The impact of data inputting in the primary health care information systems related to the individuals and community care

Impacto das ações de alimentação dos sistemas de informação da atenção primária sobre a atenção aos indivíduos e comunidade

Impacto de las acciones de alimentación de los sistemas de información de la atención primaria sobre la atención a los individuos y la comunidad

Flávia Emília Cavalcante Valença Fernandes[1], Mayra Cavalcante do Nascimento[2], Palloma Lopes de Arruda[3], Rosana Alves de Melo[4]

ABSTRACT

Objective: The study's purpose has been to assess the influence of the data input actions in the information systems used in the primary health care with regards to nursing care towards the individual or community. **Methods**: It is a quantitative research that was performed with nurses engaged in the primary health care services. The tests of one-way ANOVA, Kruskal-Wallis and Spearman correlation with significance of 5% and 95% confidence were used. **Results**: The majority of the nurses were women (94.5%), 34.4 years old, 8.8 years of professional training, had specialization and fixed job position, and were also 7.6 years engaged in the primary health care services. A negative association ($p = 0.008$) was observed between time spent for system data input and patient care. **Conclusion**: The study points out the influence of the managerial actions focused to the information systems regarding the care provided to the individuals/community.
Descriptors: Brazilian unified health system, primary health care, information systems, public health.

RESUMO

Objetivo: Avaliar a influência das ações de alimentação dos Sistemas de Informação utilizados na Atenção Primária a Saúde (APS) sobre os cuidados de enfermagem ao indivíduo ou comunidade. **Método**: Pesquisa quantitativa, com enfermeiros da Atenção Primária. Utilizaram-se os testes ANOVA *one-way*, Kruskal-Wallis e correlação de Spearman com significância de 5% e confiança de 95%. **Resultados**: A maioria dos enfermeiros era mulher (94,5%), 34,4 anos de idade, 8,8 anos de formação, sendo 7,6 anos atuando na atenção primária, especialista e concursada. Observou-se associação negativa (p-valor = 0,008) entre tempo destinado às atividades de alimentação dos sistemas e o

1   Nursing Graduate by the *UPE*, MSc in Health Management and Economics by the *Universidade Federal de Pernambuco (UFPE)*, PhD student in Therapeutic Innovation by the *UFPE*, Assistant Professor at *UPE*.

2   Nursing Undergraduate by the *UPE*.

3   Nursing Graduate by the *UPE*.

4   Nursing Graduate by the *Universidade Estadual do Maranhão (UEMA)*, MSc in Nursing by the *Universidade Estadual de Feira de Santana (UEFS)*, PhD student in Therapeutic Innovation by the *UFPE*, Assistant Professor at *UNIVASF*.

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tempo de atenção aos pacientes. **Conclusão**: O estudo aponta a influência das ações gerenciais voltadas aos sistemas de informação sobre a atenção prestada aos indivíduos/comunidade.

Descritores: Sistema Único de Saúde, Atenção Primária a Saúde, Sistemas de Informação, Atenção à Saúde.

RESUMEN

Objetivo: Evaluar la influencia de las acciones de alimentación de los Sistemas de Información utilizados en la Atención Primaria a la Salud (APS) sobre los cuidados de enfermería al individuo o comunidad. **Método:** Investigación cuantitativa, con enfermeros de la Atención Primaria. Se utilizaron las pruebas ANOVA de una forma, Kruskal-Wallis y correlación de Spearman con significancia del 5% y confianza del 95%. **Los resultados:** La mayoría de los enfermeros eran mujeres (94,5%), 34,4 años de edad, 8,8 años de formación, siendo 7,6 años actuando en la atención primaria, especialista y concursada. Se observó asociación negativa (p-valor = 0,008) entre tiempo destinado a las actividades de alimentación de los sistemas y el tiempo de atención a los pacientes. **Conclusión:** El estudio apunta la influencia de las acciones gerenciales dirigidas a los sistemas de información sobre la atención prestada a los individuos / comunidad.

Descriptores: Sistema Único de Salud, Atención Primaria a la Salud, Sistemas de Información, Atención a la Salud.

INTRODUCTION

Basic Health Care (BHC) integrates a service mode aimed at the user and management, with health actions aimed at promotion and prevention, and in this perspective, the National Primary Care Policy universal access and the provision of humanized care, as guiding pillars of the actions developed at this level of care. Therefore, BHC is the gateway to the health system and should be the authorizing officer of the existing Health Care Networks.[1,2]

The organization of primary health services through the Family Health Strategy (FHS) prioritizes actions for health promotion, protection, and recovery in an integral and continuous way.[3] In this field, nurses stand out for their interactive and associative, for understanding the human being in a holistic way, becoming more relevant when it provides the integrality of care with reception, conduct, and identification of the needs and expectations of individuals. This professional has the capacity to interact directly with the user and the community, highlighting the ability to promote dialogue between users and the family health team.[4]

The various actions developed by professionals in Primary Health Care (PHC) become the starting point of the information chain to be inserted in the Health Information Systems (HIS) in the *Sistema Único de Saúde (SUS)* [Brazilian Unified Health System]. This information is a fundamental input for management and teaching and can act as a tool to guide decision-making and knowledge production with HIS as its main tool. These systems can be defined as a set of interrelated components that collect, process, store and distribute information.[5,6]

In Brazil, the HIS have been developed and implemented since the 1970s in order to computerize their data, improve the reliability of information and support the planning and management processes in *SUS*.[7] Nevertheless, a number of difficulties and criticisms are pointed out by researchers and professionals, especially on the construction of these in isolation and in different areas and not through a broader strategy that considers the health sector in its entirety. This has led to fragmentation and redundancy in the production of health information.[8]

In this sense, the Health Ministry proposed a restructuring of the Basic Care Information System. The new Health Information System for Basic Health Care (HISBHC), with the e-*SUS* BHC Strategy, has a perspective of improving the quality of information and better use of health information by managers and professionals at PHC. The proposed new system attends to the different scenarios of computerization and connectivity in health units of BHC.[9]

Considering the diversity of actions and services provided by health professionals in the scope of their professional activities, computerization is configured as an improvement in the availability of records and, consequently, of management activities. Nonetheless, in spite of the prospect of meeting specific needs, the registration of information through this form of system data inputting is presenting repetition of information, then distancing itself from the integration of information and favoring the loss of important data in providing user service.[6]

Given the aforementioned scenario, this article aimed to assess the influence of the data input actions in the information systems used in the primary health care with regards to nursing care towards the individual or community.

METHODS

It is an exploratory study with a quantitative approach. The research was carried out with nurses engaged in the primary health care services from both the urban and rural areas of *Petrolina* city, *Pernambuco* State.

The selection of the target population was used through the database of the National Registry of Health Establishments, where 41 Basic Health Units (BHU) are registered, including the urban and rural area of the municipality. All 88 nurses enrolled in the Family Health Strategy (FHS) and Community Health Agents Strategy teams were invited to participate in the system. The sample consisted of the professionals who accepted to participate in the research and signed the Free and Informed Consent Form totaling 41 professionals. Professionals who were on leave or leave during the collection period were excluded.

Semi-structured interviews were conducted with questions related to the nurse's profile, such as socio-demographic and economic variables: gender, age (in years), income (in Real currency), professional lifetime (in years), specialization in Public Health or related areas), professional engagement in the (in years). Variables related to the data inputting actions of the PHC Information Systems in the Basic Health Unit (BHU): how to feed the information systems used in the PHC (manually, computerized or both), the average time used to fill record of HIS during one day and during one week, average time spent in monthly consolidation of systems registration

forms/instruments, average time spent in direct attention to the individual and/or collective during one day and during one week, difficulties encountered in completing of the instruments/forms.

Categorical variables were analyzed using descriptive and analytical statistics. The categorical variables were presented according to the descriptive statistics with the respective 95% confidence intervals for the proportion assuming binomial distribution. Continuous variables were presented in their mean values with the standard deviation and 95% confidence interval for the mean. The association between the HIS data input method (manually, computerized or both ways) and temporal variables were tested using ANOVA (one-way ANOVA) when they presented a normal distribution using the Shapiro-Wilk test ($p > 0.05$) and by the Kruskal-Wallis test when the normality of the distribution was not characterized ($p < 0.05$). Four observations after outlier verification were excluded by means of a box plot chart, finalizing the sample in 37 observations. The strength of the association was tested by the Spearman correlation coefficient and the rho value and signal were presented as well as the p-value. For all tests, the significance level of 5% and 95% confidence were adopted.

The data were tabulated in the Microsoft Office Excel 2013 Program and the statistical treatment of the data was performed by Stata 12.0 software. The research was submitted to the Ethics Committee in Research with Human Beings of the *Universidade de Pernambuco* with *Certificado de Apresentação para Apreciação Ética (CAAE)* [Certificate of Presentation for Ethical Appraisal] No. 51043015.0.0000.5207. The research was conducted according to the Resolution No. 466/12 from the National Health Council.[10]

RESULTS

A total of 37 PHC professionals were interviewed, of which 94.5% were female, with an average age of 34.4 years old, had about 8.8 years of professional training, with 7.6 years working in basic care, with an income of R$3,645.40. Among these nurses 67.5% had specialization and 64.9% fixed job position. When questioned if they worked in another area of nursing, only 24.3% of the professionals exposed another professional relationship, most of them in the hospital area (**Table 1**).

Table 1 - Distribution of both socio-demographic and economic characteristics of the PHC professionals. *Petrolina* city. 2016.

	Average (SD)	CI95%*	
Age	34.4 (7.0)	32.0	36.7
Professional lifetime (in years)	8.8 (4.7)	7.2	10.4
Professional engagement in the PHC (in years)	7.6 (5.0)	5.9	9.3
Income (R$)	3645.4 (1023.2)	3304.2	3986.5

	Average (SD)		CI95%*	
Sex	**n**	**%**	**CI95%****	
Female	35	94.6	87.0	102.2
Male	2	5.4	-2.2	13.0
Specialization in PHC or related areas				
No	12	32.4	16.6	48.3
Yes	25	67.6	51.7	83.4
Professional relationship in the PHC				
Hired	13	35.1	19.0	51.3
Fixed job position	24	64.9	48.7	81.0
Do you have any other professional relationship				
No	28	75.7	61.2	90.2
Yes	9	24.3	9.8	38.8
Area of the other professional relationship				
Public Health/ Administrative	2	22.2	-11.7	56.1
Professor/Education	3	33.3	-5.1	71.8
Hospital	4	44.4	3.9	85.0

*CI95% - Confidence Interval for the average
**CI95% - Confidence Interval assuming binomial distribution

Concerning the time taken to complete the recording instruments and/or information systems per day, it was observed that professionals use, on average, 2.4 hours. The average time for direct attention to the individual or community was 4.4 hours. During the week this time increases to 11.6 and 22.7 hours, respectively. The time spent in the monthly consolidation of the instruments showed an average of 2.4 days. Regarding the way the systems were fed into the units, most (21) still occurred manually (**Table 2**).

Table 2 - Time spent with the individual and HIS data input in the PHC and the input methods. *Petrolina* city. 2016.

	Average	SD	CI95%*	
Monthly consolidation time of instruments (in days)	2.4	2.0	1.7	3.0
Caring time to the individual/community (during the week in hours)	22.7	9.9	19.4	26.0
Caring time to the individual/community (during the day in hours)	4.4	1.9	3.8	5.1
System data input time (during the week in hours)	11.6	6.5	9.4	13.7
System data input time (during the day in hours)	2.4	1.5	1.9	2.9
Input method	**n**	**%**	**CI95%****	
Manually	21	56.8	40.0	73.5
Computerized	13	35.1	19.0	51.3
Both ways	3	8.1	-1.1	17.3

*CI95% - Confidence Interval for the average
**CI95% - Confidence Interval assuming binomial distribution

A significant negative association was observed (Spearman's rho = -0.432, $p = 0.008$), indicating that the greater the duration of an instrument and/or system filling and the care provided to the patient or community during the day, time required for HIS data input activities, shorter patient care time. Nevertheless, there was no statistically significant difference between the way the system was fed

at the BHU and the time taken to answer the user or the time spent with the filling activities ($p > 0.05$) (**Table 3**)

Table 3 - Characterization of the time spent with the care provided to the individual and the data input of the Information Systems used in the PHC according to the input method. *Petrolina* city. 2016.

		Manually	Both ways	Compu- terized	p-value
Caring time to the individual/ community (during the week in hours)	**Average**	23.8	26.7	20.0	0.075*
	CI95%	20.6	8.8	13.0	
		27.0	44.6	27.0	
Caring time to the individual/ community (during the day in hours)	**Average**	4.6	6.0	3.8	0.679*
	CI95%	3.8	3.7	2.6	
		5.3	8.3	5.0	
System data input time (during the week in hours)	**Average**	11.1	13.3	12.0	0.956*
	CI95%	8.2	6.6	8.1	
		14.0	20.1	15.8	
System data input time (during the day in hours)	**Average**	2.5	2.7	2.3	0.605*
	CI95%	1.8	1.3	1.6	
		3.2	4.0	3.0	
Monthly consolidation time (in days)	**Average**	2.4	1.7	2.4	0.7818**
	CI95%	1.4	0.3	1.4	
		3.4	3.0	3.4	

*One-way ANOVA test
**Kruskal-Wallis test

DISCUSSION

The present study showed that the nurses who work at PHC are mostly women, young and experienced in PHC, possessing specializations and associated to the service through a public tender.

Similar results were found in a study carried out in the *Serra* city, *Espírito Santo* State, Brazil, which aimed to identify the profile of professionals in the family health strategy (FHS), where it was evidenced that nurses were predominantly female (84.4%), had an average age of 41.2 years old, had specialization and/or full residence (93.8%) and entered the FHS through a public tender (90.6%). Most professionals (71.9%) also had prior experience in FHS.[11]

The investigation of the nurse-oriented theme is related to the role of this PHC professional for both care and management activities. In this perspective, the forms of action, skills, initiatives, and competencies, especially in the planning of actions, directs the professional's action also towards the integrality of care that involves the expanded view of the health-disease process, based on the health needs of the population.[11,12]

The first level of assistance is capable of promoting the link between professionals and users, enabling the stimulation of self-care, improving understanding of the disease and co-responsibility for treatment, and promoting a qualification of care focused on humanized practices.[13] host technology can be considered as a reform in work

processes and in the relationship between professionals and users, being strongly related to good communication, tending to solve problems and favoring the continuity and effectiveness of care.[3] When this process is carried out by professionals able to listen actively and qualified to their demands, enables autonomy, citizenship, and co-responsibility in the production of health care.[14]

The professional of the nursing team plays an important role in the HIS data inputting, and then acting in the assistance and management of the BHU. The mandatory monthly and systematic data inputting are established for Municipalities, States and the Federal District, according to the Administrative Rule No. 3.462, dated November 11th, 2010. This ordinance establishes criteria for feeding the HIS National Databases.[15]

Herein, an average time of attention to the individual/ community was higher than that assigned to the data inputting actions of the systems, considering that despite the mandatory data input of the systems, management actions should not overlap the attention given to patients. Considering the way in which the systems were filled, it was also necessary to fill in registration instruments manually, followed by computerized ones.

In spite of the non-influence of the data inputting method (manually, computerized or both ways) on the time of attention to the individuals/community or HIS data inputting, it was verified that the time devoted to the provision of assistance to the individual or community activities decreases as which increases the dedication to completing the instruments. Despite the advantages presented by the computerized process, this fact can influence the quality of the care provided by the professional in the PHC.

The municipality of Petrolina, during the research period, was in the process of computerizing the PHC network as a way of implementing and implementing the new HISBHC through the e-*SUS* BHC Strategy and the implementation of the Electronic Medical Record (EMR). Thus, some units were still in the adaptation phase, both with the handling of the new system and with the installation of this system. This fact may be related to the non-significance evidenced in the difference of the time spent and the forms of data input. However, the computerized data input can bring to the professional a greater comfort in their daily activities besides reduction of possible errors in the primary registry of the data, especially with regard to the codifications needed in certain systems used in the PHC.

Considering the various information technologies, the EMR presents an innovative perspective for improving the quality of information, as well as making it possible to correct existing fragilities in national HIS, which involve the non-payment of incipient information and interoperability. All this comes from the search to obtain a model that promotes greater integration between information, both outpatient and inpatient, being the most current health model sought by the countries.[6]

The nurses and their nursing team at all times, in their care practices, feed the databases of the HIS, through the procedures of Nursing, Nursing consultation, home visit, team meeting or educational practice. Health communication and information are daily present in nursing know-how, as well as performing the nursing records in the EMR.[16]

A study that sought to identify the experience of nurses with computers in primary care concluded that the use of this device by nursing professionals is a tool already incorporated in the work process,[17] showing a reality and a tendency in the formulation of public policies.

In November 2016, the Tripartite Interagency Committee published Resolution establishing the electronic medical record as an information model for recording health actions in basic care. It defines the electronic medical record as a repository of electronic information, where all health, clinical and administrative information, throughout an individual's life, is then stored. Furthermore, its main characteristics include, among others, rapid access to health problems and interventions and the retrieval of clinical information.[18]

In addition to establishing the electronic medical record, the National Health Information and Informatics Policy presents, among others, the improvement of quality and access to the Brazilian health system and the support of information for decision making by the manager and professional of health as some of the guiding principles and guidelines of an institutional organization. The establishment of these principles may favor efficiency gains in SUS management since it will allow a reduction in the number of existing health information systems or their simplification, among other actions.[19]

FINAL CONSIDERATIONS

In the present study, there was a prevalence of young nurses, with a broad-based qualification, stable employment relationship and at the same time experienced in PHC. There was a significant inversely proportional relationship between the time elapsed in the filling of PHC registration information instruments and the attention paid by professionals indicating the influence of administrative activities with regards to the care actions.

The form of systems' data input, either manually, computerized or even both ways, did not present a statistically significant relationship with the temporal variables in the present study. The process of transition of the information system and the data input method in the PHC brings important changes in the activities carried out by professionals, especially for nurses. Nevertheless, it can also be a limiting factor in the evaluation of the impact of managerial actions, among them the registration of information in the systems, towards the care provided to the individual or community.

It is understood that, even with all the importance of the system data input, there may be interference and injury of the assistance, considering that it can divert the professional's attention only to the bureaucratic part. Hence, computerization in PHC and improvement in the new information systems, associated to the provision of a complete assistance to the user of the service, might lead to a new moment in the delivery of health care.

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Corresponding author
Flávia Emília Cavalcante Valença Fernandes
Address: Rodovia BR 203, Km 2, s/n - Vila Eduardo,
Petrolina, Pernambuco, Brazil
Zip Code: 56.328-903
E-mail address: flavia.fernandes@upe.br
Telephone number: +55 (87) 3866-6470

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