ELECTRONIC COMMUNICATION BETWEEN HEALTH PROFESSIONALS IN PATIENT ASSISTANCE: INTEGRATIVE REVIEW

Comunicação eletrônica entre profissionais de saúde na assistência ao paciente: revisão integrativa

Comunicación electrónica entre profisionales de salud em la asistencia al paciente: revisión integrativa

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ABSTRACT: **Purpose:** To analyze scientific literature regarding the communication via electronic means between health professionals. **Method:** Integrative revision of the literature carried through databases and/or portals PubMed, Virtual Health Library and Cochrane, until August 2018, with combined describers, who answer to the leading question: "How does the electronic communication between health professionals in patient assistance occur?". **Results:** Six articles were included, published from 2011 to 2016 in the English language. Features were smartphone, pager and tablet. The applications used were WhatsApp, Medigram and Short Message Service (SMS). Agility, ease of use and support in decision-making were the advantages found in the use of this resource in the communication of professionals; among the disadvantages are lack of privacy and confidentiality of information, interruptions in assistance and inability to use the technological resource. **Conclusion:** The use of applications for messaging and interdisciplinary communication does indeed provide agility in communication, but the confidentiality of such data is still an issue to be addressed. Thus, it is up to the nurse to conduct communication with the other professionals, preserving the patient's privacy.

Keywords: Mobile applications. Information exchange. Smartphone. Communication. Nursing.

RESUMO: **Objetivo:** Analisar a literatura científica a respeito da comunicação por meios eletrônicos entre profissionais de saúde. **Método:** Revisão integrativa da literatura, realizada nas bases de dados e/ou portais PubMed, Biblioteca Virtual em Saúde e Cochrane, até agosto de 2018, com descritores combinados, que respondem à pergunta norteadora: "Como ocorre a comunicação eletrônica entre os profissionais de saúde na assistência ao paciente? . **Resultados:** Seis artigos foram incluídos, publicados de 2011 a 2016, no idioma Inglês. Os recursos foram *smartphone*, *pager* e *tablet*. Os aplicativos utilizados foram WhatsApp, Medigram e Serviço de Mensagens Curtas (SMS). Agilidade, facilidade de uso e auxílio na tomada de decisão foram as vantagens encontradas no uso desse recurso na comunicação dos profissionais; dentre as desvantagens estão ausência de privacidade e de confidencialidade das informações, interrupções na assistência e inabilidade no uso do recurso tecnológico. **Conclusão:** O uso de aplicativos para troca de mensagens e comunicação interdisciplinar de fato proporciona agilidade na comunicação, mas a confidencialidade desses dados ainda é uma questão a ser tratada. Assim, cabe ao enfermeiro conduzir a comunicação com os demais profissionais, preservando a privacidade do paciente.

Palavras-chave: Aplicativos móveis. Troca de informações. Smartphone. Comunicação. Enfermagem.

RESUMEN: **Objetivo:** Analizar la literatura científica acerca de la comunicación por medios electrónicos entre profesionales de salud. **Método:** Revisión integrativa de la literatura, realizada en las bases de datos y/o portales PubMed, Biblioteca Virtual em Salud y Cochrane, hasta agosto de 2018, con descriptores combinados, que responden a la pregunta orientadora: "¿Cómo ocurre la comunicación electrónica entre los profesionales de salud en la asistencia al paciente?". **Resultados:** Seis artículos fueron incluidos, publicados de 2011 a 2016, en el idioma Inglés. Los recursos fueron teléfono inteligente,

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pager y tablet. Las aplicaciones utilizadas fueron Whatsapp, Medigram y Servicio de mensajes cortos (SMS). Agilidad, facilidad de uso y ayuda em la tomada de decisión fueron las ventajas encontradas en el uso de ese recurso en la comunicación de los profesionales; entre las desventajas están la ausencia de privacidad y de confidencialidad de las informaciones, interrupciones em la asistencia e inhabilidad en el uso del recurso tecnológico. **Conclusión:** El uso de aplicaciones para el intercambio de mensajes y la comunicación interdisciplinaria de hecho proporciona agilidad en la comunicación, per la confidencialidad de estos datos sigue siendo una cuestión a tratar. Así, corresponde al enfermero conducir la comunicación con os demás profesionales, preservando la privacidad del paciente.

Palabras clave: Aplicaciones móviles. Intercambio de información. Teléfono inteligente. Comunicación. Enfermería.

INTRODUCTION

With the expansion of the use of smartphones, combined with increased mobile connectivity and Wi-Fi, there has been significant increase in their use in hospital environment[1].

In Brazil, a law on the protection of personal data has recently been published, which provides for specific rules on sensitive data. The importance of the so-called "precautionary principle", which provides for the reversal of the burden of proof, is emphasized, that is, those who practice the action that could cause individual or collective damages must present the evidence. In the United States of America, for example, there is the Health Insurance Portability and Accountability Act (HIPAA), an institution intended to protect all personal information used in the provision of health services[2].

In Brazil, the most common messaging application is known as WhatsApp (WhatsApp Inc. Mountain View, CA), an instant messaging application for smartphones, which uses internet to send text messages, images, videos, user location and audio messages[3].

Printed communication, as an important vehicle for mass communication, is gradually losing space for new media, including in hospital environments, with electronic medical records and telemedicine. Thus, the possibilities of communication have expanded among health professionals, made possible by the internet and by the use of smartphones.

We live in a professional environment with constant exchange of information through messages. Through these applications, it is possible to share images and have immediate access to answers, with the ease of interaction between professionals and patients.

According to the legislation of the Federal Council of Medicine (*Conselho Federal de Medicina* – CFM) No. 1643/2002, information about the identified patient can only be transmitted to another professional with prior permission, through their free and informed consent and under strict security standards, capable of guaranteeing confidentiality and integrity of the information[4], however empirical practice shows that communication occurs indistinctly, which may compromise the confidentiality of patient data.

In this process of communication by electronic means, interferences such as noise and parallel conversations can cause failures in the transmission of information; and these failures can bring direct harm to patient care[5].

It is important to take a critical look at the use of smartphones in communication among professionals, to better understand their positive and negative impact on patients, as the media often report cases of violation of privacy and secrecy in the area of health.

Given the lack of review studies on this communication medium and the expansion of the use of electronic media in health area, the current integrative literature review is justified.

OBJECTIVE

To analyze scientific literature regarding the communication via electronic means between health professionals.

METHOD

This is an integrative literature review, a research method used since the 1980s, guided by evidence-based practice. It aims to integrate scientific research and professional practice, enabling the synthesis of the state of knowledge of a subject and being able to point to knowledge gaps that deserve to be investigated[6].

This type of review proposes the following steps: formulation of a guiding question, search in the literature

for studies related to the theme, categorization, evaluation, inclusion, interpretation, results and synthesis of the knowledge evidenced in the articles analyzed[6]. Thus, this study presents as guiding question: "How does the electronic communication between health professionals in patient assistance occur?"

Inclusion criteria were: studies addressing the communication between health professionals, published in English, Spanish, Portuguese, French and Italian. Exclusion criteria were: studies addressing the communication between patients and health professionals, hospital management, monitoring of signs and symptoms.

The search was performed in databases and/or portals: National Library of Medicine (PubMed, PMC), Virtual Health Library (*Biblioteca Virtual em Saúde* - BVS) and Cochrane[7]. As the oldest database, Medical Literature Analysis and Retrieval System Online (MEDLINE) incorporates articles since 1966, the search period considered was from that year to August 2018.

Uncontrolled descriptors and Boolean operators were used in the search structure: (smartphone) AND (communication) AND (health team OR health staff) NOT (pain OR diabetic OR health promotion OR mental health).

In databases without interface with this strategy, the same structure was used with the Boolean term AND to make the connection between the search boxes. It is noteworthy that numerous combinations with controlled descriptors were performed, which resulted in a high number of studies, rendering the analysis unfeasible. Thus, to allow an analysis according to the criteria established, the use of uncontrolled descriptors was fundamental to select the studies.

Thus, 655 articles were found in the databases. Initially, an analysis of the titles was performed according to the inclusion criterion, excluding 613 articles because they did not answer the guiding question. Subsequently, the remaining 42 articles were evaluated by the abstracts and six articles remained for full reading (Figure 1).

For data collection, an instrument was elaborated with information about: authors, article title, year, location, objective, type of study, population, sample characteristics, type of equipment and application, inclusion criteria and conclusions. The data were analyzed based on a summary table. For the methodological evaluation of the selected studies, the Oxford[7] level of evidence was used. In order to present the synthesis of the articles, a synoptic

Eligibility	Articles identified by searching databases (PubMed n = 47; PMC n = 569; Cochrane n = 17; BVS n = 22) (n = 655)
Triage	Excluded by title or duplicate (PubMed n = 47; PMC n = 569; Cochrane n = 17; BVS n = 22) (n = 613)
Inclusion	Complete articles reviewed (n = 42) → Articles excluded because they do not answer the guiding question (n = 36)
Identification	Studies included in the review (n=6)

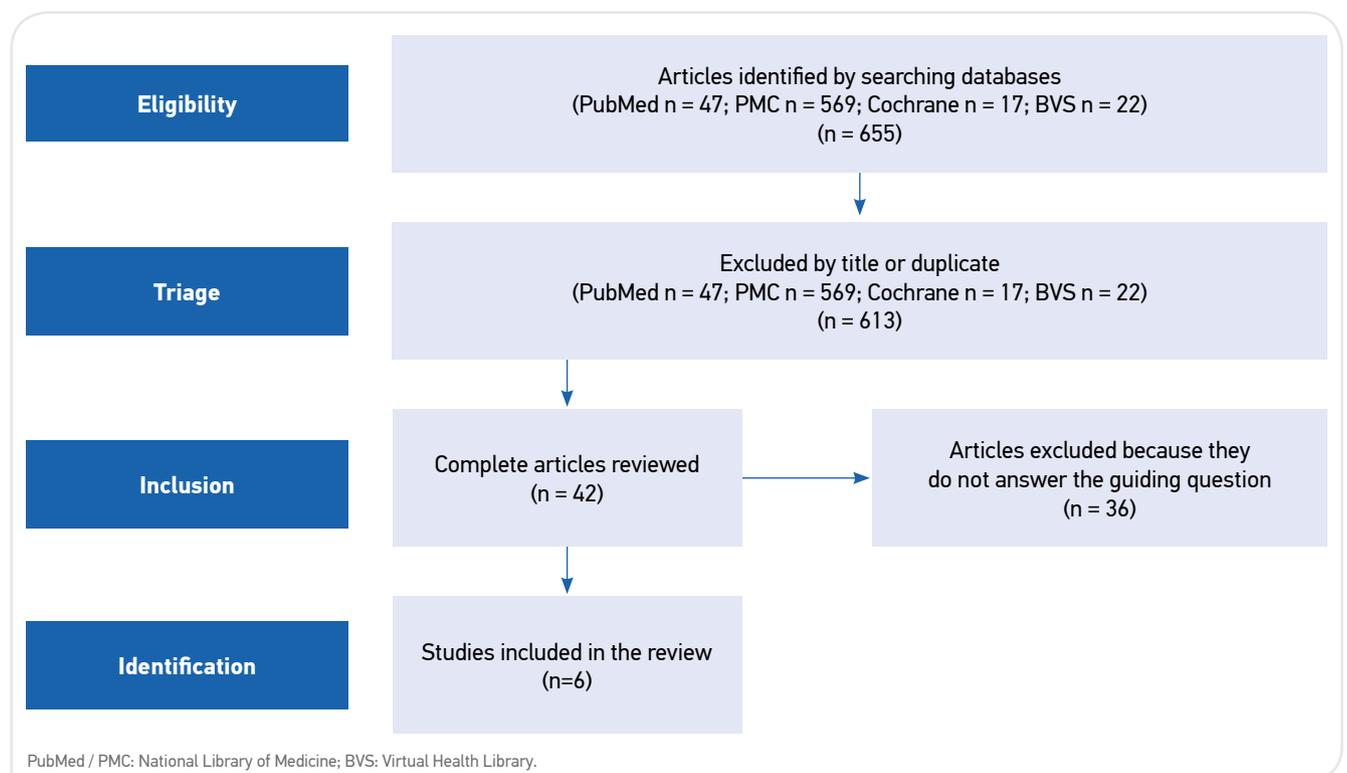PubMed / PMC: National Library of Medicine; BVS: Virtual Health Library.

Figure 1. Diagram of the search in the databases and/or portals.

table was prepared, containing the following characteristics: authors/year, type of study, type of institution/country, type of equipment/communication, population/number of participants, observation time, study objective and level of evidence.

RESULTS

The six articles selected were published in the period from 2011 to 2016. Among them, two articles resulted from a research conducted in the United States[8,9], three in Canada[10-12] and a population-based study in Kenya[13] (Chart 1).

Two studies were survey type cross-sectional quantitative studies[9,10], a randomized clinical trial[8], a qualitative study with ethnographic method[10] and two with quantitative and qualitative analysis by content[11,13]. Observation time, when described, ranged from 8 weeks to 17 months.

The study population in the articles included assistant physicians[8,10,11], clinical group coordinators, resident physicians[8-12], interns[9], medical students[10], nurses[10,11], pharmacists[8], community health agents[13], supervisors of groups of community health agents[13], professionals from the local Ministry of Health[13], professionals connected to non-governmental organizations or academic institutions participating in the project[13].

The equipment used for electronic communication in five studies was the smartphone[9-11], and, in another one, the pager and the tablet[8]. The studies looked at different forms of communication: messaging applications such as WhatsApp[12,13] and Medigram[8], suitable for health professionals; e-mail through the Blackberry server[10,11], smartphone messaging system (SMS)[9] and messages by pager[8].

The use of smartphone occurred in different ways: communication of professionals in intrahospital environment[8], communication and education of patient[9,10], patient image and video exchanges between residents and medical assistants for diagnostic assistance[9,10], electronic communication between nurses and physicians to transmit information and request physician's action[10,11], messages and photos between community agents and health supervisors for guidance on conduct[13].

Message exchanges occurred between residents and medical preceptors during patient's evaluation to report changes and to clarify doubts[8,9,12]; and among physicians and nurses to report clinical changes or to obtain information about the patient[10,11]. Some authors mentioned the number of analyzed messages: 12,936[10], 13,717 calls[10,11] and 1,830 posts [13].

The greatest occurrence of message exchanges occurred during medical visits and in the release of results of exams with laboratory or imaging alterations, mainly when other professionals were needed for distance evaluation[8-11].

The studies were carried out in health/teaching institutions: University of Toronto[12] and four teaching hospitals: Toronto General Hospital (Western), Brigham and Women's Hospital Massachusetts, University of Utah and Stanford Hospital[8,9,11]. One study involved community primary health care agents and workers participating in a distance-learning project through a forum in Makueni and Kibera, Kenya[13].

Advantages were identified in the use of electronic communication: agility in the exchange of information, since most of the participants had the habit of also using the smartphone feature for personal communication[12,13]; benefit for distance education with the WhatsApp application as a tool for improvement in environments with expressive sociodemographic problems and in professional mentoring for problem solving, in this case an outbreak of cholera[13]; possibility of forums for distance health education[13]; availability of calculation of medication and other applications that support decision-making by health professionals[9].

Positive aspects regarding the perception about the use of applications for interprofessional communication were reported, such as agility in the exchange of information[12,13]; doctors' knowledge of the names of the nurses responsible for their patients[10]; greater efficiency of residents in clinical work and perception of better care[8,9,11,12].

Although studies have evaluated the use of such equipment as a powerful communication tool[8-11], some aspects were pointed out as a cause for concern. These include the privacy and confidentiality of patient-related information; frequent interruptions during medical care (about 46%)[9, 12] and during teaching activities[10,12]; incompatibility in responses among physicians; frustration reported by nurses, since they did not receive a return in about 50% of messages sent, which required new telephone calls[10,11]; adherence to patient-specific use, including calculators, scoring systems, diagnosis and medical records[9].

Communication weaknesses were also reported, such as little return on the nurse's call due to divergence in

Chart 1. Synthesis of the six selected studies as a sample of the present research.

Authors/ year	Type of study	Type of institution, country	Type of equipment, communication	Population (No. of participants)	Observation time	Objective of the study	Evidence
Przybylo et al. (2014)[8]	Randomized clinical trial	Stanford Hospital, United States	Smartphone, Medigram compliant group messaging (HCGM) and traditional pager system	Participants divided into five groups of internal medicine: three randomized to the study group and two to the control group (n = 75)	8 weeks	To determine whether adding a Medigram text messaging application to the one-way pager improves communication between the hospital staff	1B
Raaum et al. (2015)[9]	Survey type cross-sectional study	University of Utah, Brigham and Women's Hospital, United States	Smartphone, SMS	Resident physician (175/330) (n = 175)	Not reported	To characterize the use of smartphone by resident physicians from academic institutions and to investigate their training in the clinical use of these devices	2C
Wu et al. (2011)[10]	Qualitative study with ethnographic reference	Toronto General Hospital, Canada	Blackberry cell phone, email	Resident doctors in medical clinic and nurses (n = 34)	17 months	To evaluate the use pattern of the use of smartphone , the advantages and disadvantages of its use; determine aspects to improve its use	2C
Smith et al. (2012)[11]	Quantitative-qualitative cross-sectional study of e-mail	Clinics of general hospital in Toronto, Canada	Blackberry cell phone, email	Resident physicians of medical clinic (34/67) (n = 34)	6 months	To analyze the content of e-mail communication between doctors, nurses and other health professionals	2C
Tran et al. (2014)[12]	Survey type cross-sectional study	Faculty of Medicine, University of Ontario, Canada	Smartphones, WhatsApp	Medical students of the 4th year (99/218) (n = 99)	Not reported	To evaluate the use of smartphones during the clinical stage and describe the perception of impact on the privacy and confidentiality of health information	2C
Henry et al. (2016)[13]	Quantitative-qualitative cross-sectional study of e-mail	Two units of mobile learning intervention (mCHW) study in Kenya	WhatsApp, forum learning	Community health agents, project supervisors, government health agency staff, non-governmental organizations or partner institutions (n = 41)	6 months	Document the use of WhatsApp as a support for supervision of community agents; identify how this is done and how it relates to overall project oversight	2C

SMS: Short Message System.

the severity criteria of the situation[10]; residents reported that 42% of the nurses' e-mails did not require answers, as they were informative only[11]; and lack of ability to use smartphone and applications[8,9].

The study that aimed to compare two messaging systems, one according to the information protection law, the Medigram (free access application for smartphone with access password) and a pager for use in the study hospital, did not observe statistical difference in relation to the aspects of the messages received in each modality; however, Medigram was best evaluated regarding the perceived effectiveness in the two means of communication,[8]. The most effective features of Medigram were: ease of use, ability to communicate by messages in the group, speed. The least effective features mentioned were: ability to be everywhere at the same time (ubiquity), inconsistent use by those who accessed the application, and reliability in the transmission of the message[8].

The authors of one of the studies[12] addressed the ethical question of this form of communication and observed that 78% of residents reported never identifying the patient during the exchange of messages about clinical behavior and 59% of these professionals stated that they received, in their training, guidelines on how to use the electronic communication feature and how to preserve confidentiality about patient data[13].

Overall, the results demonstrate that electronic communication brings benefits, but there must be prudence.

DISCUSSION

Few studies answered the guiding question, which may be due to the short time of use of this resource in the professional environment, since the oldest publication was in 2011. The studies included here have a predominant level of evidence 2C. In addition, no national studies on the subject were found.

The use of BlackBerry was surpassed by iPhone® in 2010, and extinct in 2016. With this, current studies depict other smartphone systems such as IOS, Android or Windows Phone. However, regardless of the technological resource used, the benefits evidenced in the use of the communication tool are similar to the findings of this study: agility in communication and efficiency in clinical work due to case sharing and the exchange of information on clinical behavior[14,15].

The SMS is similar to WhatsApp, in the exchange of text messages, but has become less used with the arrival of this new application.

Two studies[12,13] made use of the WhatsApp application for exchanging messages among health professionals. This feature has proven to be a cheap and agile tool that can be used in any mobile phone system with easy handling, speed and agility in the return of answers. On the other hand, there is a lack of understanding of how information is transmitted and stored when using WhatsApp, and problems with patient confidentiality and data security[14].

Additional WhatsApp benefits include the ability to create group messages, allowing better team communication, reviewing outgoing conversations, and additional opinion on patient cases and management[1,16].

The use of WhatsApp groups is observed in clinical practice for nurses and area coordinators for rapid communication of information related to work routine, shifts and guidelines. Another group profile consists of nurses from various hospitals to exchange information on routines and guidelines for materials.

This type of communication facilitates the transmission of messages and can be quickly visualized; however, it increases the use of smartphone in the working environment.

The use of the Medigram application was only identified in one study[8]. Messages are encrypted and access to the application is password-protected. This feature has been used in health working spaces, demonstrating increased accountability, improved efficiency, workflow integration, and overall satisfaction[1]. There is another commercially available application, Vocera, for intrahospital and secure communication and privacy of the shared data[17].

Message exchange features require careful typing, since errors, abbreviations, and auto-correction are common and may distort information. Subsequent corrections generate numerous messages, which propitiate the loss of important information, once that they go unnoticed in reading. There are also the errors of sending and receiving messages, absence of internet network, forgetting, losing or having the smartphone stolen, which prevent contact with the professional. Therefore, this should not be the only communication tool[18].

The disadvantages of these communication features were also observed in other studies, such as: interruption of work activities to consult and answer messages and calls[16,17] and possible patient exposure[16].

The use of smartphones in the workplace can be recognized as an indispensable tool to complete everyday tasks and certain clinical routines[19]; however there is concern regarding job performance, given that about 70% of the nurses witnessed improper use of the smartphone during labor activities[20].

This review also identified that nurses are concerned about the use of smartphones[8,10,12]. In a study carried out with students and nurses, there were reports of incidents caused by the use of the device during care and complaints of patients regarding the overuse of the device by the professional[21].

Health professionals, such as doctors and nurses, were extremely annoyed by interruptions to the workflow during assistance because of calls and electronic messages[22].

In a study[23], undergraduate nursing students mentioned that they observed 83% of nurses using the smartphone during clinical practice and 15% of them said that there should be regulatory policies for the use of the device. On the other hand, students, during their graduation studies, are encouraged to use the smartphone to complete the learning contents[23]. Assistant nurses, when asked about the use of the smartphone, reported that these devices bring benefits to patient care by applying technology in favor of good practices[21].

Among the limitations of this study are the few articles published about the use of this resource in communication among health professionals, which limits the evaluation of its use, as well as the variety of research outlines. The results allowed to identify the need for studies that discuss the ethical issues involved in this process of message exchange, security and data confidentiality.

CONCLUSION

It is concluded that there is little literature, so far, on the subject of electronic communication among health professionals. The advantage of information agility and the possibility of creating groups of conversation with greater dissemination of guidelines and routines among professionals is evident. However, there is still a long road to be travelled, due to legal and ethical demands, when this information is related to patients. Healthcare professionals do not yet have defined criteria for exchanging sensitive patient information and should be aware of disruptions and possible incidents related to the use of the smartphone in the workplace.

It is desirable that the nurse is the protagonist in conducting and transmitting patient's information, identifying pertinent information to be transmitted to the multidisciplinary team, maintaining the privacy of the information in an ethical and respectful way and managing assistance so the patient is benefited by the use of electronic communication, in favor of its recovery.

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