INFORMATION SYSTEM IN HEALTH: MANAGEMENT AND SUPPORT IN THE BRAZILIAN UNIFIED HEALTH SYSTEM

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ABSTRACT: This study aims to investigate studies on information system in health used by the Brazilian Unified Health System and to point out the difficulties in its applicability. This is an integrative review conducted through an online bibliographic search of the scientific production from 2009 to 2013. The articles that composed the corpus analysis revealed the need to develop systems for public access and usage by using tools able to offer consistent data and contribute to the optimization of support management provided by the National Unified Health System.
DESCRIPTORS: Information systems; Health care; Unified Health System (SUS).

SISTEMA DE INFORMAÇÃO EM SAÚDE: GESTÃO E ASSISTÊNCIA NO SISTEMA ÚNICO DE SAÚDE

RESUMO: O presente estudo objetiva investigar pesquisas realizadas sobre o sistema de informação em saúde utilizado pelo Sistema Único de Saúde e apontar as dificuldades de sua aplicabilidade. Trata-se de uma revisão integrativa efetuada por meio de uma busca bibliográfica *online* das produções científicas, no período de 2009 a 2013. Os artigos que compuseram o *corpus* de análise evidenciam a necessidade de desenvolver sistemas disponíveis para acesso e uso ao público, com ferramentas que possam oferecer dados consistentes que contribuam para otimizar a gestão assistencial prestada pelo Sistema Único de Saúde.
DESCRITORES: Sistemas de informação; Assistência à saúde; Sistema Único de Saúde.

SISTEMA DE INFORMACIÓN EN SALUD: GESTIÓN Y ASISTENCIA EN EL SISTEMA ÚNICO DE SALUD

RESUMEN: El presente estudio tiene la finalidad de analizar investigaciones realizadas sobre el sistema de información en salud utilizado por el Sistema Único de Salud y apuntar las dificultades de su aplicabilidad. Es una revisión integrativa efectuada por medio de una búsqueda bibliográfica online de las producciones científicas, en el periodo de 2009 a 2013. Los artículos que hicieron parte del corpus de análisis evidencían la necesidad de desarrollar sistemas disponibles para acceso y uso al público, con herramientas que ofrecen datos consistentes para contribuir para otimizar la gestión asistencial prestada por el Sistema Único de Salud.
DESCRIPTORES: Sistemas de información; Asistencia a la salud; Sistema Único de Salud.

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INTRODUCTION

The Brazilian Unified Health System (SUS) aims to ensure health as a citizen's right and a State´s duty through a regionalized and hierarchical network of actions and services. Therefore, SUS proposes the use of an expanded health concept, which associates the living conditions and guides the formulation and the implementation of strategies enabling a health care that is universal, integral, efficient, fairly and with popular participation[1].

Whereas many factors can interfere in the individual's health-disease process and increase the users' demand, there is a need for the use of indicators for health care, in order to assess the performance of the health care system and to guide the management of public policies and decision-making. From this perspective, the introduction of information technologies in health becomes of supreme importance[2].

It is important to understand that an information system involves a set of processes that intend to capture, process, transform, store, maintain and produce information[3]. Thus, information system in health is a means to obtain the necessary information so that the health services can develop and implement strategies, providing better conditions for the design and assessment of actions used for healthcare improvement.

However, despite progress within the information system in health in order to manage and share information, its development and applicability is still difficult in relation to the fundamental prerequisites and evolution of SUS. This applicability permits an increase of State and society responsiveness to Brazilian population health, since it involves other actors, practices, procedures and knowledge that characterize multidisciplinarity in health[4].

In this context, this study aims to investigate the scientific literature regarding the theme "information system in health used by SUS" and to point out the difficulties in its applicability. Thus, this study will search for answers to the following questions: how have information systems been applied by SUS? Has the applicability of information systems in health truly contributed to the extension and efficiency of management and care for the users of SUS?

METHOD

This is a documentary, bibliographical study, conducted according to the integrative review method. For its implementation, the following steps were performed: determination of the objectives of the study, formulation of the questions to be answered, collection and identification of the relevant primary research. Following these steps, the initially collected studies were critically evaluated, consequently resulting in a reduction in the number of studies included in the final phase of the review, which will be systematically analyzed[5].

The survey was carried out through an online search in Brazilian and international scientific literature on Information System in Health from 2009 to 2013. This scientific literature was searched in the Virtual Health Library (VHL) by using the databases: Latin American and Caribbean Literature on Health Sciences (LILACS), Scientific Electronic Library Online (SciELO), Databases in Nursing (BDENF) and Medical Literature Analysis and Retrieval System Online (MEDLINE).

The criteria for sample selection were: articles available in full; publications of the last five years; articles published in English and/or Portuguese. The Descriptors in Health Sciences (Keywords) used for the search were: "Information Systems", "National Unified Health System (SUS)" and "Health Care".

Initially, 72,072 articles resulted when using the descriptor "Information Systems", before being filtered by applying the inclusion criteria. Of these, 3,511 were obtained from the LILACS database and 62,926 from MEDLINE. Regarding the descriptor "National Unified Health System", 904 articles were found, of these 5,194 were from LILACS database, 221 were from MEDLINE and 453 were from BDENF. Regarding the descriptor "Health Care", 441,320 articles were found, 23,420 of which from LILACS, 386,431 from MEDLINE and 4.688 from BDENF.

Subsequently, by using the inclusion criteria mentioned above, the following scenario was achieved: 418 articles concerning "Information Systems" were found, of which 100 were from LILACS, 318 from MEDLINE and 453 from BDENF. Concerning "Health System", 333 articles were found, 299 of which from LILACS database and 34 from BDENF. Finally, concerning "Health

Care", 5,093 articles were featured, 4,725 were from MEDLINE, 309 from LILACS and 59 from BDENF.

By confirming a large collection of papers with varied contexts, which did not always address the essential content proposed in this study, the use of a combination of three descriptors showed to be more efficient. Thus, the following proposition was used: "Information Systems AND National Unified Public Health System AND Health Care", with these three descriptors being used simultaneously in the same research. By using this combination of descriptors, 19 items were identified, nine of which in the LILACS database and 10 in SciELO.

It was noted that, of the 10 articles found in SciELO, three were equal to the articles found in LILACS. Excluding these duplications, the other articles appeared only once. Therefore, of the 19 articles found, 16 were included in the survey because they were related to the theme, to the purpose of this study, and they matched the inclusion criteria established.

The studies selected were critically analyzed in a meticulous fashion, seeking explanations for the different or conflicting results. To this end, reading records were prepared to facilitate the logical and structural visualization of this study, to highlight the report units, to group the various themes and, next, to proceed to the study discussion with the main results evidenced by the analyses of the articles included herein[5].

RESULTS

The articles were analyzed and described in a summarized manner in Tables 1 and 2, including year of publication, database, language of publication, journal name, study type, information systems and their use.

The results expressed in Tables 1 and 2, as well as in the discussion described below, showed that the scope of the information systems in health includes the magnitude of supporting the municipal, state and federal management in relation to the programs required for the administration and maintenance of health. It is imperative to emphasize that, with regard to care information systems still require improvement in order to better address the imminent needs of healthcare users and professionals.

In view of these results, it is necessary to discuss the expressed statements in further detail.

Table 1 - Description of articles selected from 2009 to 2013, according to the year of publication, database, language of publication, journal name and type of study. João Pessoa, PB, 2013.

Article	Year	Database	Language	Journal name	Type of study
Article 1	2009	Scielo	Portuguese	Revista Brasileira de Saúde Materno Infantil	Exploratory
Article 2	2009	Scielo	Portuguese	Texto Contexto Enfermagem	Case Study
Article 3	2009	Lilacs	Portuguese	Revista Médica de Minas Gerais	Ecological
Article 4	2010	Scielo	Portuguese	Caderno de Saúde Pública	Exploratory
Article 5	2010	Scielo	Portuguese/English	Revista de Saúde Pública	Transversal
Article 6	2011	Scielo	Portuguese/English	Caderno de Saúde Pública	Ecological
Article 7	2011	Lilacs	Portuguese	Revista Baiana de Saúde Pública	Exploratory
Article 8	2011	Scielo	Portuguese	Revista Brasileira de Epidemiologia	Exploratory
Article 9	2011	Lilacs	Portuguese	Scientia Médica	Review
Article 10	2011	Scielo	Portuguese/English	Revista de Saúde Pública	Quantitative
Article 11	2011	Scielo	Portuguese/English	Revista de Saúde Pública	Transversal
Article 12	2012	Scielo	Portuguese/English	Revista de Saúde Pública	Ecological/ Retrospective
Article 13	2012	Scielo	Portuguese	Revista Brasileira de Epidemiologia	Descriptive/ Exploratory
Article 14	2012	Lilacs	Portuguese	Revista Brasileira de Reumatologia	Transversal
Article 15	2012	Scielo	Portuguese/English	Revista de Saúde Pública	Ecological
Article 16	2012	Scielo	Portuguese/English	Revista de Saúde Pública	Descriptive/ Exploratory

Table 2 - Description of articles selected according to the information system referred and the purpose of using the information system. João Pessoa, PB, 2013

Article	Information system used	Information system utilization
Article 1	Hospital Information System of the National Unified Public Health System (ISH/SUS)	Source of data
Article 2	Primary Care Information System (SIAB) and National Registry of Hypertension and Diabetes Patients (ISH/HIPERDIA)	Case Study
Article 3	Information System of Mortality (SIM) and Information System on Live Births (SINASC)	Source of data
Article 4	Authorization procedure of high complexity of the Outpatient Information System of the National Unified Health System (APACSIA/SUS/ONCO)	Source of data/ Development of an IS
Article 5	Hospital Information System of the National Unified Health System (ISH/SUS)	Source of data
Article 6	Hospital Information System of the National Unified Health System (ISH/SUS) and Authorization procedure of high complexity of the Outpatient Information System of the National Unified Health System (APACSIA/SUS/ONCO)	Source of data
Article 7	Hospital Information System of the National Unified Health System (ISH/SUS) and National Register of Health Institutions (CNES)	Source of data
Article 8	National Register of Health Institutions (CNES); Hospital Information System of the National Unified Health System (ISH/SUS); Communication of Hospitalizations (CIH)	Source of data
Article 9	Electronic Patient Record (PEP)	Information System Assessment
Article 10	Information System on Public Health Budget (SIOPS); and Siga Brasil	Source of data
Article 11	Monitoring System of the Program for Humanization of Prenatal and Birth (SISPRENATAL)	Source of data
Article 12	Hospital Information System of the National Unified Health (ISH/SUS); and Primary Care Information System (SIAB)	Source of data
Article 13	Hospital Information System of the National Unified Health System (ISH/SUS)	Source of data
Article 14	Information System of the Specialized component of Pharmaceutical Care (HÓRUS Specialized)	Source of data
Article 15	Hospital Information System of the National Unified Health System (ISH/SUS)	Source of data
Article 16	National System for the Management of Pharmaceutical Care (HÓRUS)	Information System Assessment

DISCUSSION

Several Information Systems in Health (ISH) implemented by the Ministry of Health (MOH) in recent decades, whether charitable or epidemiological, have been referred as important tools for the diagnosis of health conditions, with the aim of generating interventions more consistent with the needs of the population.

In this research, the authors are concerned with verifying the use of the ISH as a source of data to control, monitor and evaluate health care in Brazil when reading the articles.

Of the studies found, eight focused on the analysis and evaluation of public and private hospital services insured by SUS, based on data offered by ISH-SUS, which is a tool used on a larger scale for getting the data needed for the development of surveys[6-7].

In one of the articles surveyed, the combination ISH-SUS was analyzed to characterize aspects of hospital care for malnourished children under five. In this study, there was a need for health professionals to value the assessment of nutritional

status and proper recording in the ISH-SUS[8]. In another study, a predictive model for hospital mortality could be developed based on data from the ISH-SUS, thus proving that, when properly registered, reliable data are present in the system to evaluate the hospital performance[9].

The data from the ISH-SUS were also used to evaluate the use of computerized tomography scans in hospitalizations and diagnosis of Cerebral Vascular Accident in the SUS. However, it was noted that further studies will be needed to determine whether this examination brought improvements in the care provided and, consequently, to understand to what extent the results would be the product of the quality of information in the ISH-SUS[10].

It was noted that studies developed and analyzed emphasize the disease, so there is a need for more research to detail ISH-SUS and to evaluate the quality of the data generated by such a system.

This context was evidenced in the study "The Hospital Information System and its application in public health", which surveyed the scientific literature involving applications of data from ISH/SUS in Public Health with the aim of synthesizing the advantages and limitations of this system. In this study, we found an incomplete coverage of hospital admissions by ISH/SUS and uncertainties regarding the reliability of information contained in ISH/SUS. Thus, their contribution to research, organization and evaluation of medical and hospital care might be controversial[11].

Since data obtained by ISH-SUS do not always provide the information needed for an entire research, it is necessary to use other systems to supplement data that are important for the studies. Among these systems, we can mention: the Oncology module of the subsystem of the High Complexity Procedure Authorization of the Hospital Information System of the National Unified Health System (APACSIA/SUS/ONCO), the National Registry of Health Institutions (CNES), the Communication of Hospitalizations (CIH) and the Primary Care Information System (SIAB)[12]. Therefore, appropriate power and data systems processing is essential for effective service planning and distribution.

The combination of APACSIA/SUS/ONCO was used together with ISH-SUS, because it is the system used to manage the therapeutics and the resources for the treatment of cancer patients by SUS; to scale the healthcare infrastructure and to improve management of care outpatient oncology through SISONCO. The latter is a system developed in one of the studies in this research sample[1-12].

In addition to these purposes, ISH-SUS together with CNES was also used in one of the articles as a data source to discuss the current situation and trends in SUS hospital care. This characteristic of the systems is important to demonstrate that there is a tendency to extend the larger size public units through a technological densification instead of redrawing the system profile of small hospitals[13].

In another article, the authors used CNES and ISH-SUS associated with Communication of Hospitalizations (CIH) to achieve the goals of their research. When used by the National Health Agency, the CIH evaluates the care network informed by private health care plans, thus enabling a broader and deeper knowledge of nosocomial and epidemiological profile of the Brazilian population[14].

The study "Hospitalizations for cardiovascular conditions sensitive to primary care in the cities of Goiás State", contemplated in this review, used SIAB interconnected to ISH-SUS to assess the rates of hospital admissions for cardiovascular conditions sensitive to primary care. A decrease in the Hospitalization rates was observed in this study, regardless of Family Health coverage[15].

SIAB was combined with the National Registry System of Patients with Hypertension and Diabetes (SIS/HIPERDIA) and used in another research to analyze the healthcare situation and/or information production for care planning and the problem-solving ability of health actions[16].

Accordingly, in the context of this review, the ISH-SUS contribution to the development of scientific research has been emphasized until here. Next, other systems as relevant as the ISH-SUS will be addressed.

The Information System on Mortality (SIM) and the Information System on Live Births (SINASC) were discussed in an article that aimed to critically analyze and evaluate the quality of health information and the role of institutions and health professionals on this subject[17]. The authors observed that the completion of death certificates continues to present many problems, such as lack of registration in required fields, making a proper

situational diagnosis difficult. This shows the need for investments in the systems improvement and development of fundamental data sources for the planning and evaluation of public health policies.

The lack of registry was a problem also noted in the Support System of the Program for Humanization of Prenatal and Birth Care (SISPRENATAL)[18]. The information systems used to discuss the funding and planning of SUS were also included in the study sample, as well as the case of the Information System on Public Health Budget (SIOPS) and Siga Brasil[19-20].

Based on the above considerations, it was verified that the vast majority of the information systems mentioned to date was used as a data source for the development of the published studies. Some research, however, also conducted an evaluation of certain information systems in order to show their importance and contributions/ difficulties that they offer.

This context was evidenced in the articles about the National System for the Pharmaceutical Care Management (HORUS) and Electronic Health Record (PEP), which analyzed the results of its applicability and found that, despite the difficulties, the use of these systems is still valid to contribute to the improvement of health conditions[2,21-22].

It was perceived throughout the analysis of the selected articles that the information systems used by SUS are important and necessary tools for obtaining data, construction of information and use for the development of actions focused on the control, monitoring and evaluation of health across the national territory.

Some of these information systems face problems because there is no policy that encourages the correct recording of data, which increases coding problems and (often) prevents correct information collection and, consequently, the development of efficient actions. This clearly reveals the need to adapt these systems to our health situation. In addition, there is the lack of a systematic training of professionals responsible for these activities.

CONCLUSION

Despite the importance of the theme to health, there are still weaknesses in its organization and practice, which affects the reliability of the data produced, preventing these systems from representing the reality of the health situation of the Brazilian population.

The present study also revealed that most of the articles detected and discussed do not address the Information Systems as their main subject. They use the systems as a tool for concreteness of data needed for research development, expressing information systems in health in the methods sections as tools to capture data in multiple health issues.

Another factor highlighted is that, in the scope, the articles show that the health information system provided by SUS is mainly used for administrative data collection, financial costs, and support in decisions management, when compared to its use in the support of SUS users. In this study, however, the extent was revealed to which the information system showcases management but makes the user invisible, a reality that can be changed through the existence of the electronic records.

In the light of the above, the following considerations emerged: why do health professionals not develop the health information system necessary for the care they offer? Why is the data feeding of the SUS health information system performed by technicians rather than by professionals who are producing the data and know the user´s reality?

These questions reveal the need to train the health professionals who are directly attending to the SUS users and who produce the data that feed the systems, based on their consultations and activities, besides the development of systems that are free, available to the public for access and use, by means of tools that can contribute to the improvement of care management by the SUS.

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