OBJN
ONLINE BRAZILIAN JOURNAL OF NURSING
ISSN: 1676-4285

**ORIGINAL**

# Use of information and communication technologies: quantitative study with hospital managers nurses*

## Uso de tecnologias de informação e comunicação: estudo quantitativo com enfermeiros gestores hospitalares

## Uso de tecnologías de información y comunicación: estudio cuantitativo con enfermeros gestores de hospitales

Tania Maria Tacca Zunkowski[1]
**ORCID:** 0000-0002-7674-6066

Letícia de Lima Trindade[1]
**ORCID:** 0000-0002-7119-0230

Karen Cristina Kades Andrigue[1]
**ORCID:** 0000-0001-6337-5641

Maria Manuela Ferreira Pereira da Silva Martins[2]
**ORCID:** 0000-0003-1527-9940

Simone Coelho Amestoy[3]
**ORCID:** 0000-0001-8310-2157

Junir Antonio Lutinski[1]
**ORCID:** 0000-0003-0149-5415

Olga Maria Pimenta Lopes Ribeiro[2]
**ORCID:** 0000-0001-9982-9537

1 Community University of Chapeco, Chapeco, SC, Brazil
2 Porto Higher School of Nursing, Center for Research in Health Technologies and Services, Porto, Portugal
3 University of the São Francisco Valley, Petrolina, PB, Brazil

**Editors:**
Ana Carla Dantas Cavalcanti
**ORCID:** 0000-0003-3531-4694

Paula Vanessa Peclat Flores
**ORCID:** 0000-0002-9726-5229

Barbara Pompeu Christovam
**ORCID:** 0000-0002-9135-8379

**Corresponding author:**
Karen Cristina Kades Andrigue
**E-mail:** karenandrigue@unochapeco.edu.br

**Submission:** 06/18/2021
**Approved:** 03/28/2022

## ABSTRACT

**Objective:** to analyze the perception of the usefulness of information and communication technologies in hospital management by nurses. **Method:** quantitative, cross-sectional and correlational study, with a total of 91 nurse managers from three hospitals. A questionnaire and the Nursing Manager's Work Perception Scale were used, and the data were subjected to descriptive and analytical analysis. **Results**: regarding the perception of usefulness of information and communication technologies, managers brought the medical records, the internet, discussion groups, among others, as very useful. Variables such as sex, age, training, time in service and in management are shown to be significant for the use of specific technological tools. **Conclusion:** the use of information and communication technologies among nurses and hospital managers requires observing the profile, investing in their training and considering the characteristics of the work context.

**Descriptors:** Nursing; Health Menagement; Information Technology.

## RESUMO

**Objetivo:** analisar a percepção da utilidade das tecnologias de informação e comunicação na gestão hospitalar por enfermeiros. **Método:** estudo quantitativo, transversal e correlacional, com 91 enfermeiros gestores de três hospitais. Utilizaram-se um questionário e a Escala de Percepção do Trabalho do Gestor em Enfermagem, sendo os dados submetidos a análise descritiva e analítica. **Resultados**: sobre a percepção de utilidade das tecnologias de informação e comunicação, os gestores trouxeram o prontuário, a internet, os grupos de discussão, dentre outros, como muito úteis. Variáveis como sexo, idade, formação, tempo no serviço e na gestão mostram-se significativas para a utilização de ferramentas tecnológicas específicas. **Conclusão:** o uso das tecnologias de informação e comunicação entre enfermeiros gestores hospitalares requer observar o perfil, investir em sua formação e considerar as características do contexto de trabalho.

**Descritores:** Enfermagem; Gestão em Saúde; Tecnologia da Informação.

## RESUMEN

**Objetivo**: analizar la percepción de los enfermeros sobre la utilidad de las tecnologías de la información y la comunicación en la gestión hospitalaria. **Método**: estudio cuantitativo, transversal y correlacional, con 91 enfermeros gestores de tres hospitales. Se utilizó un cuestionario y la Escala de Percepción del Trabajo del Gerente de Enfermería, y los datos fueron sometidos a análisis descriptivo y analítico. **Resultados**: en cuanto a la percepción de utilidad de las tecnologías de la información y la comunicación, los gestores señalaron como muy útiles la historia clínica, internet, grupos de discusión, entre otros. Variables como el sexo, la edad, la formación, el tiempo en el servicio y en la gestión se muestran significativas para el uso de herramientas tecnológicas específicas. **Conclusión**: el uso de las tecnologías de la información y la comunicación entre los enfermeros gestores de hospitales requiere observar el perfil, invertir en su formación y considerar las características del contexto de trabajo.

**Descriptores:** Enfermería; Gestión Hospitalaria; Tecnología de la Información.

Zunkowski TMT, Trindade LM, Andrigue KCK, Martins MMFPS, Amestoy SC, Lutinski JA, et al. Use of information and communication technologies: quantitative study with hospital managers nurses. Online Braz J Nurs. 2022;21:e20226584. https://doi.org/10.17665/1676-4285.20226584

## INTRODUCTION

In the hospital context, the nurse emerges as an important manager, coordinator of people and essential services for the better fulfillment of the mission and objectives of these institutions, which provide unique services in the care of users[1].
In this scenario, Nursing represents the highest percentage of the staff, requiring nurses to have a greater adaptive capacity and the acquisition of new skills that are able to respond to the demand for health care of the hospitalized individual. Thus, these professionals play an important role in the management of health care, with adequate knowledge, skills and attitudes to perform their managerial functions effectively, developing multiple tasks with a high degree of demand, which can interfere with the quality of care, depending on the way their work is organized and the knowledge and practices adopted[2].
However, the role of nurses as managers suffers interference that can compromise their performance, among which the following stand out: unsatisfactory working conditions, tension caused by pressure from excessive demand, lack of material resources, unsatisfactory quality and lack of integrality in the Health System, precariousness of operational information systems, making it difficult to evaluate results, lack of integrated people development policy, political decisions (political interference), political-party interests external to organizational life, lack of technical-scientific knowledge about the Health System, as well as about the laws, norms and guidelines that govern health[3].
In contrast, it is highlighted that some elements optimize management by Nursing, among which are Information and Communication Technologies (ICT). An international study pointed out that ICTs have great potential to simplify and streamline the process of managing nurses in health services, as well as improving the coordination of care delivery and leading teams[1].
Thus, the contribution of technology in management influences the efficiency, effectiveness and safety of care. Among the technologies, ICTs are considered technical means used to treat information and assist in communication[1].
In the context of health management, the progress of ICT allows the operationalization of processes and the capture of data from highly varied sources in a more agile and easy way, increasingly shaping the health domain, in order to offer opportunities as well as reveal new and unforeseen application scenarios. As a result, the health sector in general is potentially benefited, since it is expected to improve the quality of medical services and reduce health costs, despite the increase in demand due to the aging of the population[1,4].
However, even though technologies can be useful in solving problems in nursing practice, their effectiveness depends on the professionals' critical sense to know when these tools help[5]. Thus, recognizing the perception of the usefulness of technologies can contribute to the understanding of work processes in nursing and also help in the practice of nursing management. It is also worth remembering the importance of the institution in valuing these managerial resources, acting in the constant learning of nurse managers. Considering the above, the objective was to analyze the perception of the usefulness of information and communication technologies in hospital management by nurses.

## METHOD

A quantitative, cross-sectional and correlational investigation was carried out in three hospitals located in Santa Catarina, selected because they stand out as the main teaching and public care scenarios in the western region of the state. The scenarios were named hospitals 1, 2 and 3, where a total of 105 nurses worked in managerial activities.
In order to define the number of participants, a 95% confidence level and a margin of error of 5% was adopted. Thus, the sample design of 83 nurse managers was established. For selection, the following criteria were used: acting as a nurse manager in the services of interest, with at least three months of professional experience. Nurses away from services for any reason were excluded. The invitation to the study was addressed to all nurses who met the inclusion criteria, totaling a sample of 91 professionals.
For data collection, we used a questionnaire on socio-occupational characteristics and the Nursing Manager's Work Perception Scale (NMWPS), which is a self-directed instrument for nursing managers, built and validated in Portugal[6]. NMWPS organizes itself into groups. Group I contain 42 questions distributed in five domains: Professional, ethical and legal practice; Care management; People management; Political intervention and advice; and Professional Development. Group II was analyzed in this manuscript to survey the ICTs used by nurses and their usefulness. For the answers, there is a

Likert-type scale, where: value one = useless/not easy; value two = not very useful/not easy; value three = useful/easy; value four = very useful/very easy; and value five = unknown. In addition, the instrument has a space for participants' comments on the topic.

The instrument underwent cross-cultural translation during a dissertation project, being co-supervised by the Author. For this purpose, there was also a pre-test of nurses not participating in the study working in other hospital settings. Its use in this research obtained a Cronback Alpha of 0.95. Data were collected between October 2019 and January 2020.

Upon prior acceptance and scheduling, the participants were contacted and signed the Informed Consent Form in two copies, as well as receiving the physical questionnaire, and the date for delivery of the self-completed physical copy was scheduled.

The findings were tabulated in a database built on the Excel for Windows (2019) software platform, and analyzed with the help of the Statistical Package for the Social Sciences (SPSS), version 21.0. Quantitative variables were described by mean and standard deviation or median and interquartile range, while categorical variables were described by absolute and relative frequencies. To test the association between categorical variables, Pearson's chi-square or Fisher's exact test was used. Differences between groups formed from the quantitative variables were tested. In this case, the data distribution was tested using the Shapiro-Wilk normality test, using the non-parametric Mann-Whitney (U) and Kruskal-Wallis (Hc) tests. The significance level adopted was 5% ($p<0.05$). The study respected the ethics in research recommended by Resolutions 466/CNS/2012 and 510/2016, aiming to preserve the dignity, rights, safety and well-being of the participants. The project was approved by the Research Ethics Committee Involving Human Beings, via Plataforma Brasil (opinion n. 3.649.424/2019).

## RESULTS

A total of 91 nurses participated in the study, distributed in three hospitals, among which mostly were women (n=82/90.1%), with a partner (n=66/72.5%), with mean age 34.6 years old (±7.6), the youngest being 24 years old and the oldest 61 years old, with seven years of professional experience (range between 4 and 15 years). In the area of management, they had an average of one year of work (range less than one year to seven years) and an average of five years working in the current service (range between 4 to 15 years), in which they work 44 hours per week. Among the nurses, 16 managers worked in other services (17.6%) and 33 (36.3%) worked as nursing technicians.

Regarding training, 63.7% (n=58) obtained the title of nurse at a private university, 74.7% (n=68) of nurses had specific training in the area of management and 83.5% (n=76) with specialization, with emphasis on those in the Intensive Care Unit (n=26/28.6%), Emergency (n=14/15.4%), Cardiology (n=11/12.1%) and Oncology (n=10/11%). Among the forms of modality for professional improvement most mentioned by the research participants, the internet (n=62/68.1%), scientific events (n=60/65.9%), graduate studies (n=58/63.7%), study groups (n=19/20.9%) and short-term courses (n=6/6.6%) emerged.

Table 1 presents the nurses' perception of the availability of technologies in nursing management.

It was evidenced that 83.5% of nurses refer to the use of electronic medical records in the management of the sector as very useful. In addition, 74.7% say the presence of protocols, Standard Operating Protocols and flowcharts is very useful for their daily practice. On the other hand, 26.4% of respondents report not knowing the E-SUS software, as well as 11% consider it not very useful for hospital management. Most pointed out that the use of spreadsheets (63.7%), the nursing process (58.2%) and the use of the Internet (56%) are of great relevance.

Table 2 presents the nurses' perception of adherence to technological resources in management. It was evident that they perceive the use of protocols, flowcharts and SOP as useful (64.8%), as well as spreadsheets (53.8%) and the nursing process (57.1%). In terms of difficulty, the E-SUS is cited by 27.5% of the participants as not easy or not at all easy, followed by the mention of team meetings (23.1%) and videoconferences (36.3%).

## DISCUSSION

As for the socio-occupational profile of nurses, most were young nurses with partners deserves to be highlighted, a finding similar to that recorded in the national and international literature, which points out nursing as predominantly female, young adult, in the age group of 30 yearsold, with a bond with partners[1,7-9].

https://doi.org/10.17665/1676-4285.20226584

**Table 1** – Availability of information and communication technologies for work in the management of health services (n=91). Chapeco, SC, Brazil, 2020

| Variables Usefulness of technological resources for nursing management practice | Useless | Not very usefull | Usefull/Very usefull | Unknown |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) |
| Electronic mail and other forms of virtual communication | 1 (1.1) | 12 (13.2) | **55(60.5)** | 3 (3.3) |
| Years of experience | | | U = 347.5; p= **0.045** | |
| Years in service | | | U = 340; p = **0.036** | |
| Domain score | | | U = 338; p = **0.035** | |
| Sex | | | $X^2$ = 11.7; p = **0.39** | |
| Patient's medical records | 1 (1.1) | 1 (1.1) | **89(97.8)** | 0 (0.0) |
| Sex | | | $X^2$ = 13.3; p = 0.01 | |
| Other user data information devices (Ex.: E-SUS) | 2 (2.2) | 10 (11.0) | **55(60.5)** | 24 (26.4) |
| Specific training | | | $X^2$ = 15.02; p = **0.02** | |
| Management experience time | | | Hc = 11.8; p = **0.19** | |
| Discussion groups/case study/team meeting | 1 (1.1) | 6 (6.6) | **84(92.4)** | 0 (0.0) |
| Years in service | | | U = 383.5; p = **0.031** | |
| Domain score | | | U = 351.5; p = **0.013** | |
| Sex | | | $X^2$ = 10.9; p = **0.028** | |
| Internet/Intranet | 1 (1.1) | 3 (3.3) | **84(92.3)** | 3 (3.3) |
| Sex | | | $X^2$ = 14.7; p = 0.012 | |
| Virtual media (blog, facebook, instagram) | 25(27.5) | **30(33.0)** | 26 (45.1) | 10 (11.0) |
| Hospital of performance | | | $X^2$ = 18.8; p = **0.044** | |
| Forum/Symposium/Video Conferences | 3 (3.3) | 9 (9.9) | **76 (83.6)** | 3 (3.3) |
| Age | | | Hc = 9.8; p = **0.044** | |
| Sex | | | $X^2$ = 13.9; p = **0.016** | |
| Protocols/Procedure Standard Operating (SOP), Flowcharts | 2 (2.2) | 1 (1.1) | **88(96.7)** | 0 (0.0) |
| Spreadsheets (Shift change record/ discharge control/Care indicators | 4 (4.4) | 1 (1.1) | **86(94.5)** | 0 (0.0) |
| Age | | | U = 181.5; p = **0.41** | |
| Systematization of Nursing Care or Process | 4 (4.4) | 5 (5.5) | **82(90.1)** | 0 (0.0) |
| Hospital of performance | | | $X^2$ = 15.8; p = **0.045** | |
| Information Materials (Booklets/Folder/ Newsletter | 6 (6.6) | 13 (14.3) | 68 (74.8) | 4 (4.4) |
| Communication extensions/landline/ WhatsApp | 4 (4.4) | 8 (8.8) | **56(61.5)** | 2 (2.2) |
| Hospital of performance | | | $X^2$ = 18.6; p = 0.045 | |

Source: Prepared by the authors, 2020.
n= quantitative; %= frequency; U= Mann Whitney; p= significance level; $X^2$= Pearson's chi-square coefficient; Hc= Kruskal-Wallis

However, studies that discuss the age group under the prism of the inherent requirements of the profession, which are reflected in the job market, deserve attention, since only 2.1% of professionals working in Brazil are over 60 years old. In this area, exposure to work activities of intense physical and psychological exhaustion, in addition to biological risks, generates early professional leaves, with six out of ten professionals being less than 40 years old[8-9].

In addition, other studies reinforce that, although the new generations of women become very early users of technology, even in percentages that exceed those of men, their presence in the study, design and development of technologies and ICT remains a minority. Authors also reiterate that innovation and digital knowledge management are mainly male, and women's technological education is important to reduce the technological gender gap[1,10].

Regarding the academic profile, it is noteworthy that the findings are in line with data at the national level, which indicate that the professional training of nurses takes place mostly (57.4%)

**Table 2** – Adhesion of technologies in management (n=91). Chapeco, SC, Brasil, 2020

| Classification according to the usefulness of technological resources in nursing management practice | Useless | Not very usefull | Usefull/Very usefull | Unknown |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) |
| Electronic mail and other forms of virtual communication | 1 (1.1) | 9 (9.9) | **75(82.4)** | 6 (6.6) |
| Domain score | | | Hc = 8.66; p = **0.047** | |
| Patient's medical records | 0 (0.0) | 7 (7.7) | **84(92.3)** | 0 (0.0) |
| Years of experience | | | Hc = 8.54; p = **0.014** | |
| Other user data information devices (Ex.: E-SUS) | 6 (6.6) | 19 (20.9) | **36 (39.6)** | 30 (33.0) |
| Discussion groups/case study/team meeting | 1 (1.1) | 20 (22.0) | **67(73.6)** | 3 (3.3) |
| Hospital of performance | | | $X^2$ = 23.8; p = **0.008** | |
| Internet/Intranet | 2 (2.2) | 7 (7.7) | **76(83.5)** | 6 (6.6) |
| Virtual media (blog, facebook, instagram) | 7 (7.7) | 14 (15.4) | **41(45.1)** | 29 (31.9) |
| Hospital of performance | | | $X^2$ = 21.9; p = 0.016 | |
| Forum/Symposium/Video Conferences | 4 (4.4) | 29 (31.9) | **51 (56.1)** | 7 (7.7) |
| Protocols/Standard Operating Procedure (SOP)/flowcharts | 0 (0.0) | 8 (8.8) | **82(90.1)** | 1 (1.1) |
| Spreadsheets (Shift change record/discharge control/Care indicators) | 0 (0.0) | 4 (4.4) | **49 (53.8)** | 1 (1.1) |
| Systematization of Nursing Care or Process | 2 (2.2) | 19 (20.9) | **86(73.6)** | 3 (3.3) |
| Information Materials (Booklets/Folder/ Newsletter) | 0 (0.0) | 11 (12.1) | **75 (82.4)** | 5 (5.5) |
| Years in service | | | Hc = 12.8; p = **0.005** | |
| Communication extensions/landline/Whatsapp | 1 (1.1) | 4 (4.4) | 82(90.1) | 4 (4.4) |
| Hospital of performance | | | $X^2$ = 20.8; p = **0.022** | |
| Online calendar, collective agenda devices | 2 (2.2) | 11 (12.1) | **40(44)** | 38(41.8) |
| Years in service | | | Hc = 11.35; p = **0.023** | |

Source: Prepared by the authors, 2020.
n= quantitative; %= frequency; U= Mann Whitney; p= significance level; $X^2$= Pearson's chi-square coefficient; Hc= Kruskal-Wallis

in private higher education institutions, the public ones being responsible for the formation of 35.6% of the contingent and the philanthropic ones for less than 5%[10]. It is also noteworthy that this profile tends to be maintained, considering the geographic distribution of higher education institutions, the increase in Distance Education (EAD) courses, as well as the operation of night courses[11].

It is worth mentioning that a significant number of nurses have specific training in the area of management, reflecting the participants' interest in developing managerial skills and competences, in order to support their actions on scientific knowledge. Thus, training promotes the development of important skills for the use of technologies in activities[1].

It is believed that adherence and skills in the use of ICT enhance time management and communication between team members, as well as between the team and patients. In addition, it favors managerial and clinical decision-making, especially among nurses, as they occupy management positions in different health services and at all levels of care.

In this area, regarding the availability of ICT, it should be noted that the electronic medical record showed positive results in terms of both usefulness and adherence by nurses. It is noteworthy that healthcare is rapidly evolving to meet the changing needs of our increasingly complex patients. Emerging ICTs, such as electronic health records, challenge nursing practice to redesign the workflow, including technologies in management practices[12].

Studies indicate that the Electronic Medical Record contributes to comprehensive care, as its access can be carried out in several places in the health care network, which promotes agility in the clinical diagnosis, conduct and treatment, optimizing the time of the patient and health professionals[12].

The Standard Operational Protocols also emerge as an available and easy-to-adhere technology, which configure managerial technologies that the professional nurse can use to improve the quality of care provided and a resource for the standardization of nursing interventions[13]. These protocols must be built as a team, taking into account the reality of the service and encouraging the achievement of improvements in their activities[13].

Regarding the use of spreadsheets (shift change record/discharge control/care indicators) and other manual methods of technology in hospital management, during the study, a significant number of professionals who use and have good adherence to these technologies were identified. As an example, another study, using these technologies, showed that, in addition to contributing to the planning, organization and optimization of nursing services, they identify problems related to care, dimensioning and nursing management, in order to modify and positively influence the care provided to the patient. Thus, it is one of the management tools for monitoring and evaluating the productivity and quality of care provided to patients in hospital environments[14].

However, the use of these technologies is the target of much criticism, as they are considered bureaucratic, since, currently, there are other digital technologies (such as Web applications, applications for mobile phones or management tablets, planning software, among others) that they provide the same resources in a more organized, easily accessible and democratic way, helping in planning, decision-making, management control, quality of care and communication between professionals[15]. It is also worth noting that, in an investigation carried out in Portugal on the usefulness of ICT in nursing practice, the factors that conditioned the appreciation of SClínico®, which in this country is the technology that incorporates items that translate the nursing process and the nurses' work plan, referred to the complexity and inadequacy of the technology to some work contexts, the lack of knowledge about the technology, as well as the time required to perform the records[16].

Although information and communication technologies constitute, when properly used, excellent working tools, the lack of knowledge about them conditions their use, as well as the exploitation of all their potential[17]. In view of the above, it is emphasized that the use of technologies aimed at communication is indispensable nowadays in health services. Through these resources, health professionals in general have the possibility of making the decision together remotely, which is important for the adequate care of the patient, with a view to detecting errors, solving doubts, in order to facilitate the meeting of the sector teams[18].

In this scenario, it is also imperative to mention the General Law for the Protection of Personal Data (GLPD), in force in Brazil since August 14, 2018, as a regulatory framework that must be observed by institutions and professionals in the

internal processes of data collection and storage of patients, in addition to unique requirements in information security management. Authors reiterate that scarce technological resources are a limiting factor for compliance with the law, as well as the lack of knowledge of best practices in information security, recommending studies that observe the development and adequacy of Brazilian organizations to regulations[19].

In order to make the most of the benefits of ICT, nurse managers need to promote the participation of nursing professionals in continuing and permanent education activities, with the aim of developing skills and competences related to the domain of information and communication resources. In addition, they should also consider the need for financial investments in networks, equipment and personnel[20].

## CONCLUSION

The results showed that nurse managers have a profile similar to that described in national and international studies, observing nurse managers as female and young. These characteristics are important to define training strategies for the use of ICT.

Still regarding the perception of usefulness and adherence to ICT, there was an appreciation of electronic medical records and protocols, which emerge as technologies capable of contributing to patient care, by optimizing nursing records, systematizing care and enhancing the care management. On the other hand, the perception of usefulness and adherence to manual ICTs (spreadsheets, shift change record/discharge control) emerged, pointing out that even in the face of the increase in electronic equipment these technologies are still used in daily practice. In the meantime, the important adoption of mobile technologies (for cellphones) for patient care at the hospital bed stands out, which optimize the time and accuracy of records, but are still timidly used.

It is worth noting as limits the approach of a portion of nursing, since technicians and nursing assistants also handle these technologies and face challenges in their use.

It is also noteworthy that the optimization and training of management tools, such as ICT, by nurses must be improved, aiming at better care, organization of the work environment and services, without losing the appreciation of interpersonal relationships and the potential of other technological resources of different natures.

*Paper extracted from the master thesis "Health planning as a work technology for nurses in hospital management", presented to the Community University of Chapeco, Chapeco, SC, Brazil.

## ACKNOWLEDGMENTS

We thank Maria da Silva for her collaboration in the data analysis and interpretation.

## CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

## REFERENCES

1. Martins MMFPS, Trindade LDL, Vandresen L, Leite MJMGC, Pereira CMG, Landeiro MJL. Tecnologias utilizadas por enfermeiros gestores em hospitais portugueses. Rev Gaucha Enferm. 2020;41:e20190294. https://doi.org/10.1590/1983-1447.2020.20190294

2. Ferracioli GV, Oliveira RRD, Souza VSD, Teston EF, Varela PLR, Costa MAR. Competências gerenciais na perspectiva de enfermeiros do contexto hospitalar. Enferm Foco [Internet]. 2020 [cited 2020 set 29];11(1):15-20. Available from: http://revista.cofen.gov.br/index.php/enfermagem/article/view/2254/696

3. Fernantes JC, Cordeiro BC. The management of basic health units from the point of view of nursing managers. Rev Enferm UFPE (Online). 2018;12(1):194-202. https://doi.org/10.5205/1981-8963-v12i01a23311p194-202-2018

4. Aceto G, Persico V, Pescapé A. The role of information and communication technologies in healthcare: Taxonomies perspectives and challenges. Journ Net Computer Applications. 2018;107:125-154. https://doi.org/10.1016/j.jnca.2018.02.008

5. Reis NSP, Dias CS, Monteiro VO, Barreto CTG, Santos RS, Nunes AS. Insertion of

nursing in diagnostic technologies: innovations in secondary health care. Rev Fun Care (Online). 2020;12(0):29-36. https://doi.org/10.9789/2175-5361.rpcfo.v12.6903

6. Martins MM, Gonçalves MN, Teles P, Bernardino E, Guerra N, Ribeiro OMPL. Construção e validação de um instrumento de percepção do gestor. Rev Enferm UFPE (Online). 2021;15:e245192. https://doi.org/10.5205/1981-8963.2021.245192

7. Boniol M, McIsaac M, Xu L, Wulij T, Diallo K, Campbell J. Gender Equity in the health workforce: analysis of 104 countries. Geneva: World Health Organization; 2019 [cited 2020 maio 3];50(1):109-17. Available from: https://apps.who.int/iris/bitstream/handle/10665/311314/WHO-HIS-HWF-Gender--WP1-2019.1-eng.pdf

8. Arroyo-Laguna J. Redistribution of salary or professional recognition? The difficult construction of a profession, the Peruvian nursing. Ciênc Saúde Colet. 2020;25(1):223-232. http://dx.doi.org/10.1590/1413-81232020251.25972019

9. Silva MCN, Machado MH. Health and Work System: challenges for the Nursing in Brazil. Ciênc Saúde Colet. 2020;25(1):7-13. https://doi.org/10.1590/1413-81232020251.27572019

10. Gonzáles-Palencia RJ, Jiménez Fernán- dez C. La brecha de género en la edu- cación tecnológica. Ensaio: Aval Pol Públ Educ. 2016;24(92):743-71. https://doi.org/10.1590/S0104-403620160003000010

11. Frota MA, Wermelinger MCMW, Vieira LJES, Neto FRGX, Queiroz RSM, Amorim RF. Mapping nursing training in Brazil: challenges for actions in complex and globalized scenarios. Ciênc Saúde Colet. 2020;25(1):25-35. https://doi.org/10.1590/1413-81232020251.27672019

12. Malane EA, Richardson C, Burke KG. A Novel Approach to Electronic Nursing Documentation Education. J Nurses Prof Dev. 2019;35(6):324-29. https://doi.org/10.1097/NND.0000000000000587

13. Cordeiro TLR, Andrade LAS, Santos SP, Stralhoti KNO. Prontuário eletrônico como ferramenta para a sistematização da assistência de enfermagem no serviço de urgência/emergência: percepção dos enfermeiros. Espaç saúde. 2019;20(2):29-41. https://doi.org/10.22421/15177130-2019v20n2p30

14. Sales CB, Bernardes A, Gabriel CS, Brito MF, Moura AA, Zanetti ACB. Standard Operational Protocols in professional nursing practice: use, weaknesses and potentialities. Rev Bras Enferm. 2018;71(1):126-34. http://dx.doi.org/10.1590/0034-7167-2016-0621

15. Borges TAC, Sá RC, Neves MGC. Planejamento da Assistência em Enfermagem: proposta para implementação de um instrumento administrativo-assistencial. Comum Ciências Saúde. 2018;28(03/04):413-8. https://doi.org/10.51723/ccs.v28i03/04.283

16. Machado GR, Évora YDM, Rangel AL, Silveira RCCP, Silva BR. Development of a software for intraoperatory nursing assistance. Rev Bras Enferm. 2019;72(3):680-686. http://dx.doi.org/10.1590/0034-7167-2018-0665

17. Ribeiro, OMPL, Martins MMFPS, Vandresen L, Ventura da Silva JMA, Cardosos, MFPT. Usefulness of information and communication technologies: portuguese nurses' look. Texto Contexto Enferm. 2021;30:e20190139. https://doi.org/10.1590/1980-265X-TCE-2019-0139

18. Souza RS, Teichmann PV, Machado TS, Serafim DFF, Hirakata VN, Silva CH. Prontuário Eletrônico do Paciente: percepção dos profissionais da Atenção Primária em Saúde. Rev Saud Digi Tec Edu [Internet]. 2018 [cited 2020 maio 25];3(1):51-68. Available from: http://periodicos.ufc.br/resdite/article/view/33069

19. Piurcosky FP, Costa MA, Frogeri RF, Calegario CLL F. A lei geral de proteção de dados pessoais em empresas brasileiras: uma análise de múltiplos casos. Suma Neg. 2019;10(23):89-99. https://doi.org/10.14349/sumneg/2019.v10.n23.a2

20. Barra DCC, Paim SMS, Sasso GTMD, Colla GW. Methods for developing mobile apps in health: an integrative review of the literature. Texto Contexto Enferm. 2017;26(4):e2260017. http://dx.doi.org/10.1590/0104-07072017002260017

| **AUTHORSHIP CONTRIBUTIONS** |
|---|
| Project design: Zunkowski TMT, Trindade LL, Martins MMFPS, |
| Data collection: Zunkowski TMT, Trindade LL, |
| Data analysis and interpretation: Zunkowski TMT, Trindade LL, Andrigue KCK, Martins MMFPS, Lutinski JA, Ribeiro OMPL |
| Writing and/or critical review of the intellectual content: Zunkowski TMT, Trindade LL, Andrigue KCK, Martins MMFPS, Lutinski JA, Ribeiro OMPL |
| Final approval of the version to be published: Zunkowski TMT, Trindade LL, Andrigue KCK, Martins MMFPS, Lutinski JA, Ribeiro OMPL |
| Responsibility for the text in ensuring the accuracy and completeness of any part of the paper: Zunkowski TMT, Trindade LL, Andrigue KCK, Martins MMFPS, Lutinski JA, Ribeiro OMPL |