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MODELS FOR THE IMPLEMENTATION OF EVIDENCE-BASED PRACTICE IN HOSPITAL BASED NURSING: A NARRATIVE REVIEW[1]

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ABSTRACT

Objective: to identify models for the implementation of evidence - based practice in hospital based nursing.

Method: this is a narrative review of the literature. After the identification of the models, a search of specific references on the topic of interest was carried out and the articles were published.

Results: 16 models are presented for the use of research in the practice of hospital nurses, published between 1970 and 2015. The stages for the implementation of the models were described with emphasis on the types of evidence and approaches for the use of the research.

Conclusion: in the analysis of the assumptions of the models described, it can be inferred that the use of research in the practice of hospital nurses requires knowledge and skills beyond the usual in the daily work. Thus, the challenge for the national scenario is the development of national models, specific to the reality experienced and, also, the elaboration of initiatives that portray the implementation and/or adaptation of the models proposed in an international scope.

DESCRIPTORS: Evidence-based nursing. Nursing research. Hospitals teaching. Nursing model. Evidence-based practice.

MODELOS PARA A IMPLEMENTAÇÃO DA PRÁTICA BASEADA EM EVIDÊNCIAS NA ENFERMAGEM HOSPITALAR: REVISÃO NARRATIVA[1]

RESUMO

Objetivo: identificar modelos para implementação da prática baseada em evidências na Enfermagem hospitalar.

Método: revisão narrativa da literatura. Após a identificação dos modelos, realizou-se uma busca de referências específicas sobre o tópico de interesse e procedeu-se a leitura dos artigos publicados

Resultados: são apresentados 16 modelos para a utilização de pesquisas na prática de enfermeiros hospitalares, publicadas no período de 1970 a 2015. Foram descritas as etapas para a implementação dos modelos, com ênfase nos tipos de evidências e abordagens para utilização das pesquisas.

Conclusão: na análise dos pressupostos dos modelos descritos, pode-se inferir que a utilização de pesquisas na prática de enfermeiros hospitalares requer conhecimento e competências para além dos usuais no exercício cotidiano do trabalho. Desta maneira, o desafio para o cenário nacional perfaz o desenvolvimento de modelos próprios, específicos para a realidade vivenciada ou, ainda, a elaboração de iniciativas que retratem a implementação e/ou adaptação dos modelos propostos em âmbito internacional.

DESCRITORES: Enfermagem baseada em evidências. Pesquisa em enfermagem. Hospitais de ensino. Modelo em enfermagem. Prática baseada em evidências.

MODELOS PARA LA IMPLEMENTACIÓN DE LA PRÁCTICA BASADA EN EVIDENCIAS EN LA ENFERMERÍA HOSPITALARIA: REVISIÓN NARRATIVA

RESUMEN

Objetivo: identificar modelos para implementación de la práctica basada en evidencias en la enfermería hospitalaria.

Método: se trata de una revisión narrativa de la literatura. Después de la identificación de los modelos, se realizó una búsqueda de referencias específicas sobre el tema de interés y se procedió a la lectura de los artículos publicados.

Resultados: se presentan 16 modelos para la utilización de investigaciones en la práctica de enfermeros hospitalarios, publicadas en el período de 1970 a 2015. Se describen las etapas para la implementación de los modelos, con énfasis en los tipos de evidencias y enfoques para la utilización de las investigaciones.

Conclusión: en el análisis de los supuestos de los modelos descritos, se puede inferir que la utilización de investigaciones en la práctica de enfermeros hospitalarios requiere conocimiento y competencias además de los usuales en el ejercicio cotidiano del trabajo. De esta manera, el desafío para el escenario nacional es el desarrollo de modelos propios, específicos para la realidad vivida o, aún, la elaboración de iniciativas que retraten la implementación y/o adaptación de los modelos propuestos a nivel internacional.

DESCRIPTORES: Enfermería basada en evidencias. Investigación en enfermería. Hospitales de enseñanza. Modelo en enfermería. Práctica basada en evidencias.

INTRODUCTION

Research as the guiding thread of nursing care is, above all, a transforming *praxis*. Regarding the scientific production of a profession, it is hoped to portray the specific area of knowledge.[1] The production of knowledge in nursing is an action that seeks to transform the social and cultural practice of health care. Thus, researches have been increasingly recognized as essential to the Nursing practice - be it in the clinical, managerial or teaching field, because it allows the acquisition of knowledge and the evaluation of behaviors, allowing greater security for decision making.[1-2] However, the use of research to modify clinical practice still presents itself as a construct for nursing.

The Brazilian context, contextualized to the Unified Health System (SUS), the Higher Education Institution and the health services cooperate to carry out training, research and university extension practices.[3-4] As a traditional *locus* of teaching-service integration, public teaching hospitals have, as part of their mission, the development of the teaching-research binomial in order to achieve qualified training and assistance. However, one of the greatest challenges is to adopt research in this space in an inventive way where the reproduction of the institution predominates daily.[3-7] The culture of Brazilian hospitals has contained elements related to the rigid organizational structure and the centralization of power; resulting in competitions, individualism and difficulty in developing teamwork; disinterest in the welfare and promotion of interpersonal relations; and disregard for the needs of workers.[5-7]

It is also emphasized that the perseverance of this context is related to the guidelines established by classic administration models, based on the logic of legal authority inherited from bureaucratic conception and characterized by hierarchical, vertical structures and fragmentation of responsibilities. For nursing, the contextualization of the fragmentations in the work relations in the hospital scope presents itself as established from its modern origin. The productive structure of nursing is based on the social division of labor. In the hospital context, it places an emphasis on organization, processes and tasks; excessive preoccupation with manuals of procedures, routines, norms and in the control of the work process of the nurse.[5-7]

In the teaching hospital scenario, where care and management nurses actively participate in different academic activities, it is crucial to foster the approximation of these professionals for the utilization of research. This action is beneficial to qualify the scenario, mainly, to develop research to respond to local demands in order to strengthen this space as a territory of good research practices, training and assistance/ care.[1,3] It is added that new knowledge, if isolated, is not applied or has an effect on society. Traditionally, the use of research in practice is slow, making it difficult to incorporate the produced knowledge. On the other hand, there are cases where the traditional disclosure of research results is obsolete to everyday demands, widening the gap between what is known and what is consistently done in the practical world.[8-9] Faced with this context the questioning emerges : what are the existing models to guide the implementation of evidence-based practice among hospital nurses?

The use of surveys can be defined as the application of a study or its results in practice. In general, the transfer of research to practice involves different

activities in order to culminate in the creation of an innovation. It is emphasized that conducting the research is directed towards the production of knowledge that is generalizable beyond the population that was directly studied, while the use of research is directed to transfer a specific knowledge based on studies to the practice, using techniques developed and tested in practice. However, the confusion between the two processes occurs because one set of activities does not happen in isolation from the other.[10] The use of research in practice is one of the elements of evidence-based practice (EBP). Even in view of the benefit to cost control, care quality and patient safety, the implementation of this approach has presented itself as a complex challenge to nursing worldwide.[11] In light of the above, this study aims to identify implementation models of evidence based practice in hospital nursing.

METHOD

A narrative review of the literature consisting of a wide publication, appropriate to describe and discuss the "state of the art" under the theme in contextual perspective.[12] The sources of information or the methodology for the search in narrative reviews are not usually informed. Basically, the narrative review is composed of the analysis of the literature contained in books and/or articles, as well as the author's personal interpretation and critical analysis.[12] The main sources of information used in this review to identify the models were a book, a thesis of Full Professors[14] and seven scientific articles.[2,15-20] After the identification of the models, a search of specific references on the topic of interest was performed and the published articles were read.

The models for the use of research in practice were presented according to the historical emergence. The implementation and emphasis steps of the approach of each model were described, i.e., whether there was focus on the organizational aspects of the hospital and/or the individual competencies of the nurse. Another aspect also presented regarding the models refers to the types of evidence. Thus, we observed the following: synthesis of research results with different designs and methodological approaches (scientific evidence); synthesis of results from primary studies with experimental or quasi-experimental designs, through systematic review (better evidence); non-scientific evidence: data from the analysis of records of hospitalization unit, quality control reports and/or hospital infection control (among others), surveys of hospital institution guidelines and professional expertise.

RESULTS

Based on the information sources used in conducting the narrative review, 16 models were identified and directed for the use of research in the practice of hospital based nurses. Table 1 shows the name of the model, the year and country of its first publication, the emphasis of each model's approach, types of evidence and the synthesis of steps for implementation.

Table 1 - Characterization of the models for the use of research in the practice of hospital nurses

Model (year/country), emphasis of approach and type of evidence	Synthesis of steps*
Stetler Model of Research Utilization[21-22] (1976, USA) Individual Scientific evidence	Establish purposes for literature review; to carefully evaluate the research findings; comparing the results of the studies with the practice of care; make a decision (use, expect to use, reject or not use); detail and justify the steps for the implementation of the new procedure and evaluate formally.
Conduct and Utilization of Research in Nursing (CURN)[23-25] (1978, USA) Individual Organizational Scientific evidence	Concern about changes in Nursing practice; define and evaluate a problem in patient care; seek solutions; selecting a potential solution; perform experiments or test the proposed solution; evaluate satisfaction or dissatisfaction with the solution, therefore repeat the steps.
Quality Assurance Model Using Research (QAMUR)[26] (1987, USA) Organizational Scientific evidence	Ask questions or identify problems; seek solutions, review and evaluate literature (conducting research); plan to change; implement innovation (protocols, procedures and policies); evaluate the expected results; formulate care standards (ensure quality improvement).

Iowa Model[27-28] (1994, USA) Organizational Scientific evidence	Identify practical problems and formulate research questions; determine how much of a problem the priority topic is for the organization; identify terms for searching for evidence, critically analyze and synthesize this evidence; determine if the evidence is sufficient - otherwise conduct a search; if evidence is sufficient and the changes are appropriate, conduct a pilot study to change the practice; evaluate pilot results, disseminate results and implement change.
Ottawa Model of Research Use (OMRU)[29-30] (1999, Canada) Individual Organizational Scientific evidences	Identify people with authority to legitimize the change process and the required resources; clearly specify what innovation need to be implemented; evaluate innovation: potential actors that can adopt it, barriers and facilities implementation; select strategies to sensitize those involved about the value of innovation, its diffusion in the organization until reaching the direct care to the patient; evaluate the impact and disseminate the results.
Promoting Action on Research Implementation in Health Services Framework (PARIHS)[31] (1998, United Kingdom) Organizational Scientific evidence	Seek evidence from scientific research, clinical experience, patient experiences, institution data and reports; adopt innovation in order to influence organizational culture by supporting leadership and reviewing practices; incorporate people into the organization whose knowledge and skills can support change in practice according to the evidence.
The Rosswurm and Larrabee Model[32] (1999, USA) Individual Best scientific evidence	Identify the need to change practice; approximate the problem with outcome indicators; summarize the best scientific evidence (systematic review) considering feasibility, benefits and risks for its implementation; develop a plan for changing the practice, including the necessary resources; implement and evaluate change (inform if a pilot study is conducted); integrate and maintain change in practice (communicate results to strategic leaders); monitor implementation (evaluate process and results).
Advancing Research and Clinical Practice Through Close Collaboration (ARCC)[33-34] (1999, USA) Organizational best evidence	Understand organizational culture and readiness to change; identify strengths and barriers for the implantation of EBP in the organization; identify the professionals specialized in the organization to assist in the implementation of the EBP with the assistance teams in the clinical units; implement the evidence in practice and evaluate the results.
The Tyler Collaborative Model[35] (2004, USA) Organizational Scientific and non scientific evidence	Breaking the ice: identifying forces in the organization that can affect change; building collaborative relationships among strategic leaders to adopt change; diagnose the problem: identify areas to implement EBP; acquiring resources: raising financial and human requirements for the implementation of change; move: engage nursing assistants to identify solutions to their demands based on EBP (organize working group); choose a solution: rigorous review of scientific production; gain acceptance and followers: implement the evidence through a pilot study, in which they can evaluate the care given to the adoption of the evidence regarding their non-adoption; Stabilize: include evidence in the organization's rules and routines; evaluate results in the organization against the incorporation of evidence into work routines, and prepare reports that evaluate the results.
Johns Hopkins Nursing Evidence-based Practice Model (JHNEBP)[36-37] (2007, USA) Individual Scientific and non scientific evidence	Identify a question of practice, formulate the research question using terms appropriate to the search for evidence; search, critically evaluate, summarize and classify levels of evidence; use "non-scientific" evidence (financial data, professional experience and patient preferences) for decision making; determine the feasibility of applying the evidence, draw up an action plan for its translation, implement the change, evaluate and communicate the results.
Academic Center for Evidence-Based Practice (ACE)[38-39] (2004, USA) Individual Scientific evidence	To seek new knowledge through research; to carry out a rigorous review of multiple primary studies (in view of the different designs) to formulate new knowledge; prepare a document or guide to translate the evidence into practice; integrate evidence into practice by influencing changes in people and organization; evaluate the impact of the change in practice and its increase in the quality of care provided.
The Clinical Scholar Model[40] (2009, USA) Individual Organizational Scientific and non scientific evidence	Identify opportunities to implement change in the organization; review internal evidence (information and service data) and external evidence (search results); determine the strength of the evidence and conduct a plan for its implementation. If they are not safe enough, conduct a search; to simulate its application with different means; apply them and obtain the results in context; disseminate the results to the internal and external community of the organization.

Model in an Academic Medical Center[41] (2009, USA) Individual Organizational Best evidence	Formulate a clinical question; search for the best evidence (systematic review of primary experimental studies); critically review the evidence; integrate evidence into practice; communicate the results.
The Colorado Model[42] (2011, USA) Individual Organizational Scientific and non scientific evidence	Identify factors that facilitate organizational change; elaborate a clinical question using the PICO strategy; identify the patient's needs; evaluate patient's values and preferences; seek scientific evidence according to a protocol (if the hospital has a protocol for EBP) or to carry out a rigorous review of the literature (in the absence of an institutional EBP protocol). In the absence of scientific evidence, use evidence from other sources: infection control data, cost-effectiveness analyzes, and clinical expertise; summarize the evidence considering their level of classification; use them according to the context and decisions of the patient; evaluate the results.
The Multisystem Model of Knowledge Integration and Translation (MKIT)[43] (2011, USA) Organizational Scientific and non scientific evidence	Induce the development of research that can be applied in practice; identify transformational leadership in organizations; perform a search, critical evaluation and synthesis of the evidence by the actions of nurses with specialty for the action; to promote the translation of evidence through meetings between nurse researchers and nursing assistants; prepare a pilot study and intervention plan with the support of specialized nurses; integrate evidence into the work process and organize normative documents (protocols and clinical guidelines); monitor the results achieved by the implementation; to disseminate implementation results.
The Research Appreciation, Acessibility and Application Model (RAAAM)[44] (2015, Australia) Organizational Scientific and non scientific evidence	To value research in the hospital context (through partnerships between universities and hospitals); access research results that can support the improvement of the quality of practice (organization of committees or specific groups and inclusion of specialist tutors in the hospital context); apply research (the development of research is an integral activity of the role of nurses in the hospital context); ensure the sustainability of the model (the development of communication strategies for dissemination and reporting to evaluate EBP).

In the conduct of the narrative review it was possible to verify the absence of national publications in Latin America and the Caribbean describing models for the use of research in the practice of hospital nurses. The emphasis on the organizational approach was a predominant proposition among the models for the implementation of EBP in the hospital setting. It could also be observed that the models differ in the conduct of specific research to support nurses' practice decisions, discussed in: QAMUR,[26] Iowa Model,[27-28] OMRU,[33-34] Tyler Collaborative Model,[39] The MKIT Model[43] and RAAAM[44] - the others turned to the synthesis of the results of primary studies. The concept of evidence was also distinct among models. Systematized information derived from reports from the service itself was considered important evidence from the Tyler Collaborative Model,[35] JHNEBP,[36-37] The Colorado Model,[42] The Clinical Scholar Model,[40] The MKIT Model[43] and RAAAM[44] models. While the models Rosswurm and Larrabee's Model,[32] ARCC,[33-34] Model in an Academic and Medical Center [41] presented stricter structures for the incorporation of the evidence to the practice, being understood exclusively as application of synthesis of results of experimental or quasi-experimental studies. Prior to the dissemination or protocol incorporation of innovation / evidence into the hospital organization, models guided: a pilot study, such as CURN,[23-25] Iowa Model,[27-28] Rosswurm and Larrabee Model;[32] the simulation of evidence in context, such as Scholar Model;[40] or the elaboration of an action plan to translate the evidence into practice, according to: JHNEBP,[36-37] ACE.[38-39]

DISCUSSION

In the 1970s, the federal government of the United States of America financed institutional projects to promote the use of research in practice, and thus test its operationalization.[13-14] The Western Council on Higher Education for Nursing, a nursing project that originated from this initiative involved thirteen states. In the first phase, nurses with research training (teaching nurses and/or researchers) were recruited. Next, through workshops, the nurses were educators and/or researchers with the attending nurses of the hospitals participating in the project, whose purpose was to critically evaluate the research and to identify nursing interventions based on their results in order to be implemented

in institution. Subsequently, a new workshop was held, in which participants reported the trajectory of implementation of new practices and the results achieved, as well as the follow-up of these changes for six months in hospitals. The project's objective was partially achieved, with some scientific publications referring to the results of the initiative.[14]

The Stetler Model[21-22] was the first to be published in the USA in the 1970s. The purpose of the model was to direct nursing postgraduates on how to apply research results to their professional performance. This model presents guidelines for the translation of evidence and the implementation steps. It was conceived as an advanced instrument for EBP guidance and an important reference for the training of specialist nurses. The author presented reformulations of the model with publications aimed mainly at the political use of research results for decision-making in hospitals.[31-32]

In the 1980s, the Conduct and Utilization of Research in Nursing (CURN) project[23-25] originated as a model for the integration between faculty and nurse assistants at the University of Michigan. One of the most relevant contributions of this project was the establishment of guidelines for the use of research results, aiming at eliminating the attempt to implement inconsistent or insufficient research results into nursing practice.[23] Goode and collaborators[24] improved the concept used in the CURN project, and applied it to a rural community hospital. This experience was notorious within the country for reflecting excellence in the clinical application of research results among the 200 evaluated hospital institutions.[24]

In the 1990s, two new relevant model proposals emerged to guide the use of research in nursing practice in the United States. In general, the model proposals brought the recommendations of the quality assurance programs of the American hospital institutions, and the use of research with an instrumental approach was predicted as a quality indicator.[13-14] The Quality Assurance Model Using Research (QAMUR)[26] was developed as a collaborative program between hospital and nursing school, which already had formal teaching, practice and research links. The activities of the program integrated nurse professors / researchers, nursing students and nurses of the assistance scenarios. The model is based on the use of research to formulate standards of quality of care and direct it both to the use of research results and to conducting new research.[26] The QAMUR model has been used frequently among US nurses due to the easy application of its steps, as well as having a decision-making algorithm format.[16, 26]

The Iowa Model of Evidence-Based Practice (Iowa Model),[27-28] is one of the most popular models, and was also proposed from the improvement of the steps recommended in the CURN[23] model, as it has seen the different context that permeated the elaboration of this model fashion model. At the time, there was a growth in the number of clinical nursing researches published and also a larger number of trained specialist nurses. According to the CURN[23] model, the Iowa model advocated that the use of research in practice would occur when new knowledge was published or that nurses experienced a specific demand that indicated the need for a change in practice.[27-28] The differentiated view of this model consists in the perception on the use of surveys. For the first time, it was pointed out that the use of research (development and/or incorporation of its results) should be an inherent action of hospital nurses, and therefore, health organizations had the role of supporting this performance. In its detail, the Iowa model recommended, with respect to the use of research: it should be included in the description of the assignments of the nurses, in the philosophy and in the patterns of the Nursing Divisions; institutions should ensure time for nurses to participate in research and that in the hospital units the research climate should be encouraged by the provision of specialized consultancies for further research, as well as participation in study groups and/or committees for activities. In the model, the importance of the mobilization of the organizational climate was highlighted so that it was favorable for EBP implementation. The Theory of Innovation Diffusion[45] was used for this mobilization.[14, 27-28]

At the end of the 1990s, the first publications in Canada and the United Kingdom on models for the implementation of EBP began to appear, including: Ottawa Model of Research Use (OMRU)[29-30] and Promoting Action on Research Implementation in Health Services Framework (PARIHS),[31] respectively. It was observed that in the aforementioned countries, the previous scientific publications had, in short, reports of experiments on the use of research in practice, especially in the context of nurse training.[13] In the OMRU model, designed to guide the transfer of research for practice, it was recommended that a theoretical framework be initially identified in order to support the adoption of innovations, which should consider the characteristics of innovation and the ability to influence leaders to engage in the process. As a result, it would be nec-

essary to plan the change of practice in a dynamic and interactive way, including the researchers and potential users of the research results. It was also pointed out that the choice to use research would be influenced by external factors, involving patient preferences and the status of innovation in society as a whole. The propositions of the OMRU model encompassed the use of research as innovation, and not exclusively the use of synthesis of study results.[29-30]

The structuring of the PARIHS model, similar to the OMRU[29-30] model, started from a premise regarding the complexity and dynamism involved in the incorporation of research in practice. The model approach advocated the use of the synthesis of research results. Among the guidelines of the model, the importance of identifying the reasons why the evidence was not incorporated in the nurses' practice, as well as the level of individual competencies of these professionals and the main barriers that they found for the use of research were highlighted. Above all, the implementation of EBP would occur when the evidence was scientifically sound, corresponding to nurses 'interests and patients' preferences, and when the context for implementation was conducive to change. A favorable context would be a supportive organizational culture, with transformational leaders with high capacity of influence, and with appropriate monitoring of the results found after the implementation of the evidence. The PARIHS model has undergone adaptations over time related to the steps, which included subcategories being added, which may provide better order to the transfer of research results to practice.[31]

Thanks to the advent of the Internet, in the late 1990s and early 2000s, American publications on models for EBP implementation in Nursing were expanded.[13] Rosswurm and Larrabee's Change Model for Evidence-Based Practice (Rosswurm and Larrabee's Model)[32] was presented as the model whose principal concern was related to transforming the intuitive practice of nurses into practice that used consistent research results. The authors, professors of the University of The Virginia School of Nursing, advocated the importance of using valid and recorded descriptors as search terms for scientific evidence, and the systematic review of (exclusive) experimental studies as important criteria in the definition of EBP. Also, they argued that EBP was guided by standardized problems through Nursing Diagnostics, which presented standardized terminologies worldwide. The model was applied at the Charleston Area Medical Center.[32]

The Advancement Research and Clinical Practice through Close Collaboration (ARCC) model[33-34] emerged as an initiative to bring research results closer to the practical performance of nurses, with a view to advancing EBP in a teaching hospital. The elaboration of the model began with a survey of nurses working in this hospital regarding the barriers and facilities that they experienced with EBP.[33-34] Thus, the formulation of the dimensions of the model was based on the results of this survey and the authors considered the Theory of Control (cognitive behavioral theory) as a theoretical reference.[46] The structuring of the ARCC model started from the argument that nurses' beliefs and values about EBP, and the strengthening of competencies for the use of evidence, would be able to make feasible the daily exercise care based on the EBP premises. In particular, to strengthen the nurse competencies to search for primary studies from experimental research designs, standardized by the strategy according to the anagram PICO: P - person, population under study or health problem, I - intervention to be analyzed, C - comparison of the intervention to be analyzed, O (outcomes) - clinical outcome; with the use of appropriate descriptors, and systematic reviews. The development of this initiative was performed by specialist tutors already working in the hospital - Advanced Practice Nurses, who were oriented to work on strengthening the positive belief about the value of research among nursing teams, as well as in increasing the competence of the teams in order to use EBP. Specialist tutors were responsible for conducting strategies in hospital units, such as: study groups, critical reading of research, among others. In addition, the tutors worked with the nursing teams to organize internal evidence (reports with data on the care provided) and to manage the projects / action plans for the incorporation of EBP. The structure of the model was broad, and included a scale to evaluate whether there was an effective implementation of EBP among the nursing teams.[33-34]

The Tyler Collaborative Model[35] addressed collaboration and integration among nurse researchers and hospital administrators for the implementation of EBP with care nurses. The author reinforced the need for changes in health services and the availability of resources (specialized human and financial resources) for an orderly implementation of this approach. The structure of the model was based on an extensive review of the main barriers involving the use of EBP, and on the models available for its implementation. The main barriers described were

the knowledge gap in nurses for the critical evaluation of research results; among those who presented the knowledge, many felt isolated because of the lack of specialized support to guide the translation; for hospital administrators, the use of surveys was not identified as a priority action. In view of the above, the need to induce was demonstrated, firstly by a theoretical model, a cooperative environment to implement EBP. It would be comprised of the use of results from different sources of evidence, not only those from surveys, but also from local reporting.[35]

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP)[36-37] is represented as an open system. At its center, the evidence is presented as the basis for practice, training and research. The model considered as evidence the results of researches with different methodological delineations as evidence, with the necessary classification of the level of evidence. In general, decision-making for the use of evidence would be influenced by external factors such as the accreditation process and inductive and internal policies, such as organizational culture and team engagement and available financial resources. In this context, the model also advocates the need to evaluate internal evidences (infection control reports, cost-effectiveness evaluation, among others) in order to support the change in practice. This model was composed of guiding questions, which detailed the implementation of EBP step by step. The nurses at Johns Hopkins Hospital have adopted this model in the standardization of EBP, as well as using it for teaching at the linked university.[36-37]

In 2001, the Academic Center for Evidence-Based Practice (ACE)[38-39] of the University of Texas Health Science Center (USA) convened a national consensus among experts in the field in order to develop a panel on essential competencies for EBP in nursing. The model is represented as a simple five-point star, the ACE Star Model described the relations between the various stages of the transformation of knowledge, to the extent that the newly discovered knowledge was put into practice.[15-16,38-39] This model has been considered more as a "teaching-learning" structure for EBP. The national consensus on the essential competences for EBP pointed to the inclusion of content in the training of nurses, favoring the educational preparation for this approach.[15-16,38-39] As discussed in the model, the standardized search of primary studies and the development of a rigorous method for the synthesis of these results (in view of the different types of study designs) could ensure the paradigm shift in nursing related to the use of research in practice. Specifically, this step would be considered as the generator of innovation to be implemented.[38-39]

The Clinical Scholar Model[40] and the Evidence-based Practice Model in an Academic Medical Center,[41] both published in 2009, were developed as specialized mentoring programs to support the implementation of EBP with nurses in care settings. The first model addressed the training of the clinical nurse scholar – a category of professional to compose the nursing team (denomination given by the authors). The program proposed the training of nurses with specific competence to induce EBP in care units. This approach was understood as a method for solving problems in units by means of scientific principles. The maintenance of the curiosity for constant questioning of the practice was considered as the main attitude to be incorporated into the nurses' performance, the analysis of results of researches with different methodological delineations associated to the internal evidences (unit reports, clinical expertise, satisfaction of the patient) being important in order to produce the future implemented innovation. The clinical scholar nurse, working with the nursing care teams, should decide which practices needed to be improved or revised or even abolished. The elaboration of the model was based on the CURN project[23] and the Diffusion of Innovations Model.[45] Another document used in the description of the assignments of the clinical scholar nurse was the Clinical Scholarship Resource Paper, disseminated by Sigma Theta Tau International, in which the practice of nurses and the results achieved by projects developed for the implementation of EBP.[40]

The second model, The Evidence-based Practice Model in an Academic Medical Center,[41] also resulted from a program for the training of tutors for EBP implantation. The purpose of the program was to prepare nurses to exercise transformational leadership and to promote changes in the organization's culture to ensure the sustainability of EBP. This program was developed at the Barners-Jewish Hospital, linked to the Washington University School (USA). The site had multidisciplinary committees for reviewing practices and also Advanced Practice Nurses, or in other words, a strong team to induce change in practices through research results.[41] The conceptual basis for the elaboration of this model was by Melnyk and Fineout-Overholt.[33] The Evidence-based Practice Model in an Academic Medical Center was drawn from practical results achieved by a training program, which considered the integration of the best evidence resulting from

the synthesis of experimental studies, according to the ARCC Model.[41]

In 2011, another model was published by Goode and colleagues, who included the practical application of the CURN project.[42] The proposal consisted of updating the experience of implementing the CURN model and was also influenced by the models: Iowa, OMRU, PARIHS, The Tyler Collaborative Model and JHNEBP. The model called The Colorado Patient-Centered Interprofessional Evidence-Based Practice Model (The Colorado Model)[42] consisted of two diagrams, in which one of these diagrams the feasible aspects for the change of the organizational structure favorable to EBP as approached. In this diagram, the patient was the center of the interventions, and leadership, specialized mentoring and organizational support (human and financial resources) were presented as catalysts for the implantation of EBP. The second diagram demonstrated the steps for the evidence to be used in order to generate changes in clinical practice. The incorporation of non-scientific evidence (institution reports, information from the Center for Disease Control and Prevention, professional expertise) together with scientific evidence (studies of different designs) to broaden the decision-making scope. In order for decision-making to incorporate evidence into practice, the context of the organization and, in particular, patient preferences should be considered. The Colorado Model presented an approach that considers a greater number of aspects for EBP implementation and sustainability, both within the organization and in relation to the individual competencies of nurses.[42]

The Multisystem Model of Knowledge Integration and Translation (MKIT)[43] and The Research Appreciation, Accessibility and Application Model (RAAAM)[44] were models that addressed the systemic implementation of EBP in nursing, and presented conceptual similarities. In the description of the MKIT model, it was argued that nurses want to improve the quality of the practice, however they do not know how to use the research for that purpose. On the other hand, researchers usually conduct inquiries for their particular interests and "passions", and at the same time, hospital administrators refute any innovations that are not in line with their planning. Historically, research has been judged by its methodological rigor, and an assessment of its usefulness to practice is not added. The MKIT model presented systemic reconciliation between these poles in order to achieve the sustainability of EBP in health institutions. The importance of the team of research nurses to respond to the needs of changing practices in the hospital was described, with the attribution of this team to the search, critical evaluation and synthesis of the evidence. The meetings between research nurses and caregivers should be programmed according to the recommended model for the construction of the change plan, as well as for the delineation of the pilot study to be previously carried out, and for the final decision to integrate the evidence.[43]

The RAAAM model was applied in a large hospital in Australia. The author of the model and coordinator of the study started the proposal due to the need to promote the research in the health institution. The model focused on conducting research (not just the use of results) as a guideline for problem solving. Potential partnerships between university-institution hospitals were identified for the provision of specialized tutors (research nurses) in the guidance on the use of research. The second dimension of the model approached the access to the research results, emphasizing that this step requires action that requires greater specialization and improved competence. Therefore, the identification of the evidence was conducted by the tutoring originated in the relationship between university-hospital institution - conducted by nurses researchers.[44] For the translation of research results into clinical practice, groups of facilitators were organized, which intermediated the reading of the syntheses of evidence for the language for the improved comprehension throughout the nursing team.

The EBP sustainability in the hospital institution, from the perspective of this model, was due to the collaboration and partnerships between researchers, translation facilitators and Nursing teams. The sustainability of the research value occurred when the care nurses were engaged in collaborative research projects with researchers and facilitators. As a result, those involved used the research to find alternative solutions for everyday problems.[44]

Historically, EBP originated in evidence-based medicine (EBM). Despite being an approach, discussed in Clinical Epidemiology since the 1970s, the first MBE publications occurred in the 1990s with Guyatt et al., At McMaster University (Canada) and Sackett and the editorial collaborators in the British Medical Journal.[47-48] The Institute of Medicine (IOM) of the United States of America (USA), in its report entitled "Crossing the quality chasm: the new health system for the 21st century", already highlighted the compulsory teaching of EBM in undergraduate medical curricula. This initiative emerged due to the

number of medical errors that have contributed to people's deaths. Thus, evidence-based action could promote increased patient safety.[15]

In contrast, nursing has a different history related to the use of evidence in clinical practice. The first publication of a Nursing theory occurred in 1952 by Hildegard Peplau, and placed the status of this profession as a science based on human and health needs.[2] In Brazil, the participation of nurses in research development occurred from the creation of the university career in 1963, evolving greatly with the creation of postgraduate programs, with the commencement of the first master's degree in nursing in 1972 at the Anna Nery Nursing School, Federal University of Rio de Janeiro.[49] In the 1970's Research utilization began , which advocated the relevance of conducting research in nursing, as well as the use of its results in clinical practice.[15] In addition, scientific publications have discussed the role of Florence Nightingale as an EBP protagonist in nursing, in view of her pioneering role in organizing nursing care observation, statistical analysis and scientific research.[50-51]

CONCLUSION

In general, the implementation of evidence-based practice models in hospital nursing aims to promote the improvement of the quality of care by increasing the reliability of the interventions. The models describe stages that include the search and selection of the best evidence, to strategies to guarantee the sustainability of its incorporation in hospital organizations. However, through the assumptions of the models described, it can be inferred that the use of research in the practice of hospital nurses requires knowledge and skills beyond the usual in the daily work practice. In addition to the transformational leadership exercise and greater approximation with nurse-researchers.

Despite its specificities, the implementation of the models requires nurses: to be knowledgeable about methodological approaches and different types of research; critical analysis of publications (primary studies), as well as methods of synthesizing the results of primary studies (e.g., systematic review). In the organizational context, for the use of research in practice, it was presented as an essential aspect that the nurse promotes the engagement of all nursing staff, other workers and the managers acting on the scene. Monitoring, evaluation and dissemination of results were presented as crucial components for the use of research in nursing practice. The teaching-service integration and the approach between researchers and nurses of the hospital scenario was presented as fundamental.

In view of this reality, the use of research in the practice of nurses has been complex worldwide. The challenge for the national scenario is the development of national models, specific to the experienced reality, or the elaboration of initiatives that portray the implementation and/or adaptation of the models proposed in the international scope. Thus, this review provides support for the development of future research on the use of models for the use of research in the practice of hospital nurses, seeking to contribute to the increase of scientific production on this subject which remains a challenge in the national nursing context.

REFERENCES

1. Carvalho V. Linhas de pesquisa em enfermagem: destaques filosóficos e epistemológicos. Rev Bras Enferm. 2015; 68(4):723-9.
2. McCrae N. Whither Nursing Models? The value of nursing theory in the context of evidence-based practice and multidisciplinary health care. J Adv Nurs. 2012; 68(1):222-8.
3. Fortuna CM, Mishima SM, Matumoto S, Pereira MJB, Ogata MN. A pesquisa e a articulação ensino-serviço na consolidação do Sistema Único de Saúde. Rev Esc Enferm USP. 2011; 45(spe2):1696-700.
4. Brehmer LCF, Ramos FRS. Teaching-service integration: implications and roles in experiences of Undergraduate Courses in Nursing. Rev Esc Enferm USP. 2014; 48(1):118-24.
5. De Paula GF, Figueiredo ML, Camargo FC, Iwamoto HH, Caixeta CRCB. Concepções de liderança entre enfermeiros assistenciais de um hospital do Norte de Minas Gerais. Rev Eletr Enf [Internet]. 2012 [cited 2017 Jul 05]; 14(4):821-30. Available from: https://revistas.ufg.br/fen/article/view/15102
6. Carvalho MC, Rocha FLRR, Marziele MHP, Carmen SG, Bernardes A. Work values and practices which characterize the organizational culture of a public hospital. Texto Contexto Enferm. 2013; 22(3):746-53.
7. Rocha FL, Marziale MHP, Carvalho MC, Cardeal SF, Campos MCT. The organizational culture of a Brazilian public hospital. Rev Esc Enferm USP. 2014; 48(2):308-14.
8. Freitas CCG, Segatto AP. Ciência, tecnologia e sociedade pelo olhar da Tecnologia Social: um estudo a partir da Teoria Crítica da Tecnologia. Cad EBAPE BR. 2014; 12(2):302-20.
9. Oelke ND, Lima MADS, Acosta A M. Translação do conhecimento: traduzindo pesquisa para uso na prática e na formulação de políticas. Rev Gaucha Enferm. 2015; 36(3):113-7.

10. Horsley JA. Using research to improve nursing practice: a guide. CURN Project. New York (US): Grune &Stratton; 1983.
11. Melnyk BM, Ford LG, Long LE, Overholt EF. The establishment of evidence-based practice competencies for practicing registered nurses and advanced practice nurses in real-world clinical settings: proficiencies to improve healthcare quality, reliability, patient outcomes, and costs. Worldviews Evid Based Nurs. 2014; 11(1):5-15.
12. Rother, ET. Revisão sistemática X revisão narrativa. Acta Paul Enferm. 2007; 20(2):5-6.
13. Melnyk BM, Fineout-Overholt E. Evidence-based practice in Nursing & Healthcare: a guide to best practice. 2nd ed. Philadelphia (US): Wolters Kluer; 2011.
14. Caliri MHL. A utilização da pesquisa na pratica clínica de enfermagem: limites e possibilidades [tese] Ribeirão Preto (SP): Universidade de São Paulo, Escola de Enfermagem de Ribeirão Preto; 2002.
15. Bondmass, M. Evidence-based practice: part one of a four-part series on evidence-based practice. Nevada RN formation. 2010; 19(3):6.
16. Bondmass M. Conceptual models of evidence-based practice: part II of a four-part series on evidence-based practice. Nevada RN formation. 2010; 19(4):6, 22.
17. Bondmass M. Implementation strategies for evidence-based practice: part III of a four-part series on evidence-based practice. Nevada RN formation. 2011; 20(1):14.
18. Bondmass M. Evaluation and dissemination: part IV of a four-part series on evidence-based practice. Nevada RN formation.2011; 20(2):14.
19. O'byrne L, Smith S. Models to enhance research capacity and capability in clinical nurses: a narrative review. J Clin Nurs. 2011; 20(9-10):1365-71.
20. Schaffer MA, Sandau KE, Diecrik L. Evidence-based practice models for organizational changes: overview and practical applications. J Adv Nurs. 2013; 69(5):1197-209.
21. Stetler CB. Refinement of the Stetler/Marram model for application of research findings to practice. Nurs Outlook. 1994; 42(1):15-25.
22. Stetler CB. Updating the Stetler modelo f research utilization to facilitate evidence-based practice. Nurs Outlook. 2001; 49(6):272-8.
23. Horsley JA, Crane G, Bingle JD. Research utilization as an organizatiom process. J Nurs Adm. 1978; 8(7):4-6.
24. Goode CJ, Lovett MK, Hayes JE, Butcher LA. Use of research based knowledge in clinical practice. J Nurs Adm. 1987; 17(12):11-8.
25. Goode CJ, Piedalue F. Evidence-based clinical practice. J Nurs Adm. 1999; 29(6):15-21.
26. Leske JS, Whiteman K, Freichels TA, Pearcy JM. Using clinical innovations for research practice. AACN Adv Crit Care. 1994; 5(2):103-14.
27. Titler MG, Kleiber C, Steelman VJ, Rakel BA, Budreau G, Everett LQ, et al. The Iowa model of evidence-based practice to promote quality care. AACN Adv Crit Care North Am. 2001; 13(4):497-509.
28. Titler MG. Nursing Science and evidence-based practice. West J Nurs Res. 2011; 33(3):291-5.
29. Kitson AL, Harvey G, Mccormack B. Enabling the implementation of evidence-based practice: a conceptual framework. Qual Health Care. 1998; 7(3):149-58.
30. Kitson AL, Malone JR, Harvey G, McCormack B, Seers K, Titchen A. Evaluating the successful implementation of evidence into practice using the PARIHS framework: Theoretical and practical challenges. Implement Sci. 2008; 3(1):1-12.
31. Ricroft-Malone J. The PARIHS framework – A framework for guiding the implementation of evidence practice. J Nurs Care Qual. 2004; 19(4):297-304.
32. Rosswurm MA, Larrabee J. A model for change to evidence-based practice. J Nurs Scholarsh. 1999; 31(4):317-22.
33. Melnyk BM, Fineout-Overholt E. Putting research into practice. Reflect. Nurs Leadersh. 2002; 28(2):22-5.
34. Melnyk BM, Fineout-Overholt E, Gallagher Lynn, Stillwell SB. Sustaining Evidence-Based Practice Through Organizational Policies and an Innovative Model. AJN September. 2011; 111(9):57-60.
35. Olade RA. Strategic collaborative model for Evidence-Based Nursing Practice. Worldviews Evid. Based Nurs. 2004:1(1):60-8.
36. Newhouse R, Dearholt SL, Poe SS, Pugh LC, White KMW. Johns Hopkins nursing Evidence-Based Practice: Model and Guidelines. Indianopolis (US): Sigma Theta Tau International; 2007.
37. Newhouse RP, Johnson K. A case study in evaluating infrastructure for EBP and selecting a model. J Nurs Adm. 2009; 39(10):409-11.
38. Kring DL. Practice domains and Evidence-Based Practice compentencies: a matrix domains of influence. Clin Nurs Spec. 2008; 22(4):179-83.
39. Stevens KR. ACE Star Modelo f EBP: knowledge transformation. Academic Center for evidence practice. San Antonio (US): The University of Texas Health Science Center at San Antonio; 2004.
40. Strout T, Lancaster K, Schultz AA. Development and implementation of an inductive Model for Evidence-based Practice: A grassroots approach for building evidence-based practice capacity in staff nurses. Nurs Clin North Am. 2009; 44(1):93-102.
41. Balakas K, Potter P, Pratt E, Rea G,Williams J. Evidence equals excellence: the application of an evidence-based practice model in an academic medical center. Nurs Clin North Am. 2009; 44(1):1-10.
42. Goode CJ, Fink RM, Krugman M, Oman KS, Tradili LK. The Colorado Patient-Centered Interprofessional

Evidence-Based Practice Model: a framework for transformation. Worldviews Evid Based Nurs. 2011; 8(2):96-105.

43. Palmer D, Kramlich D. An introduction to the multisystem model of knowledge integration and translation. Adv Nurs Sci. 2011; 34(1):29-38.
44. Edward KL. A model for increasing appreciation, accessibility and application of research in nursing. J Prof Nurs. 2015; 31(2):119-23.
45. Rogers EM. Diffusion of innovations. 5 ed. Nova York (US): Free Press; 2003.
46. Carver CS, Scheier MF. Control Theory: a useful conceptual framework for personality-social, clinical and health psychology. Psychol Bull.1982Jul; 92(1):111-35.
47. Sackett DL, Rosenberg WM, Gray JA, Haynes B, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996 Jan 13; 312(7023):71-2
48. Evidence-Based Medicine Working Group. Evidence-based medicine: a new approach to teaching the practice medicine. JAMA. 1992 Nov 4; 268(17):2420-5.
49. Mendes ALTM, Aperibense PGGS, Almeida Filho AJ, Peres MAA. Nursing master's program at Anna Nery school 1972-1975: singularities of graduating and challenges in its implementation. Esc Anna Nery. 2015; 19(1):11-7.
50. Mackey A, Bassendowski S. The history of evidence-based practice in nursing education and practice. J Prof Nurs. 2017; 33(1):51-5.
51. Beyea SC, Slattery MJ. Historical perspectives on evidence-based nursing. Nurs Sci Q. 2013; 26(2):152-5.

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