dx.doi.org/10.5380/ce.v27i0.87756 Cogitare Enferm. 2022, v27:e87756

Cogitare Enfermagem

ORIGINAL ARTICLE

INFORMATION AND COMMUNICATION TECHNOLOGIES: THE PERSPECTIVE OF THE URGENCY AND EMERGENCY MOBILE CARE SERVICE PROFESSIONALS

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ABSTRACT

Objective: to assess the interest, access and knowledge of the Urgency and Emergency Mobile Care Service professionals in relation to Information and Communication Technologies in such service. Method: a descriptive and cross-sectional study conducted with Urgency and Emergency Mobile Care Service professionals (physicians, nurses, nursing technicians and drivers) in September and October 2020 in the Northwest region of the state of Paraná, Brazil. The data were collected through a structured instrument and analyzed by means of descriptive statistics. Results: of the 30 participants, 80% reported access only to a simple cell phone, and 86.7% believed in the viability of a computerized system to assist in care provision and in the improvement of the response time for the event. Conclusion: despite the technological deficit in the service researched and dissatisfaction of its professionals, they wish for technologies to streamline care, thus reducing the response time for the event. Thus, the results can support management of the services and bring about positive contributions to the SAMU team professional practice.

DESCRIPTORS: Health Professionals; Emergency Medical Services; Applications of Medical Informatics; Information Technology; Professional Practice.

HOW TO REFERENCE THIS ARTICLE:
Mendonça RR, Salvador DLVF, Mata TCF da, Nakasima PAM, Derenzo N, Covre ER, et al. al. Information and communication technologies: the perspective of the urgency and emergency mobile care service professionals. Cogitare Enferm. [Internet]. 2022. [accessed "insert day, month and year"]; 27. Available on: http://dx.doi.org/10.5380/ce.v27i0.87756.

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INTRODUCTION

In-service technologies can be classified as soft, hard and soft-hard. The soft ones are those related to welcoming, bonding, management, search for autonomy and qualified listening. Hard technologies correspond to material technological equipment used in health care, such as glucose meters, scales, data forms, organizational, manual and normative structures; whereas soft-hard technologies are technical-scientific knowledge and expertise[1].

Among the technological tools available, one of the most widely disseminated are Information and Communication Technologies (ICTs), which can be defined as a set of technological resources used in an integrated manner, with a common goal. This information exchange generates new knowledge and competencies among the professionals[1]. It is worth highlighting that ICTs have been enhanced in order to improve health care, so that patients receive more rapid and effective services, in addition to serving as an ancillary tool in the improvement of the technical-scientific knowledge of health care professionals[1-2].

ICTs promote an improvement in the clinical practice and in the assistance provided to the clients, enabling disclosing, dissemination and update of the knowledge in the health area. In addition to that, they serve as tools to support decision-making by health care professionals, through the development of more reliable diagnosis, guidelines and qualified therapeutic actions aimed at the patients[2].

In the context of the Unified Health System (*Sistema* Único *de Saúde*, SUS), ICTs are increasingly more incorporated into the health care networks, contributing to information exchange, streamlining the care process, and making it easier to fill in and send medical records, which lead to an improvement in the care provided to users[3].

The Urgency and Emergency Care Network (*Rede de Atenção* às *Urgências e Emergências*, RUE), one of the priority networks of the SUS implemented in 2011 by the Ministry of Health (*Ministério da Saúde*, MS)[4], was proposed to articulate and integrate health equipment in order to expand and qualify humanized and comprehensive access of users in urgency/emergency situations in the health services, in an agile and timely manner, i.e., this network aims at developing a rapid diagnosis that enables referring patients to appropriate treatments, according to their complexity level[5].

One of the components of RUE is the Urgency and Emergency Mobile Care Service (*Serviço de Atendimento Móvel de Urgência e Emergência*, SAMU) and its medical regulation centers, in partnership with the Military Fire Department, the Emergency Care Unit (*Unidade de Pronto Atendimento*, UPA), and the Hospital Care Network. The main objective of the SAMU is to arrive as early as possible to the site, providing effective support to the victims in urgency and emergency situations. In this service, decision-making is important for care efficacy and, in this context, the fundamental role of information technologies is made evident[6].

The diverse information about the event in the assistance provided by the SAMU should arrive as soon as possible to the reference services, such as Emergency Care units. In this regard, implementation of the SAMU contributes benefits to the population, as it provides faster and more efficient care and may be even more qualified with the implementation and appropriate use of ICTs[7].

For the analysis of ICT use in the SAMU, for being a still incipient topic in the literature, it is considered necessary to develop research studies on the theme. Collection of data regarding the need and interest of urgency and emergency service professionals can be used to subsidize the search for incorporating new ICTs that could contribute to optimizing the service, in addition to encouraging new research studies on the subject matter[8].

Given the above, the objective of this study is to assess the interest, access and

knowledge of the Urgency and Emergency Mobile Care Service professionals in relation to Information and Communication Technologies in such service.

METHOD

This is a descriptive and cross-sectional study with a quantitative approach about the interest, access and knowledge of the SAMU professionals in relation to ICTs. This research included 30 professionals from a decentralized base of SAMU 192 in a municipality from the Northwest region of the state of Paraná, working in all professional categories (physicians, nurses, nursing technicians and drivers).

The SAMU is ruled by the Urgency and Emergency Intermunicipal Consortium of Northeastern Paraná (*Consórcio Intermunicipal de Urgência e Emergência do Noroeste do Paraná*, CIUENP), which, since 2011, has joined 101 municipalities to coordinate Urgency and Emergency Services delivered to 1,200,000 people through the SAMU 192 Regulation Center.

The service researched has an Advanced Life Support unit and two Basic Life Support units. It comprises six care teams, with seven professionals working in 12-to-60-hour shifts, including 18 drivers, 12 nursing technicians, six nurses and six physicians.

The following inclusion criterion was adopted for data collection: being an active professional in the study reference base. The professionals excluded were those that were not working during the research period, either due to holiday or leave.

Data collection took place between September and October 2020 by means of a form designed in the *Google Forms*® online platform, due to the protection measures against the COVID-19 pandemic.

The form consisted of *Likert* scale questions divided into three main axes, namely: sociodemographic characterization of the participants; questions regarding knowledge and use of ICTs by the professionals from the decentralized base; and interest and need of ICTs in the RUE components, in order to provide quality care in urgency and emergency services.

The participants were sent the electronic form via *WhatsApp®*. For the participants to access the questions in the form, they were required to accept participating in the study after reading the Informed Consent Form, which was displayed on the homepage of the link sent via the app. The form remained open for five days for the participants to provide their answers.

The data were tabulated in a *Microsoft Excel* 2016 spreadsheet and analyzed in the *Statistical Package for the Social Sciences* (SPSS), version 21.0, presenting the absolute frequencies and the respective percentage values and employing descriptive statistics.

All the ethical precepts about research studies involving human beings were respected, and the research was approved by the Research Ethics Committee of *Universidade Estadual do Paraná* under No. 4,573,667.

RESULTS

A total of 30 professionals were interviewed, of which 21 (71.4%) were aged 39.9±5.5 years old (Mean±Standard Deviation). Regarding the professional category, the

participants were 11 drivers and nursing technicians, five nurses and three physicians. In relation to the time working in the SAMU, 28 (93.3%) of the participants did so for more than five years in the decentralized base. Regarding the training level, 14 (46.6%) of the participants had Complete Higher Education or graduate studies (Table 1).

Table 1. Professional characterization of the SAMU active workers, Paranavaí, PR, Brazil, 2020 (n=30)

Professional category	**f_i (%)**
Driver	11 (36.7)
Nursing Technician	11 (36.7)
Nurse	5 (16.7)
Physician	3 (10)
Time working in SAMU 192	f_i (%)
2-5 years	2 (6.7)
5+ years	28 (93.3)
Training level	f_i (%)
Complete High School	9 (28.1)
Incomplete Higher Education	3 (9.4)
Higher Education student	4 (12.5)
Complete Higher Education of graduate studies	14 (46.6)
Total	30 (100)

Key: f_i: Absolute frequency; %: Relative percentage
Source: The authors (2020)

In relation to the professionals' perception on ICT use in the work environment, it was observed that 16 (53.3%) showed much interest, 22 (73.3%) found it pertinent that the care call form (CCF) be in digital format, 26 (86.7%) believed that the implementation of a computerized system would be viable, and 28 (93.3%) believed in the need for some technological resource to help create a database for urgency and emergency services (Table 2).

Table 2. Perception of the professionals working in the SAMU from the study reference base about the technologies existing in the service, Paranavaí, PR, Brazil, 2020

Interest for the ICTs in the work environment	**f_i (%)**
Very much	16 (53.3)
Reasonable	12 (40)
A little	2 (6.7)
None	0 (0)

You find it pertinent that the Care Call Form be in digital format	f_i (%)
Yes	22 (73.3)
No	6 (20)
I'm not sure	2 (6.7)
Viability of computerizing the system in the service	f_i (%)
Yes	26 (86.7)
No	1 (3.3)
I'm not sure	3 (10)
Need for the ICTs to create a database	f_i (%)
Yes	28 (93.3)
No	1 (3.3)
I'm not sure	1 (3.3)
Access to the ICTs in the work environment	f_i (%)
Yes, to all of them	2 (6.7)
Only to some	18 (60)
I don't have access	8 (26.7)
I'm not aware of the existing ICTs	2 (6.7)
Total	30 (100)

Source: The authors (2020)

When asked about access to the ICTs in everyday work, 18 (60%) reported having access only to some technologies, two (6.7%) had access to all technologies available, whereas eight (26.7%) stated that they did not have access to any technology, and two (6.7%) were not aware of the existing technologies in the service (Table 2).

The participants were asked to indicate which ICTs were available for use in their work environment, and most of them (24; 80%), reported that a simple cell phone (not a smartphone) was the only tool provided by the service (Table 3).

Table 3. Information and Communication Technologies available for use in the SAMU 192 service pointed out by the professionals, Paranavaí, PR, Brazil, 2020 (n=30)

Technology	f_i (%)
Simple cell phone	(80)
Smartphone	(13.4)
Computer/Notebook	(3.3)
None of the alternatives	(3.3)

Key: ICTs: Information and Communication Technologies; f_i: Absolute frequency; %: Relative percentage
Source: The authors (2020)

Conversely, 14 (46.7%) indicated little or reasonable interest in using ICTs at work and 28 (93.3%) expressed the need for some type of technology to help create a database for the emergency service, by including the CCF in digital format. Only one professional stated uncertainty regarding this aspect and another one did not see such need (Table 4).

One participant reported that collection and storage of the patient's and event's data were performed in an electronic form, whereas the other 29 (96.7%) pointed out that the printed paper forms were the instrument most used (Table 4).

Table 4. The professionals' perception about the relevance, importance and availability of the ICTs in the SAMU service integration, Paranavaí, PR, Brazil, 2020

Relevance of the availability of ICTs in the work environment	f_i **(%)**	
3. Very relevant	13 (43.3)	
2. Relevant	3 (10)	59 (2.0)
1. Little relevant	14 (46.7)	
Need for an app aimed at optimizing the care call time		
3. Extremely necessary	20 (66.7)	
2. Necessary	7 (23.3)	77 (2.6)
1. Little necessary	3 (10)	
Collection, recording and storage of the patient's and event's data		
Printed form (paper)	29 (96.7)	
Electronic form	1 (3.3)	
Own app	0 (0)	
Nonexistent	0 (0)	
Total	30 (100)	

Key: ICTs: Information and Communication Technologies; f_i: Absolute frequency; %: Percentage; : Mean
Source: The authors (2020)

In the "knowledge level category", six (20%) participants made a negative evaluation of their knowledge about ICTs in the service, whereas the others claimed good knowledge levels (Table 5). Consequently, when asked about their satisfaction level in relation to ICTs, no participant was fully satisfied. The vast majority was little satisfied or dissatisfied (=1.9).

Also in Table 5, in addition to the dissatisfaction identified, it was noticed that the participants had little or average interest in availability of the ICTs in the service (=2.6), with the possibility that these factors are interlinked. However, they manifested significant interest when asked about a system that connects the SAMU to other urgency and emergency care services (=4.0).

Table 5. Knowledge, satisfaction and interest levels in relation to the ICTs incorporated into the SAMU service, Paranavaí, PR, Brazil, 2020

Knowledge level in relation to the ICTs used in the service	f_i(%)	
5. Excellent	6 (20)	
4. Very good	8 (26.7)	
3. Good	10 (33.3)	102 (3.4)
2. Fair	4 (13.3)	
1. Bad	2 (6.7)	
ICT use frequency during the care calls		
5. Always	7 (23.3)	
4. Frequently	12 (40)	
3. Sometimes	3 (10)	101 (3.4)
2. Almost never	3 (10)	
1. Never	3 (10)	
Employees' satisfaction level in relation to the ICTs available and used in the service		
5. Extremely satisfied	0 (0)	
4. Satisfied	0 (0)	
3. Partially satisfied	8 (26.7)	53 (1.9)*
2. Little satisfied	10 (33.3)	
1. Dissatisfied	12 (40)	
Interest in availability of the ICTs in the service		
5. Extreme interest	0 (0)	
4. Very much interest	13 (40.6)	
3. Average interest	2 (6.3)	79 (2.6)*
2. Little interest	17 (53.1)	
1. No interest	0 (0)	
Interest in a system that is interlinked to other services		
5. Extreme interest	0 (0)	
4. Very much interest	23 (71.9)	
3. Reasonable interest	9 (28.1)	119 (4.0)**
2. Little interest	0 (0)	
1. No interest	0 (0)	

Key: ICTs: Information and Communication Technologies; f_i: Absolute frequency; %:Percentage; : Mean; *Value below the mean in the *Likert* scale; **Value above the mean in the *Likert* scale
Source: The authors (2020)

DISCUSSION

According to the results of this research, it is noticed that 66.7% of the participants feel the need for an app that may improve the care call time. As per a study conducted in Recife[9], ICTs are one of the bases for the managerial approach of efficient public administration. When

adopted as a mechanism to facilitate service provision, they stand out as strategic means to manage the health system. in addition to contributing to strengthening the regulatory state, as their use provides efficiency and transparency in the public health services.

Another analysis conducted in the same municipality emphasized that ICT use resulted in a significant improvement in the quality of the care provided to the users, in the efficiency of the management of health institutions and in intelligent use of the data obtained. The impact caused by ICT use on the competencies of the Urgency and Emergency service workers that provide direct care to the patients was evident. It is noted that access, whether in real time or remote, to all the information brought about significant contributions to the resolution of health problems[1].

According to the study findings, the professionals believe in computerization and improvement of the system; likewise, they highlight the need to create a database to improve urgency and emergency services. Although this research had identified restricted access to the technologies existing in the service by health professionals, there was a deficit in availability of the technologies provided by the service, evidencing the extent to which ICTs may help in the care process delivered by the SAMU[10].

ICTs are classified as soft, soft-hard and hard and can be considered as a support means in the assistance provided. In the health area, among the types of technologies mentioned, a study conducted in Colombia[11] specifically refers to the importance of those classified as hard technologies and emphasizes their importance in care optimization. This reflection corroborates the results obtained in the current study, which found that the participants expressed the need for implementing an app to aid and optimize urgency and emergency services.

Technologies contribute great advances to professionals and to health service users, as the information becomes available in electronic/digital format, enabling rapid and easy access and assisting both in service organization and in patient care[12]. Therefore, in addition to bringing about direct benefits for care provision, the incorporation of ICTs helps reduce costs and possible errors, as paper documents have limitations and are much prone to erasures and illegibility, in addition to increasing personnel and storage costs[9].

It was verified that the research participants showed an interest in a technological tool for interacting in the service; however, when asked on the interest in new technologies, the professionals expressed a low level of interest, a finding consistent with that of a study conducted in Santa Catarina, Brazil[13], which noticed resistance regarding employees' acceptance and adaptation as a limitation for ICT use. This fact can be associated to the lack of a technological tool in the service, considering that 80% of the participants reported that a simple cell phone was the only technological tool provided in the urgency and emergency service.

A study conducted in Rio Grande do Norte[1], Brazil, showed that ICTs have been increasingly more used as tools to assist in time/response and diagnosis of events treated by the pre-hospital care service, SAMU 192. In addition, it points to a great advance in the response time of diagnoses made by the medical team of the concerned service, after the implementation of an app called *SOS Socorrista*, which aims at helping the regulation team in the process of providing care to urgency and emergency events with regard to decision-making.

Therefore, although this study was developed only in a single decentralized base of the SAMU, which is a limitation, it shows the perspective of implementing new ICTs to optimize care provision in emergency services. It can be observed that health services increasingly require new technological tools designed to deliver more qualified and humanized care, in a rapid and agile manner, enabling easy access and information exchange across the health services, especially among the urgency and emergency ones[15]. The results of this research can support management of the services and bring about positive contributions to the SAMU team professional practice.

CONCLUSION

Most of the health professionals participating in this research did not have appropriate knowledge of ICTs (16 [53.3%]), or appropriate access to them, (28 [96.4%]); however, 16 (53.3%) manifested interest in using these technologies, which evidences the need for training to meet the current technological demands, in order to improve care, with emphasis not only on the agility and quality aspects but, above all, on maintaining humanized characteristics in care provision.

Therefore, the results of this study may support new surveys on the topic since although Information Technology is a current topic, there is still the need for a deep understanding in order to encourage health professionals working in urgency and emergency services, who have to provide an efficient and effective response, in order for them to get familiar with the ICTs, thus improving care quality and aiming to reduce the mortality rates. Moreover, the theme is still incipient in the literature focusing on urgency and emergency services, which represents a deficit in the contribution for the professional practice of this sector.

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*Article extracted from the master's/PhD thesis Tecnologia de informação para o atendimento pré-hospitalar". Universidade Estadual de Maringá, Maringá, Brasil, 2021.

Received: 17/07/2021
Approved: 13/06/2022

Associate editor: Dra. Luciana Nogueira

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Salvador DLVF, Nakasima PAM, Derenzo N, Covre ER, Costa MAR; Drafting the work or revising it critically for important intellectual content - Mendonça RR, Salvador DLVF, Mata TCF da, Nakasima PAM; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Mendonça RR. All authors approved the final version of the text.

ISSN 2176-9133