



ENSAYOS

Reflections on Information Systems in Health, Evaluative Search and Nursing

Reflexões acerca de Sistemas de Informação em Saúde, Pesquisa Avaliativa e Enfermagem
Reflexiones acerca de Sistemas de Información Sanitaria, Investigación evaluativa y Enfermería

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Palavras-chave: sistemas de informação; sistema único de saúde; avaliação em saúde; uso da informação científica na tomada de decisões em saúde; enfermagem.

Palabras clave: sistemas de información; sistema único de salud; evaluación en salud; uso de la información científica en la toma de decisiones en salud; enfermería

ABSTRACT

This study is aimed at reflecting theoretically on the nursing perspective, the use of health information systems as a source of quantitative data for evaluation research. From an analytical perspective, evaluative research establishes relations of influence between action / evaluated intervention, the effect and context. The health information systems provide quantitative data that allow to know the object of study subsidizing conducting evaluation studies. The use of information systems requires projects that contemplate the specific object of study, present the methodological steps for obtaining and analyzing the data of interest, in view of achieving the proposed objectives and answer evaluative question. For

the nurse, the combination of evaluative research and information systems has the potential to develop scientific knowledge that support decision making in healthcare management and the development of new investigations.

RESUMO

O presente estudo teve como objetivo refletir teoricamente, na perspectiva da enfermagem, o uso de sistemas de informação em saúde como fonte de dados quantitativos para a pesquisa avaliativa. Em uma concepção analítica, a pesquisa avaliativa estabelece relações de influência entre ação/intervenção avaliada, efeitos e contexto. Os sistemas de informação em saúde disponibilizam dados quantitativos que permitem conhecer o objeto de estudo subsidiando a realização de pesquisas avaliativas. O uso desses sistemas requer projetos que contemplem a especificidade do objeto de estudo, apresentem os passos metodológicos para obtenção e a análise dos dados de interesse, para atingir os objetivos propostos e responder a pergunta avaliativa. Para o enfermeiro a articulação entre pesquisa avaliativa e sistemas de informação tem potencial para desenvolver conhecimentos científicos que favoreçam a tomada de decisão na gestão em saúde bem como o desenvolvimento de novas investigações.

RESUMEN

El presente estudio tiene por objetivo reflexionar teóricamente sobre la perspectiva de enfermería, el uso de sistemas de información de salud como fuente de datos cuantitativos para la investigación evaluativa. En una concepción analítica, la investigación evaluativa establece relaciones de influencia entre acción/intervención evaluada, propósito y contexto. Los sistemas de información en salud proporcionan datos cuantitativos que permiten conocer el objeto de estudio subvencionando la realización de estudios de evaluación. El uso de estos sistemas requiere proyectos que contemplem la especificidad del objeto de estudio, presenten los pasos metodológicos para la obtención y el análisis de datos de interés, para alcanzar los objetivos propuestos y responder a la pregunta de evaluación. Para la enfermera, la combinación entre investigación evaluativa y sistemas de información tiene potencial para desarrollar conocimientos científicos que favorezcan la toma de decisiones en la gestión sanitaria así como el desarrollo de nuevas investigaciones.

Contextualizing the topic

Evaluation is a very old activity, an essentially human process that is carried out daily. However, to define evaluation is a complex activity, since it is a word of highly rich semantic, besides being applicable to various areas of knowledge. In its Latin root, "evaluate" means to measure based on quantitative standards and, in Greek, the base word *axios* relates to the production of value judgment and it is connected to qualitative measures, and this etymology shows the contribution of several science areas to the field of evaluation⁽¹⁾.

To evaluate is basically to make a judgment value concerning an intervention or about any of its components with the aim of supporting decision making⁽²⁾.

Evaluation is not a science or science area, but a field of knowledge application in various areas, which uses multiple concepts and methodological approaches that support a broader view of the evaluated object⁽³⁾.

The evaluation in healthcare expanded in the end of the twentieth century, especially concerning scientific production, but its institutionalization in the fields of research and healthcare services lacks a solid progress; however, both aspects still require investments to support its consolidation as part of the management work process, which enables the qualification of the management process in relation to healthcare.

Recognized as a component of healthcare management, the evaluation can contribute

to a more objective decision making process, confirming and/or redirecting the health interventions and practices, within a political, economic, social, cultural and professional context. It is defined as a “technical-administrative process aimed at decision making”, involving mediation, comparison and value judgment, from the judgment made with basis on previously defined criteria, with the purpose of supporting decision making⁽⁴⁾.

Therefore, evaluation in the healthcare area has potential to quality decision making in various areas given that, based on evidence, it can reduce the uncertainty degree that permeates decision making processes.

Many authors conceptualize healthcare evaluation, each with a different focus, but the idea of knowing a certain object in order to establish a value judgment and support decision making, permeates a reasonable number of the concepts. It can be noted that the judgment of the object’s value assumes the evaluator’s view of the world, the position of the evaluated object and the context in which the evaluation occurs, that is, evaluation has some subjectivity despite being controlled and/or minimized. In this sense, it becomes even more relevant in evaluations to adopt a rigorous methodological approach that ensures the accuracy required, since the project’s conception until the application of analysis techniques and dissemination of results.

Although there are different definitions and responsibilities for evaluation in healthcare, it is believed that this may contribute to decision making, with a commitment to improve healthcare interventions which ultimately has a positive impact in the health conditions of the population.

In this sense, evaluation in healthcare can be considered part of the managerial work to support nurses in the decision-making process, both in aspects related to the production of knowledge and evidence that qualify the practice, and the aspect of qualifying the management of services and healthcare systems.

Evaluation in healthcare is an area undergoing conceptual and methodological construction. In order to group the main types, it is possible to adopt a typology⁽⁵⁾ that considers the following aspects: objective, evaluator’s position, primary focus, main methodology, manner in which the information produced is used, evaluation context, temporality and kind of judgment developed. According to this approach, evaluation in healthcare can be classified as follows: evaluative investigation, evaluation for decision and evaluation for management.

The evaluative investigation is mainly aimed at “the production of knowledge that is recognized as such by the scientific community”⁽⁵⁾. It concerns researches developed in the academic field, by the own initiative of researchers or meeting public demands. The focus of these researches is primarily the identification of the impact resulting from the evaluated action, that is, the establishment of “causality” relations.

Another way of classification considers two types: normative evaluation and evaluative research⁽²⁾.

The evaluative research has an analytical perspective, establishing relations among the problem, the intervention, the objectives of the intervention, the resources, the effects, the actions and the context in which the intervention is a part of⁽²⁾.

Without ignoring the importance of the evaluation in healthcare for decision, the evaluation for management and the normative evaluation, this study was focused on an evaluative research that, in this context, is understood as a synonym of evaluative investigation.

The evaluative research occurs in different contexts, justifying the adoption of proposed actions which, taking into account the theoretical, technical and strategic aspects, support the operationalization of the investigation.

In the development of the evaluative research, the healthcare information systems (HIS), which provide data that can lead to information that allow knowing and characterization the study's object, are highlighted

According to the European Regional Office of the World Health Organization, the HIS can be defined as a tool for collection, processing, analysis and transmission of the information required to organize and operate healthcare services. They are also useful for research and planning, with the aim of controlling diseases. They are aimed at selecting relevant data to the services, turning them into information required for the decision-making process that is suitable for the organizations and the people who plan, administer and evaluate the healthcare services⁽⁶⁾. Thus, among the main tasks of the HIS are those related to the development of healthcare monitoring and evaluation.

Healthcare services in different countries have different approaches to the issue of HIS. Successful experiences with HIS in the Brazilian healthcare system, although still being consolidated, may provide support to the healthcare context of other countries that adopt universal systems like Brazil.

In Brazil, the Ministry of Health (MH), through the Information Technology Department of the Unified Health System (DATASUL), provides healthcare information systems nationwide, with direct impact on care, management, educational and research processes. It is important to note that, although most HIS are provided by the DATASUL, several states and cities implement other systems and programs to meet their specific needs and match their contexts. Given these various HIS, it is possible to identify the availability of official data that can, among other initiatives, support the development of researches.

On a regular basis, in many areas of healthcare, nurses are responsible for inputting data and updating databases of different HIS. It is believed that this is an important role, since it supports the updated maintenance of systems. However, nurses are trained and qualified professionals for a more dynamic role in these processes and in the management of the information produced, turning them into useful tools to decision making and establishing an interface between the socio-demographic, epidemiological and management aspects in order to provide new knowledge and support to qualify the administration, management and care.

Therefore, the relevance of this topic, the potential of nursing professionals in the production of new knowledge that promotes care and management, the importance of information in the development of evaluative research, the articulation between the use of HIS and evaluative research, the scope of the information systems used in the Unified Health System (SUS) and the academic experience in the development of researches using secondary data provided by official organizations have justified the

development of this study, which is aimed at theoretically reflecting, from the professional nursing activity's perspective, on the use of HIS as a source of quantitative data for evaluative research.

Although the literature addresses issues related to evaluative research and information systems, there is a lack of articles approaching the interface between the two topics and their potential for the professional nursing activity. It is noteworthy that, the articulation of theoretical knowledge and the authors' academic experience is aimed at raising the reflection of nurses about the relevance of healthcare information systems for developing evaluative research, going beyond the conception in the current general view concerning the use of secondary data.

Evaluative research and healthcare information systems

The development of the evaluative research emerges from the identification of key questions (evaluative questions) and requires the structuring of a project that addresses the methodological stages to put the investigation into practice. There is the need to reflect and propose the way in which to identify the problem, define the theoretical and methodological framework to be adopted, the participants, the research scenario, the necessary resources and how to obtain them, as well as the data collection and analysis procedures and the ethical aspects involved. An interesting aspect of the evaluative research concerns the possibility to form multidisciplinary teams of researchers, taking into account the specificity of different areas of knowledge which, when articulated, may support a broader and deeper approach of the study's object.

Currently in the world, the representativeness of the professional nursing activity in the development of researches that provide evidence to the care and management practices has been increasing. The evaluative research has the potential to qualify part of the researches on the nursing field, with the purpose of obtaining new approaches and theoretical and methodological frameworks.

The methodological approach mostly used in evaluative research is the quantitative one, with increasing participation of those with a qualitative nature, and this is a combination that supports the collection of complex objects⁽⁵⁾.

The quantitative research uses data that, when changed to a numerical format, can express the extent of the object and uses statistical analysis to interpret the results and substantiate the conclusions. In turn, the qualitative approach seeks to understand the situations related to the object, taking into account the meanings given to the object/fact/relationships or practices of the subjects within a certain context⁽⁷⁾.

In evaluative research, it is common to use case studies. One premise of this type of study concerns the relevance and representativeness of the case so that, although the results are not generalized, they allow the extension of the discussion beyond the case itself. In this sense, different research techniques related to the quantitative and qualitative approaches have been used, such as documental research, time series analysis, population surveys, self-administered questionnaires, participant observation, focus groups, and interviews, among others.

The HIS are particularly useful to support the quantitative approach in evaluative research and, based on the critical and contextualized analysis of data, it is possible to

choose key questions and subjects to be part of the qualitative approach, if the option is to develop a mixed approach research that articulates quantitative and qualitative data⁽⁸⁾.

The definition of participants of the study or the population object of the study is important to indicate the source and method of data collection. For example, in quantitative approaches, depending on the object of the evaluative research, it is possible to access different sources of data in the healthcare information systems, that cover demographic, epidemiological, morbidity, care and management aspects⁽⁹⁻¹¹⁾.

These HIS have, as positive aspects, the national coverage and, most times, the continuous updating, thus being an important source of data in a country of continental dimensions.

The use of systemic approach in the development of evaluative research is shown to be adequate because it allows better systematization and approach of the object, considering the structure, process and result components according to Donabedian's framework. It is important to note that, by understanding that the process component is an essential step in which the interaction with the user supports the implementation of healthcare actions, the organization of quantitative data is proposed on the basis of this component⁽¹²⁾.

Therefore, based on the data provided by different information systems, it is possible to develop indicators for the evaluation of outpatient and hospital care (number of appointments per facility, number of appointments per person/year, number of tests per specialty, number of procedures per healthcare facility, costs of hospitalization, hospital morbidity and mortality coefficients, length of hospital stay) and obtain information concerning the structure of healthcare services (location, physical area, human resources, equipment). It is also possible to monitor the care provided to certain health issues (maternal and neonatal care, control of certain diseases), as well as support the logistics for acquisition, dispensing and distribution of medication, among others.

The negative aspects of the information systems provided include the inability to integrate the data, that is, the small interaction among the systems that results in the duplication of data collection, problems with the update and quality of data, besides the diversity of human resources training and equipment that operate these systems, which are conditions that determine the quality of information.

Concerning the human resources, all the complexity involved in the information management process for healthcare evaluation requires the development of people's informative skills.

It is important that there is a possibility to establish data integration and interface among the healthcare information systems, since the complement of data is important for the analysis of care provided to users and to know the effectiveness of healthcare services. When analyzing the various healthcare information systems of the SUS, this difficulty in integrating the data can be noted, as well as the diversity of registration unit in the various information systems which are either related to the user, to the procedure undertaken or to the service.

The integration, comparison and analysis of data of different healthcare information

systems help minimize the weakness of the registration quality and allow working on relationships and trends more than the reliability of the absolute value.

Healthcare information systems, implemented for long periods of time, support the development of researches involving time series analysis and the characterization of the long term event, the seasonal fluctuations, the implementation of healthcare strategies and the variations resulting from management changes. On the other hand, changes in the name of certain procedures or in the way they are grouped over time, frequently occurs. For historical series analysis, the clear identification of the procedures is necessary, as well as the changes of names and in the way these procedures are grouped over time, in order to allow a proper interpretation of the data collected.

Depending on the objective and object of the study, it is necessary to adequate the timeframe when intending to use data originating from healthcare information systems. To determine the period of study, a previous analysis of the context is desired, in order to choose a timeframe that supports the collection of events regarding the object of the study. A long period of study does not necessarily mean that the object is better represented.

Concerning the use of healthcare information systems, the following limitations are pointed out: low skills, poor connections and staff turnover, lack of integration among the HIS, difficulties in inputting data and updating the HIS, besides the insufficient IT infrastructure. In relation to the positive aspects, the following can be highlighted: access to information, possibility to monitor the actions and existence of qualified professionals⁽¹³⁾.

As for the procedures for quantitative data analysis, the use of secondary data requires the creation of possibilities that support the interpretation of possible meanings of a number, percentage or ratio in the context of healthcare system. There is a need to select the conditions of a context for analysis, which are, the variation of population, morbidity and mortality patterns, occurrence of disasters/accidents, changes in the standards of healthcare provision, among others. Thus, the analysis of trends in the development of procedures allows the comparison of the level of variation in the supply of services and the consequent institutional response for the emerging demands.

It is believed that the methodological diversity, through a combination of approaches, is important to support the broad collection of the object of study; however, adding quantitative and qualitative designs is not enough and it is necessary to plan the approaches in order to encourage the integration and complementarity of data to answer the initial evaluative question.

In this sense, the academic experience has shown to be very positive to start data collection in evaluative research from quantitative and secondary data that are available in healthcare information systems and/or official documents, so that it is possible to perform an initial critical analysis indicating the relevant aspects that need to be better explored in a primary data collection in a qualitative approach. This combination of quantitative and qualitative approach allows seeking the representativeness of the care provided by healthcare services, understand the meaning of events and evaluate their relationships⁽⁴⁾.

At last, it is noteworthy that the large volume of available data about healthcare is a source of data for performing researches and it requires the design of projects that address the specificity of the object of study, clearly present the methodological steps for collecting relevant data that are often spread in different HIS which, if recovered and analyzed in an integrated manner, help answer the evaluative question. These considerations are elements to be addressed by nurses in the development and execution of research projects.

Decision-making in the area of healthcare has high social relevance and responsibility. Based on this, evaluative research and the use of information systems can reduce the uncertainty level about a certain situation, supporting the decision-action process⁽¹⁴⁾.

Considerations for reflection

In the academic professional experience, there is underutilization of resources provided by the HIS. This situation seems to result more from the weaknesses of the informative skills and the difficulty in incorporating information than from the limitations of the HIS.

Although there are criticisms, the diversity of the HIS available in the healthcare systems is an important source of data concerning the healthcare system, including data that, whether solely or conjunctly analyzed, allow demographic, epidemiological and care characterization, supporting the development of evaluative researches that promote the improvement of the healthcare system.

Concerning the discussions about the quality of the data provided by the HIS resulting from several factors, among them the lack of staff's qualification and structural inequalities, some of these systems have the potential to gradually enable the disintegration of the data at the healthcare user's individual level, which allows the analysis of individual care and population coverage in specific situations, supporting the definition of large samples with low operational costs.

The object of this study was the HIS and their potential in evaluative research in the context of professional nursing activity without, however, disregarding the fact that they are inserted into a larger context of healthcare information management.

It is believed that the evaluative research has the potential to develop scientific knowledge that support the process of healthcare management, showing the particularities of the healthcare system and consequently has the potential to produce knowledge to improve the empowerment of nurses in the management process, in a multidisciplinary approach, and respecting the particularities and specificities of knowledge and practices in nursing.

The evaluative research reflects conceptions, values, assumptions, intentions, that is, it is subject to the world view of the researcher in relation to a set of data and information, subject to the opinion made from them, being important to remember that this must be supported by the ethical aspect that permeates all scientific research. Finally, it is believed that evaluative research using HIS promotes care, which is considered to ultimately be the focus of nurses' work.

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