INFORMATION TECHNOLOGY: AN ALLEY TO IMPROVE NURSING MANAGEMENT

ABSTRACT: to survey how the use of information technology (IT) might contribute to the improvement in nursing management. Methodology: this was an explorative descriptive research with a quantitative approach, performed in the Military Police Medical Center (MPCMC) of the State of Pernambuco. Two interviews, one with the health Director and another with the IT coordinator of the system were conducted for the data collection; 44 nurses received a questionnaire during the period between August and October of 2011, however, only 35 professionals responded. The collected data were logged and analyzed in a 2010 Excel worksheet. This research project was approved by the Ethical in Research Committee from the Agamenon Magalhaes Hospital under the registration no. 154 and CAAE – 0176.0.236.000-11. Results: 69% of the participants confirmed that the use of IT tools has contributed in the last two years to the advancement of several nursing services at the Military Medical Center. The three most mentioned suggestions by the nurses for service improvement were: implementation of electronic medical records (33%), systematization of the electronic nursing care system (29%), and training courses for the professionals (9%). Conclusion: the information technology is embedded in nearly all hospital units and is essential that health professionals embrace this reality, not as something remote or difficult to use, but as being part of management and health care, facilitating and improving the process of patient care.

Descriptors: information technology; nursing; hospital management.

RESUMEN: levantar como el empleo de la tecnología de la información podrá contribuir para el perfeccionamiento de la gestión de enfermería. Metodología: investigación exploratoria-descriptiva, con abordaje cuantitativo, realizada en el Centro Médico Hospital de la Policía Militar de Pernambuco. Para la recolección de los datos fueron realizadas dos entrevistas con el Director de Salud y con la Coordinadora de Tecnología de la Información; 44 enfermeras recibieron un cuestionario, en el periodo de agosto a octubre del 2011, mas apenas 35 lo entregaron respondido. Los datos recopilados fueron tabulados y analizados en el planilha Excel 2010. El proyecto de pesquisa foi aprovado pelo Comité de Ética em Pesquisa do Hospital Agamenon Magalhães com o nº do registro 154 e CAAE - 0176.0.236.000-11. Resultados: 69% confirmaron que, en los últimos dos años, a la utilización de las herramientas de TI, han contribuido para el avance de varios servicios de enfermería en el Centro Médico Hospital. Las tres sugerencias más recordadas por las enfermeras para la mejora de los servicios fueron: implementación del registro electrónico (33%); sistematización de la Asistencia de Enfermería Informatizada (29%); Cursos para los profesionales (9%). Conclusión: la tecnología de la información está incorporada en prácticamente todas las unidades hospitalarias, siendo fundamental que el profesional de salud asuma esta realidad, no como algo distante o de difícil utilización, mas como parte de la gestión y de la asistencia a salud, facilitando y perfeccionando el proceso de cuidado a los pacientes. Descritores: tecnología de la información; enfermería; gestión hospitalaria.
Hospitals generate a large amount of information yearly from both assistance services and management, which need to be stored and processed in order to be used; however, often because of the large volume and deficiency in data collection, it is lost or becomes inaccessible, thereby undermining any management, regardless of the area, to carry out its work satisfactorily. In this scenario the employment of IT in hospital units becomes vital. The IT can be conceptualized as “technological and computational capabilities for data preservation and generation of information”, which is vital for the decision-making processes of any company.1

It can be said that the IT is based in the following components: “hardware” and its peripheral devices; software and its resources; telecommunication systems; and management of data and information”. Obviously, an interaction between these tools and the human factor must occur, i.e., peopleware or humanware, which although not a part of the information technology, is what will put to work and give practical use to the process.1

The use of IT tools is important in hospital organizations since it plays a key role in becoming an ally for the hospital management covering the entire organization and facilitating the administrative process. The use of these tools improves the communication dynamics between all the involved actors allowing the constant innovation of the various routines in the light of the thread between the components of the organization, which can be summed up in one sentence, continuous improvement.2

The common denominator of current managers is the need to offer services and products with the highest possible quality because the clients seeking hospital care, often affected by their pathology, hope to find professionals and technology geared to meet all their needs. Therefore, the health unit has to be satisfactorily organized and abreast of the technological advances to provide assistance aimed at the well-being of the patient because if this concern is not constant, the systematic occurrence of errors could bring irreparable consequences.3

In this scenario, the charges on the nursing professionals to assume management responsibilities are an undeniable reality because customers are increasingly more demanding. Nurses must be up to date in the light of technological advances in order to meet the needs of the people who need services from a health unit; these customers are increasingly informed about their illnesses and treatments, hence, the nursing professional stops being a single head of the sector and becomes a business strategist, understanding all the nuances involved in hospital management, facilitating, and mainly improving the assistance, taking into account cost versus benefit.4

Currently, in general, and as a result of market pressure, the nurses realized “the necessity of the expansion of an administrative vision and body of knowledge necessary for the effective management of health care institutions”.4

Another point to be highlighted in this study is the need to arouse interest in nurses related to hospital management, enhanced here by the effective use of IT tools; the nurse has to have a managerial vision aimed at a quality administration, primarily for customer satisfaction with regard to nursing care. Therefore, the focus of this study is related to the concern that every organization must have for continuous improvement in the system.

In summary, the hospital management presupposes a process that should involve all in the achievement of the organization objectives. “The administration of a hospital requires not only the use of a professional, but the work of a multidisciplinary team focused on managerial activities.”5

**OBJECTIVES**

- To assess how the employment of IT tools might contribute to the improvement of nursing management.

**METHODOLOGY**

This was a descriptive-exploratory research with a quantitative approach. The study was conducted at the Military Police Hospital Medical Center in Pernambuco, where the use of IT tools began two years ago; thus, this scenario was interesting to evaluate if such instruments have been employed effectively for improving nursing care and how nurses perceive this transformation.

The data collection was through the use of questionnaires responded by nurses, spread across multiple sectors, shifts, and on call shifts justifying the need to analyze the various situations in which they were involved; the nurses were chosen so that they...
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could advise on which technologies were employed toward nursing, their perceptions of the advantages offered by these tools, and suggestions for the improvement of the nursing service.

The criteria used for inclusion of subjects was comprehensive because it allowed the participation of all of staff nurses (regular staff and outsourced nurses) working at the MPMC; 44 nurses received the questionnaire during the period between September and October of 2011, however, only 35 professionals responded.

Two interviews were conducted, despite the initial plan for four (there were scheduling difficulties with the Deputy Director of MPMC and head of the Pharmaceutical Centre), however, this did not adversely affect the result of the study because the main managers participated in the process, such as the Director of Health (Colonel in the medical staff - Dr Diniz Paraíso) and the Information Technology Coordinator (Major Official PM Kátia Garcia), whose primary purpose was to survey how the use of IT has contributed to the improvement of the management of the Military Health System in the State of Pernambuco - SISMEPE, as well as to identify potential suggestions for the improvement in the hospital management activities.

The professionals selected for the study were briefed about the nature of the research, and the ethical and legal aspects in accordance with the consent form. These professionals voluntarily signed a consent form, according to resolution No. 196/96 of the National Health Council. This research project was approved by the Ethical in Research Committee from the Agamenon Magalhães Hospital under the registration no. 154 and CAAE - 0176.0.236.000-11 and received formal authorization from the hospital Director. All the collected data were tabulated and analyzed, with a few graphical presentations, in a 2010 Excel spreadsheet.

RESULTS

The demographic data about the nurses from MPMC are presented in Table 1:

<table>
<thead>
<tr>
<th>Variables</th>
<th>n = 35</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feminine</td>
<td>33</td>
<td>94.3</td>
</tr>
<tr>
<td>Masculine</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 29</td>
<td>11</td>
<td>31.4</td>
</tr>
<tr>
<td>From 30 to 39</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>From 40 to 49</td>
<td>12</td>
<td>34.3</td>
</tr>
<tr>
<td>From 50 to 59</td>
<td>5</td>
<td>14.3</td>
</tr>
<tr>
<td>Over 60</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>13</td>
<td>37.1</td>
</tr>
<tr>
<td>Specialized</td>
<td>22</td>
<td>62.9</td>
</tr>
<tr>
<td>Employment link to MPMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff nurse (civilian)</td>
<td>14</td>
<td>40.0</td>
</tr>
<tr>
<td>Staff nurse (military)</td>
<td>6</td>
<td>17.1</td>
</tr>
<tr>
<td>Nurse from the cooperative agency</td>
<td>15</td>
<td>42.9</td>
</tr>
</tbody>
</table>

The majority of the nurses were female (94.3%) and the minority male (5.7%). The most frequent ages were in the range up to 49 years (85.7%). A significant number of nurses had education up to at least one specialization (62.9%) beyond the undergraduate degree (37.1%); none held advanced degrees. Three situations were present as for employment links to MPMC: civilian staff nurses (40.0%), nurses hired through a cooperative agency (42.9%), and military staff nurses (17.1%).

Specific data about other topics related to nursing service and the use of IT tools were also surveyed, as shown in Table 2:
Table 2. Nurses’ opinions at the Military Police Medical Center in Pernambuco about various topics related to the service and the use of IT - Aug/Oct 2011.

<table>
<thead>
<tr>
<th>Satisfaction level</th>
<th>EI %</th>
<th>Mo %</th>
<th>Ai %</th>
<th>AS %</th>
<th>MS %</th>
<th>ES %</th>
<th>NR %</th>
<th>Σ %</th>
</tr>
</thead>
<tbody>
<tr>
<td>How the information is transmitted</td>
<td>14.3</td>
<td>14.3</td>
<td>20.0</td>
<td>28.6</td>
<td>17.1</td>
<td>0.0</td>
<td>5.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Motivation with own tasks</td>
<td>11.4</td>
<td>2.9</td>
<td>8.6</td>
<td>34.3</td>
<td>28.6</td>
<td>14.3</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Implemented changes and innovations</td>
<td>8.6</td>
<td>8.6</td>
<td>34.3</td>
<td>31.4</td>
<td>14.3</td>
<td>0.0</td>
<td>2.9</td>
<td>100.0</td>
</tr>
<tr>
<td>The IT has been improving management and nursing services</td>
<td>2.9</td>
<td>2.9</td>
<td>20.0</td>
<td>40.0</td>
<td>25.6</td>
<td>8.6</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Nursing registration on the paper health record</td>
<td>14.3</td>
<td>20.0</td>
<td>14.3</td>
<td>28.6</td>
<td>22.9</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

1-Extremely dissatisfied; 2-Very dissatisfied; 3-Somewhat dissatisfied; 4-Somewhat satisfied; 5-Very satisfied; 6-Extremely satisfied; 7-Did not respond; 8-75% of the discouraged ones (total of 22.9% of 35) are civilian staff nurses and 25% from the cooperative agency.

The results showed that more than half of the nurses are not satisfied with how the information flows in the hospital (54.3%). Other information that may concern the management is about the question on motivation on the tasks at work among the nurses; 22.9% or roughly one in every five confessed not being motivated. Among the ones that reported being dissatisfied, the vast majority (75%) belongs to the civilian staff and the rest (25%) to the cooperative agency. All military nurses are fully satisfied; these ones studied nursing and are registered at the Nursing Regional Council registration, however, they do not belong to a specific staff team in the military corporation, but work at the hospital. The majority is not satisfied with respect to the implementation of changes and innovations (54.4%), however, surprisingly, a considerable percentage (74.2%) thinks that the IT is improving the management and nursing assistance at MPMC. Significant criticism (48.6%) was expressed regarding the patient’s records on paper, which could be already in an electronic form.

The nurses were asked (open-ended question with justification) if the implementation of IT tools certainly brought advancement to MPMC, primarily to the nursing service. The results are shown in Figure 1:

![Figure 1. Improvements in the nursing service cited by the nurses from MPMC - Aug-Sept 2011](image)

From the information gathered with the questionnaire, 69% of nurses agreed that the IT tools undoubtedly brought technological advancement to MPMC and especially to the nursing service, reassuring the affirmative responses; most of the justifications were based on the fact that the tools enabled nursing assistance through better control and speed of information, increased agility in the rescue of exam results, agility and safety in the search for patient data in the inpatient program, and efficiency in scheduling services of ongoing activities. The percentage of 17% responded negatively towards the improvement at MPMC and nursing service; 14% out of this 17% did not present arguments that could justify their answers regarding the request for explanation in question, and the other remaining 3% stated not being aware of the tools, and whether they were being used in the hospital. The remaining 14% did not answer the question, leaving it blank or did not know how to express their answer.

The data shown in Figure 2 was obtained according to information collected with the questionnaires regarding the nurses’ knowledge on the applied tools and the...
possibilities that they provide to the nursing service:

It was observed that the Hospital Medical System (HMS), which comprises a central sector of beds, was cited as one of the main tools that contributed to the technological growth at MPMC and in particular in the nursing service (40%), followed by the implementation of the Clinical Analyses Laboratory (computerization of the LACLIN) (24%), in which the ordering of exams and mainly the rescue of results have been improved in speed. The SISMEPE portal or online SISMEPE (13%) was also cited. The implementation of satellite pharmacies and electronic vaccine cards were referred with the same percentage (6%). Others (11%) cited materials and equipment that were already part of the hospital routine.

This research collected some suggestions from the nursing staff, geared to the IT area to provide further advances both to MPMC and nursing service; the vast majority of opinions were related to the implementation of electronic health records (33%) and Systematization of Nursing Assistance – SAE (29%) in addition to other suggestions, as described in Figure 3:

The need for electronic prescriptions (9%) in order to facilitate the understanding the doctors’ writings and consequently decreasing medication and patient care procedures errors was outstanding. Training courses (9%) for the qualification in the use of IT tools were also suggested, as well as toward specialization and improvement of the nursing service. There was also suggestion about an online pharmacy that would avoid delays in the delivery of medication’s requests, since these pharmacies would be networked with each sector, thus avoiding having the professional searching for orders (4%). In the item categorized as ‘other’ (16%), materials and equipment to be purchased and enable better hospital care and innovation were cited.

The result from the interviews with the Director of Health and the head of the Information Technology Coordination (ITC) provided the following findings:

- Awareness of the importance in the use of IT tools is essential for the analysis, control, and decisions within
the framework of management of health services;

- There have been improvements in the hospital’s management over the past two years as a function of IT tools utilization, especially in the light of lack of previous indexes to allow system performance analysis, which are imperative to support financial applications and human and administrative resources. In addition to allowing the exploration of what should be done for the future of the system;

- The systems developed over the past two years were:
  - SMS - System of Materials and Services;
  - SEE - External Examinations System;
  - SMH - Hospital Medical System;
  - SCV - Vaccination Control System;
  - Virtual Nursery;
  - JMS - Health Military Junta;
  - Appointment scheduling via Web;
  - SAO - Ambulatory and Dental System;
  - SISMEPE Site (which allowed users to schedule appointments, redeem exam results, verify registration, ask questions via email, follow the top stories, print forms, and check monthly bills statements);
  - SICPES - Personnel Control System;
  - PEPNet - Electronic Health Record (in development).

- The establishment of the Relationship Center created a direct communication channel with SISMEPE customers where a team clarifies questions and schedule appointments in real time.

- The implementation of satellite pharmacies allowed on-line prescription filling in nursing offices. The following systems also contributed to the improvement of the nursing activities:
  - Online consultation about laboratory exams performed in the Hospital.
  - Control of external admissions via web.
  - Control of cancer patients.
  - Control of surgeries.
  - Materials and Services System.
  - Emergency Room System.
  - External Exams System.

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which is a reality more and more common in the hospital environment.

Two tools were widely cited in the survey, the electronic health record and the SAE. In the first case, the hospital still currently works with paper forms, which are archived in folders that become the medical records of each of the nearly 74,000 beneficiaries, occupying a large space and involving a large contingent of people who work in the organization and distribution of these patient records to the outpatient clinics. Other problems were also reported such as the difficulty to access patient information; risk of losing critical data about the patient on the basis of the precarious security of those documents; possibility of the occurrence of cross infections because of the handling of these records by the patient and other professionals. The electronic health record has the functions of: “Assistance, Diagnostic support, internal and external epidemiological indicators, research and teaching, administration and legal.”

The electronic SAE is an indispensable instrument for the nurse, because through it the professional manages to keep up with the changes and evolutions on the process of individual and systematized care. At this point, the actions related to the application to the Nursing Process (NP) cannot be forgotten; the NO represents the basis of the SAE comprising five inter-connected steps: research; nursing diagnosis; planning of the expected results; implementation of nursing assistance; and evaluation of nursing care. The implementation of the SAE, in addition to constituting a legal requirement of the representative professional in the organization, it also meets one of the requirements for hospital accreditation. The lack of mobilization for effective working procedures at the SAE can lead nursing into the serious risk of being reduced to a mere instrument of execution, not producing scientific knowledge geared to the development of the nursing care practice.

It was observed that 3% of the participant nurses (Figure 1) claimed unawareness about the changes that have taken place in the SISMEPE over the past two years in addition to other 22.9% (Table 2) who confessed lack of motivation with the work. Of these, the vast majority (75%-Table 2) belongs to the nurse’s civilian staff and the remainder (25%-2 Table) to the cooperative agency. It is imperative to know the level of lack of motivation and what can be done to reverse this situation. This represents another challenge to managers, who will need to find ways to motivate these professionals who in turn will motivate the nursing team. It was verified in the present study that this lack of motivation can reside on the changes implemented in the hospital; some people are resistant to them and thus, develop selective vision and hearing, i.e., there is a selective processing of information, where they only see and listen to what matters to them. Regardless, it is necessary to disseminated that the nurse should “Exercise the profession with justice, commitment, fairness, resolubility, dignity, competence, responsibility, honesty, and loyalty.” (Art. 5 of the Code of Ethics).

According to the studied variables, a large proportion of nurses are not satisfied with the way the information is transmitted in the hospital (54.3% 2 Table). It is necessary that such communication be enhanced through meetings with the heads of sectors conveying to their staff what will be implemented; managers need to see the possibility of consolidating a single system that provides access to all professionals according to a defined profile. In addition, it is significant that the ITC monitor the progress in the various sectors, after completion of training, in order to identify failures to be corrected, as well as, collect improvement related information and suggestions from the nurses using the system.

**CONCLUSION**

The difficulties currently experienced in virtually all units of the country, in relation to health demands, imposes optimal utilization of resources (efficiency) combined with the efficacy of their use (achievement of results). Good management cannot ignore the resources provided by an efficient information technology system because the variables and demands by the clients for quality service are plenty. In this context, everything is facilitated by the use of modern IT tools for continuous improvement in the system; it is not enough to just want, but most of all, to execute training programs to make professionals feel at ease in handling and processing the tools.

The main objective of this research was achieved as it was concluded that the use of information technology at the Military Police Hospital of Pernambuco has contributed to the improvement of Nursing Management through the use of tools implemented over the past two years, which have improved the quality of the service not only in nursing, but in all of the MPMC health sectors. Therefore, a large part of the professionals stated that the nursing service became more possible with the
use of IT tools, reaffirming the importance of training and improvement in the internal communication between managers and health teams. The improvements listed in the research include: online consultation of laboratory exams performed in the Hospital; control of external admissions via web; control of cancer patients; control of surgeries; SMH (central sector beds); and scheduling of appointments via web, among others.

Beyond the surveyed data, it is essential to suggest to management the establishment of the SAE and if possible, to verify further research to investigate on the level of the nurses’ knowledge on that system. The integration of the whole IT system is recommended in addition to the implementation of the electronic health record. The adoption of measures in the area of human resources in order to improve staff motivation is also suggested, mainly targeting staff nurses verifying legal issues, such as the requirement of public exams for civilians intended to fill in staff positions at MPMC and also defining specific nursing staff for the military. The employment of military police, even those with higher education or with nursing technician certificate and duly registered but not belonging to a specific health staff in the military organization to which they belong, is a clear misuse of function, which would require further studies.

REFERENCES

Information technology: an ally to improving the...