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Use of information and communication technologies by Family Health Extended Centers

Utilização das tecnologias de informação e comunicação pelos núcleos ampliados de saúde da família

Uso de tecnologías de información y comunicación por los Núcleos Ampliados de Salud de la Familia

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Abstract: Objective: To analyze the use of information and communication technologies by Family Health Extended Centers and to reflect on their potential for care. **Method**: study of mixed methods, with a quantitative sample of 359 professionals from the nuclei, in 149 municipalities, with survey application, and qualitative step comprising focus groups with five teams, 43 from the nuclei. Data was collected between May and November 2017 and treated according to descriptive statistical approach and thematic analysis. **Results**: Among technologies, electronic medical records and dialogue between professionals of the Family Health teams and the nuclei are highlighted. Dialogue with community agents is frequent, but there is little participation of health leaders and counselors. **Conclusion**: Despite the advances, the use of technologies still does not reach its full potential for care, and one must stimulate dialogue among teams, the use of territory map and social participation.
Descriptors: Primary Health Care; Technological development; Access to health services; Health services administration; Nursing

Resumo: Objetivo: analisar a utilização das tecnologias de informação e comunicação pelos Núcleos Ampliados de Saúde da Família e refletir sobre seu potencial para o cuidado. **Método:** estudo de métodos mistos, com amostra quantitativa de 359 profissionais dos Núcleos, em 149 municípios, mediante aplicação de *Survey*, e etapa qualitativa por grupos focais com cinco equipes, 43 nasfianos. Dados coletados entre maio e novembro de 2017 e tratados conforme abordagem estatística descritiva e análise temática. **Resultados:** dentre as tecnologias, destacam-se os prontuários eletrônicos e o diálogo entre os profissionais das equipes de Saúde da Família com os nasfianos. O

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agente comunitário é acionado com frequência de diálogo, porém há reduzida participação de lideranças e conselheiros de saúde. **Conclusão:** apesar dos avanços, a utilização das tecnologias ainda não atinge todo o seu potencial para o cuidado, sendo necessário estimular o diálogo entre equipes, a utilização do mapa do território e a participação social.
Descritores: Atenção primária à saúde; Desenvolvimento tecnológico; Acesso aos serviços de saúde; Administração de serviços de saúde; Enfermagem

Resumen: **Objetivo**: analizar uso de tecnologías de información y comunicación de Núcleos Ampliados de Salud de la Familia y reflexionar sobre su potencial de atención. **Método**: estudio de métodos mixtos, muestra cuantitativa de 359 profesionales de los Núcleos en 149 municipios, mediante aplicación de encuesta, y etapa cualitativa con grupos focales en cinco equipos, 43 del Núcleo. Datos recopilados entre mayo y noviembre de 2017 y tratados según enfoque estadístico descriptivo y análisis temático. **Resultados**: Entre las tecnologías, destacamos registros médicos electrónicos y diálogo entre profesionales de los equipos de Salud de la Familia y los del Núcleo. Diálogo con agentes comunitarios es frecuente, pero hay poca participación de líderes y consejeros de salud. **Conclusión**: a pesar de los avances, el uso de tecnologías aún no alcanza su máximo potencial para la atención; es necesario estimular el diálogo entre equipos, el uso del mapa del territorio y la participación social.
Descriptores: Atención primaria de salud; Desarrollo tecnológico; Acceso a servicios de salud; Administración de servicios de salud; Enfermería

Introduction

Health information and communication technologies (ICTs) are tools used to improve information processes and storage – for example, computer systems. In Primary Health Care (PHC), resources such as electronic medical records are gaining prominence and investment at the international level. This type of ICT directly interferes with the quality of the user interface and integration with external systems, impacting the efficiency of communication and coordination of care in clinical practice, with results for chronic patients.[1] Integrated and timely information are tools that subsidize decision-making processes and qualify attention beyond the care focus; in this sense, team dialogue also operates as a technological device.[2]

The process of incorporating ICTs, especially in PHC, has advanced significantly, and their availability and use are key to promoting safer care. The federal government, through the Ministry of Health (MOH), has made important efforts for PHC teams to use information systems to qualify management and care work processes, as they provide new interpretations of events and phenomena, besides assisting in the preparation of planning and autonomy for the

formulation and implementation of public policies and comprehensive and longitudinal care for users of the Unified Health System (SUS).[3]

The relationship between innovation and development allows the insertion of new technologies in the health sector. Although still precarious, in PHC the articulation between services and actions for integral care can be enhanced by the use of ICTs, as well as the informational continuity between Primary and Secondary Care, through the electronic medical record, for example.[4] However, the technology , under various modalities, has been gradually incorporated into health care and management, including at a distance, with cost reduction as one of its main concerns.[5]

The Extended Family Health and Primary Care Centers (Nasf-AB) are a policy to stimulate PHC consolidation in Brazil, through the composition of multiprofessional teams that operate in the perspective of matrix support with Family Health teams (eSF) , with a view to strengthening them and increasing their solvability. The diversity of professions that can be integrated into generalist (Family Health) teams allows Nasf to perform interdisciplinary activities, considering the knowledge of the specific nuclei of each profession and the field of knowledge of health care common to all professions.[6-7]

When considering the model that operates in PHC, the challenge for the performance of Nasf-AB teams is even greater than that of the ESF, given the special characteristics of the activities performed by this support team, since it is highly dependent on the integration of the system with other activities and social devices. Challenges include: lack of structure, poor use of organizational work tools, weak employment and staff turnover.[7]

The organization of each Basic Health Unit and the work process of eSF and Nasf professionals are very heterogeneous, alternating demands and different situations, requiring high reliability information for communication and development of planned activities, which can be intensified by through ICTs. The work of the Nasf-AB teams often ends up being

immediate to meet the demands, with the development of actions and interventions with little or no planning and monitoring of individual and collective situations.[8]

Technological changes and recurrent transformations related to ICTs are directly implicated in work processes and impact the forms of management and organization of health services. Among the dilemmas observed in the daily life of eSF and Nasf-AB, there is the underutilization of the potential of the new incorporated technologies, which even with the effort of the MoH and Health Secretaries, is at the mercy of the possibility of use and resolution of problems in the health sector. It is noticeable the difficulty of NASF-AB team professionals and other eSF professionals to dispose and use information, as well as other social support devices for health services and the care network itself. In this sense, it is necessary to include actions and technological devices that promote knowledge aimed at prevention, promotion and rehabilitation of health in PHC. In addition, the promotion of the strengthening of a culture that values the use of information to support the work process.[4]

Based on this context, the following questions arise: which sources of information are used by Nasf-AB teams that are characterized as ICT? How are they used to qualify relationships and improve work processes of the teams? From these issues, the study aims to analyze the use of ICT by Nasf-AB and reflect on its potential for care.

Method

Multicenter mixed-method research, in which data production and analysis used quantitative and qualitative approach, exploratory and sequential strategy. Conducting a mixed methods study does not imply conducting separate research that addresses a specific question, but the inclusion of different methods to answer the question by providing additional information.[9] The study was developed by researchers from five universities in Santa Catarina

state (two public, two community and one private), with the participation of the State Health Secretariat

The participants were professionals from NASF-AB teams in Santa Catarina. For the quantitative phase, a sample calculation was performed, which defined the number of participants among the 1,312 NASF-AB professionals working in the state. This stage occurred through the application of a survey, sent via e-mail, to all Nasfian professionals (who work at NASF-AB). As an inclusion criterion, it was necessary to be formally working at NASF-AB for at least one year. Professionals who were away for any reason during this period were excluded.

The sample of the quantitative phase consisted of 359 professionals from NASF-AB, working in 149 municipalities of Santa Catarina state, distributed in the nine health macro-regions. To participate, upon receiving the invitation email, it was necessary to click “accept”, which gave access to the Informed Consent Form (ICF) and released the survey. The professionals answered the questionnaire in the survey tool, with 19 closed and open Likert-type questions, including data such as territory characteristics, assisted population, main problems, among others; there were also questions about the work process and demands of the team’s performance. The instrument obtained a high Cronbach's alpha coefficient ($\alpha = 0.819$) and was tested for consistency and language. This step took place between May and June 2017.

The quantitative information analytical procedure was performed by coding and data entry in the Excel® program, tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) ®, version 21.0. Variables of this nature were described by measures of central tendency and dispersion: mean, standard deviation, median and minimum and maximum observed value, confidence interval estimate for the population average based on the number of valid answers, considering the level significance level lower than 5% ($p < 0.05$), while the confidence interval was equal to or greater than 95%. Categorical variables were described by absolute frequencies and proportions, and we present in this study those related to the proposed theme.

After the first stage and based on the previous analysis of the findings, the qualitative stage was performed through five focus groups with five NASF-AB teams, representative of the macro-regions, drawn by lot and appropriate as access feasibility. This stage was attended by 43 professionals from five municipalities, belonging to four of the nine macro-regions. The groups took place between September and November 2017, led by the main researcher, with the help of a rapporteur (making notes on the profile and sequence of speakers) and supporters (circulating around the room with the recorders). They lasted two hours on average and the testimonials that emerged were recorded and transcribed in full.

Information was interpreted based on the thematic content analysis.[10] The text was cut into registration units, from which two categories emerged: Health care planning and Practices in the use of ICTs.

The research was approved by UDESC Human Research Ethics Committee under Opinion No. 1.812.835, of November 08, 2016, and complied with all ethical principles and current legislative guidelines. Identities were preserved by coding (letter M of "municipality", followed by order number and letter P of "professional", followed by sequential order number of focus group).

Results

Participated in the quantitative stage 359 professionals who worked in 149 NASF-AB in Santa Catarina state, totaling 53.8% of municipalities with implemented NASF-AB. Table 1 presents the macro-regions, the percentage by municipalities and the total of professionals who participated in the research.

Table 1- Scenario and study participants, NASF-AB, Santa Catarina state, 2018

Health Macro-regions in Santa Catarina state	Municipalities with deployed NASF-AB	Professionals who took part in the quantitative stage	Professionals who took part in the qualitative stage
1. Grande Oeste	75	94	26
2. Meio Oeste	43	38	0
3. Nordeste	9	25	0
4. Grande Florianópolis	39	54	9
5. Foz do Rio Itajaí	12	13	0
6. Vale Itajaí	40	49	4
7. Serra Catarinense	10	15	4
8. Sul	40	60	0
9. Planalto Norte	9	11	0
Total	**277**	**359**	**43**

Among the professions recommended by the MoH for the composition of NASF-AB, 11 stood out, the most frequent being: psychologist (n = 96/27%), physiotherapist (n = 65 / 18.3%) and nutritionist (n = 63 / 17.7%); and less common: veterinarian (n = 1 / 0.3%), occupational therapist (n = 2 / 0.6%) and sanitarist (n = 3 / 0.8%). Table 2 presents the frequency of valid responses to NASF-AB professionals' dialogues with social actors in the community to search for data on the territory.

Table 2- Presentation of the frequency of dialogues of NASF-AB professionals with community social actors, Santa Catarina state, 2018

Frequency of dialogues with social actors	n	(%)
Dialogue with health community agents	**357**	(**99.4%**) [**100%**]
Daily	87	(24.4)
Up to 3 times a week	91	(25.5)
Up to twice a month	115	(32.2)
Rarely	63	(17.6)
Never	1	(0.3)
Dialogue with community leaders	**358**	(**99.7%**) [**100%**]
Once a week	26	(7.3)
Up to twice a month	60	(16.8)
Up to twice a semester	46	(12.8)
Rarely	179	(50.0)
Never	47	(13.1)
Dialogue with local health counselors	**358**	(**99.7%**) [**100%**]

One a week	22	(6.1)
Up to twice a month	86	(24.0)
Up to twice a semester	48	(13.4)
Rarely	153	(42.7)
Never	49	(13.7)

Among the social actors, the community health agent (CHA) is the one who dialogues with NASF-AB professionals, with a relatively high frequency during the month of work. Community leaders and local health counselors have a low frequency of dialogue with NASF-AB staff.

Table 3 presents the records as NASF-AB's information source, considering the digital information systems, physical records and territory map and, respectively, the frequency of use.

Table 3- Presentation of the use of records of the Primary Health Unit as a source of information for Nasf-AB professionals, Santa Catarina state, 2018

Information records and frequency of use	**n**	**(%)**
Health Information Systems*	**357**	**(99.4%) [100%]**
Daily	248	(69.5)
Up to 3 times a week	56	(15.7)
Up to twice a month	28	(7.8)
Rarely	14	(3.9)
Never	11	(3.1)
User's/Family Physical Record	**356**	**(99.2%) [100%]**
Daily	128	(36.0)
Up to 3 times a week	54	(15.2)
Up to twice a month	36	(10.1)
Rarely	92	(25.8)
Never	46	(12.9)
Territory map	**358**	**(99.7%) [100%]**
Once a week	25	(7.0)
Up to twice a month	54	(15.1)
Up to twice a semester	68	(19.0)
Rarely	160	(44.7)
Never	51	(14.2)

*Electronic medical record.

Among the information sources that support the professionals' practices, the electronic medical record is used in 87.1% as a whole, considering daily (36%), up to 3 times a week (15.2%), up to twice a month (10.1%) and rarely (25.8%). However, the territory map is used once a week

(7.0%), up to twice a month (15.1%), up to twice a semester (19.0%) and rarely with a higher percentage (44.7%) as information source.

Another means of obtaining information used in practice is dialogue with eSF professionals are conversations, which enable the exchange of information, and occur formally and informally, as shown in table 4.

Table 4- Presentation of frequency and means of dialogue between Nasf-AB professionals and Family Health teams, Santa Catarina state, 2018

Dialogues with eSF	**N**	(%)
Scheduled / regular meetings with teams	**357**	(**99.4%**) [**100%**]
Once a week	159	(44.5)
Up to twice a month	0	(0.0)
Up to twice a semester	175	(49.0)
Rarely	19	(5.3)
Never	4	(1.1)
Unscheduled conversations * with teams	**356**	(**99.2%**) [**100%**]
Daily	235	(66.0)
Up to 3 times a week	72	(20.2)
Up to twice a month	34	(9.6)
Rarely	10	(2.8)
Never	5	(1.4)
Virtual conversationswith team professionals**	**358**	(**99.7%**) [**100%**]
Daily	141	(39.4)
Up to 3 times a week	122	(34.1)
Up to twice a month	59	(16.5)
Rarely	34	(9.5)
Never	2	(0.6)

*corridors, pantries, kitchens, among other spaces in the Health Unit.

** By e-mail or phone call.

Dialogues between NASF-AB and eSF professionals are constant, occurring during scheduled meetings and not summarized, in meetings in the units' spaces, by virtual means or by telephone.

In the analysis of the focus group results, referring to the **Health Care Planning** category (represented by scheduled meetings and use of medical records, structured forms of communication), such communication devices emerge in the statements.

> *Today, we have an electronic medical record in the Health Units. So, all the actions of NASF we evolve in the electronic medical record. (M4 P3)*

> *The case comes and is already submitted to a NASF follow-up form. So, the team [eSF] gives us the history, we put it in the form to keep track of what happened in the visits, we printed out what we evolved in the electronic medical record, we attached it to the file and wrote down all the dates of the visits. (M4 P4)*
>
> *To the patient's record, everyone has access. So, depending on the Strategy team, some people are already doing the evolution and putting there what was defined. Even informal conversations go to the electronic medical record [...] (M4 P5)*
>
> *We have the NASF meeting, [...] it meets weekly or fortnightly. So we go over cases at these times, discuss what you can do, actions and planning. (M2 P4)*
>
> *As we are always in the Unit, [...] the weekly team meeting is always available for the Nasfians to participate. So we ended up talking. (M4 P2)*

In the second category, **Practices in the use of Information and Communication Technologies** (represented by informal means of communication, with emphasis on virtual means, non-chronologically and linearly), the participants emphasized that information exchanges also occur at informal moments, such as meetings between professionals in various spaces of the Units.

> *Discussion of cases and data [*territory statistics*] is sometimes done outside [*team meeting*], in hallway conversations, [...] communication occurs in other spaces. (M4 P1)*
>
> *We work well partnership, sit down and talk. It happened, it came to the situation, as we are in the same unit: so and so, I have a situation [...] (M1 P1)*
>
> *When we get a moment from us, we also talk, discuss our priorities for breakfast. (M5 P1)*

It is important to highlight that real cases and territory statistical data are used as a source for decision making. Communication by virtual means is also a form of transfer and exchange of information about patients and community issues:

> *A lot of telephone conversations [...] all teams receive the monthly schedule, we are here today, but there in the other Unit they have the schedule and they know we are here. Then they can call us directly or we leave our phones to the manager. (M5 P2)*
>
> *We go [*to the Unit*] to enroll the teams, they send cases by WhatsApp and e-mail, how is the patient's evolution, if it gets worse, if you may need the intervention of a professional [...]. We talked to the nurse through WhatsApp and email, to know more about the indicators, the characteristics of the region, to be able to act. (M3 P1)*
>
> *We often use telehealth to answer questions that we cannot resolve among ourselves, talking, or sometimes, also search the internet [...]. (M1 P7)*

Discussion

From the results, it can be inferred that there is still a gap for the incorporation and efficient use of information and communication technologies in PHC, as found in the literature.[1-3,5] Santa Catarina NASF-AB teams apply several ways of communicating with the SFs to obtain information that helps their practices, but it is necessary to reflect on the obstacles to the structuring, standardization and assimilation of technologies in order to address them.

The main interlocutors for information and communication were identified, as well as the barriers, innovations and facilities arising from the insertion of technologies, with considerable impact on the work process and on forms of health care and management. NASF aims to solve communication problems through the unique skills of each team member.[11] Consistent with this guideline, the study reveals communication as one of the key tools for developing NASF-AB work. In the meantime, matrix support can be configured as a core technology for advanced and resolutive access care, even as a unique space for team meetings.[8]

We highlight the dialogue between NASF professionals and CHAs as the predominant source of information about the reality and needs of the territory. This worker occupies a privileged place from the perspective of popular education and represents an important source of information at the interface between the community and the team. However, despite the

recognition, studies indicate that little is invested in qualification and its critical process of commitment to leadership practice, although it is evident that effective communication between CHA, Family Health team professionals, NASF and community gives sense and meaning to health practices.[12-14]

Quantitative data revealed low frequencies of dialogue with community leaders and local health counselors, which was not explored in focus groups. Such interaction represents a challenge in the implementation of the social participation guideline provided for in SUS legislation. Studies[12,14] warn that the dialogue between the community and the FSH strengthens the constitutional prerogatives of the SUS, which is in the process of change and discredit. Forging alliances between community actors and health services is important to broaden access and strengthen the care network.[15] However, local counselors still are invisible to many health professionals, which could be resolved by publicizing and inviting teams to meetings, encouraging social, community and health service participation.[16]

Regarding the use of the records of the Unit, such as the electronic medical record, the quantitative and qualitative data point to their satisfactory use, although it is observed the need to think about new forms of information appropriation, aiming at the planning, monitoring and evaluation. A study that analyzed the work of NASF-AB in the Brazilian territory, considering its integration with the FSE, in relation to the use of common medical records among teams, has a positive impact on 83% of them.[17] Another publication on the perceptions of managers, professionals and users, regarding electronic registration, highlights its importance in care, issues involving costs, confidentiality, privacy and implications of centralization or decentralization of information.[18] The use of electronic records in PHC seems to work for the operationalization of work, as can also be verified by testimonials from professionals in this study. In the Brazilian and world context, in general, the use of computerized reports and informal records is more recurrent, and the recognition of the potentials of the electronic

medical record remains a challenge,[1] which differs from the reality found in the scenario under study.

Territory maps are important sources of information about the community, but are little used by professionals participating in this study, unlike national studies that indicate the use of this type of tool for the teams' performance in PHC.[1] Maps represent an effective way of visualizing information on topics crucial to health care, as they enable the identification of care and visualization of disease patterns in a population. Therefore, they represent a technology modality that enables the improvement of quality in health services. However, its use requires updated territorialization actions to problematize, intervene, evaluate, monitor and facilitate communication, with information exchange for the development of interdisciplinary and intersectoral work, meeting the demands of each territory.[19]

ICTs may be a means to build knowledge, but they do not guarantee its generation. The data that originates from them, generally raw, do not generate statistics or information that can produce evidence for decision making. However, they may favor the agility and dissemination of information, which, associated with knowledge, which is the property of the actors, can support collegiate decisions.[5,20] One promising aspect of this survey has to do with the fact that professionals are using the available information – cases and statistical data – for their team performance.

A study revealed that, in Brazil, there is no tradition of personalized dialogue between different professionals, not even the collective construction of therapeutic projects in health services, which is one of the major challenges of SUS, considering that communication enables and qualifies attention to users, either punctually or continuously.[21] In this sense, the lack of interprofessional performance in PHC has also been explored in the literature, precisely due to the difficulty of collaboration and interaction between the various knowledge and practice nuclei.[22] However, the quantitative and qualitative findings of this research reveal informal

conversations as sources of information for NASF-AB activity, and that regular team meetings are an important space for dialogue and exchange of information and knowledge between NASF and eSF professionals. So it is worth remembering that the vertical management / administration model reflects the biomedical model, against the one recommended by NASF-AB.

Thus, NASF professionals perform matrix support to some extent through ICTs. In Brazil, the idea of matrix support is linked to the theoretical and methodological conception that aims to support the co-management of collectives in PHC, with functionality from three application axes: institutional support, matrix support and extended and shared clinic. Collaboration is an essential element in the success of this proposal, based on collective actions focused on user needs, as well as teamwork that contemplates the perspectives of each professional, which means dealing with conflicts.[8,17,23] In the studied context, matrix support, in line with other studies in the state, upholds, as an applied method, the work of the NASF teams.[23] Some testimonials also reveal the use of telehealth as a technology for the matrix support. Consistent with other research, the data points to the importance of in-service learning through distance communication.[24]

With the technological evolution, the traditional methods of communication are being replaced by different technologies, as a strategy to establish dialogicity between the members of eSF and NASF, and of these with the community. It is clear that the virtual space becomes part of a new field of communication. However, when discussing forms of communication between people and teams, it is essential to understand that the ICTs used should be tools capable of reducing and eliminating polyphonic discourses or so-called noises, so that the process is clear and understandable to all actors involved, since misinterpretations can lead to wrong decisions. That said, training strategies need to be established so that information is processed, stored and ultimately serves as a means of communication between health professionals and supportive tools in the operationalization of care, matrix support and health services management.

Conclusion

In the context under study, the use of ICTs by NASF-AB teams still represents a challenge, although with some advances for Primary Care. They contribute to the strengthening of matrix support, such as innovation and transformation in labor relations and, consequently, to an integrative care model that may impact on primary care. However, the identified obstacles may be linked to the profile of professionals who sometimes do not hold the necessary skills for the use of information, as well as the structural problems for the insertion of new technologies in PHC.

Data from information systems are used for intervention planning, with a strong emphasis on electronic medical records. Dialogic processes during team meetings, and even informal ones, between NASF-AB and eSF professionals, are also technologies that favor care by sharing information and creating possibilities to solve problems. However, there is a need to strengthen communication between NASF-AB and social actors, favoring the participation of community leaders and local health counselors, and incorporating other technologies, such as the territory map, into their work process.

Although the use of technologies does not yet reach their full potential for care in the studied scenario, the research may serve as a stimulus for managers and health teams to strengthen the use of tools such as team dialogue, territory map and social participation, in order to qualify their work process.

In the study design, oriented to the analysis of an intervention strategy with peculiar characteristics, randomized experiments were selected, limiting the generalization of results. Although the diversity of municipalities in Santa Catarina was highlighted, it was possible to reflect on the potential of ICTs used by NASF to develop PHC care, as well as it can be useful in defining strategies for organizing the health care network.

Finally, further studies are suggested, with broader scenarios and longitudinal perspective, to better understand the phenomenon in all its complexity and uniqueness.

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