

Health Information Systems in the Decision-Making Process in Primary Care

REVIEW

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Abstract

Objective: Identifying the scientific literature about the use of health information systems, their weaknesses and potential for decision-making.

Method: A systematic literature review study conducted in September/October 2014. The sample consisted of 13 articles published in the databases: LILLACS, SciELO, PubMed, Cochrane.

Results: There was a small number of publications about the subject; it was pointed out as weaknesses for use of the systems: unpreparedness of the professionals, lack of training, poor access to systems; and how potential: characterization of the population profile, epidemiological, people's living conditions, etc.

Conclusion: The health information systems provide great potential for decision-making and must overcome difficulties to use, being necessary to carry out more studies about the subject.

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Keywords

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Introduction

Systems Health Information (SIS) constitute a set of components that work seamlessly as a data collection mechanism, processing, analysis

and transmission of information, as well as research and planning in disease control, able to structure, operational, supervise, monitor and evaluate the performance and quality of health services, producing the necessary information for the decision process of these services. [1, 2]

In 1998, the Department of Primary Health Care Department of the Ministry of Health and the Department of Computer and Information of the National Health System (DATASUS) inaugurated the Information System of Primary Care (SIAB). Through this system, it had knowledge of population indicators (morbidity, mortality, and services) of a specific area, thus facilitating the achievement of the health diagnosis, planning and evaluation of actions in health primary care teams. In addition, this system includes administrative background information, making it essential for decision-making. [3]

Thus, the SIAB was created to provide operational and managerial support to the work of data collection of the Family Health Strategy (ESF), providing information to managers in order to facilitate and expedite the decision-making process. [4, 5]

However, some difficulties have been raised in the course of its use, starting with data collection, which was characterized as a step that had major deficiencies, bringing in some way negative, since the guarantee of quality information is condition essential for objective analysis of health status, health actions programming and also for making evidence-based decisions. [6]

Study also points out that in general there is an acceptance of the professionals in relation to computing resources that the Health Information Systems contemplate. This resistance is given by different factors such as a lack of information about the true purpose of information systems, lack of adequate training for health staff and the lack of motivation. [2]

In an attempt to minimize these problems in primary care, the Ministry of Health launched through

Ordinance N° 1412 of June 10, 2013, the establishment of the Health Information System for Primary Care (SISAB). This will be operationalized through the Department of Primary Care by e-SUS Primary, consisting of two systems: the Simplified Data Collection (CDS) and the Electronic medical records Citizen (PEC). [7]

Thus, the new system seeks to ensure the constant updating of easy access, allowing professionals to plan and organize their actions in their work processes, acquiring and applying knowledge and skills in their interventions, permeating the solution of the problems, quality of labor and employee. The use of information systems in the decision-making process increases the efficiency of services provided to customers therefore provides qualified and updated professionals to work in health services. [2]

Thus, it is clear that from the creation and implementation of new SIS, improvements are being made in the processing of data provided by the ESF, and thus a very important step forward for public health policies, since it guaranteed quality and reliability of the data will be decisions taken in health by the safer management. [4, 8]

Allied to this context, the process of health decision-making is characterized by a chain of decisions, which are taken by people in different situations, it is necessary for it to formulate plans and interpretation of goals to be achieved, from an in-depth study of the problem through data collection and information from the SIS, which will require the knowledge of the best way forward. [9]

However, the management practice of the ESF territory has not yet expressed a definition and therefore struggling. In this sense, managing a territory requires professionals that add diverse knowledge and understands the social, political, cultural, epidemiological, ecological and historical region.8 of the process of managing, when run properly is directed to the critical examination issues, problem solving and decision making. [10]

Therefore, it is of fundamental importance that health information would make suggestions to build explanatory chain of information system problems, thus increasing the capacity of decision-making, since the information is essential to the decision, so that gives the manager knowledge of living conditions and health of the population. [10]

Thus, in view of the above and of the need for evaluation of the SIS as a support tool for the management and work of health professionals, this study seeks to reflect on the following problem: that scientific production is the use of health information systems for the decision-making process in primary care?

Thus, this study proposes the following objectives: to identify the scientific literature on the use of health information systems as well as the weaknesses and potential for the decision-making process.

Method

This is a systematic review study of literature, which is a form of research that uses literature as a source of data, obtaining them through an intervention strategy with application of explicit and systematic methods of search in order to identify issues that require further investigation, as well as the synthesis of information about a particular topic. [11]

To carry out the review, seven steps have been taken based on the Cochrane Handbook, described as: formulation of the scientific question, location and selection of studies, critical assessment of studies, data collection, analysis and presentation of data, data interpretation, enhancement and review update. [12]

This study was conducted with the participation of three researchers who evaluated independently, the quality of each article on the methodology adopted. To that end, we created a research protocol to be followed by all who submitted from local and ways to search until criteria for inclusion and

exclusion, defining the outcomes of interest and finally the analysis of results.

With regard to the search performed the virtual databases were involved national and international scientific works published in online journals from August 2009 to September 2014, because it is the last five years of publications, which dealt with the use of health information systems for decision making in primary health care.

They were used for this: the Virtual Health Library (VHL), whose database was used the Latin American and Caribbean Health Sciences (LILACS); the PubMed Library, whose database was the "Medical Literature Analysis and Retrieval System Online" (Medline); and the Cochrane Library.

The collection of data in the databases took place in August and September 2014. For the survey of journals were used the following descriptors in MeSH indexed in English, "information systems", "primary health care", "health management "; and in Portuguese: "information systems", "primary health care", "health management"; interspersed with the Boolean operator "AND".

For filtering and sample selection of journals there were established as selection criteria: full-text articles available and free, "free full text", published in August 2009 to September 2014, in Portuguese and English. Exclusion criteria were articles in duplicate published for over five years, in other languages, dissertations and theses in addition to those studies that did not address directly the issue in focus.

When conducting the search were raised 216 research articles on health information systems. Subsequently, filtering was carried out following the articles previously established selection criteria, as well as a thorough reading of studies chosen for each author, thus finalizing the choice of 13 studies in common by the three researchers. Please note that the selected papers presented their goals compatible with those of research, where the search strategy can be seen in **Table 1**.

Table 1. Description of selected articles and their search modes.

Search Mode	Database	Articles Found	Selected articles
"Information systems" AND "primary health care" and "health management"	LILACS	30	4
	SciELO	0	0
	PubMed	6	0
	Cochrane	5	0
"Information systems" and "primary health care"	LILACS	32	2
	SciELO	7	0
	PubMed	38	2
	Cochrane	1	0
"Information systems" and "health management"	LILACS	13	2
	SciELO	0	0
	PubMed	17	1
	Cochrane	1	0
"Primary health care" and "health management"	LILACS	55	1
	SciELO	4	0
	PubMed	3	1
	Cochrane	4	0
Total		216	13

To perform the analysis of the articles it was built and used an instrument with the following categories: journal title, year of publication, type of study, vocational training's lead author, institution, approach, objectives, results and conclusions. The content analysis was developed in a systematic and critical way, as was carried out in-depth reading of the articles found.

Results

The results were extracted from 13 articles and found in the sample of this study. Although demand in the databases have been held in the databases LILACS, PubMed, SciELO and Cochrane; They considered only the periodicals found in LILACS and PubMed considering that only these have demonstrated compatibility with the research objectives.

As can be seen in **Table 2**, most of the produced articles were found in Brazil totaling 9 (69.23%) studies; publications on SIS in primary care decision-

Table 2. Characterization of the selected articles on the publication year, journal, study site, and use of SIS in decision-making.

N°	Year of publication	Periodic	Data base	Geographic location	Title Study
1	2013	Cogitare Enferm	LILACS	Brazil	Primary care information system: potential and under-utilization in decision-making
2	2013	Applied Clinical Informatics	PubMed	Colombia	An Information Systems Model of the Determinants of Electronic Health Record Use
3	2012	Online Brazilian Journal of Nursing	LILACS	Brazil	Basic care information system as a management tool: a case study in Santo Antonio de Jesus / BA
4	2012	Croat Med J	PubMed	Croatia	Users' satisfaction with the primary health care information system in Croatia: a cross-sectional study
5	2012	AMIA Annu Symp Proc	PubMed	USA	Clinical Information System Services and Capabilities Desired for Scalable, Standards-Based, Service-oriented Decision Support: Consensus Assessment of the Health Level 7 Clinical Decision Support Work Group
6	2012	Rev. Gaúcha Enferm.	LILACS	Brazil	Use Information System in the Family Health Strategy: perceptions of nurses
7	2011	Rev. Panam salud Publica	LILACS	Brazil	Health information Area structure from the information resources management: experience analysis

N°	Year of publication	Periodic	Data base	Geographic location	Title Study
8	2011	Rev. Saude publica	LILACS	Brazil	Use of health information systems gauchos small towns
9	2010	Rev. Espaço para Saúde	LILACS	Brazil	Primary care information system and its use by the family health team: an integrative review
10	2010	BMC Health Services Research	PubMed	India	Evaluation of computerized health management information system for primary health care in rural India
11	2010	Rev. Baiana Saúde Pública	LILACS	Brazil	Using the Primary Care Information System (SIAB) for the planning of actions by the teams of the Health Strategy for the Municipality of Montes Claros Family (MG).
12	2010	Cien Cuidado Saude	LILACS	Brazil	Primary care information system - health status of a municipality in Mato Grosso
13	2009	Rev. APS	LILACS	Brazil	Nursing management in Basic Units: information as a tool for decision-making

Table 3. Relationship per article the use of health information systems in the decision-making process.

N° Article	Use of information systems in health decision-making
1	Important to the decision-making process in the administration or in patient care;
2	Supports the clinical data query service, the notification and user communication services
3	A tool for planning the activities and services offered in the health strategy unit of the family;
4	It saves time for health professionals on your record, maintenance and reporting
5	It reduces costs, improves the quality of medical care as supporting the electronic clinical decision and order entry also eliminates medication errors and reducing unnecessary tests;
6	Instrument for data collection, control and information as well as being a tool that aids in local diagnosis, helping to identify the community's health needs
7	Helped to change the care model from the integrated computerization of primary health care units;
8	Contributes to the understanding of the needs of municipalities and subsidizes decision-making in municipal management;
9	Tool to guide actions in accordance with local realities;
10	Ability to obtain specific information according to the needs of each healthcare professional
11	Household assessment, construction of health indicators, definition of priorities, work organization, local programming
12	Knowledge of health social reality accompanied population assessment and the adequacy of health services and their readjustment whenever necessary;
13	Essential support to the organization and management of services, management of health facilities

making process more were held in 2010 and 2012 with four (44.4%).

For the construction of **Table 3** were selected for each item, the features brought by these health-related decision-making, thereby addressing the vision brought by each study for this process.

Regarding the construction of **Table 4**, it was identified in the course of reading the articles some weaknesses and potential of information systems in health decision-making, and therefore listed.

Table 4. Description of the weaknesses and potential of health information systems in the decision-making process found in the articles.

Weaknesses	Potential
<ul style="list-style-type: none"> • The under-utilization of systems for directing the work; • Lack of training, support, and knowledge of professionals to use the systems; • The limitation of SIS found refers to the use of strategic information to the long-term decision; • Lack of mechanisms for evaluation and control of the data produced; absence of popular participation in the collection and use of information generated; • Access difficulties to information systems; • Incompatibility of conceptual or geographical information between different databases, and the discrepancy between the statism of the data and the dynamism of the local reality 	<ul style="list-style-type: none"> • It has great potential to contribute to the local epidemiological surveillance; • Fundamental to the implementation of planning, monitoring and evaluation of health actions in the ESF; • Collaborates so that the data are transformed into information and then into knowledge for the health team; • Features population profile, epidemiological and living conditions of the population and quantitatively assesses the production of USF services; • It allows to evaluate the work performed and the adequacy of health services; • The SIS provide information about the population and it can make a diagnosis of reality and intervene when necessary;

Discussion

In health care, information systems are used to collect, store and disseminate data that can contribute to the planning and decision making. Currently, it is essential to modernize these systems in view of the intense structural, procedural and managerial changes in order to provide answers to the new and complex demands. These demands are mainly due to the organizational changes, which have intensified the flow of information required and therefore a decentralized decision-making process, requiring a more effective participation of the different stakeholders involved in decisions. [13]

In this sense it is essential that the information is located, accessible and meaningful data to build explicative chain of the health system or a territory problems, allowing to increase the capacity of decision-making, since knowing the living conditions and health of the population is a necessary step for assessing the impact of actions previously performed. [10]

The 13 articles in the sample of this study brought in general, the use of health information systems for decision making, in addition to the publication year of the features, periodic, authors and place of

publication, article title and base data, as can be seen in **Table 1**.

Since the characteristics presented in **Table 2** demonstrate the importance of using health information systems as a data collection tool and information about specific population by providing diagnosis of the health situation for holding actions and public health policies, since the information system can guide and support the implementation of strategies that seek to solve the problems found.

It is worth portray the process of working with managers during the management of health facilities, should focus on the SIS, contributing thus to the construction of local knowledge and collaborating directly to the implementation of a model of care that builds on the principles and SUS guidelines. [8]

However, it is known the existence of many weaknesses and difficulties to use such information systems. Some of the found studies revealed that among these weaknesses were highlighted under-utilization of systems for directing the work; difficulty of access to information; lack of training, support, and knowledge of professionals to use the systems; limitation on the use of strategic information for making long-term decision; absence of evaluation

mechanisms and control of the data produced; absence of popular participation in the collection and use of information generated; conceptual or geographic information incompatibilities between different databases, and the discrepancy between the statism of the data and the dynamism of the local reality. [14, 4, 13]

Another important fact is found that the high volume of data and information has caused difficulties for the management and care process, as health records are still guided predominantly by written culture providing poor information to drive management decisions; and support care activities. [13]

Municipalities face difficulties in developing its technical capabilities, thus assuming the role of mere collectors of data, which leads professionals to under-utilize information systems. SIS several initiatives of adaptation to changing needs is being undertaken; however, the diversity of Brazilian municipalities implies different possibilities for implementing health policies. [15]

The difficulties brought by the studies faced with the real objectives of the SIS. Every health manager needs updated, reliable and complete to be able to take appropriate decisions on the operations and performance of health activities and services under their responsibility, since the problems coping process, can make inferences, and plan, deploy and implement actions based on the information that is available. [10]

Oposing the difficulties encountered and weaknesses, research also shows strengths, identifying and indicating great potential brought by the SIS as characterizing the population profile, epidemiological and living conditions of the population; the quantitative assessment of the production of USF services; great potential for contribution to the local epidemiological surveillance; collaboration for the transformation of data into information and knowledge to those in the health teams; It allows the evaluation of the work and the adequacy of health services offered in addition to the implemen-

tation of planning, monitoring and evaluation of health actions developed in the ESF. [4, 10, 16, 14]

Yet the SAIS are important tools for collecting and tracking data to assist in the understanding of the needs of the people belonging to the territory of the health unit. From this information, professionals will be able to know what issues are really prevalent among families and, therefore, may carry out the planning of health actions. Thus, it can be said that the SIS become tools to support activities for decision making and acquisition of knowledge, resulting in more trained professionals, creative, able to change reality and improve the care of health services. [4]

It is clear that the use of information systems as an instrument of the family health team's work was instrumental in the identification and assessment of families in the construction of health indicators in setting priorities in the organization of work in local programming and direction of home visits. So the SIS has the power to assist the teams and health managers to define their priority groups through local diagnosis and plan the actions that would be implemented in teams. [16]

It adds that, through the information systems of primary care professionals can obtain, by means of information created, knowledge of what is happening with the client as well as situations that involve targeting interventions that lead to prevention and promotion of health. [13]

However, it is observed that the health information systems are little used and valued by professionals who use it, starting with the coordination of the ESF than the use of critical and reflective tool as management.¹⁶ A study of workers primary care shows that some dental and medical professionals use these systems, unlike the nurse uses the SIS as an analytical tool of health inspection and epidemiological situation, with diagnosis and action planning. [17]

Conclusion

Based on these, sets up essential that professionals and health managers pay attention to this decision-making tool, since if used correctly will allow the transformation of data into information, which will generate knowledge appropriate to draw an effective planning for health decision-making, thereby promoting the solving of several problems.

SIS are characterized as important tools that assist in decision making based on knowledge from the interpretation of their information, thus enabling proper planning of care actions, sanitary partner, assessment of the local health situation among other actions aimed at proposing strategies for problem solving.

In this perspective this study identified 13 studies related to the use of these systems for decision making, and therefore a reduced number of publications, which implies the opportunity to conduct more studies on this theme.

Still, the analysis of the results shows that the SIS provide great potential for strategic planning in health, such as the contribution to epidemiological surveillance, planning and evaluation of health actions by the ESF and to other health agencies, as well as for adequacy of health services among other measures. However, such opportunities are devalued by most health professionals, which only refer to difficulties in handling and using this tool, indicating no training for use of systems, lack of support, lack of knowledge, difficulties of access, etc.

Thus, it highlights the need to invest in skills and expertise of managers and health professionals involved in this process, through the teaching-learning, skills and training, among other permanent activities for the strengthening of local management, of solving at work, the epidemiological assessment and relationship with reality.

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