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The use of health information in the decision-making process of the municipal management in Minas Gerais

O uso da informação em saúde no processo decisório da gestão municipal em Minas Gerais

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ABSTRACT
This study aimed to analyze the use of data and information from Primary Health Care by municipal managers. This is a cross-sectional study developed with 419 health managers from Minas Gerais State through an online questionnaire, built based on the literature, applied between 2017 and 2018. The data were treated using bivariate and multivariate analysis. The results indicate that managers use data and information to organize management in local health. The municipalities produce, make available and analyze these resources satisfactorily. The scarcity of infrastructure and equipment, training and financial resources was cited as an obstacle. Trained managers plan and make decisions based on data and information made available by the municipal Health Information System.

Keywords: Health services administration. Primary health care. Health planning. Health services research. Health information systems.

RESUMO
O estudo teve como objetivo analisar o uso de dados e informações da Atenção Primária em Saúde por gestores municipais. Trata-se de um estudo transversal desenvolvido com 419 gestores em saúde do Estado de Minas Gerais por meio de um questionário *online*, construído com base na literatura, aplicado entre 2017 e 2018. Os dados foram tratados por meio de análise bivariada e multivariada. Os resultados apontam que os gestores utilizam dados e informações para organizar a gestão em saúde local. Os municípios produzem, disponibilizam e analisam esses recursos satisfatoriamente. A escassez de infraestrutura e equipamentos, de treinamento e de recursos financeiros foi citada como entrave. Os gestores capacitados planejam e tomam decisões baseados em dados e informações disponibilizados pelo Sistema de Informação em Saúde municipal.

Palavras-chave: Administração de serviços de saúde. Atenção primária à saúde. Planejamento em saúde. Pesquisa sobre serviços de saúde. Sistemas de informação em saúde.

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INTRODUCTION

Health management is a complex practice considering the duties of the Unified Health System (SUS) and its need to equalize different interests involved. In order to manage efficiently and effectively, managers are required, in addition to the assessment, definition of criteria, values and the evidence base, personal knowledge and the timely use of health information in their decision-making process[1,2]. It is important that their definitions are supported by strategies that use Information and Communication Technology (ICT), thus being able to seek the provision of quality healthcare services[3,4].

Usually, health managers use their knowledge, techniques and skills to lead healthcare services and systems to the established objectives. However, they face some challenges such as human relations among their collaborators, users and the population[4,5]. Despite knowing that this is essential for the implementation of public health policies, there is still a lot to be developed on the consistent description of what is characterized by the manager's actions in the organization of healthcare systems and services, however[4]. The complexity of this understanding is due to the large number of actors in their different levels of action, seeking solutions for a given situation[2].

Some aspects can impact on the decision-making process and, consequently, on management, such as the lack of professionalization of managers, insufficient staffing of qualified professionals, the slowness in the insertion of new technologies, excessive bureaucratization, political influences and staff turnover, bringing harm to the assistance provided by SUS[6,7].

One of the essential tools to support the manager's decision is the Health Information Systems (SIS)[8], which consist of innovation strategies to provide tools for the process of collecting, processing, analyzing and disseminating information, enhancing the use of information in healthcare services[9,10]. In contrast, most healthcare managers and professionals do not use this information produced by the SIS, justifying its use only for the municipalities revenues, transfer of resources and for administrative purposes[9,11,12].

The process of searching for information in the SIS still presents itself as something fragmented and laborious for many managers. Another aggravating factor is the difficulty in initiatives that articulate the training of the teams responsible for the use of data and information in the different management spaces[13,14].

To foster knowledge about management in Primary Health Care (PHC), this study aimed to analyze the use of data and information in PHC by municipal managers, in the state of Minas Gerais, Brazil.

METHODOLOGY

This is an observational, cross-sectional study conducted with municipal health secretaries in the state of Minas Gerais or PHC coordinators. The state of Minas Gerais has the largest number of cities in Brazil (n = 853), totaling about 21 million inhabitants

representing about 10% of the national population [15].

All municipal health secretaries in the state of Minas Gerais were considered eligible for the study. Data collection took place between September 2017 and October 2018. The managers received a link, from all municipalities in the state, with the data collection instrument by e-mail from the Municipal Health Department. The contact was made through the Council of Municipal Health Secretariats of Minas Gerais (COSEMS/MG) via electronic mail. Control of responses and resending of the invitation was also carried out by COSEMS/MG. We obtained a response from 419 (49.1%) of the participants. All mesoregions in the state participated in the study (Table 1).

Table 1. Distribution of the responding municipalities according to the Mesoregions of Minas Gerais. Brazil, 2017-2018

Mesoregions of Minas Gerais	Participating municipalities n (%)
Minas Northwest	02 (0.5)
Minas North	42 (10.0)
Jequitinhonha	50 (11.9)
Vale do Mucuri	14 (3.3)
Triângulo/ Alto Paranaíba	50 (11.9)
Central Mineira	09 (2.1)
Metropolitan Area of BH	51 (12.2)
Vale do Rio Doce	36 (8.6)
West of Minas	19 (4.5)
South/ Southwest of Minas	51 (12.2)
Campo das Vertentes	13 (3.1)
Zona da Mata	82 (19.7)
Total	419 (100.0)

The instrument used in data collection was previously tested in some municipalities, chosen for convenience. The elaboration of the questionnaire was based on the analysis of scientific productions available in the databases of the Latin American and Caribbean Center on Health Sciences Information (BIREME) and Medical Literature Analysis and Retrieval System Online (MEDLINE) on the topics Health Information, Health Management, Decision-Making, Primary Health Care between 2013 and 2018.

The questionnaire had 49 questions about: social and demographic aspects, professional and administrative characteristics of the managers; Use of health information by management as a subsidy for decision-making in PHC and limiting factors for their use of health information. Most responses were given using a 5-point Likert scale that portrayed frequency and satisfaction. We opted for making our own questionnaire due to the absence of validated instruments on the decision-making of the healthcare manager based on data and information.

Data collection was performed electronically (web-based survey), which allows acquiring a large amount of data in an estimated time, with low cost and maintaining its quality[16]. The data were collected using google forms and analyzed using the Statistical Package for the Social Sciences software (SPSS 21.0). Descriptive analysis was performed with calculation of measures of central tendency and dispersion. The bivariate analysis, chi-square test, was performed to verify associations between the outcome variable (production of information for decision-making) and the exposure variables, through simple logistic regression (Odds Ratio value - unadjusted OR) and their respective 95% confidence intervals. Finally, we performed multivariate logistic regression analysis. Variables with p value <0.20 were modeled in the bivariate analysis. Variables with a 5% significance level remained in the final model.

The present study complied with Resolution 466/2012 of the National Health Council and was approved by the Human Research Ethics Committee of the Federal University of Minas Gerais (CAAE: 45706815.6.0000.5149). All participants signed an informed consent form at the beginning of the research.

RESULTS

Most respondents were municipal health secretaries (70.6%), followed by PHC coordinators (22.0%). Regarding the profile of the respondents, most were female (62.1%), had higher education (82.1%) and had been in the position for less than a year (48.9%). Less than half received training to start working (37.7%), with the majority of these training courses being carried out by COSEMS/MG. Just over a third (34.8%) of the participants had previously held the position of municipal health manager.

Most of the participants (54.4%) declared to have the necessary structure and equipment to carry out their managerial activities. Human resources were also considered sufficient by 48.9% of the participants.

The results on the purpose of using health data and information for the PHC decision-making process among the available options were: Organize Health Management (average position=1.82), followed by supplying the Ministry of Health's databases Health (average position=1.99) and other possibilities (average position=2.42). Thus, the table below was built to describe this use related to the perspective of production, availability, analysis, use of health indicators and health reports by management (Table 2).

Table 2. Distribution of variables related to the use of information in the decision-making process of Primary Health Care in municipalities of Minas Gerais. Brazil, 2017-2018

Variables		Use of information for decision-making			Pearson's Chi-Square	df	P-value
		No (n=10)	Yes (n=409)	Total (n=419)			
Production of health data and information in PHC	Highly satisfactory	20.0%	21.8%	21.7%	21.383	3	0.000
	Very satisfactory	20.0%	35.5%	35.1%			
	Satisfactory	20.0%	37.7%	37.2%			
	Unsatisfactory	40.0%	5.1%	6.0%			
	Do not produce	0.0%	0.0%	0.0%			
Availability of updated and real-time health data and information in PHC	Very frequent	20.0%	23.0%	22.9%	9.496	3	0.023
	Quite frequent	30.0%	40.1%	39.9%			
	Regularly	20.0%	31.1%	30.8%			
	Infrequent	30.0%	5.9%	6.4%			
	Do not use	0.0%	0.0%	0.0%			
Frequency of analysis of data and information in PHC	Very frequent	10.0%	17.6%	17.4%	2.942	2	0.230
	Quite frequent	30.0%	49.1%	48.7%			
	Regularly	10.0%	28.6%	28.2%			
	Infrequent	50.0%	4.6%	5.7%			
	Do not use	0.0%	0.0%	0.0%			
Frequency of production of health indicators by the Secretary in PHC	Very frequent	10.0%	21.5%	21.2%	10.431	3	0.015
	Quite frequent	30.0%	44.5%	44.2%			
	Regularly	30.0%	28.4%	28.4%			
	Infrequent	30.0%	5.6%	6.2%			
	Do not use	0.0%	0.0%	0.0%			
Frequency of production of management reports in PHC based on Health Information Systems	Very frequent	0.0%	14.4%	14.1%	11.052	3	0.011
	Quite frequent	20.0%	40.8%	40.3%			
	Regularly	40.0%	35.0%	35.1%			
	Infrequent	40.0%	9.8%	10.5%			
	Do not use	0.0%	0.0%	0.0%			
Existence of structure and equipment to develop management actions with health data and information	Insufficient	50.0%	45.5%	45.6%	0.081	1	0.777
	Sufficient	50.0%	54.5%	54.4%			
	Total	100.0%	100.0%	100.0%			

It was observed that more than half of the responses in Table 2 focused on the options satisfactory or with a desired frequency for municipalities that use health data and information in management. Following this same line, most of these municipalities also made their data and information available appropriately ($p<0.0001$) and frequently used the indicators produced ($p<0.0001$).

The databases provided by the SUS IT Department (DATASUS) are used as a database and health information by the respondents. The systems of the e-SUS strategy were also mentioned, both the Simplified Data Collection (CDS) (51.8%) and the Electronic Citizen Record (PEC) (38.4%), as the basis for the decision-making process. Only six cities did not use e-SUS resources,

78.7% being implemented and 20.8% with the system in place.

Table 3 presents factors that hinder the use of information by health managers in the PHC decision-making process.

Table 3. Complicating factors in the use of information in the decision-making process of Primary Health Care in municipalities of Minas Gerais. Brazil, 2017-2018

Variables	n	%
Lack of team training	256	61.1
High demand and workload	232	55.4
Lack of financial resources in the municipality	230	54.9
Lack of human resources in the Health Department	208	49.6
Lack of equipment such as computers, screens, etc.	198	47.3
Delay in the dissemination of health information generated by the State	161	38.4
Poorly-paid professionals in the municipality	159	37.9
Lack of support from the State healthcare reference bodies	157	37.5
Difficulty in the process of implementing new SIS	156	37.2
Lack of explanatory material on the use of health data and information	151	36.0
Inadequate physical structure	149	35.6
High turnover of professionals in the Health Department	138	32.9
Difficulty to have internet access at the Health Department	136	32.5
Personal difficulty in working with health data and information	126	30.1
Frequent changes and requirements related to the use and treatment of health data and information	126	30.1
Excessive bureaucracy of activities developed in the health department	125	29.8

The managers' difficulty in treating and analyzing health data and information was mentioned by 111 (26.5%) managers and the resistance of the health team to this same issue by 100 (23.9%) of them.

The main source of information reported was the use of Health Information Systems (SIS) available in PHC (94.7%), with epidemiological bulletins (80.7%), reports from the Ministry of Health (80.0%) and the State Health Secretariat (81.4%). Thus, we relate the use of this system to the production of data and information, its availability, analysis, use of health indicators and reports by management (Table 4).

Table 4. Distribution of the SIS data and information production considered useful by managers in the decision-making process in the municipalities of Minas Gerais. Brazil, 2017-2018

		Production of useful data by the SIS of PHC used in the decision-making process						
Variables		**No n= (2)**	**Yes n= (285)**	**Partly n = (132)**	**Total**	**Pearson's Chi-Square**	**df**	**P-value**
Production of health data and information in the PHC	Highly satisfactory	0.0%	23.9%	17.4%	21.7%	25.349	6	0.000
	Very satisfactory	0.0%	38.9%	27.3%	35.1%			
	Satisfactory	50.0%	33.0%	46.2%	37.2%			
	Unsatisfactory	50.0%	4.2%	9.1%	6.0%			
	Do not produce	0.0%	0.0%	0.0%	0.0%			
Availability of updated and real-time health data and information in the PHC	Very frequent	0.0%	28.1%	12.1%	22.9%	19.217	6	0.004
	Quite frequent	0.0%	39.6%	40.9%	39.9%			
	Regularly	50.0%	27.0%	38.6%	30.8%			
	Infrequent	50.0%	5.3%	8.3%	6.4%			
	Do not use	0.0%	0.0%	0.0%	0.0%			
Frequency of analysis of data and information in the PHC	Very frequent	0.0%	22.8%	6.1%	17.4%	21.684	6	0.001
	Quite frequent	100.0%	47.7%	50.0%	48.7%			
	Regularly	0.0%	26.0%	33.3%	28.2%			
	Infrequent	0.0%	3.5%	10.6%	5.7%			
	Do not use	0.0%	0.0%	0.0%	0.0%			
Use of the PHC health indicators for planning and decision-making	Very frequent	0.0%	29.5%	12.9%	24.1%	4.145	6	0.657
	Quite frequent	50.0%	45.6%	50.0%	47.0%			
	Regularly	50.0%	22.8%	28.8%	24.8%			
	Infrequent	0.0%	2.1%	8.3%	4.1%			
	Do not use	0.0%	0.0%	0.0%	0.0%			
Frequency of production of management reports in the PHC based on Health Information Systems	Very frequent	0.0%	17.5%	6.8%	14.1%	8.689	8	0.369
	Quite frequent	50.0%	42.1%	36.4%	40.3%			
	Regularly	0.0%	31.2%	43.9%	35.1%			
	Infrequent	50.0%	9.1%	12.9%	10.5%			
	Do not use	0.0%	0.0%	0.0%	0.0%			
	Total	100.0%	100.0%	100.0%	100.0%			

Table 5 shows the result of the logistic regression performed with the variables that were associated with the production of health data and information by the SIS.

There is a greater chance that health managers will produce useful data and information in real time by the SIS in their decision-making process, which have undergone partial training and have partly used DATASUS as a source of reliable data. The level of explanation of the model is 36.8% (Nagelkerk R square).

Table 5. Final logistic model for the production of data and information from the SIS considered useful by managers in the decision-making process in the municipalities of Minas Gerais. Brazil, 2017-2018

	B	S.E.	Wald	df	Sig.	Exp(B)
Availability of updated and real-time health data and information			9.297	3	,026	
Quite Frequent	2.104	,725	8.417	1	,004	8.199
Regularly	,413	,488	,718	1	,397	1.512
Infrequent	,481	,489	,966	1	,326	1.617
Existence of Training to develop skills related to the use of health data and information as a basis for planning and decision-making			23.637	2	,000	
Yes	-,807	,344	5.492	1	,019	0.446
Partly	1.221	,329	13.813	1	,000	3.391
DATASUS as a source of reliable data			61.834	2	,000	
Yes	1.005	,789	1.623	1	,203	2.732
Partly	2.061	,262	61.803	1	,000	7.853
Constantly	-,907	,470	3.728	1	,053	0.404

DISCUSSION

There are many barriers found in the country for the incorporation of information technologies and, for this reason, there is a long way to go. It is known that there is a relationship between the development of this area and the quality of healthcare services provided. Thus, problems such as infrastructure, the implementation of systems and the use of health information should be minimally mitigated[12,17].

With this still incipient scenario, there are limitations in using health data and information in the context of PHC. In general, they are produced and made available, however, it is perceived that little is used as a basis for the production of knowledge and decision-making[8] in health. This is probably due to the natural difficulty of dealing with the topic. There are several skills and competences to be consolidated in order to work with information and manage it ethically and with intellectual respect, in an organized manner, assessing its quality/reliability and qualifying users and professionals[18].

The SIS are important technological tools that, in addition to organizing data and generating information, support health management planning and decision-making in general. A SIS that works well, usually guarantees the production of reliable and timely information about the health status of its users and its determinants, thus providing the possibility to measure the performance of the health system in question[8,19].

There are not yet, effectively, defined standards that guarantee the use of the SIS in the decision-making process of health managers. In this study, reports of production, use, storage, analysis, production of indicators and reports by managers were observed. When developed by trained healthcare professionals inserted in a minimal infrastructure, the data help to qualify health care, professionals and improve the health status of the population[14]. The correct and updated data insertion and treatment of the systems generates health information that portrays the reality. The use

and optimization of the SIS favors the increased use of health data by professionals, users and the academic community in general. It is the role of the manager to monitor this use, aiming to guarantee the quality of these indicators, preventing these health systems from functioning only as a data repository [8,14]. The use of health indicators and information systems contribute to disease planning and control processes in healthcare services[20]. It should be noted that there are numerous epidemiological challenges in each region, the local socio-demographic and economic scenario[13] to plan and make the best decision.

However, there are some points that should not be ignored. The Ministry of Health's SIS are not the only systems operated by the municipalities. It was recently identified in a study that a considerable number of cities use private Health Information Systems called their own SIS[9]. These were incipient in terms of the same standards of interoperability and regulated health information, which even generated difficulties in exporting their health data to the ministerial base [9].

Other obstacles mentioned by the professionals were the difficulty to organize information in the healthcare service, excessive number of graphics, work overload, bureaucratization, weaknesses in the dissemination of results. In this scenario, it is understood that there may be losses in health assessment, impacting the decision-making process[13,21,22].

Another important aspect is the need to consider that the use of traditional management strategies associated with not using the SIS, deficit in the structure, inexperience and managerial unpreparedness, problems in accessing the internet, lack of human resources and various versions of software can distance the manager of understanding about the real health condition of the population[4,14,20].

In this perspective, PHC management needs to overcome the limits of superficiality and fragmentation and seek a level in which fundamental aspects such as adequate working conditions, people management policy, use/incorporation of technologies, multiprofessional work, permanent training and participatory planning are valued[22]. Associated with these prerogatives, planning and evaluation contribute to the organization of PHC, which are essential for quality management[22], as well as consistent health data and information.

Although some managers have been trained and/or qualified, this is still a weakness pointed out by professionals, due to the reduced number of qualifications for the use of the SIS[14]. It is essential that there is a strengthening of the information culture and that the use of information is consolidated as an important source of knowledge, in addition to its need for dissemination and reflection, making it possible to subsidize the decision-making process in the SUS[23]. In addition, adopting systemic actions capable of producing learning in the subjects involved, thus investing in qualification, consequently strengthening the practices of planning, regulation, monitoring and evaluation in an integrated manner[24]. It is clear that in order to enhance a quality PHC it is necessary to invest in permanent education at the same time as

strategies are developed to enhance financial, material and human investments [4].

The e-SUS AB strategy was the target of investigation since it is directly related to the theme, aiming at improving the work processes of the integration of information, management and qualification of health care in assistance[25]. The scenario of challenges of the SIS in PHC and health management applies to what is experienced in the strategy regarding interoperability, insufficient equipment, weaknesses in connectivity, misunderstanding about the software, resistance to technology and the possibility of a negative impact on the assistance provided. Some professionals have not yet recognized the e-SUS AB strategy systems as a tool for local planning and care management [26]. During the investigation period, the implementation was not yet consolidated despite the planning and incentive[26]. Despite the effort of the federal initiative, this process is complex, running through the availability of technology and infrastructure to put it into practice[9].

The size of the sample, the time frame for data collection, the modest number of studies on the topic were understood by the researchers as limiting factors. The continuity of this monitoring over the years associated with the quality of the healthcare services provided is something important to be discussed.

CONCLUSION

This study showed that the use of data and information in the decision-making process in PHC was presented as a practice instituted in the management process in the municipalities investigated. Managers reported producing, analyzing and using data via the SIS, in addition to generating health information guiding the municipal assistance process. Trained managers plan and make decisions based on data and information made available by the municipal Health Information System. Access to training and qualifications was an important condition for the exercise of the use of health information, even without considering the differences and the quality offered.

Old obstacles still remain. Perhaps the problems of infrastructure, financing, among others, associated with the complexity of health management and the multifactorial nature of causes do not favor substantial changes in some municipal health conditions. The emergence of new healthcare demands may require new investments, interdisciplinary practices and perhaps a little more dynamic management models. Seeking political-economic strategies that guarantee minimum resources and structures to develop and guarantee the practice of health information in management and invest in permanent education would enhance the improvement of healthcare resolution.

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