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Dissemination of the Electronic Citizen's Record: a case study in Minas Gerais

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Dissemination of the Electronic Citizen's Record: a case study in Minas Gerais
Difusión del Registro Ciudadano Electrónico: estudio de caso en Minas Gerais

RESUMO

Objetivo: analisar processo de difusão do Prontuário Eletrônico do Cidadão no trabalho de equipes de saúde da família. Métodos: estudo de caso único holístico, de abordagem qualitativa, à luz da teoria de difusão da inovação. Dados coletados entre março e maio de 2021, em sete equipes de saúde da família de um município de Minas Gerais. Foram entrevistados 31 profissionais de saúde e 3 informantes chave envolvidos com a implantação e utilização da tecnologia, aplicado questionário sociodemográfico e observações diretas do cotidiano de trabalho. A análise dos dados foi a partir da Análise de Conteúdo e com auxílio do software MAXQDA. Resultados: verificamos que a difusão da inovação avaliada apresentou vantagens em comparação com a tecnologia anteriormente utilizada no município, apresentando também (in)compatibilidades e complexidades em seu processo de difusão. Conclusão: a difusão do Prontuário Eletrônico do Cidadão depende de fortalecimento de sua compatibilidade ao trabalho e desenvolvimento da percepção de seu uso vantajoso.

DESCRITORES: Difusão de Inovações; Atenção Primária a Saúde; Prontuário Eletrônico; Sistema de Informação em Saúde; Informação em Saúde.

ABSTRACT

Objective:analyzed the process of dissemination of the Electronic Citizen's Record in the work of professionals from family health teams. Methods: a single holistic case study, with a qualitative approach, in the light of the innovation diffusion theory. Data collected between March and May 2021, in seven family health teams in a municipality in Minas Gerais. We interviewed 31 health professionals and 3 key informants involved with the implementation and use of technology, applied a sociodemographic questionnaire and carried out direct observations of daily work. Data analysis was based on Content Analysis and with the help of the MAXQDA software. we verified that the diffusion of the evaluated innovation presented advantages compared to the technology previously used in the city, also presenting (in)compatibilities and complexities in its diffusion process. and development of the perception of its beneficial use.

DESCRIPTORS: Diffusion of Innovations; Primary Health Care; Electronic Medical Record; Health Information System; Health Information

RESUMEN

Objetivo: analizar el proceso de difusión del Registro Ciudadano Electrónico en el trabajo de los profesionales de los equipos de salud de la familia. Métodos: estudio de caso único, holístico, con enfoque cualitativo, a la luz de la teoría de la difusión de la innovación. Datos recolectados entre marzo y mayo de 2021, en siete equipos de salud familiar de un municipio de Minas Gerais. Entrevistamos a 31 profesionales de la salud y 3 informantes clave involucrados con la implementación y uso de la tecnología, aplicamos un cuestionario sociodemográfico y realizamos observaciones directas del trabajo diario. El análisis de datos se basó en el análisis de contenido y con la ayuda del software MAXQDA. comprobamos que la difusión de la innovación evaluada presenta ventajas frente a la tecnología previamente utilizada en la ciudad, presentando también (in)compatibilidades y complejidades en su proceso de difusión. y desarrollo de la percepción de su uso beneficioso

DESCRIPTORES: Difusión de Innovaciones; Primeros auxilios; Historial médico electrónico; Sistema de información sanitaria; Información de salud

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INTRODUCTION

The e-SUS Primary Care Strategy (e-SUS AB), launched in 2013, aims at the qualified computerization of the Unified Health System (SUS) in search of an "electronic SUS". 1 To this end, it uses the implementation of technological innovations such as the Citizen's Electronic Health Record (PEC - Prontuário Eletrônico do Cidadão), seeking the qualified management of information arising from the work process in the context of Primary Health Care (PHC). PEC is the software that operates as an online repository where clinical and administrative patient information can be managed. 2

The e-SUS Primary Care Strategy (e-SUS AB), launched in 2013, is a resource that meets the SUS qualified computerization process in search of an "electronic SUS". 1,2 The Citizen's Electronic Health Record (PEC), as a modality of the e-SUS, is a software that operates as an online repository where all the patient's health, clinical and administrative information are stored. 1,2 In a study carried out in the southern region of Brazil, it was evidenced that the use of PEC contributes to care management, decision-making and work planning for PHC nurses. 3

The incorporation of the PEC represents possibilities for qualification and advancement in the use of information in PHC, and, in addition, implies structural changes in the ideas and practice of pro-

> **The e-SUS Primary Care Strategy (e-SUS AB), launched in 2013, is a resource that meets the SUS qualified computerization process in search of an "electronic SUS". 1,2 The Citizen's Electronic Health Record (PEC) [...]**

fessionals and users of health services, thus becoming an innovation. 3,5,6,7,8 Corroborating this thought, the technological resources used in Primary and Supplementary Health Care expand and interconnect its principles, seeking resolute, qualified, practical and accessible solutions for the real needs of this segment. 4

However, the PEC as an innovation needs to be evaluated in order to enhance its adoption, improvement and related processes when implementing technologies in the daily work in health. It is known that the evaluation of the innovation diffusion process is crucial for the success or failure of its implementation and incorporation into daily life. 8 Therefore, the Diffusion of Innovations Theory (IDT) is an important reference for guiding the evaluation of the innovation diffusion process. 9

In Brazil, studies conducted in the light of DIT provided instruments for investigations in several areas of knowledge, but in health, its use is still timid when compared to its use around the world. 9 Thus, the process of diffusion of an innovation is crucial and determinant for its adoption or rejection by individuals/adopters. Although protocols, hard technologies (software) and programs are presented to health professionals, they decide what will actually be used and how to use it. 10,11,5,7

This study is justified by the need to better understand the process of disseminating the PEC as a national ministerial strategy with repercussions on the daily work of he-

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alth professionals and on the production of health information in and for PHC. It is assumed that health work in PHC is affected by the incorporation of hard technologies such as PEC, favoring negative perceptions from the use of software, resistance to technology and its underutilization, as well as the precariousness of work relationships.

Therefore, the way in which PEC has been disseminated among health professionals can generate a favorable environment for negative aspects to be captured/perceived to the detriment of positive ones. Resistance to technology, the modus operandi of its use, its repercussions and emerging challenges are complex aspects to be understood. However, for this research, the guiding question was defined: How has the PEC been disseminated in the daily work of family health teams (FHS)?

Thus, we sought to analyze the process of diffusion of the PEC in the daily work of professionals from family health teams in the light of the Theory of Diffusion of Innovations.

METHOD

It is a single holistic case study, with a qualitative approach, in the light of DIT. The single case study is justified due to the need to investigate a contemporary phenomenon, the diffusion of an innovation (the PEC), in depth and in its real context. 12 The use of DIT 7 is justified by the need to investigate the process of diffusion of an innovation from its elements and attributes, as described in Table 1.

The present study intends to analyze the diffusion of PEC in the daily work of family health teams, and for that, the ideal scenario for apprehending the phenomenon is where the same happens. 12 It is noteworthy that the setting of the scenario took place during the COVID-19 pandemic, a fact that restricted access to municipalities in compliance with the restrictions recommended by the Minas Consciente Program. 13 However, after the appropriate approvals by the municipality and respecting the sanitary protocols, it was decided to maintain the face-to-face collection due to the need to apprehend the adopters' perception associated with the observation of aspects in the daily work that cannot be captured only by the interview.

In the meantime, data collection was carried out between April and June 2021, in a city in the Expanded Health Region - West of Minas Gerais, intentionally chosen, which we called "A" to ensure anonymity. Study participants were 31 FHS health professionals (doctors, nurses and community health agents - CHA) according to the following inclusion criteria: being an FHS professional; be using PEC during the data collection period; have more than 06 months of use of the PEC to record the attendance to the population. The exclusion criterion was being absent on vacation or sick leave during the data collection period. During the study, 3 key informants from the Municipal Health Department were included, holders of strategic information for the implementation/operationalization of the PEC. Thus, this study had 34 participants in total.

Data were obtained through a questionnaire to characterize the participants, an interview guided by a semi-structured script and direct observation in the study setting. The variables of the questionnaire were: profession, position held, age, education, graduation, working time in the PHC.

Table 1 - Elements and Attributes of the Diffusion of Innovations Theory		
ELEMENTS		
Innovation: (is an idea or practice perceived as new by future adopters)	**ATTRIBUTES**	**Relative Advantage:** Perception that the use of innovation is advantageous, better than previous practices **Compatibility:** Perception that the innovation is consistent with the values, past experiences, and needs of the adopters. **Complexity:** Perception that using and understanding the innovation is considered difficult. **Trial:** Period in which the innovation is tried/tested before its effective implementation. **Observability:** Perceptions about the results, visible effects of innovation in everyday life.
Communication channels	**Concept:** Channels in which messages/information about innovation circulate among individuals or groups of the same social system, considering its nature.	
Time	**Concept:** The dimension of time between contact with the innovation and the decision to accept or reject it.	
Social System	**Concept:** Interrelated units with similar goals. The members or unit of a social system can be individuals, informal groups or organizations.	
Source: Prepared by the authors, 2021.		

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The data collected from the interviews and observations were submitted to Content Analysis, Thematic-Categorial modality, from three phases: pre-analysis; exploration of the material and treatment of the results; inference and interpretation. 14,15

In the pre-analysis, a floating reading of all the material was carried out in the first contact with the text to be analyzed and a more precise alignment with the objectives of the study (interviews and field diary), organization of the material and preparation to transform the raw data into analysis material. The codes were regrouped according to the theme they referred to, listing the themes identified, building the categories, which were analyzed through the formulation of inferences and interpretations derived mainly from the researcher's capture.

The methodological procedures adopted in this study complied with the National Health Council Resolutions 510/2016 and 262/2012. The research was approved by the Ethics Committee in Research with Human Beings of the Federal University of Minas Gerais – opinion nº 4,770,276 and Federal University of São João Del Rei – opinion nº 4,662,362. The Free and Informed Consent Term (FICF) in writing was applied to all participants (interviewed and directly observed), guaranteeing the confidentiality, anonymity and privacy of the participants.

RESULTS AND DISCUSSIONS

The profile of the participants revealed the predominance of the female gender, with 91.18% (n=31) and 70.59% (n=24) who are public employees under the statutory regime. The average time of work in the health area was 10.79 years and the average time of experience in a family health unit was 6.13 years. Regarding the workload, 94.12% (32) declared a 40-hour work week with the FHS .

The diffusion of the PEC favored by the perception of relative advantage and observability

In the scenario under study, prior to the implementation of the PEC, there was already another information system, "VIVER", an outsourced technology used to manage the information arising from daily work:

> **"Because of the inconsistencies, because of the ease, sometimes the system is down, sometimes you need to consult something... I prefer to keep both" (E09NUR02)**

> *"in October 2019, a team came here to be able to make the transition, right? From VIVER to e-SUS, PEC (...) And then we migrated [referring to the PEC]." (E09ENF02).*

For professionals: "(...) VIVER lacked a lot.

> *"We are tidying up the records, it's much better" (E18ACS03).*

Another interviewee endorses the advantage of using the PEC:

> *"(...) I think it has improved compared to before, when it was VIVER. I like this new proposal from the PEC (...) I think the electronic medical record is a gain." (E01ENF01).*

However, the incorporation of the PEC in the daily life of the FHS has not represented, so far, a complete rupture with the other forms of paper registration usual in the units, and that in a certain way provide the development of the perception of the need to continue its use. In this sense, it is recognized that it is more advantageous to continue using paper in parallel with the use of technology (PEC), even if the technological artifact represents an innovation. One of the interviewees explains the use of PEC concomitantly with the use of paper:

> *"Because of the inconsistencies, because of the ease, sometimes the system is down, sometimes you need to consult something... I prefer to keep both" (E09NUR02).*

Another interviewee also acknowledged:

> *"I started with the paper, but later, I made the effort and adapted (...) now I'm already integrated (...) now I go alone [referring to the use of PEC]. (E03MED01)*

To Rogers, 7 the acceptance of an innovation depends on developing the perception that there is a relative advantage in using it over the previous one. Thus, the need for a new electronic medical record was recognized due to the fact that VIVER

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presents inconsistencies and is no longer compatible with the professionals' work reality. However, maximizing the acceptance of the PEC depends on developing a perception that its use can be independent of the paper record. The purpose of implementing the PEC across the country is to favor the complete replacement of paper for recording information in the daily work of the FHS. 16,17 In addition, it is known that the use of paper to record information in the context of health organizations is a practice that is not fully aligned with patient safety and the difficulties related to local planning and qualified decision-making. 18,19

Respondents noted benefits of adopting PEC (observability) in everyday work, which strengthened the development of the perception of the relative advantage of PEC over previous technology. It was recognized that the PEC benefits from the systematization of information registration:

> "Sometimes I would see the patient and there would be that pile of medical records to evolve. Now with the PEC, I try to make an effort to provide that service on time" (E01ENF01).

> "(...) I think it's very complete, you want a certificate, a prescription, a list of medications, a certificate of attendance, a referral. Everything is here." (E07DEN01).

As highlighted by Rogers, 7 potential adopters of an innovation need to see positive results from its use. This is essential for the qualified diffusion of an innovation. It is not enough just to perceive that the current innovation is advantageous in relation to the previous one, it is necessary that its contributions to the work are apparent and with transformations on the daily practices. 9

The (in)compatibilities, complexities and communication channels in the social system influencing the diffusion of innova-tion

Some interviewees highlighted the need to summarize some information in the

> "Sometimes I would
> see the patient and
> there would be
> that pile of medical
> records to evolve.
> Now with the PEC,
> I try to make an
> effort to provide
> that service on time"
> (E01ENF01)

PEC, claiming that it is extensive, which refers to part of its (in)compatibilities and complexities:

> "I would change in relation to the

structuring of the anamnesis, I know they used the SOAP method. It is very extensive (...) it takes time, difficult to use" (E08MED02).

Innovation could also have improved your information retrieval process:

> "The system needs to improve in this sense so that we can monitor what we have done through reports, more filters, in order to search for things" (E01ENF01).

In addition to the need to integrate information between the points of the care network:

> "you throw it here, send it to the emergency room, and they don't send the counter-reference in the system" (E03MED01).

The need to optimize time and work overload are situations that justify, from the perspective of professionals, adaptations in the use of PEC, minimizing the complexity of its use. In relation to the doctor, for example, we observed the organization of his schedule to attend 14 appointments in the morning and another 14 in the afternoon. Thus, in 8 hours of work, the medical professional must attend to 28 users, and with subsequent registration in the physical and electronic medical records [NO].

> This makes it difficult to record the immediate care, such dynamics (mainly of doctors and nurses) finds in the PEC other possibilities of registration, in the so-called "late registration". (E01ENF01)

We also verified professionals, who, by habit, maintain practices that can become obstacles to the adoption of innovation, increasing the complexity of its adoption:

> "I record everything in the physical file because I haven't lost the habit (...) I'm very attached to old things. I register in the electronic medical

record only at the end of the day." (E12MED03)

In one scene, we observed a doctor and two nurses confessing to register "only a few" of the consultations, in addition to choosing to "put" "only what is necessary" in the system, due to the work overload. They understand that the PEC is still mandatory, its adoption is controversial and complex [NO].

Compatibility for Rogers [7] it is related to the meaning attributed to the work and the unique particularities of those who perform it. Although technological incorporation is, at first sight, related to standardization and the need to capture the work, the process of diffusion of an innovation goes beyond that. The uniqueness of each professional must be considered in the diffusion process through the compatibility of the innovation with the adopter's needs, referring to the dynamic and flexible character that welcomes the praxis of the worker/adopter. Compatibility in this sense is related to the (re)signification of the innovation, making it less complex for the adopter. In this sense, the complexity oscillates between presence and absence, which can be described as a coming and going of movements between the actors involved. Thus, the perceived difficulties are overcome and as the adopter appropriates the innovation. [7]

As described by Rogers, [7] there are specific challenges in the diffusion of software-related innovations due to the immaterial nature that involves them, however, the use of means of dissemination/mass communication can favor familiarity and successful adoption. The recognition of these communication channels emerged in the speeches as contributing elements to the adoption of the PEC, reducing their incompatibilities and mitigating their complexities:

"I joined the PEC tutorial to see how we filled it in (...) it cleared my doubts and everything. Because sometimes I didn't fill in all the topics I had to fill in." (E07DEN01)

Thus, the accessibility of information about the PEC was linked to the mobilization among people, through communication channels, in the social system, favoring the dissemination in order to mitigate its complexities. Communication channels determine how information is received by adopters and how it circulates among the others involved, helping to persuade and decide to accept the technology. [20,21,7]

CONCLUSION

In this study, we sought to analyze the process of diffusion of PEC in the daily work of professionals from family health teams in the light of the Theory of Diffusion of Innovations. We verified that the dissemination of the PEC is favored by the development of the perception of its advantages to the detriment of the previous technology, but also as an innovation that already allows the observation of results on the daily work, mainly improving the management of information in the context of PHC. (In)compatibilities and complexities were also present in the diffusion of the PEC, but they were minimized from the existing communication channels in the social system constituted by the mobilization of actors that somehow influenced the diffusion of innovation. As limitations of this study, we highlight the context in which the data were collected, the period of the COVID-19 pandemic, influencing the researcher's observation time in the units, as well as the development of some interviews.

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