it was possible not only to note a tendency in nurses to underestimate the degree of pain but even in cases where patients assess the pain as severe. The difference in assessments between nurses and patients was statistically significant (p<0.001).

In examining results concerning the level of incongruence between the assessment of patients and nurses, an attempt was made to analyze the characteristics of the individual nurse and his or her professional and educational experience through the use of

Table 2. Pain assessment of patients and nurses

Patient \ Nurse	NRS			
	1-4	5-6	7-10	Total
NRS 1–4 mild pain	23*	0	0	23
	100.00	0.00	0.00	100.00
	40.35	0.00	0.00	18.25
NRS 5-6 moderate pain	22*	7	0	39
	56.41	43.59	0.00	100.00
	38.60	43.59	0.00	30.95
NRS 7–10 severe pain	12*	22*	30*	64
	18.75	34.38	46.88	100.00
	21.05	56.41	100.00	50.79
Total	7	39	30	126
	45.24	30.95	23.81	100.00
	100.00	100.00	100.00	100.00

Pearson chi-squared test=64.6850   P<0.001
*P<0.05

Table 3. Individual correlation variables to the level of congruence in assessments

Variabile	R value
Age of nurse	-0.3234*
Gender of nurse (M=1 ; F =2)	0.0104
Years of employment	-0.2841*
Years in Emergency Service	-0.3065*
Courses in Pain Management	0.1154

*p<0.005

the Pearson correlation coefficient (Table 3). The questionnaire compiled by the nurse provided the factors for analysis including age, gender, years of employment, years of service in the ED and possible participation in specific training on pain management and assessment.

The age of the nurse, years of employment and years in Emergency service are significant in so far as these three factors are inversely proportional to the level of congruence in assessments. The greater the age of the nurse, and the higher the number of years of employment and time worked in Emergency Departments, the higher is the difference in the evaluation of pain assessments of nurse and patient.

Discussion

Among pathologies most often found in EDs, a rating of pain intensity above 6 is considered as severe pain (17). In a previous study (12) the average intensity of perceived pain by patients was 7.5 in triage while nurses rated the level at 5.1. Successively, in 2008 Martin Duignan and Virginia Dunn (13) repeated the statistical analysis and found that the patient's average intensity rating was 6.45 while that of the nurse was 5.2. Our study resulted in a calculation of patients' average assessment of intensity at 6.16 while the average pain rated by nurses was 5. Thus, the patient's average of 7.5 found by Puntillo undergoes a progressive decrease to 6.16 with a corresponding decrease from levels of severe to moderate pain. Similarly the average assessment of the nurse decreased to 5. However, in this case, there is less discrepancy between nurse and patient in assessments of lower values. In the Duignan

study (13) 45% of the nurses assessed the category of their patients' pain differently from that of the patients themselves; in 90% of the cases the rating was lower. In only three cases did nurses overestimate in comparison to the patients' assessment. In the present research study, 55.5% of the nurses estimated a degree of intensity congruous to that estimated by the patient but in no case did the nurse overestimate. Having found under-assessment, Baharuddin (18) could attribute this underestimation to the context and general environment of the ED: overcrowding in EDs could be a factor that leads to indifference among caregivers towards pain, and thus to underestimation and undertreatment.

Every patient when turning to the ED for assistance does not always desire medication to alleviate the pain (19). Only half the number of patients who turn to EDs due to pain, request and receive analgesics and among these the majority express satisfaction with hospital services (20, 21).

Unlike similar studies (13), ours correlates the demographic characteristics of nurses to the variables in assessment of pain. This study concludes that age, years of employment and years in Emergency service are detrimental to congruence in assessment by nurse and patient resulting in a wider divergence between points attributed to the degree of pain.

It is still the case that overestimation of pain occurs among young, inexperienced nurses, while, on the contrary, nurses with long experience tend to underestimate pain (22).

Use of nursing protocols for pain management with implementation of medication can reduce intervention delays and the occurrence of oligoanalgesia (23, 24), for pediatric patients also (25, 26).

In any event, difficulties in pain assessment may not always be due to problems related to caregivers in EDs. Marco et al. (27, 28) conducted several studies regarding the self-reporting of pain correlated to a number of demographic factors particular to the population. Higher pain scores were significantly correlated with younger age and the number of ED visits in the previous 12 months. Female gender, African race and patients with Medicaid coverage similarly reported higher scores. Nevertheless, gender alone does not significantly influence pain scores among patients coming to EDs (29).

Limitations

Our study has several notable limitations. The main is that it was conducted in two hospitals in a single geographical region, and the results may not be generalized to include other locations.

Conclusions

This study demonstrates how difficult it is to assess pain in EDs. The nurse, in fact, tends to underestimate the patient's pain intensity level, as shown by the results of this survey, and by many other articles in literature. The combined use of pain measurement with the same tool by the nurse and the patient would allow a step forward to be taken towards raising awareness of professionals to such a delicate topic. The measurement of pain by both parties will stimulate the nurse in realising the difference between her assessment and that of the patient. Moreover this would imply a reduced oligoanalgesia since the nurse, upon noticing the level of pain declared by the patient, will tend to pay greater attention to the fact. The nurse's pain assessment has to be based, in fact, essentially on what the patient says - pain is totally subjective and only the suffering person is aware of it - supported by other parameters regarding the opinion and critical sense of the nurse who observes, speaks to and interrogates the person. If these criteria are complied with, the gap between the nurse's pain assessment and that of the patient can be bridged. This will trigger greater sensitivity of nurses to the issue of pain, help in creating a stronger therapeutic rapport with the patient, and reduce the oligoanalgesia phenomenon. To favour this change, we would need to organize a training course that can involve the nurse firstly as a person, and then as a healthcare practitioner. A training path has to be set to show nurses the real status of pain assessment in the ED, the evident underestimations, the causes that lead professionals to size down the points referred by patients and the consequences of this fact. This study moreover offers a further contribution to increase nurses' awareness and greater attention to recognizing pain. Good documentation can lead to good pain management, while a lack of adequate awareness acts as an impediment to pain assessment.

Acknowledgements

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