

## The challenges of nursing information systems: a narrative review of the literature

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**Abstract** *Nursing information systems, where quality indicators are integrated, focus on the standardization of health records and the consequent visibility of the provided care. Despite the acknowledged importance of the contributions of information systems, their implementation has been characterized by several challenges, so we propose to reflect on them. To identify the evidence available in the literature on these same challenges, a narrative review of the literature was developed, with the analysis of relevant articles and reports on this issue. It is clear in the literature the importance of information systems for obtaining quality indicators that are sensitive to nursing care, with a positive impact on the quality of care, allowing for measurable quality in interventions, as well as facilitating inter and intra-institutional comparability, in real-time or in a retrospective analysis. The challenges encountered and which urgently needs to be resolved in clinical practice are related to the difficulty for professionals to perceive the impact of computer records, the visibility of nursing indicators and the time that is allocated in the context of providing care to carry out these records.*

**Key words** *Professional practice, Information systems, Quality indicators, Health care*

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## Introduction

Information systems have shown to be an asset in information systematization, allowing the protection of sensitive data and ensuring interoperability between the different health system actors.

In the field of nursing, they were created with the intention of extracting data that would allow the calculation of indicators that are sensitive to nursing care and, as a consequence, an increase in the visibility of care, professional appreciation and activity monitoring.

According to the European Commission, most countries in Europe have performance measurement strategies, aiming to improve the quality of health services. These strategies typically include sets of indicators that are measured over time; the number of indicators varies between less than 30 (Austria) and more than 1,000 (Finland).

Information systems can be understood as a set of procedures that aim to transmit information between individuals and agencies through any means<sup>1</sup>; they are “the application of a perspective of total systems in the connection of relevant theoretical principles with practical methodologies for the effective management of information technologies and its applications to improve the provision of health services in the context of current and future health care environments”<sup>2</sup>.

Some of the information systems, such as DREAM, SINUS and the ID card, have shown to be maladjusted, from a functional and technological point of view, showing several weaknesses<sup>3</sup>, so the following question arose: what are the contributions and challenges of information systems for quality indicators in clinical nursing practice? Underlying this question were the following questions: how can information systems promote the safe provision of nursing care? How can the indicators produced through the utilization of information systems be used for changes in operational management? What strategies can be developed to give visibility to the indicators produced by nurses in the context of providing care? This gap is also identified in the literature, that, in order to increase the use of the systems, it is necessary to carry out further studies on the factors that influence the increase in nurses' motivation and interest to use them<sup>4</sup>. Thus, the aim of this study is to reflect on the challenges and the effective contribution of information systems, integrating them into the professionals' practice and their evidence-based practice, continuing what has been evaluated by Nascimento<sup>5</sup>.

## Methods

The methodology of narrative review of the literature<sup>6</sup> was used, aiming to identify the challenges of information systems for quality indicators in clinical nursing practice, to support and corroborate the reflection on this subject and provide an answer to the guiding question: ‘What are the contributions and challenges of information systems for quality indicators in clinical nursing practice?’ A research was carried out from January 5 to 25, 2020, in the Medline<sup>®</sup> (Medical Literature Analysis and Retrieval System Online Complete) and CINAHL<sup>®</sup> (Cumulative Index to Nursing and Allied Health Literature Complete) databases, using the following terms in English: information systems; nurs\*; quality indicators.

The definition of time limit was not used, as it is considered pertinent to analyze the evolution of the needs related to this topic over time. The inclusion criteria comprised articles published in the languages understood by the researchers: Portuguese, English and Spanish, as well as available full-text articles. The exclusion criteria comprised articles of which title did not include the topic of nursing. In addition to the databases, a free search was carried out simultaneously using the Google Scholar platform, as well as a manual search of the references obtained from the selected literature.

A total of 119 articles were obtained, which were submitted to the inclusion and exclusion criteria, resulting in 33 articles. After reading the titles and analyzing the abstracts, 13 articles were selected, plus 7 articles that were obtained from the manual search, totaling 20 articles.

## Results and discussion

Regarding the analyzed articles, it is clear that this discussion started about 25 years ago, concomitant with the publication of articles defining the problem, which is expected, considering the evolution of information systems as well as access in the contexts by Nurses. However, the small number of articles found shows that there is still no comprehensive and continuous discussion, although there are articles that demonstrate the work carried out in very specific contexts, but with few examples of cross-section integration.

The importance of information systems is unquestionable, as an important work tool and quality assessment, with a change in the growing perspective in results and organizational intelli-

gence. They are also of particular importance as they must also contribute to the measurement of health performance<sup>7</sup>.

Regarding nursing information systems, the Nursing Council (OE, *Ordem dos Enfermeiros*)<sup>8</sup> warns about the relevance, not only “of the requirements of a legal and ethical nature of information systems, but also of those derived from their importance for clinical decisions, continuity and quality of care, management, training, research and for decision-making processes.”

Considering the information systems, they include 6 components (Figure 1).

Hence, this author considers quality indicators as a component through which it is possible to obtain the data that are essential for decision-making, whether operational, tactical or strategic ones. To assess quality, we need it to be measurable<sup>9,10</sup>. The current health policies are based on financing that is based mostly on the medical aspects, not taking into account the care provided by nurses in obtaining health gains for the population.

The lack of the application of indicators is thus a handicap that has been slow to be solved. According to Pinto and Ferreira<sup>11</sup>, “indicators are management tools used to measure, monitor and evaluate the results of a process, project or policy, based on data registered in an organized

and structured way as part of the information systems”. The structuring documents of the profession, the regulation of the general care nurse’s competences, define in chapter C.2 – Quality improvement, point 89, that the nurse “uses valid indicators in the assessment of the quality of nursing practice”, as well as in point 90, which says that the nurse also “participates in quality improvement programs and quality assurance procedures”<sup>8</sup>.

Relevant gains in nursing care are defined as positive developments or changes in the status of nursing diagnoses after the interventions<sup>7</sup>, so that the measurability of this gain is translated through an indicator<sup>12</sup>. This measurability is confirmed, still in the same document, in the sense that the assessment, either quantitative or qualitative, of nursing care requires a set of indicators and measurement units that are sensitive to them and, therefore, different in most cases from those usually used in other disciplines<sup>7,13</sup>.

Thus, assuming that the most reasonable method for decision-making at the operational level is the longitudinal monitoring of nursing care productivity in the units, combined with quality indicators of patient care, the OE defends a global model for quality assessment and productivity in nursing that simultaneously includes indicators for the structure, the process and the result<sup>8</sup>.

However, for these indicators to be expressed, it is essential that they are recorded, that is, the information on the intervention performed by the Nurse must be correctly registered, not only regarding the location, but also regarding its content. This content should be as uniform as possible, allowing different nurses to register the same interventions in the same way in any region of the country, in any context of care, thus ensuring an adequacy and, above all, a greater expression concerning its impact. If the registration of the entire nursing process provided to the user is not carried out, the quality assessment indicators are not produced. This reflects not only the lack of visibility to society regarding the performance of this professional class, but the process of improving the quality of nursing care is hardly apparent<sup>14</sup>.

Due to the complexity of a health service, a single indicator is not able to evaluate the quality of the service provided to clients and thus, it is necessary to list a group of indicators of each category for this purpose<sup>15-17</sup> or at least one indicator from each category. The use of technology allows the creation of computerized indicators

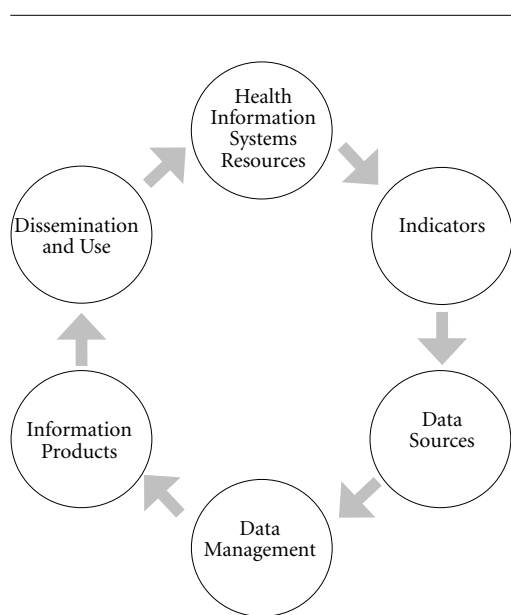


Figure 1. Components of Information Systems<sup>9</sup>.

that will subsequently provide nurses with work tools that allow the measurement of indicators and the development of easily managed databases, contributing to the continuous improvement of the quality of care<sup>11,18,19</sup>.

There is a worldwide consensus that scientific evidence increasingly demonstrates the need to implement results that assess the contribution of care to clinical quality and safety, highlighting the existence of indicators that are sensitive to nursing practice<sup>20</sup>. Studies have estimated that the concomitant use of standardized informatic support and language provides complete and accurate information, contributing to the quality of nursing records<sup>11</sup>. The same authors maintain two preponderant questions; in the first instance, that the quality of care is directly related to the quality of the nursing records and, secondly, that the use of standardized language combined with informatic tools contributes to a better decision-making.

The nurses' conceptions highlighted the fact that this is a system that facilitates practice, considering the information access, availability, speed, practicability, clarity and optimization of the physical space<sup>21,22</sup>. Empirically, nurses understand the importance of information systems, from the perspective of resource optimization, as well as easy access and increased safety of the registered information.

We are living a time of reduced human resources, reduced budgets, increased activity and complexity and, with the existence of new technologies, it is essential that services understand how they provide care and determine how this care is effective and efficient<sup>23</sup>. This scenario corroborates the current Portuguese reality, despite more than a decade of difference.

Therefore, it is necessary that nurses be held responsible for more than their interventions, but also for the results of these interventions, thus allowing greater concern with their performance. From the same perspective, Akachi and Kurk<sup>24</sup> define that health information systems provide incomplete and often unreliable data, with many indicators of uncertain usefulness. We consider that the existing metrics may not have the sensitivity to translate the care process and the users' experience in the health system.

The results of users who are sensitive to health care practices constitute a mainstay of quality assessment and are rarely collected. These authors<sup>24</sup> propose six policies to improve the quality of care measurability and amplify its impact on policy: (i) redouble efforts to improve

and institutionalize the registration of vital signs; (ii) carry out investigations on renovation facilities and improve the information systems; (iii) promote new quality measures for low-resource settings; (iv) obtain the user's perspective on the quality of care; (v) invest in high-quality national data; and (vi) translate quality into evidence with an impact on policy.

The most important challenges regarding the use of information systems are the factors related to the human environment and human factors, so that the involvement of aware and trained professionals is associated, reflecting a well-structured, planned and organized work, with direct influence on comprehensive user care, in the processes of improving information systems<sup>4,22</sup>.

In addition to the professionals' perspective, it is also essential that the systems allow an adequate transmission of information between them, guaranteeing the information is provided to the health professional about each client, in real time, ensuring their safety at all times, thus avoiding repetitions and loss of information<sup>25,26</sup>.

## Final considerations

The literature supports the empirically carried out reflections from a perspective in which the information systems constitute the future for the visibility and performance evaluation of the provided care. However, it needs to be consolidated regarding the translation of results into practice and with an impact on health policies.

It is essential to develop mechanisms that allow greater interoperability between the different systems, while increasing the capacity of being user friendly, heeding the health professionals at the different levels of care.

Regarding the methodological limitations of the study, the existing literature does not yet allow a more in-depth analysis of the topic and, therefore, it is important to develop studies that can fill this gap in scientific evidence, focusing on the perception of professionals over the years, whereas it takes into account the limitations of the available resources, as well as how these records can express the greater dependence of users, but also, how they eliminate hours of care necessary for them.

It is therefore relevant to recognize this existing gap, which allows us to suggest future investigations in this area, aiming to intensify the analysis of this phenomenon and, consequently, improve the established practice.

## Collaborations

T Nascimento and I Frade: design and elaboration of the article; analysis and interpretation of data; writing of the manuscript. S Miguel: data analysis and interpretation; revision of versions and critical revision of the content. MH Presado and M Cardoso: revision of versions and critical review of the content.

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Article submitted 27/04/2020

Approved 04/06/2020

Final version submitted 06/06/2020

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Chief editors: Maria Cecília de Souza Minayo, Romeu Gomes, Antônio Augusto Moura da Silva