● **Original article**

NURSES' EXPERIENCES WITH THE USE OF INFORMATION TECHNOLOGY IN PRIMARY HEALTH CARE: AN EXPLORATORY RESEARCH

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ABSTRACT: An exploratory research (survey) using a quantitative method was conducted to identify the experiences of nurses with the use of information technology in primary health care. The research involved 152 nurses of the Health Department of a city in Southern Brazil. The respondents completed the questionnaire Staggers on Nursing Computing Experience between September 2014 and January 2015. In the sample, female professionals n=146 (96.05%), assistant nurses n=67 (44.08%) and specialists n=59 (38.82%), aged 31-40 years n=70 (46.05%), with up to 10 years of experience n=68 (44.74%), reported frequent use of computers n=122 (80%), in care and administrative activities. It is concluded that computers are part of the nursing activities. However, permanent educational actions are needed to improve the incorporation and effective use of information technology skills in health care services and nursing in primary health care.
DESCRIPTORS: Information Technology in Nursing; Knowledge of Information Technology; Attitude towards Computers.

EXPERIÊNCIA DE ENFERMEIROS COM COMPUTADORES NA ATENÇÃO PRIMÁRIA: ESTUDO EXPLORATÓRIO

RESUMO: Para identificar a experiência de enfermeiros com computadores na atenção primária, foi realizada uma pesquisa exploratória do tipo Survey de abordagem quantitativa desenvolvida com 152 enfermeiros da Secretaria Municipal de Saúde de uma capital do Sul do Brasil, pelo preenchimento do Questionário Staggers sobre a Experiência Computacional de Enfermeiros, entre setembro de 2014 e janeiro de 2015. Na amostra, profissionais do sexo feminino n=146 (96,05%), assistenciais n=67 (44,08%) e especialistas n=59 (38,82%), na faixa etária entre 31 e 40 anos n=70 (46,05%), e com tempo de atuação de até 10 anos n=68 (44,74%), referem utilizar computadores com frequência n=122 (80%), para atividades assistenciais e administrativas. Conclui-se que o computador está presente neste processo de trabalho de enfermagem, entretanto, são necessárias ações de educação permanente para melhor incorporação das competências em informática, visando utilização efetiva das tecnologias da informação e comunicação nos serviços de saúde e de enfermagem na atenção primária.
DESCRITORES: Informática em Enfermagem; Conhecimentos em Informática; Atitude Frente aos Computadores.

EXPERIENCIA DE ENFERMEROS CON COMPUTADORES EN LA ATENCIÓN PRIMARIA: ESTUDIO EXPLORATORIO

RESUMEN: Para identificar la experiencia con computadores de enfermeros de atención primaria, se realizó investigación exploratoria tipo *Survey*, de abordaje cuantitativo, desarrollada con 152 enfermeros de la Secretaría Municipal de Salud de capital del Sur de Brasil, mediante completado del Cuestionario *Staggers* sobre Experiencia en Computación de Enfermeros, entre setiembre 2014 y enero 2015. Constitución de la muestra: profesionales de sexo femenino n=146 (96,05%), de atención n=67 (44,08%) y especialistas n=59 (38,82%), en faja etaria entre 31 y 40 años n=70 (46,05%), tiempo de actuación hasta 10 años n=68 (44,74%), informan uso frecuente de computadores n=122 (80%), para actividades de atención y administrativas. Se concluye que el computador está presente en este proceso de trabajo de enfermería, aunque se necesitan acciones de educación permanente para optimizar compresión de competencias informáticas, apuntando a utilización efectiva de tecnologías de información y comunicación en servicios de salud y enfermería en la atención primaria.
DESCRIPTORES: Informática Aplicada a la Enfermería; Conocimientos en Informática; Actitud hacia los Computadores.

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● INTRODUCTION

Scientific advances over the past years were decisive for the progressive introduction of technology in various sectors, including in health care and nursing practices in Brazil and in the world. Since the 1990's, especially, Information and Communication Technologies (ICT) have been playing a key role in health care processes[1-3].

The use of computers has improved the management of clinical and administrative data that can be efficiently and accurately recorded, stored, shared and accessed to support the decision-making process and the implementation of more assertive strategies in health care[2-5].

Meanwhile, the incorporation of new technologies is inherent to health professionals and services. The replacement of paper by other tools, more integrated and automated, aimed to improve patient safety, impacts the quality of health care services (1,6). Thus, it can be seen that the Brazilian scientific production has been consistent with the world trends in research and debates related to information technology in health care and nursing, particularly at the end of the 1990's[1,7-8].

The Brazilian Ministry of Health (MS) defines the National Policy on Health Data and Information Technology (PNIIS), which establishes the use of ICT as one of the main goals to be met for the improvement of Brazil's Unified Health System (SUS). The PNIIS is aimed to assure the universal right to information, reliability and quality of health information, decentralization, social control and the state-s obligation to ensure these rights, together with the Information Technology Department of the Unified Health care System (DATASUS), which regulates and manages health information produced by the SUS and its several health information systems (SIS)[7,9-10].

Despite the growing number of similar studies, most of them were developed in academic environments (68%), 20% in health institutions, in secondary and tertiary health care, and only 6% in health institutions in primary health care, which reinforces the need for closer ties between teaching and research institutions and health services[7].

Therefore, given the significant percentage of nursing professionals in health services, the lack of studies focused on the use of IT in primary care, the need for incorporation of technological resources in health care practice, one justification for this study is that it can the used as a strategy to understand the attitude of this target audience towards the use of computers in their professional activities[3,7].

The present study aimed to identify the experiences of primary care nurses with computers and it consists in the second step of a project titled "Experiência Computacional de Profissionais e Estudantes de Enfermagem" (Computer Experience of Nursing Professionals and Students) aimed to identify the experience of nurses and nursing students with computers in different settings of the nursing profession.

● METHOD

This is an exploratory research (survey) using a quantitative method. Data collection was performed between September 2014 and January 2015, with nurses who performed their duties at the Municipal Health Department (SMS) of a capital city in southern Brazil.

The instrument used in data collection was the Staggers Nursing Computer Experience Questionnaire – SNCEQ®, which has the purpose of investigating the experience of nurses in information technology, with emphasis on the use of computers[11]. It is a self-explanatory questionnaire composed of eight sections with structured questions. Regarding sections three and five of the instrument, the topics were analyzed by the participants according to a 5-point Likert scale, ranging from: 0 (None), 1 (Little), 2 (Intermediate), 3 (High) and 4 (Extensive).

The participants were contacted through the Health Districts (DS) and subsequently in the Basic Health Units (UBS) and Family Health Strategy (ESF) units to which they belonged. The inclusion criteria were be a nurse attached to a UBS and ESF of the city during data collection and signing of the Free Informed Consent Form (TCLE). The exclusion criteria were nurses away from work (vacation

or leaves). The sample was composed of 152 nurses. Data analysis was performed with descriptive statistics on spreadsheets. The project was approved by the Research Ethics Committee (CEP), under no 550.383 and protocol no 55/2014 of August 20, 2014.

● RESULTS

The 387 nurses of UBS and ESF of the Municipal Health Department (SMS) received 332 questionnaires during the data collection period; of these, 152 were returned completed and integrated the sample of this research, corresponding to 39.27% of the population. Of these, 146 (96.05%) were female individuals and six (3.95%) were male individuals. The predominant age range of the sample was 31-40 years (46.05%), followed by 41-50 years (21.71%) and 51- 60 years (19.08%).

Regarding the number of years working in the area of Nursing, the ranges 0-10 years and 11-20 years were the most frequent, with relative frequencies corresponding to 44.74% and 32.24% respectively, followed by 21-30 years (17.11%) and over 30 years (5.92%).

Regarding the positions of the participants, 67 reported being Assistant Nurses (44.08%), 13 Unit Managers (8.55%), and 10 Administrative nurses (6.58%). Correlation of such data with the corresponding degree of instruction showed a prevalence of Assistant Nurses, as follows: 39 (25.66%) specialists, eight (5.26%) doing specialization, three (1.97%) master students, and one (0.66%) master. OF the Unit Managers, 10 (6.58%) are specialists, two (1.32) master students, one (0.66%) doing specialization. Among the participants who performed administrative duties, 10 (6.58%) were specialists.

Use of Computers in Nursing Professional Practice

The first two sections of the questionnaire are explanatory, concerning the completion of the answers to the questions. The third section contains 20 topics on Computer Use: respondents must indicate the current or past type of computer use (UC) and level of knowledge (NC) of the described functions, using a 5-point Likert scale. Chart 1 includes a summary of the participants' responses to this section.

Clinical Use of Information Systems

The fourth section of the questionnaire concerns the clinical use of information systems, aimed to identify the use of information technology in direct and indirect patient care. The participants marked the items relevant to their professional activity, according to Chart 1.

It should be stressed that the least frequently marked items concern the "Record of nursing notes/evolution (documentation)" n=82 (53.95%); and "Record of nursing assessments" n=44 (28.95%).

Computer Use II

The fifth section of the questionnaire concerns the use of computers (UC) and level of knowledge (NC) of nurses in the identification, elaboration, selection, implementation and assessment of computer systems and the teaching practice in computing. Thus, as it was done in the third section, the topics were assessed by the participants through a Likert scale. In general, the participants reported 0 or None computer use (UC) and level of knowledge (NC) for the items listed.

Formal Knowledge of Computers

The sixth section of the questionnaire aims to identify the formal knowledge of participants on computers based on the number of courses taken and the frequency of reading of books and

Chart 1 – Relative Frequency of participants' responses about level of knowledge and use of computer in their professional practice (n=152). Curitiba-PR, Brazil, 2015

Computer Use	None (0)		Little (1)		Intermediate (2)		High (3)		Extensive (4)	
	*UC	**NC	UC	NC	UC	NC	UC	NC	UC	NC
Uses word processor	1.32	1.32	10.53	5.92	15.79	22.37	26.32	**38.16**	**44.74**	28.95
Uses e-mail	3.29	0.66	3.95	5.92	10.53	11.18	23.68	30.92	**57.89**	**48.03**
Database management	17.76	13.82	8.55	8.55	17.76	19.08	22.37	**28.29**	**30.26**	25.66
Conducts research with data analysis	13.82	10.53	10.53	9.21	20.39	25	**28.95**	**29.61**	25	21.05
Searches bibliographic information	11.84	7.24	7.24	5.26	23.68	23.68	**30.26**	**38.16**	26.97	24.34
Creates figures, slides or projections	**26.32**	19.74	15.13	13.16	19.08	**25**	19.74	22.37	19.74	16.45
Project management	**34.21**	**25.66**	13.82	19.74	26.97	**25.66**	17.76	15.79	5.26	9.21
Creates work schedules	8.55	8.55	8.55	5.92	11.18	14.47	32.89	28.95	**37.5**	**38.82**
Uses educational tutorials	**30.92**	23.03	13.16	11.84	18.42	17.76	20.39	**25.66**	15.79	17.76
Calculates numerical data	**32.89**	**26.97**	13.16	15.79	19.08	18.42	17.76	18.42	17.11	17.76
Communication programs	23.03	**24.34**	18.42	14.47	27.63	**24.34**	18.42	**24.34**	12.5	10.53
Copies, deletes, changes directories and performs functions of the hard disk drive or system	**29.61**	**29.61**	15.79	13.82	24.34	21.71	16.45	18.42	13.16	13.16
Recovery of data, files or system performance indicators	**38.82**	**37.50**	12.50	12.50	21.05	20.39	17.11	17.76	9.87	9.21
Writes computer programs	**77.63**	**75.66**	7.24	6.58	10.53	10.53	4.61	5.26	0	0
Uses stored technical information (artificial intelligence)	**47.37**	**46.71**	16.45	15.79	15.79	15.79	9.21	10.53	9.87	7.89
Computer-aided software engineering	**79.61**	**77.63**	10.53	10.53	3.95	5.26	3.29	2.63	0.66	0
Writes macros for spreadsheets or word processing packages	**73.03**	**71.05**	9.21	10.53	9.87	9.21	5.26	4.61	0.66	0.66
Creates computer-aided instruction software	**83.55**	**78.95**	5.26	7.89	6.58	7.24	4.61	3.95	0	0
Writes database management programs	**75.00**	**71.05**	7.24	7.24	11.18	11.18	4.61	4.61	1.32	1.32
Internet access	12.50	9.87	9.87	9.87	14.47	19.74	21.05	24.34	**42.11**	**33.55**

* UC – Computer use / **NC – Level of knowledge

magazines on the theme. The answers ranged from 0, 1, 2, 3, 4 or more. As shown in Chart 2, option 0 was the most common answer, with a significant variation only for the item "Number of short courses on applications/programs".

Classification of Experience with Computers

In the seventh section of the questionnaire, 72.36% (n=110) of the participants responded to a question related to their experience with computers, indicating how they perceived such experience, through a scale ranging from levels beginner n=14, (9.21%) up to expert n=13 (8.55%). The results are shown in Chart 3, with higher frequencies for the second and fourth intermediate levels proposed, n=28 (18.42%) each.

Reasons for not using computers in their professional practice

The eighth section of the questionnaire comprises the possible reasons for the little use of computers by nurses. The participants could select more than one option, even if they had reported frequent use of computers (Chart 4).

The option "Not applicable, I use computers frequently" was the most prevalent among the participants n=122 (80.26%) followed by "The staff in my workplace do all the computer-based tasks" n=41(26.97%); "I have never taken a computer course" n=25(16.45%); and "I am afraid of losing files or information" n=18 (11.84%).
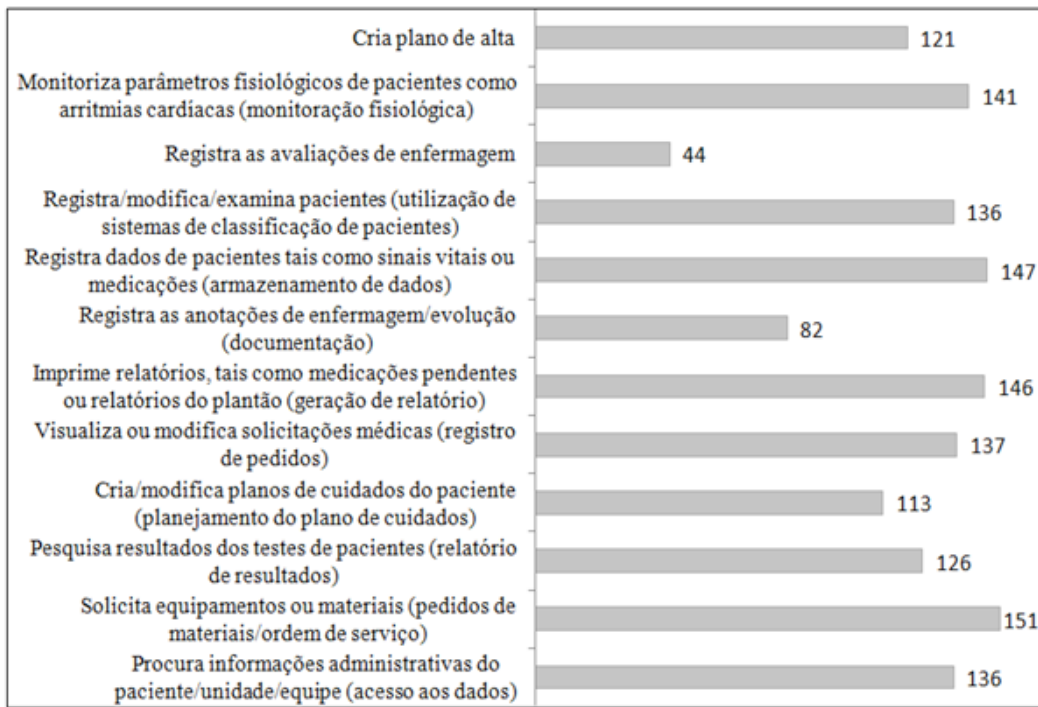
Chart 1 – Absolute frequency of responses of participants regarding the clinical use of information systems (n=152). Curitiba-PR, Brazil, 2015
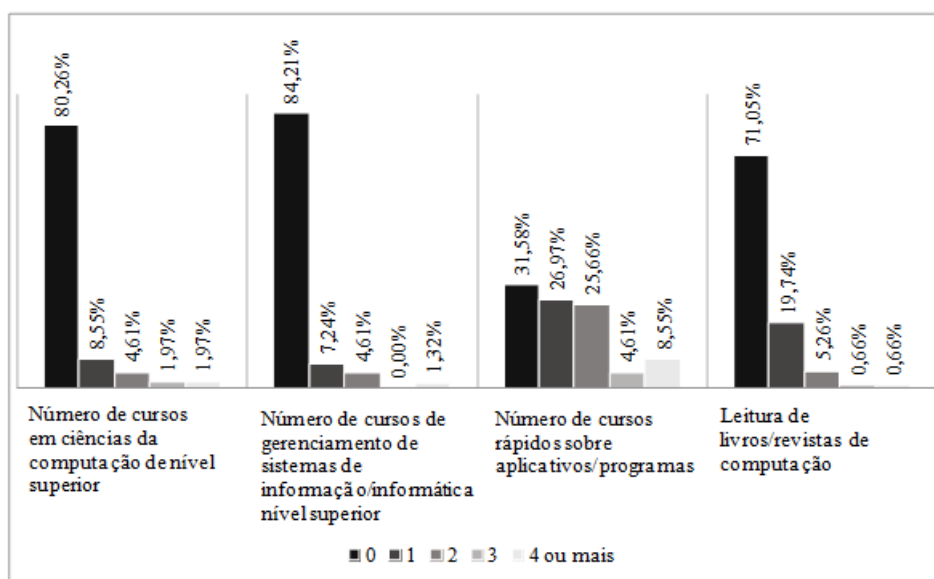

Chart 2 – Relative frequency of participants regarding formal knowledge of computers (n=152). Curitiba-PR, Brazil, 2015
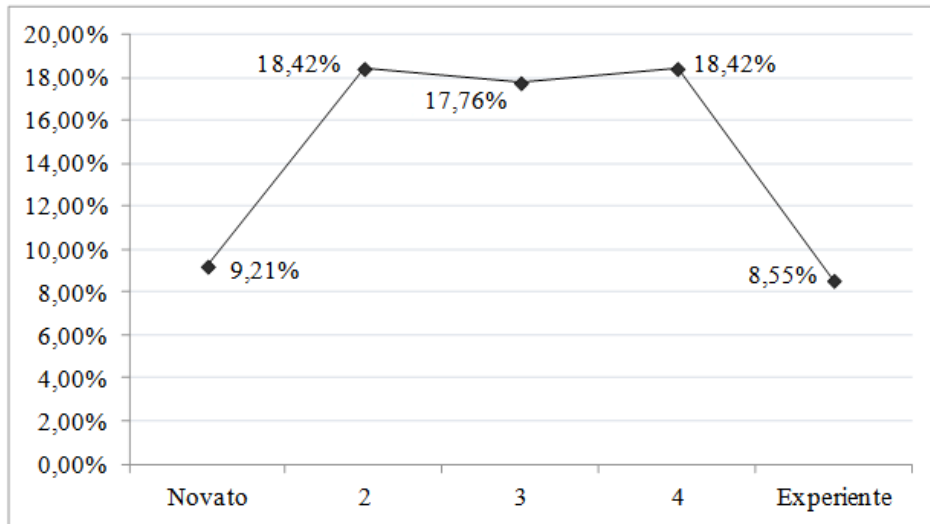
Chart 3 – Relative frequency of participants' answers regarding their experience with computers (n=110). Curitiba-PR, Brazil, 2015
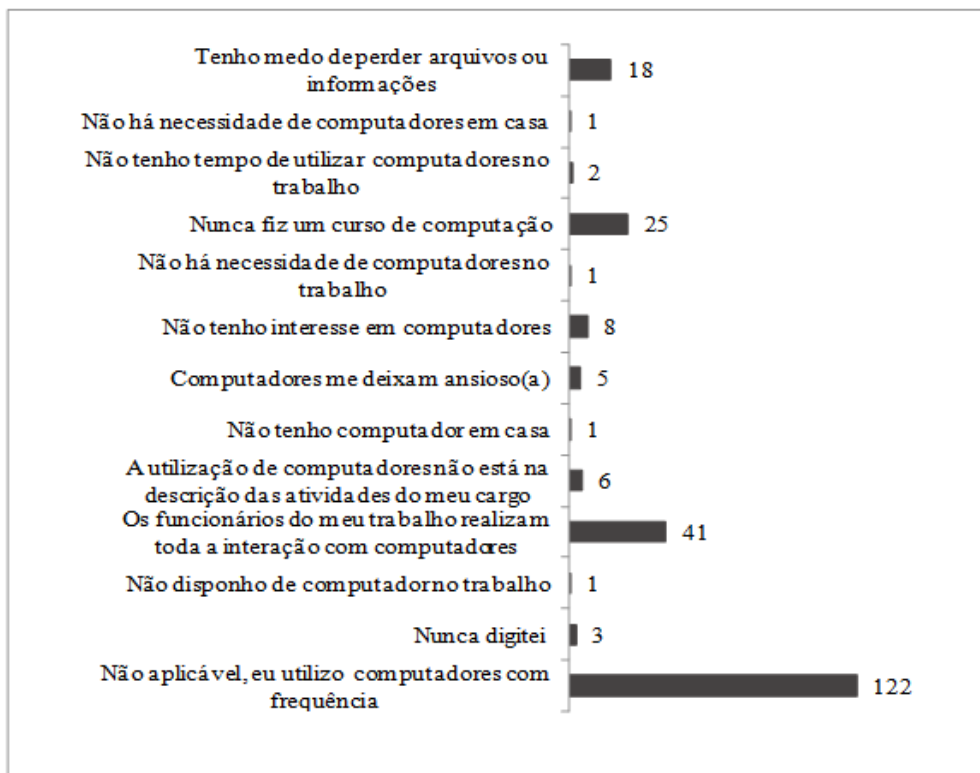

Chart 4 – Absolute frequency of participants' answers regarding the reasons for not using computers in their professional activities (n=152). Curitiba-PR, Brazil, 2015

● DISCUSSION

Regarding the nursing profile in Brazil, a study conducted by Oswaldo Cruz Foundation (Fiocruz), in partnership with the Federal Nursing Council (COFEN) reports that the nursing team consists mostly (84.6%) of women, a percentage slightly lower than the one obtained in this research[12].

As for the nurses who composed the sample of this research, most are specialists, and some are doing specialization, are master students and there is one master, which reflects their participation in nursing postgraduate programs. Such fact may have contributed to expand the possibilities of more advanced training of the professionals, the development data analysis and interpretation skills. Concomitantly, the use of Health Information Systems (SIS) provides greater capacity of storage and management of data, which can be efficiently and accurately recorded, stored, shared and accessed. Such factors contribute to the understanding that knowledge is required in decision-making, resulting in better health care to users[2,4].

Regarding the past and current use of computers in nursing professional practice in the different domains (care, management, teaching and research), despite the high number of answers indicating extensive computer use and high level of knowledge in the use of word processors, the care activities performed with the least amount of technology (information systems) concern nursing records: "Record of nursing notes/evolution (documentation" and "record of nursing assessments". One study suggests the impossibility of properly recording nursing care, reporting this gap in some information systems[13].

Moreover, the participants of this study reported using the Health Information System (SIS) both in clinical and management issues in the nursing practice. Or else, it is very likely that nurses know and use word processing tools, but do not take advantage of them in their professional practice, particularly in the documentation of their activities.

From the time of Florence Nightingale (1859) until today, nursing records have been considered essential to clinical practice. Based on her knowledge of mathematics, statistics and writing, Florence emphasized the need for systematic collection, recording and analyses of data to ensure continuing care to the patients. Thus, she considered statistics the main tool in the process of improvement of health services[14-15].

Currently, the records are used in the different steps of the nursing process in order to provide information on the care delivered and facilitate the communication between the members of the multidisciplinary team. Data must be accurate, complete, organized and ensure confidentiality to the user[16]. Thus, computer systems have been implemented to promote the quality of the content of documents, ensure compliance with the required standards and reduce the time taken in data interpretation[2].

Concerning the factors that affect the nurses' attitudes towards computers, the authors stress that Electronic Medical Records can be an information system with valuable data about the population that uses the municipal health network, and over time, this information system will be essential to ensure that the nursing process and the planning of health actions are effectively conducted (6). Thus, special attention should be given to the mapping of system requirements, in order to emulate the real care flow, and to issues related to the computer system response time.

The incorporation of new technologies to the work process, and the improvement of strategies of data management and processing, require critical judgment to develop an investigative approach to ensure that the actions taken have a scientific nature[2].

The findings of this study suggest that a significant percentage of the participants do not use or do not have knowledge of the functions related to research involving data analysis, to tutorials (computer-assisted instruction) or to the search of books, articles or other bibliographic information. This characteristic is also observed in the use of the World Wide Web, although participants reported using the internet. It should be stressed that the internet is an important tool in evidence-based practice that can contribute to confer a scientific character to the work process[7].

Regarding primary care nursing, where strategies are designed to facilitate the planning of disease prevention actions, health promotion and protection, prioritizing collective actions, it is essential to seek innovative methods to meet the population's needs, analyze the problems in the light of the relevant literature and implement educational actions. Also, with the use of the internet and increased access to information, the user obtains more knowledge and becomes more demanding[2,9].

In turn, concerning the use of information systems in management activities, the most frequently marked activities corroborate that computers were used rather as a tool for entering and recording data than in analyzes.

Despite the identification of the many potential uses of computer in the professional practice of nurses, and although the National Curriculum Guidelines in health care graduation courses require mastery of ICT, some nurses did not take advantage of this tool in their daily activities. This situation might not be the result of

> "[...] a philosophical approach or a standardization of nursing actions to be performed, but of empiricism or non-systematization of what is done, which makes it difficult to fully understand the importance of this technology to the daily routine of nursing professionals"[17:725].

Therefore, this study stresses the need for greater emphasis on the development, recognition and dissemination of knowledge, skills and attitudes related to the use of information technology in nursing, for the timely application of these resources already available in various nursing settings, especially in primary care. Brazil has made progress regarding the identification of the information technology skills needed by health professionals: the Brazilian Health Informatics Association (SBIS) published in 2012 a list of core competencies to be developed by health professionals[1].

About nursing, specifically, there is a study on the identification of computer skills according to the nurses' level of knowledge (practice) in computing, as follows: beginner, expert, specialist and innovative[18,1]. Such competencies are classified into three different categories: computer use skills; knowledge of information technology; and information technology skills, with sub-classifications related to the various activities performed by nurses in the different settings of their professional practice.

Asked to classify their own experience with computers, the participants of this study mostly reported levels 2, 3 and 4 (proficient, advanced beginner and competent); however, the predominance of negative answers to questions on computer science courses (informal, upper level or advanced), reading of computer books/magazines and specific information technology functions should be considered. According to relevant studies on information technology competencies in nursing, knowledge and skills arising from these experiences are required even from nurses that are beginners in information technology[18,1].

● **CONCLUSIONS**

This study allows concluding that the use of computers was incorporated to the nursing work process in the setting of the study. However, continuing education actions targeted to the integration of ICT in nursing services are needed, which contemplate demands and possibilities, aiming to optimize the use of computers in the various dimensions of professional practice, and particularly in primary care.

Although the participants reported being proficient, advanced beginners and competent in the use of computers in their daily activities and indicated that they used the resource in care and administrative functions, the findings of this research showed that computers were mostly used in data recording and not in analysis, despite the fact that the respondents had expertise in their specific fields.

According to the literature, few nurses are specialist in information technology in nursing in Brazil, and although computers are present in nursing professional practice, these resources are probably underused in the context of health services, particularly in primary care.

Thus, besides the inclusion of specific content of information technology in health and nursing in

the formal curricular structures (undergraduate and graduate studies), strategies that contribute to the awareness of the need for training in the use of information technology in health care and nursing are essential, as well as the recognition of these specific competencies for health services and the health care system.

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