Applications, benefits and challenges os using information systems in the perfomance of nursing

RESUMO | Objetivo: Apresentar benefícios e entraves que impedem os profissionais de Enfermagem utilizarem sistemas de informação (SI). Métodos: Trata-se de revisão sistemática. Dados coletados nas bases: Scielo, Biblioteca Virtual em Saúde (BVS) e PubMed Centralcom descritores: enfermagem AND sistemas de informação AND aplicações OR beneficios OR limitações,utilizando a estratégia PICO.Critério de inclusão: artigos completos, idioma Português, período 2019 a 2021, excluídos artigos repetidos e não vinculados ao tema. Resultados:Analisadas sete publicações que discutem dificuldades na utilização do sistema devido ao atraso na inserção das informações do paciente,baixa adesão e aceitabilidade entre os profissionais. Pontos positivos encontrados foram otimização de tempo, redução de atividades burocráticas, agilidade para tomar decisões corretas no atendimento ao paciente.Conclusão: Os sistemas de informação fornecem o armazenamento, a organização e o controle das informações que facilitam o conhecimento prévio do paciente; além de fornecer o suporte necessário para a tomada de decisão na prática de Enfermagem.
Descritores: Enfermagem; Sistema de informação; Tecnologia da informação.

ABSTRACT | Objective: To present benefits and obstacles that prevent Nursing professionals from using information systems (IS). Methods: This is a systematic review. Data collected in the following databases: Scielo, Virtual Health Library (BVS) and PubMed Central with descriptors: nursing AND information systemsAND applications OR benefits OR limitations, using the PICO strategy. Inclusion criteria: full articles, Portuguese language, period 2019 to 2021, excluding repeated articles not linked to the theme. Results: Seven publications were analyzed that discuss difficulties in using the system due to the delay in entering patient information, low adherence and acceptability among professionals. Positive points found were time optimization, reduction of bureaucratic activities, agility to make correct decisions in patient care. Conclusion: Information systems provide the storage, organization and control of information that facilitate prior knowledge of the patient; in addition to providing the necessary support for decision-making in Nursing practice.
Keywords: Nursing; Information system; Information Technology.

RESUMEN | Objetivo: Presentar beneficios y obstáculos que impiden que los profesionales de Enfermería utilicen los sistemas de información (SI). Métodos: Esta es una revisión sistemática. Datos recolectados en las siguientes bases de datos: Scielo, Biblioteca Virtual en Salud (BVS) y PubMed Central con descriptores: enfermería Y sistemas de información Y aplicaciones O beneficios O limitaciones, utilizando la estrategia PICO. Criterios de inclusión: artículos completos, idioma portugués, período 2019 a 2021, excluyendo artículos repetidos no vinculados al tema. Resultados: Se analizaron siete publicaciones que discuten las dificultades en el uso del sistema debido a la demora en el ingreso de la información del paciente, baja adherencia y aceptabilidad entre los profesionales. Los puntos positivos encontrados fueron optimización de tiempo, reducción de actividades burocráticas, agilidad para tomar decisiones correctas en la atención al paciente Conclusión: Los sistemas de información brindan el almacenamiento, organización y control de la información que facilitan el conocimiento previo del paciente; además de brindar el apoyo necesario para la toma de decisiones en la práctica de Enfermería.
Palabras claves: Enfermería; Sistema de información; Tecnología de la informacion.

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INTRODUCTION

Information systems have proved to be an asset in the systematization of information, allowing the safeguarding of sensitive data and ensuring interoperability between the various factors of the health system. [1]

The introduction of computerized systems in the health area contributes to the organization of services, communication and the improvement of the quality of care provided. However, some factors – such as lack of knowledge and lack of

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resources and infrastructure – have influenced the acceptance and use of the system. [2]

However, one of the great difficulties observed in the application and effective use of Information Systems is the acceptance of professionals in relation to these computing resources. This can be due to several factors: lack of information on the true objective of the information system, lack of adequate training for the health team, lack of motivation and difficulty in reconciling work time, search for new information and the deficit in the number of employees for food and searches in Nursing Information Systems. [3]

Information is the key to the power of this technological age. Professionals with more information have more opportunities to choose, decide and ensure better living conditions, health, resources and finances. [4] Health Information Systems (SIS - sistemas de Informação em Saúde) constitute strategies of technological innovation that instrumentalize the process of collecting, processing, analyzing and disseminating information, enhancing the management of this data in different settings of health care. [5] Nursing, therefore, needs to continually learn to manipulate these tools, often having to re-signify its practices, since care involves the generation, handling and processing of health information about patients, as well as the multidisciplinary team.

Health information systems (SIS) can be defined as a set of interrelated components that collect, process, store and distribute information to support the decision-making process and assist in the control of healthcare organizations. Thus, health information systems bring together a set of data, information and knowledge used in the health area to support planning, the improvement and decision-making process of the multiple health professionals involved in the care of patients and users of the health system. [4]

The computerized system applied to the health area provides different technological resources that, in addition to care management, allow the implementation of different barriers to the occurrence of adverse events. In recent years, systematic programs have been developed for the collection and analysis of information that support the planning of interventions and the management of care plans. [6]

“Health information systems (SIS) can be defined as a set of interrelated components that collect, process, store and distribute information to support the decision-making process and assist in the control of healthcare organizations.”

Nursing information systems, where quality indicators are integrated, focus on the standardization of health records and the consequent visibility of the care provided. Despite the recognized importance of the contributions of information systems, their implementation has been marked by several challenges, so we propose to reflect on these. [1]

A study carried out by Pinheiro et al indicated that the implementation of an information system represents an important advance in the qualification and use of the information recorded during the health actions developed. [7]

Therefore, this work aims to investigate and expose the applications and benefits of using Information Systems by Nursing professionals; as well as pointing out possible limiting factors for adherence and use of the system, having as a guiding question “What are the applications and benefits of the use of information systems by Nursing professionals?”.

METHODS

The present work consists of a systematic review. Thus, in order to formulate the research problem and the adoption of the search system, the PICO (Patient, Intervention, Comparison and Outcome) strategy was used, with the following guiding question: “What are the applications and benefits of using information systems by Nursing professionals?”.

The sample selection was made through access to the databases: Scielo, Virtual Health Library (VHL) and PubMed. Controlled descriptors combined with Boolean operators arranged in Medical Subject Headings (MeSH) were used as a search strategy: “nursing” AND “information systems” AND “applications” OR “ benefits” OR “limitants”, in the PubMed database, without determining a specific search field (article title; abstract; keywords, etc.), but opting for all fieds. The following combination was used in LILAC, according to Health Sciences Descriptors (DeCs): “enfermagem” AND “sistemas de informação” AND “aplicações” OR “benefícios” OR “limitações”. The terms were combined using the Boolean operators “AND” and “OR” to compose the search strategies, as shown in Table 2.

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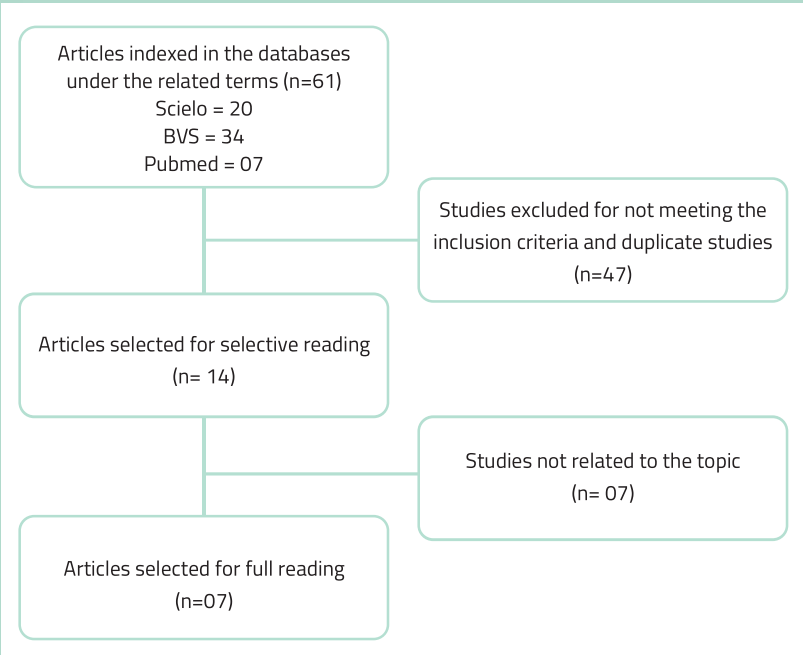
After collecting the material, the following steps were taken: 1) exploratory reading; 2) selective reading; 3) critical reading; 4) summary of each selected material; 5) analysis and discussion of the data obtained.

Based on the methodology described, 61 manuscripts were found. Of these, 34 from the Virtual Health Library, 7 from PubMed and 20 from Scielo. The title and abstract of these 61 articles were read. After applying the exclusion criteria, a total of 07 scientific articles remained to form the body of the work. After configuring the corpus of analysis, as shown in Figure 1, the articles were read in full, filling the instrument with the following information: author and year; type of information system used; challenges and limiting factors and finally the applications and benefits for Nursing.

Table 1 presents the distribution of terms of the guiding question according to the PICO strategy

Manuscripts published from 2019 to 2021, having full text available, were adopted as inclusion criteria. Articles that were not linked to the theme "use of information systems in nursing" were also excluded, as were repeated texts when comparing the three virtual platforms.

Figure 1. Flowchart of the study selection process for review



Source: authors data, 2021

Table 1 – Description of the PICo strategy, 2021.

Acronym	Definition	Description
P	Population	Nursing
I	Intervention	Information systems
C	Comparison	Limiting factors (Challenges)
O	Outcome	Applications / Benefits

Source: description of the PICo strategy, adapted by the authors, 2021.

RESULTS

Of the selected manuscripts, 07 deal with different types of Information Systems and report the main obstacles encountered during the implementation of the information system. Of the reviewed articles, 04 were published in 2019, 02 in 2020 and 01 in 2021. Table 2 shows the individual synthesis of the articles that made up the corpus of analysis, contributing to the interpretation of the results.

The main difficulties encountered in managing the work of nursing professionals were low adherence and low acceptability in the use of the systems by professionals, causing delay in typing the forms and even inconsistency in patient data, lack of training to use the system correctly, infrastructure problems such as lack of computers and low internet connectivity. The lack of correct information inserted in the system can influence the actions on the nursing care of the individual or a community. On the other hand, the systems brought positive aspects related to information management, agility in decision-making, reduction of bureaucratic activities of the nursing professional, optimization of time and work processes, and being able to subsidize correct decisions to give more attention to the patient.

DISCUSSION

As we all know, health information systems help to improve the efficiency of institutions and allow access to various information that support health planning and decision-making, therefore, health professionals have a working tool that can help in the management of care and assistance. It is important to note that hospital managers are aware of the importance of using information technology (IT) in their institutions, but still do not prioritize its use, and often leave it in the backgrou-

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Quadro 2– Caracerização do corpus de artigos de pesquisa. Jaú – SP. 2021.

Author/ Year	Type of information system used	Challenges / Limiting factors	Applications and Benefits for Nursing
Carvalho MLT., et al 2021	Management Application for University Hospitals (AGHU - Aplicativo de Gestão para Hospitais Universitários)	Low adherence of nursing professionals, lack of a module to use the Nursing Care Systematization (NCS), lack of professional training, it was concluded that the AGHU system, as it is structured, is not being used in a cohesive way, having a negative impact on the quality of services provided to health management.	The instrument allows expanding knowledge about the theme related to the decision-making field of nurse managers, providing subsidies for the improvement of Nursing actions.
Pedroso AOet al., 2020	Notifiable Diseases Information System (SINAN - Sistema de Informação de Agravos de Notificação)	Low acceptability of the system in the municipalities of Pará; delay in entering notification forms into the system; Inconsistencies in filling in the data.	We can see that the system can help health surveillance and reduce the waste of resources by subsidizing correct decision making.
Oliveira VCet al., 2020	Computerized Immunization System (SII - Sistema Informatizado de Imunização)	Organizational infrastructure problems due to lack of computers and low internet connectivity in health facilities.	Nursing professionals perceived advantages in accepting and using the Information System of the National Immunization Program. With better control of the vaccinated history, and reduction of paper records.
Fernandes FEMV etal., 2019	Impact of feeding actions of primary care information systems on the care of individuals and the community	To evaluate the influence of the feeding actions of the Information Systems used in Primary Care (PC) on the nursing care provided to the individual or community.	The study points out the influence of managerial actions aimed at Information Systems on the care provided to individuals/community.
Domingos CSet al., 2019	Information system with the Intensive Care Nursing Process (SIPET - Sistema de informação com o Processo de Enfermagem em Terapia Intensiva)	Adequacy of the system to better serve the Nursing team; acquisition of equipment to use the system (tablets)	The use of the system allows for a reduction in the time dedicated to bureaucratic activities, such as records in medical records, and time management is optimized in direct patient care
Araújo JR et al., 2019	E-SUS Primary Care (e-SUS AB - E-SUS Atenção Básica)	Troubled deployment process; Lack of guidance/training regarding the use of the system	It can be seen that the system can be an important tool within the context of the ESF, contributing to the optimization of work processes
Silva BS, et al., 2020	Immunization Information System	Problems related to professionals' practices; Low registration of enrolled population; failures in the active search for defaulters; Training was considered insufficient and ineffective	The system is an essential technology for the management of immunization actions

Source: authors data, 2021

nd. [8]

Health Information systems are recognized as instruments that increase the effectiveness of professionals and reduce health costs, as well as helping to promote standardization of care. [9] Therefore, the SIS (Health Information System) must be used to manage the information necessary for health professionals to carry out activities effectively, efficiently, promote communication, integrate information and coordinate actions between multiple sectors.

However, as in any moment of change, there is a more critical initial period

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until the new processes and instruments used are incorporated into the routine of health team professionals. [13]

When implementing changes that affect a healthcare organization's structure, culture, work processes, behavior and communication channels, some resistance is expected. One solution is to carry out progressive training and educational activities. In a systematic review, it was identified in the studies that, where there was adequate technological support and training, the acceptance of the information system was easier. In contrast, in studies in which inadequate or non-existent IT support or training was reported, the tendency was to conclude that these factors were barriers to system implementation. [10]

The introduction of systems found was related to technical and operational aspects: Copying prescriptions and reports; lack of computers; Need for portable or handheld computers (tablet, laptop); and need for training. One of the dangerous features of the computer, which is also pointed out as a negative aspect, corresponds to the possibility of copying and pasting information. In this sense, copying prescriptions in full, without evaluating the patient and without proper analysis and reflection on what was previously prescribed, must be fought to comply with the code of Medical Ethics. [11]

It is important to remember that every nursing professional has the ethical responsibility to record information that is essential to the care process in the patient's medical record, in a complete and reliable way, to ensure continuity of care, being prohibited from registering partial and untrue information about the assistance provided. For this, it is recommended that the nursing notes are recorded soon after each procedure or care is performed, with its respective execution time, as per the Code of Ethics for Nursing Professionals. [12]

Another limiting factor may be related to the lack of familiarity of professionals with technologies and possible failures in the systems, since the successful implementation of information systems depends on the active involvement of health professionals. The ease of using a technology is a factor influencing its acceptance. Thus, carrying out qualifications/training for the use of an information system is related to the ease of use and usefulness of the system insofar as it improves people's abilities to handle the technology. [14]

According to a study carried out by Pedroso et. al. [15] where the results demonstrate a low acceptability of the immunization system in the municipalities of Pará, less than 70%, therefore, bad according to the established parameters. A time lapse in the system records was also evidenced, where half of the cases took up to 26 days to be typed, and in the entire series studied, more than 10.00% of the records had this time typed for more than 100 days.

This delay in feeding the system compromises quick/immediate surveillance actions, in addition to making it difficult to identify outbreaks, as it is an arbovirus. Furthermore, it can discredit the weekly/monthly epidemiological bulletins, and run the risk of disguising the beginning of outbreaks, or even the recognition of the introduction of new diseases in the territory. [15]

The introduction of new technologies in daily work also refers to the process of innovation in health practice, as it is a technical tool, but it also brings some challenges, as it requires adjustments in the acquisition and professional preparation of new knowledge, including all the knowledge and factors inherent to the context in which they are inserted. [13]

Although information systems are being developed to improve the efficiency and productivity of the nursing team, the key to success lies in their acceptance and willingness to initiate the change process.

The awareness of nursing professionals regarding the use of information technology will result in product orientation, in the sense of benefiting the patient, reducing costs and rationalizing work. This has been the great challenge of informatics in nursing. [16]

The awareness of nursing professionals regarding the use of information technology will result in product orientation, in the sense of benefiting the patient, reducing costs and streamline work. This has been the great challenge of informatics in nursing. [17]

Knowledge acquisition for these systems is related to the identification and assessment of the best available knowledge, making their effectiveness dependent on evidence from high-quality clinical research being up-to-date, easily accessible and computer-interpretable. The use of clinical decision support systems, in addition to helping decision makers, can increase the quality of care provided and reduce errors. However, there is still limited evidence available on the widespread use of these systems, and the quality or relevance of the evidence may constrain their effectiveness according to ARAUJO et al. [18]

CONCLUSION

The objective of this study was to understand the applications and benefits of the use of information systems by Nursing professionals through a systematic review on topics related to information technology systems, concepts of innovation, and mainly, on the theories of acceptance, adoption and diffusion of innovations. In general, the results of this review demonstrate a portrait of the lack of infrastructure of health services in the light of information technology and the difficulty of implementing information systems in the Health Service. We were able to conclude that, although obstacles to its use were found, Information Systems are currently related to the optimization of the nurse's work process in different scenarios and contexts, prior knowledge of each patient, being a tool that facilitates

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their actions and decision making, whether in care, management or teaching.

The introduction of technology in daily work, while referring to a process of innovation in health practices, as it is a technological tool, also brought with it several challenges, as it requires adaptation and preparation of the professional regarding the acquisition of new knowledge, involving factors inherent to each one and the context in which they were inserted.

Ease of access to information via the computer was one of the factors that also stood out, easy access is directly related to decision-making and care, as well as less displacement of professionals within the work environment.

There is great resistance regarding the use of information systems, often due to unsatisfactory training, which leaves the professional with doubts and resistance regarding the use of the systems.

The present article consisted, therefore, of knowledge for reflection by all nursing professionals, regarding the benefits of using this technological instrument, provided that there is a good qualification, supervision and support after the installation of an Information System.

References

1.Nascimento T, Frade I, Miguel S, Presado MH, Cardoso M. Os desafios dos sistemas de informação em enfermagem: uma revisão narrativa da literatura. Ciência & Saúde Coletiva [Internet]. 2021 Feb [cited 2021 Nov 28];26(2):505–10. Available from: https://www.scielo.br/j/csc/a/gXgZpscZ-5qcNH9hHF5WD9Xd/?lang=pt

2.Nascimento T, Frade I, Miguel S, Presado MH, Cardoso M. Os desafios dos sistemas de informação em enfermagem: uma revisão narrativa da literatura. Ciência & Saúde Coletiva [Internet]. 2021 Feb [cited 2021 Nov 28];26(2):505–10. Available from: https://scielosp.org/article/csc/2021.v26n2/505-510/

3.Silva, Tayane Medeiros de Oliveira, Francisca, Liliane Barbosa Rodrigues, Mércia Gomes Oliveira de Carvalho, Jackeline Neres Bellucci. Sistemas de informação como instrumento para tomada de decisão em saúde: revisão integrativa. Revista de Enfermagem UFPE on line [Internet]. 2016 [cited 2021 Nov 28];10(9):3455–62. Available from: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/11428

4.Fabiane M, Rosangela P, Cândido P. FUNDAÇÃO EDUCACIONAL DO MUNICÍPIO DE ASSIS INSTITUTO MUNICIPAL DE ENSINO SUPERIOR DE ASSIS Coordenadoria de Enfermagem OS SISTEMAS DE INFORMAÇÃO COMO SUBSIDIO À TOMADA DE DECISÃO PARA O PROFISSIONAL DE ENFERMAGEM [Internet]. Available from: https://cepein.femanet.com.br/BDigital/arqTccs/0611251073.pdf

5.Heimar Fatima Marin, Luciane Mandia Grossi, Ivan Torres Pisa. Tecnologia da Informação e Comunicação na Auditoria em Enfermagem. Journal of Health Informatics [Internet]. 2015 [cited 2021 Nov 28];7(1). Available from: http://www.jhi- sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/314/227

6.Cavalcante RB, Kerr-Pinheiro MM, Guimarães EA de A, Miranda RM. Panorama de definição e implementação da Política Nacional de Informação e Informática em Saúde. Cadernos de Saúde Pública [Internet]. 2015 May [cited 2021 Nov 28];31(5):960–70. Available from: https://www.scielo.br/j/csp/a/P3hvqjy9qxJ9H7QshNxjxdB/?lang=pt

7.Kleib Manal, Simpson N, Rhodes B. Information and Communication Technology: Design, Delivery, and Outcomes from a Nursing Informatics Boot Camp [Internet].

ResearchGate. 2016 [cited 2021 Nov 27]. Available from: https://www.researchgate.net/publication/310479141_Information_and_Communication_Technology_Design_Delivery_and_Outcomes_from_a_Nursing_Informatics_Boot_Camp

8.SINANWEB - O Sinan [Internet]. Saude.gov.br. 2016 [cited 2021 Nov 28]. Available from: http://portalsinan.saude.gov.br/o-sinan

9.Araújo JR de, Araújo Filho DC de, Machado LDS, Martins RMG, Cruz R de SBLC. Sistema e-SUS AB: percepções dos enfermeiros da Estratégia Saúde da Família. Saúde em Debate. 2019 Sep;43(122):780–92.

10.SILVA, A.M.F. et al. Desafios para a implantação de sistemas informatizados na saúde. Revista Saúde em Foco, [online], 2017. Disponível: http://portal.unisepe.com.br/unifia/wp- content/uploads/sites/10001/2018/06/015_desafios_implanta%C3%A7%C3%A3o. pdf [capturado em 10 fev. 2021].

11.Janett R. Electronic Medical Records in the American Health System: Challenges and lessons learned. [Internet]. Cienciaesaudecoletiva.com.br. 2019 [cited 2021 Nov 28]. Available from: https://www.cienciaesaudecoletiva.com.br/artigos/electronic-medical-records-in- the-american-health-system-challenges-and-lessons-learned/17396?id=17396.

12.BRASIL. Conselho Federal de Medicina. Resolução CFM No 1931/2009. Código de ética medicina. Brasília (DF): Diário Oficial da União; 2009. Seção I, p. 173.

13.BRASIL. Conselho Federal de Enfermagem. Resolução COFEN n. 311/2007.Código de ética profissionais de enfermagem. Rio de Janeiro (RJ): COFEN; 2007

14.Santos TO dos Passos Pereira L, Tolfo Silveira D. Implantação de sistemas informatizados na saúde: uma revisão sistemática. Revista Eletrônica de Comunicação, Informação e Inovação em Saúde [Internet]. 2017 Sep 29 [cited 2021 Nov 28]; 11(3). Available from: https://www.reciis.icict.fiocruz.br/index.php/reciis/article/view/1064.

15.Valéria Conceição de Oliveira, Eliete Albano de Azevedo Guimarães, Gabriela Gonçalves Amaral, Pinto I. Acceptance and use of the Information System of the National Immunization Program* / Aceitação e uso do... [Internet]. ResearchGate.; 2020 [cited 2021 Nov 27]. Available from: https://www.researchgate.net/publication/342339734_Acceptance_and_use_of_the_Information_System_of_the_National_Immunization_Program_Aceitacao_e_uso_do_Sistema_de_Informacao_do_Programa_Nacional_de_Imunizacao

16.Oeiras Pedroso, Maria L, Ivaneide Leal Ataíde Rodrigues, Lidiane de Nazaré Mota Trindade, Lucia V. ANÁLISE DO SISTEMA DE VIGILÂNCIA EPIDEMIOLÓGICA DA FEBRE DE CHIKUNGUNYA NO ESTADO DO PARÁ. Cogitare Enfermagem.[Internet]. 2020 [cited 2021 Nov 26];25(0). Available from: https://revistas.ufpr.br/cogitare/article/view/65540/pdf

17.Dora Y, Évora M. A enfermagem na era da informática [Internet]. Revistas.ufg.br. 2021 [cited 2021 Nov 28]. Available from: https://revistas.ufg.br/fen/article/view/7095/5016

18.Dora Y, Évora M, Márcia R, Melo, Rodrigues Da J, Nakao S. O Desenvolvimento da Informática em Enfermagem: um Panorama Histórico [Internet]. Available from: https://telemedicina.unifesp.br/pub/SBIS/CBIS2004/trabalhos/arquivos/416.pdf

19.Araújo JR de, Araújo Filho DC de, Machado LDS, Martins RMG, Cruz R de SBLC. Sistema e-SUS AB: percepções dos enfermeiros da Estratégia Saúde da Família. Saúde em Debate. 2019 Sep;43(122):780–92.

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