

Patient Classification System based on Dependency of Nursing Care (PCS/N)

Authors: *Helena Mota**; *Cristina Duarte Paulino**; *Maria Helena Simões**

* Administração Central do Sistema de Saúde, IP

Abstract

The authors present the Patient Classification System/Nursing (PCS/N) model, created by a Portuguese nurses' team, its development and implementation results. The PCS/N application in Portuguese NHS hospitals allowed them to develop the mechanisms to improve the provision of care, through a more accurate identification of their "clients' needs. The system also enables discussions with the Central Administration regarding the hospitals' global needs in nursing resources and its adjustments based on activity reports.

INTRODUCTION

One of the challenges to which hospitals, is the provision of high quality care while containing the costs. This task requires a more flexible position from the organisations, a more rational use of the existing structures and accuracy when managing the available resources.

Back in 1982, the Portuguese Ministry of Health concerned with those questions, created a team to implement the program "Information System to Hospital's Management", which had a nursing care area. This was the starting point for the patient classification system based on nursing care dependency levels. Starting with the productivity reports evaluation and the statistical data available for a given set of hospitals, the conclusion made was the existence of a wide asymmetry regarding the nurses' distribution by the hospitals and by the different specialization areas within the same hospital. The tools available for measuring the needs of the patients in terms of nursing care were also inexistent thus, creating the need for a precise identification of the causes for those asymmetries, but making it an almost unsolvable problem. Therefore, questions such as: "were the differences justified by the hospitals characteristics, by the specializations or by the patients?" or "were they a consequence of an inefficient planning?" could not be answered with certainty.

So, the decision taken was to have a project in the nursing area that would create results, order to make possible a more adjusted allocation of the nurses by the hospitals, thus meeting the real needs of the patients admitted. Its goals were:

the development of tools to measure the number of nursing hours needed for each inpatient ward;

The training of hospital managers in the use of that information, which would be a tool in planning the number of nurses required and in quality monitoring activities.

In 1984, one of the teams' first tasks was to select a patient classification system for nursing activities among the existing ones: 1) subjective, which means that the classification is done through an evaluation of models; or 2) objective, which means a classification based on the evaluation of critical care indicators. The system chosen was of the objective type, where the most important activities in the provision of direct nursing care are identified, and, for each activity, the different levels of dependency with the respective number of hours required by patients. A standard number of hours for indirect care also has to be identified and added to the hours for direct nursing care.

For each level of dependency the standard number of minutes for the nursing care is determined by evaluating the total number of minutes of nursing care required by each patient within a 24 hour period making it, therefore, possible to plan for the next day.

For a better understanding it is important to define the concept of direct and indirect care:

Direct care: activities which mean the provision of care to a patient to satisfy his/her daily needs (including, but not limited to feeding, bathing, toileting, dressing, lifting, moving the patients.);

Indirect care: activities which being part of the care provided to patients are cannot be identified as specifically to one patient (for example: to answer the phones, to arrange the working cabinet, etc.).

The main constraints of this system lies on the complexity and high costs of its implementation however, these are largely exceeded by the advantages such as the accuracy in calculating the number of minutes really required and the easiness of its application.

The system can be characterised as: objective, individual, global, flexible and easy to understand.

The objective of the PCS/N, is to provide an information tool, allowing the rational management of the human resources through the optimisation of the available nursing staff.

This information generated on a timely and regular basis, supports the nursing managers with their decision-making, the introduction of corrective measures and planning the admission of new nurses, as well as the justification to update their staff board, according to the budgetary context of the organisation.

The application of the PCS/N has the following goals:

To optimise the number of nurses available

To plan the delivery of nursing care

To identify the needs in terms of nurses staff

To adjust the allocation of the hospital staff

METHODOLOGY AND DEVELOPMENT

This system has been developed from the GRASP S (Grace-Reynolds Application and Study of PETO) methodology and consists of classifying inpatients by critical activity indicators, according to their nursing care needs. By that time, this was an innovative and unknown management system in Portugal; thus, the team was counselled by a North American nurse, who was also a hospital manager. To evaluate its performance applied to the Portuguese reality and the adjustments required, five hospitals from the National Health Service (NHS) were selected and the areas targeted were internal medicine and surgery. At present, the system is

also developed to be applied in the following areas: obstetrics, orthopaedic, oncology, paediatrics and rehabilitation.

In order to be able to use the system the organisations have to fulfil a set of requirements from the law abiding the nurses' career and the global quality system:
the provision of nursing care, based in the individual method;
to the existence of the nursing process model;
to the existence of a Definitions and Procedures Manual.
it must be applicable to the acute and admission hospitals which equals or is superior to a 24hour period

The development of the tools for the application of the system, which have specific to each area of specialization, is developed in several phases namely:

To identify the main nursing activities of direct care and their respective dependency levels. At this stage several groups are involved, the co-ordinator group, nurses working in the hospitals participating and the consulting nurses. This stage ends with the issuance of a Definitions Manual describing the intended standard of care to be achieved and the number of minutes spent in the nursing procedures in order to achieve it.

To check the percentage of pre-defined direct care. This step involves the analysis, through a sampling method, of the most significant nursing activities and their proportion in the total workload. As in the previous phase, the group coordinator and the nurses from the hospitals involved work closely together and with the research centre from a Portuguese University.

To ascertain the standard time of care by level of dependency. The professional groups involved are the same mentioned in phase 1. In order to achieve it, the nominal group technique is used.

To establish the frequency of the provision of direct care within a 24 hour period To find out how often each activity is repeated within a 24 hour period, there is the collection of information in the pilot hospitals during a fortnight and using a list where all the possible direct care activities are itemised.

To produce and to validate a model of the patient classification chart. On this chart are listed the most time consuming nursing activities in terms of direct care and the number of minutes required to perform them. For convenience matters, the number of minutes is expressed in "points". The model chart is validated by the hospitals involved, prior to its full implementation.

To identify the indirect care nursing activities and their respective standard minutes. In this stage the indirect care activities are listed and the standard minute required by each of the activities is estimated by consensus.

To develop a conversion table. In order to easily operate this method it is necessary to convert the total number of points obtained in the classification chart into minutes of predicted nursing care hours required by each patient for the next 24 hours. The formula used is:

Total care required = \sum listed direct care + \sum unlisted direct care + \sum indirect care

At the end of all the listed stages a final model chart is finalised to be tested in all the hospitals involved. If there is no need for adjustments, the chart is approved and can then be used in all the hospitals. The result is the Patients' Classification Chart (PCC) for the specialization studied. In this classification tool is included the more representative direct care tasks of nurses workload.

The information circuit begins with the identification of the nursing care dependency levels, per patient and per day. The nurses classifying the patients are in charge of this step, which is the starting point for the system use.

Through the daily assessment of inpatient's needs the nurses are able to plan their activities based in the programmed nursing care and in the physicians' orders. Those activities are highlighted prospectively on the PCC by circling the number of points that correspond to the level of care required by each patient. After converting those points into hours of required nursing care, it is possible to obtain a management indicator called "Number of hours of nursing care required per inpatient per day" (HCR-ID) according to the total number of patients admitted in each specialization. Then, the necessary number of hours for nursing care is compared with the available number of hours of nursing care observed from the nurses' timetable. The results allow an optimised use of the available resources by adjusting the distribution of the staff by similar wards. Every day, in a retrospective basis, the effective use of resources is analysed.

Relating the number of hours provided with the number of patients admitted another management indicator is obtained: "Number of hours of care provided by inpatient day" (HCP-ID). The results of both indicators - $(HCR/HCP) \times 100$ - determines the staff workload rate. This is a straight forward indicator for checking the under or over work load of the staff. All this information is generated on a daily basis allowing the accuracy of the resources management and contributing to the quality standards established.

Associated with the application of the PCS/N are the internal audits aiming at ensuring the reliability of the data generated and verifying the accomplishment of the patients' classification rules. The suitability of the recorded care levels is evaluated through the analysis of: patients' records and planned estimated care. Internal audits are based on the Audit Chart and take place every month, based on a randomised analysis of nursing procedures, thus enabling managers to trust the quality of the information received. The internal auditors are nurses designated by the Nurse Director of each hospital, according to a predefined profile.

Simultaneously, an external audit process was set up, aiming at implementing a control system to ensure the reliability of the information generated. External audits take place once a year and a random set of internal audits is thoroughly analysed not only to ascertain the fulfilment of the rules but also to monitor the presupposition of the PCS/N, which contribute directly to ensure the quality of the system itself and, indirectly, to the quality of the healthcare provided. External auditors are recruited from the internal auditors and trained by the project manager from a central department of the Ministry of Health and who has to make a findings report for each audited hospital.

PRODUCTS AND RESULTS

Since the beginning of this project, the major concern of the people involved has been the definition and the finding of an objective working method, so as to ensure that all the different users are following common principles and procedures. This concern is a justification why the

development of the system is based in manuals, which constitute the guiding and normative supports for the professional practices. So far, were compiled the definition manuals, patient classification charts and guidelines for each specialization, classification rule manuals, internal and external auditing manuals, nursing care procedure manuals, and the software user manual.

The application of the system is voluntary and depends on the interest of each hospital Management.

This method is now implemented and used in 50 of the 100 Hospital from the Portuguese Health System, distributed throughout the Regions in the country (including the Madeira and Azores Islands), and also in the Rehabilitation Centre in Alcoitão, a health unit.



In these hospitals the system is implemented in the following specializations:
Internal medicine (cardiology, gastroenterology, pneumology, infectious diseases nephrology, geriatrics and neurology);
Surgery (gynaecology, urology, and neurosurgery);
Paediatrics;
Obstetrics;

Orthopaedics
Oncology
Rehabilitation

The information circuit was defined and sharpened in order to contribute to the comparative results and the principles regarding the person who generates the information and when and how that information will be available for implementation is stated in the Audit Standard and Classifications Manual.

Patients are classified once a day by their attending nurse and, until 4 pm, the head nurse for each unit is able to better manage the service, taking into account the available and necessary resources. Moreover, this information flux regarding the staff needs for each unit and the available resources allows the head Nurse to take decisions regarding the daily management and the monthly reports.

To centralize all the information regarding the needed and the available staff in each unit in the hands of the Nursing Director allows him/her to decide taking into consideration the best daily management possible of the units. Moreover, it makes it easier to elaborate the monthly productivity reports as well as the internal audit to be forwarded to the project coordinators at the Ministry of Health.

From the information received, the coordinators produce quarterly and yearly feedback reports. Feedback reports allow the users to have a national perspective of the systems' performance in all the hospitals where it is implemented. The averages at national level are calculated when grouping the data per specialization. The data grouping per area, allows to obtain the results at global and national level, as it can be verified on the next chart indicating the averages for the last five years

**Table 1: Global average of nursing care hours required per inpatient per day
2003-2007**

Areas/Services	2003		2004		2005		2006		2007	
	DIST	C/ESP	DIST	C/ESP	DIST	C/ESP	DIST	C/ESP	DIST	C/ESP
CARDIOLOGY	4,83	4,11	4,87	4,16	4,95	3,97	5,58	4,42	5,68	4,45
CEREBROVASCULAR				8,47	6,21	8,37	6,33	8,47	6,11	8,41
SURGERY	4,71	4,78	4,81	5,08	4,85	5,18	4,93	5,07	5,00	5,19
CARDIOTHORACIC SURGERY (1)		4,31		4,05		4,19		4,30		4,62
MAXILLOFACIAL SURGERY		3,40		3,58		3,99		3,79		4,31
VASCULAR SURGERY (1)		4,37		4,43		4,66		4,64		4,81
PLASTIC SURGERY		4,55		4,76		4,99		5,37		4,97
THORACIC (1)				4,21		4,53		4,81		5,12
CONVALESCENCE (1)									4,74	
PALATIVE CARE (1)									5,75	
SURGICAL SPECIALIZATIONS	4,54		4,38		4,40		4,73		5,21	4,47
MEDICAL SPECIALIZATIONS	4,94		5,15		5,29		5,72		5,44	4,54

GASTROENTEROLOGY	4,84	3,21	4,66	3,47	4,74	4,31	4,82	4,43	4,18	4,80
GAENECOLOGY	4,24		4,48	4,05	4,42	4,16	4,53	3,96	4,89	4,10
HAEMATOLOGY (1)		3,79		4,08		4,20		4,12		4,28
INFECCIOLOGY		3,86		4,12		4,51		4,25		4,65
VERTEBRAL AND SPINAL LESIONS		4,53		4,88		4,81		4,80		4,63
GENERAL PRACTICE	5,73	5,38	5,83	5,60	5,93	5,69	6,07	5,95	6,21	6,04
NEFROLOGY	4,79	4,68	5,45	5,06	5,23	4,92	5,40	4,78	5,31	4,52
NEUROSURGERY		5,64		5,38		5,50		5,72		6,45
NEUROLOGY		5,45		5,88		5,95		6,14		6,09
NEUROTRAUMATOLOGY								6,66		6,95
OBSTAETRICS	3,71	4,13	3,71	4,04	3,69	3,87	3,74	3,90	3,89	3,84
OBSTAETRICS /GAENACOLOGY									3,74	
OFTALMOLOGY	3,46	3,48	3,54	3,43	3,58	3,64	3,68	3,79	4,00	3,64
ONCOLOGY (1)							5,97		5,78	
ONCOLOGY IN THE CITY OF COIMBRA		4,60		4,83		4,76		4,60		4,76
ONCOLOGY IN THE CITIES OF LISBON/OPORTO		5,71		5,84		6,05		6,12		5,99
ORTOPAEDICS	4,98	5,19	5,29	5,40	5,37	5,56	5,35	5,44	5,43	5,45
THROAT EAR AND NOSE				4,63		4,98		4,91		4,48
PAEDIATRICS	5,01		4,93	5,29	5,04	5,37	4,96	5,18	4,97	4,68
PNEUMOLOGY	4,91	4,70	5,00	4,83	4,84	4,84	4,66	4,91	4,83	5,92
ADULTS GENERAL REHABILITATION		5,69		5,69		5,66		5,59		5,92
UROLOGY	5,43	3,60	5,35	3,80	5,53	4,17	5,54	4,09	5,66	4,15

SOURCE:ACSS – SCD/E

Legend: DIST – District Hospitals

C/ESP – Central and Specialized Hospitals

(1) Data generated in just one ice

CONCLUSIONS

The most important achievement of the PCS/N is its contribution for improving the organisational and managerial systems of the hospitals through the availability of structured, on time and objective information.

The nurses involved in the system have emphasised the following as the most important outcomes:

- the care provided;
- the adjustment of the available resources to the patients' needs;
- the communication between the nurses;
- the standardisation of the concepts used by the nurses.

So far, the outcomes indicate the shortness of nurses for the inpatient units, especially regarding the internal medicine. Nevertheless, the information obtained allows the **allocation of**

the available resources in conformity to the patients' real needs, and taking into consideration the expected variations for the 24 hours period and minimising under or over staffing. Moreover, it is possible to obtain the indicators that can be used to adequate the number of nurses to the patients' needs and to define the goals and management policies.

The use of PCS/N influenced the organisational culture in a very positive way, once the nurses became dynamically involved with the care management and inpatient units. It should also be stressed out that the Administration Board has an objective information system available, which can help in the decision making concerning the daily and strategic management of the hospital.

The opinion of the coordinating team and the nurses using the system is that the constraining factors associated with the widespread use of the system, result from the following factors:

The shortness in the number of nurses - a situation that is becoming more serious and jeopardises the investment made in the system by all the professionals involved so far.

The non mandatory adoption of the system in all NHS hospitals - if the system had a nationwide application, the results would be much more consistent.

The time consumed to standardise the concepts- which is a requirement for using the system- is also slowing its development.

So, the main conclusion is that SCD/E is a management tool where the first care manager being in fact the nurse who has the leading role in this system, who is the professional close to the patient and the one interpreting the signs and symptoms and identifying his/her needs, thus generating the first existing information- the HCN indicator (hours needed for the care provided) with the patient being at the centre of the whole system.

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