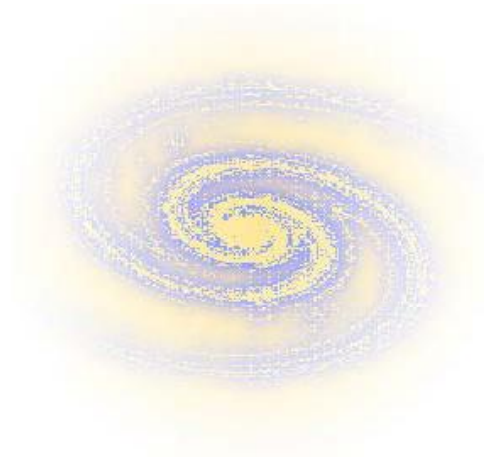# Barriers and Facilitators for Implementing Evidence-Based Practice Among German Nurses Working in a General Hospital.

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Abstract

Background: It is evident in nursing literature that there are many factors that impede or facilitate the use of research findings in practice. These factors should be identified if evidence-based practice is to become a reality in clinical practice. This study surveys the perceptions of German nurses with respect to the barriers to using research findings and facilitators in nursing practice.

Methods: A questionnaire based on implementing innovations in health care with potential barriers and facilitators was administered to 250 nurses in a general German hospital; 87 nurses returned the questionnaire, giving a response rate of 35%.

The four factors that influence the first two stages of Rogers's five stage model "Diffusion of innovations" were examined. The factors, characteristics of the adopter, characteristics of the organisation, characteristics of the innovation and characteristics of the communication, were measured using an adapted version of the BARRIERS scale.

Results: Barriers were present in all four characteristics, but the major facilitators were found to be in the organization and the communication. The results showed that the greatest barriers were insufficient time on the job to read research (84%) or to implement new ideas (64%) and lack of authority for the nurses to change patient care (64%). Both availability of time and staff hires were facilitators at 86% in research findings.

Discussion and Conclusions

Based on the survey issues related to setting, presentation of research findings and to knowledge, thus we can conclude that nurses of this hospital were not familiar with the term evidence-based practice, even though they had access to computers. This lack of knowledge resulted from limited time, lack of skills and support administration. Therefore, nurses in the health care community need improved conditions in order to provide the appropriate care to patients and the hospital.

Summary

<u>Introduction to the study</u>

Evidence-based practice in nursing (EBP) is a framework for clinical practice that integrates the best available scientific evidence with nurse's expertise and the patient's preferences and values to decide about healthcare of individual patients. EBP has flourished in nursing and in health care generally. In spite of all the various programs and strategies to promote the use of research findings, there is still a gap between theory and practice.

This study seeks to increase our understanding of barriers and facilitators to the utilization of research by nurses through an exploration of perceived barriers and facilitators on the part of nurses. It focuses on German nurses, working in a general hospital in Münster, West Germany.

Review of the literature

A search of the literature revealed myriad of studies describing barriers nurses perceive in trying to apply research findings in their practice. A lot of countries have surveyed their nursing staff, on research-related activities indicating that it is not a local, but a global issue. The main barriers to all these studies to nurses utilizing research are lack of authority to change nursing practice, time constraints and lack of knowledge of research methods. The main conditions to the same studies that would facilitate nurses in the use of research findings are support from administration or colleagues, available time and research knowledge base.

Theoretical Framework

The current study was guided by the first two stages of Rogers's "Diffusion of Innovations" model, knowledge and persuasion. New knowledge was given to the nurses, with the intention to make them aware of, and convince them to use the research findings.

Purpose

The purpose of this study was the investigation of the barriers that German nurses working in a hospital believed hindered their ability to integrate research into their practice, as well as the identification of the facilitators that enhance research utilization in practice.

Research questions

The primary research question for this study was the following:

- What are the perceived barriers and facilitators to utilising research among nurses in a German hospital?

Methodology

Design

A descriptive design utilizing a survey was selected as the method to examine the perceptions, regarding the barriers and facilitators to research utilization among nurses in a German hospital.

Sample

Participants for the research were all the nurses working both full-time and part-time in the hospital.

Development of the Questionnaire

The survey used for this study was a 71-item questionnaire. It included the 29-item Barriers Scale to research utilization, which was developed by Funk, Champagne, Wiese and Tornquist. The rest of the questionnaire consisted of questions on demographic information, communicational characteristics, evidence-based practice questions and questions about barriers on the basis of the literature review. Additionally, a list of questions about conditions that facilitate the use of research findings in nursing practice was added.

Open questions for additional barriers or facilitators and questions to rank the three greatest barriers or facilitators to using research into practice were also added.

The last question invited the nurses to add any other comments on the whole questionnaire.

Procedure

The questionnaire was accompanied with a cover letter that explained the purpose of the study to the participants. It was translated into German by German professionals and then the questionnaires were given to the Nursing Director of the hospital, who gave the questionnaires to the nurses and encouraged staff nurse participation. Returned questionnaires were delivered to the Nursing Director of the hospital.

Analysis

Quantitative data were coded and analyzed using Statistical Packet for Social Sciences (SPSS, 15) software.

Results

Demographic characteristics

Data were collected among the nurses (n=250) of the German hospital. The response rate was 35%. The vast majority of the respondents were female. 49% of the participants were under 34 years old and 39% were between 35 and 49 years old.

All of the respondents reported having finished nursing school, 43% participated in additional professional development, 3% obtained a master's degree and 1% obtained a doctorate degree.

The areas of most participation were the medical-surgical units (41%), operating units (15%) and other units (37%).

Information characteristics

Respondents were asked for the frequency they looked for information to support their nursing practice. 35 % of the respondents said they needed to seek information one or two times per month and 30% of them less than once per month.

To find the information they needed, 45% of the respondents said that they searched the internet and nearly 23% asked their colleagues or read journals or books.

38% of the respondents used reference texts as sources of monthly information. 55% were informed by journal articles monthly, but the hospital library was used only by 10% of the nurses as a source of information.

Evidence-based practice activities

When respondents were asked for the frequency they participated in different evidence-based activities, only 11,5% had participated in research, 53% had participated in the development of guidelines and 19,5% had participated in the solution of researchable problems.

Concerning the evaluation of the availability of information resources in the hospital, 37% said that print materials were available, 77% said that online resources were available and 47% of the respondents said that other information resources were also available. Although evidence-based practice has been widely discussed in the literature over the last years, more than the half (65,5%) of the respondents said they were not familiar with the term.

Barriers to Research Utilization

Respondents were asked to rate each of the 38 items on the scale with the barriers according to the extent to which they were perceived as barriers.

The greatest barrier was that there was not enough time to read research, followed by insufficient time to implement new ideas. Another barrier was that the nurse has not enough authority to change practice, that she is unaware of the research, or the relevant literature is not compiled in one place.

Facilitators

Participants were asked to rate a list of twelve facilitators to the use of research in nursing practice. The most frequently cited facilitator was that there should be more time available for research findings, followed by the answer that more employees should be hired. Other conditions that can facilitate the implementation of research findings were to improve the availability and understandability of research reports.

<u>Discussion</u>

Although the nurses recognized the need for information in their practice, their most frequent source of that information was the Internet. Information resources in this hospital are available to a great degree, especially on-line resources, which indicates the high level of German hospitals in information. Unfortunately, nurses were not in a great degree familiar with the term "evidence-based nursing".

The major barriers to the utilization of research findings were found to be the work organization (setting), the adopter (nurse) and the presentation of research findings.

The barriers and the facilitators of the utilization of research findings, as measured in this study, were consistent with previous works regarding barriers to research utilization.

Barriers related to setting

The major barrier to research utilization was related to insufficient time to read research. Lack of time reflects the serious and deep seated problem that exists in Germany as well as other hospitals all over the world. Time to read, evaluate, analyze, disseminate and implement research is very limited for nurses everywhere.

Nurse administrators have a pivotal role to play in decreasing this barrier and providing an organisational context which will support evidence-based practice. This can be done by writing into contracts that a certain period of time should be devoted to research implementation; giving more time for professional development and other solutions.

The second great barrier was nurses's lack of authority to change patient care procedures, maybe because half of them were under 34 years of age and as a result they were in lower levels of hierarchy and were less likely to have authority to change procedures as nurses who belong to higher levels of hierarchy and tend to be older.

Barriers related to presentation of research findings

The fact that the relevant literature was not put together, according to the respondents, was perceived as an obstacle. This finding shows that the nurses do not have the tradition to use the library services as it is indicated from the great percentage of nurses (81%) that have not used the library.

Facilitators

The major facilitators to the utilization of research findings were found to be in the work organization (setting), and the communication/presentation of research findings.

Sufficient time and staff was also suggested from the other studies as a major facilitator, which reflect the barriers in the organisation.

Nurses find it difficult to evaluate scientific articles, due to the lack of knowledge and education in research methods. It needs to be evaluated whether nursing curricula are successful in transmitting the skills and knowledge that is required to understand statistical data.

Limitations

This study has some limitations and generalizations should be made carefully. The limitations related to the low response rate, the low sample and "no opinion" answers.

Conclusions and Implications for Practice

The findings from this survey point out that the nurses in this German hospital are not at all familiar with the term "evidence-based nursing".

It is suggested that nursing should be developed as an academic specialty in order to remove the barriers identified and to make research-based practice a reality. Furthermore, education about research is of great importance, due to the different educational backgrounds of nurses.

Administrators should provide nurses time to learn skills related to Evidence-based Practice and also provide expertise and funds.

Recent innovations need to be evaluated and creative strategies remain to be discovered, so as to identify the best strategies for implementing EBP.

Future implications for nurses

It would be beneficial to develop websites or a newsletter as an e-mail with systematic reviews, to lower the high percentage of nurses that are unaware of the research findings. Additionally, it would be very helpful if online resources should be available for all the nurses and if conclusions could be presented in summaries with full reports. Nurses can attend seminars that teach research methods and offer their knowledge to other nurses in their clinical area.

Future implications for administrators

Administrators can support nurses by providing time for activities that promote evidence-based nursing. It should be beneficial to create an organisational position for nurse researchers who can also organise research committees. Administrators can also encourage an evidence-based practice environment, by asking for evidence to support nurses' suggestions or recommendations for change in a clear way.

"Research without practice is like building castles in the air.

Practice without research is building castles on slippery grounds"

Parahoo (1997, p4)

Introduction to the study

1. *Nature of Project and Problem identification*

Health care is filled with uncertainty (e.g. what type of treatment is most effective to have the best outcomes for the patient? How have patients coped with their disease? What is the best nursing plan based upon a nursing assessment?) Nevertheless, in a complicated health care system, the uncertainty can be reduced if clinicians base their practice on evidence. Patients demand quality of care and clinicians want to provide great patient care**.**

As research and technology in health care thrive, evidence-based practice in nursing (EBP) is getting important in delivering high quality healthcare. Internet offers a plethora of information, which is easily obtained and can be used as a learning tool. EBP is essential for nurses to get acquainted with the available evidence and implement research findings to patient care (Hockenberry, 2006).

Evidence-based practice in nursing (EBP) is a framework for clinical practice that integrates the best available scientific evidence with nurse's expertise and the patient's preferences and values to decide about healthcare of individual patients. EBP has been presented as a decision-making model or a model for solving clinical problems. The basic steps involved in evidence-based nursing practice are the following:

a) Defining a problem and formulating clinical questions that can be answered through research or other sources of evidence

b) Finding the best evidence to answer these clinical questions

c) Assessing the validity of the evidence to provide answers to clinical questions

d) Incorporating the evidence with nurse's expertise and patient's attitude

e) Evaluating the whole process and the results.   (Levin, 2006)

EBP has flourished in nursing and in health care generally. This is obvious from the establishment of the Cochrane Library which contains the Databases of Systematic Reviews, nursing journals as the journal of Evidence-Based Nursing and centres as the Joanna Briggs

Institute for Evidence-based Nursing in New Zealand and the Centre for Evidence Based Nursing in the University of York in Great Britain (Estabrooks, 1999). In Germany, the Center for Evidence-based Nursing has been founded in 1998 by Pr. Johann Behrens and it is a member of the International Network of the Centers for Evidence-based Nursing.

More than 25 years have already passed since research utilization has been discussed in the nursing literature with enhanced enthusiasm and demands for using research findings into practice. Moreover, the movement of evidence-based practice which started in 1990s has underlined the significance of integrating research utilization in practice (Hutchinson, 2004).

Researchers have argued that daily practice in nursing care is influenced more by tradition, intuition and experience and less by scientific research. Reviews in literature focus on the difficulty that exists trying to apply research findings into practice (Scudder 2006, Stetler 2006).

Although the utilization of research in nursing practice has increased, there are differences in the nurses' education level regarding research utilization. Moreover research was highly dependent on the culture of the hospital, meaning the provision of resources and the support that nurses had (Rodgers, 2000).

The reasons why nurses should integrate research findings in their routine practice are several. Utilization of research findings increases the quality of health care, provides increased efficiency in patient care (Pettengill, 1994) and also personal and professional attitudes of the nurses are developed (Funk 1991). Nursing research produces knowledge that nurses can use in their routine work (Oranta 2002). In a meta-analysis designed to identify the contribution of research-based practice to patient outcomes, results were presented from 84 research studies concerning nurses and involved 4146 patients. It was reported that patients who received care based on the best and latest evidence from well-designed studies, experience 28% better outcomes in behavioural knowledge as well as physiologic and psychosocial outcomes than patients whose care was based on traditional practice (Heater, Becker and Olson, 1988; Melnyk, 1999).

In spite of all the various programs and strategies to promote the use of research findings, there is still a gap between theory and practice (Camiah, 1977, Waddell, 2002). Only a small percentage of health care providers implement research findings into practice, due to demanding patient loads, the great amount of journal articles related to their nursing practices and of

misunderstandings of the time and procedures implementing practice based on evidence (Melnyk, 2000).

From a study in 1993, it was found that only 21% of 1200 practicing nurses had integrated evidence from research findings into their practice the last 6 months, due to excessive time demands for clinical work, lack of access to articles and inability to evaluate them critically (Bostrom, Suter 1993). Other researchers claimed that although both the quality and quantity of nursing research related to clinical practice has dramatically grown, the use of research findings in daily practice remains low, mainly because of the limited ability of nurses to understand research articles (Camiah, 1977, Waddell, 2002).

This study seeks to increase our understanding of barriers and facilitators to the utilization of research by nurses through an exploration of perceived barriers and facilitators on the part of nurses. It focuses on German nurses, working in a general hospital in Münster, West Germany.

Chapter One

1. *Review of the literature*

A search of the literature revealed myriad of studies describing barriers nurses perceive in trying to apply research findings in their practice. A lot of countries have surveyed their nursing staff, on research-related activities meaning that it is not a local issue, but a global issue.

Barriers

In the USA, Sandra Funk (1991) has offered some possible reasons to explain why nurses do not use research findings in their practice: (1) The nurse does not feel she/he has enough authority to change patient care procedures. (2) There is insufficient time on the job to implement new ideas. (3) The nurse is unaware of the research. (4) Physicians will not cooperate with implementation. (5) Administration will not allow implementation. (6) Other staff is not supportive of implementation. (7) The nurse feels results are not generalizable to own setting. (8) The facilities are inadequate for implementation. (9) Statistical analysis is not understandable. Finally, (10) the nurse has not time to read research. These points can be summarised in terms of organizational constraints (lack of authority, lack of time to implement new ideas or to read research, lack of cooperation with the physicians, administration or other personnel, inadequate facilities), nurses' attitudes to undertake research (lack of knowledge of research methods), and research communication (research jargon).

Again in the USA, Carroll (1997) also supports the fact that there are barriers that have the potential to hinder the implementation of using research findings in nursing practice. These constraints include lack of knowledge of research methods, lack of time to implement new ideas or to read research, unavailability of research reports, lack of authority to change practice, research jargon, lack of access of relevant literature, isolation from colleagues who know and can discuss research, unsupportive staff and inability of the nurse to evaluate research. These points concerning barriers to research use can be summarized in terms of the attitude of nurses to undertake research (lack of knowledge about research, lack of communication from knowledgeable colleagues, weakness of evaluating research), organizational constraints (time, lack of authority, unsupportive personnel) and research communication (not readily available reports, research jargon, literature).

In Sweden, Kajermo (1998) has investigated nurses' perceptions of barriers to research utilization. She prioritized the reasons why nurses do not use research findings in their practice in the following order: (1) Lack of accessibility, (2) inadequate facilities, (3) isolation from knowledgeable colleagues, (4) time constraints, (5) lack of authority to change practice, (6) unclear implications for practice, (7) lack of access of relevant literature, and (8) English language. These barriers to research use can be summarized in terms of research communication (unavailability of reports, unclear recommendations, lack of literature), organization (resources, time to read or implement new ideas, lack of authority) and nurses' attitude toward research (isolation from aware clinicians).

In Australia, Retsas (1999), surveyed the factors Australian nurses perceive to interfere with their ability to use research in their clinical practice. Stated reasons as to why they did not implement research activities included the following: Insufficient time on the job to implement new ideas, lack of authority, inadequate facilities, lack of understandability of research, physicians' uncooperation, isolation of knowledgeable colleagues, inability to access research findings, lack of generalized results and unsupportive staff. These barriers to research utilization can be summarized in terms of organizational constraints (time, lack of authority, resources, uncooperation of physicians, ungeneralizable results, and opposing co-workers), research communication (research jargon) and the attitude of nurses (lack of communication of insightful co-workers, inability of estimating the quality of research).

More recently, in Northern Ireland, Parahoo (2000) has pointed out nurses' perceptions of barriers to research utilization. Some of the factors contributing to the gap between research and practice include lack of nurses' authority to change practice, lack of understandability of reports, inadequate time to integrate new ideas, lack of allowance from the management, ungeneralizable results to nurse setting, inability of accessing research, doctors' uncooperation, insufficient facilities, unsupportive staff and lack of access of relevant literature. These barriers to research are summarized in terms of the organization, research communication and the individual.

In Finland, Oranta (2002) has pointed out the barriers to research utilization from the point of view of Finnish registered Nurses. The main constraints include language of reports, lack of cooperation with the physicians, difficulty to understand statistical analyses, insufficient time, unclear recommendations for practice, difficulty to comprehend research findings due to unclear reporting, lack of support from other personnel, ungeneralizable results and lack of access in

relevant literature. These views can be summarized in terms of organizational constraints (uncooperative physicians, time to implement ideas or to read research, lack of staff support, ungeneralizable results), and research communication (research jargon, unclear suggestions for practice, unsupportive staff).

To summarize previous studies, the main barriers to nurses utilizing research are lack of authority to change nursing practice, time constraints and lack of knowledge of research methods. All the previous barriers can be synopsized in characteristics of the individual, that is, the nurses' research values, skills and awareness; characteristics of the organization, such as, barriers and limitations perceived in the work setting; characteristics of the research, such as its methodological soundness and the appropriateness of conclusions derived from the research; and characteristics of the presentation of the research and its availability.

Facilitators

There has been global concern related to studies on research related activities by nurses. Some researchers have described the facilitators nurses perceive in utilising research-based findings into their practice.

In the USA, Funk (1991) has noted various facilitators that enhance the use of research findings into practice. These facilitators include: increase of administrative support, improvement of availability of research reports, increase of research knowledge base, provision of support from colleagues, conduct of more clinically focused research, increase of the time available to implement research findings and improvement of the understandability of research reports. These points can be summarised in terms of facilitators related to organization (support from administration and colleagues, time available), to research communication (accessibility of research, clinically focused research, understandability of research reports) and to the individual (additional education).

In the USA, Carroll (1997) has noted some facilitators to the use of research in nursing practice. These facilitators include more time available for implementing research findings, more clinically focused, relevant research, accessibility of research reports, support from administration and colleagues and understandability of research reports.
These points concerning facilitators of research utilization can be summarized in terms of the attitude of organizational factors (time, support, education) and research communication (clinically, relevant research, accessibility of reports, easily to understand reports).

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In Sweden, Kajermo (1998) has investigated nurses' perceptions of facilitating the use of research findings in practice. She categorised the facilitators in five groups as follows: knowledge, communication, resources, support-attitudes and research. The first category included education in scientific methods, the second translation of the articles in Swedish, the third available time, money and staffing, the fourth support and encouragement from the personnel and the fifth was related to more clinically focused research.

In Australia, Retsas (1999), surveyed the factors Australian nurses perceive to facilitate their ability to use research in their clinical practice. He said that in order to improve this ability, critical changes need to be done in the educational system, in an attempt to improve the research skills among clinical nurses.

In Ireland, Parahoo (2000) investigated facilitators of research utilization among Irish nurses. The most common responses were "manager's support', "time" and "support from colleagues".

In Finland, Oranta (2002) has pointed out the facilitators to research utilization from the point of view of Finnish registered Nurses. The main facilitators were nurses' positive attitudes and abilities.

To summarize the previous studies, the main factors that would facilitate nurses in the use of research findings are support from administration or colleagues, available time and research knowledge base. All the previous facilitators can be synopsized in characteristics of the organization, such as, factors perceived in the work setting; and characteristics of the presentation of the research and its availability.

In order to develop a plan for the implementation of research findings into practice, potential local barriers and potential facilitators needed to be identified.
The summary of the review of the literature can be seen in Appendix A.

It is evident that these barriers and facilitators are global issues within the healthcare community. For this reason we should sensitize ourselves in all the ways we can about the importance and value of evidence-based nursing.

2. *Theoretical Framework*

Based on the previous review of the literature, there are reasons that hinder the nurse's ability to use research findings in clinical practice. Insufficient time, lack of authority to make changes, lack of knowledge of research methods, lack of cooperation from physicians and unsupportive colleagues are only some of the plethora of barriers.

The adoption of a new clinical behaviour by a clinician and healthcare system is a consequence of multiple factors, with research evidence being only one. Research on the diffusion or adoption of innovations suggests that many subjects come into play.

Rogers (Rogers, 1995), has developed one of the very well-known theoretical approaches to diffusion of innovation. In Rogers's model, the diffusion of new innovations develops through five stages: knowledge or awareness, persuasion, decision, implementation and confirmation. The diffusion of innovations is addressed towards one or more adopters or potential users of the new knowledge.

Figure 1.Rogers's Diffusion of Innovations Theoretical Framework

In the first phase, the adopter must be exposed to and obtain the appropriate knowledge. In the second phase, the adopter has to be convinced that the knowledge is beneficial and applicable. Third, the adopter must come into a decision whether to use the knowledge or not. Then, the adopter has to implement the knowledge. At the end, the implementation has to be assessed or confirmed.
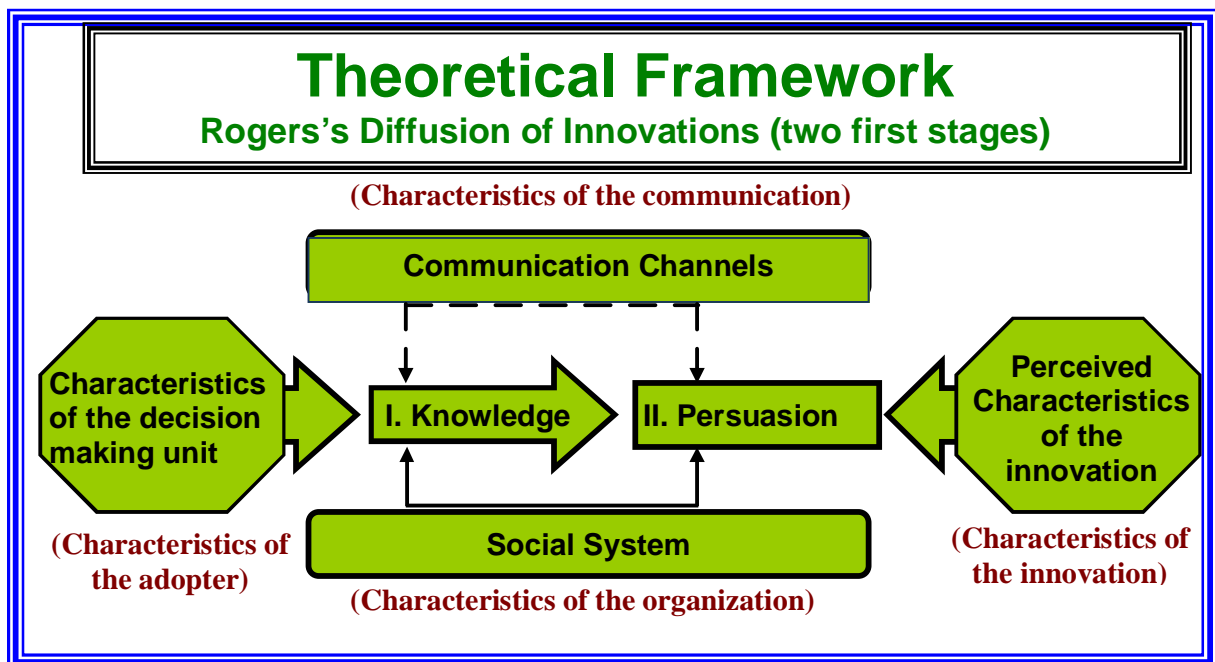
The items in parenthesis indicate the factors that were labeled and measured in the study

Figure 2. The first two stages of Rogers's Diffusion of Innovations Model

The current study was guided by the first two stages of the diffusion process. New knowledge was given to the nurses, with the intention to make them aware of, as seen in phase I and convince them to use (as seen in phase II) the research findings. In particular, all items that affect the first two phases were investigated as it is shown in Figure 2. All these factors are potential barriers in the first two stages of the diffusion process. The factors are characteristics of the adopter, the communication, the innovation and the organization.

The decision to accept or reject an innovation does not happen automatically.

In terms of applying research findings into practice, these elements can be translated as the characteristics of the research, its presentation and accessibility, the setting or organization and the individual. I will investigate the reasons why there are so many barriers in applying research into practice in Germany.

3. *Purpose*

The purpose of this study is the investigation of the barriers that German nurses working in a hospital believed hindered their ability to integrate research into their practice, as well as the investigation of the facilitators that enhance research utilization in practice.

4. *Research questions*

The study identified the four factors that influence the first two stages of diffusion via the research questions that follow:

The primary research question for this study was the following:

- What are the perceived barriers and facilitators to utilising research among nurses in a German hospital?

Sub-questions:

1. Is Evidence-based Practice implemented in a large scale among nurses in Germany?
2. To what extent do the German nurses perceive the following characteristics to be important barriers to utilising research into practice?
    - characteristics of the adopter?
    - characteristics of the organisation?
    - characteristics of the innovation?
    - characteristics of the communication?
3. To what extent do the German nurses perceive the following characteristics to be important facilitators to utilising research into practice?
    - characteristics of the adopter?
    - characteristics of the organisation?
    - characteristics of the innovation?
    - characteristics of the communication?

Chapter Two: Methodology

1. *Design*

A descriptive design utilizing a survey was selected as the method to examine the perceptions, regarding the barriers and facilitators to research utilization among nurses in a German hospital. With this design, information about characteristics within a particular field of study was obtained. The threat of internal validity was present, due to the selection of participants. In order to minimize threats to internal validity related to this design, all the nurses who were working at that time in the hospital were invited to fill in the questionnaire.

2. *Sample*

Participants for the research were all the nurses working both full-time and part-time in a general hospital in Münster, West Germany. At that time the hospital utilised 316 beds and approximately 260 nurses worked in the hospital.

I chose a German hospital for two reasons. German hospitals are well known for their high standards of nursing care and because the quality of service is under continuous government supervision.

Approval for using the questionnaire to the nurses was obtained from the president of the hospital.

3. *Development of the Questionnaire*

Developed in the USA in 1987, Funk, Champagne, Tornquist and Wiese, based a questionnaire on the literature on research utilization, on the Conduct and Utilization of Research in Nursing (CURN) Questionnaire (Crane, Pelz and Horsley, 1977) and on informal data collected from nurses. This questionnaire includes the 29-item Barriers Scale to research utilization. This scale asks the nurses to rate the extent to which they think each item is a barrier to nurses' use of research to change or improve their practice. Responses were rated from 1 to 5, which displays the point to which each item is considered to be a barrier to research utilization (1, to no extent; 2, to a little extent; 3, to a moderate extent; and 4, to a great extent). A "no opinion" response option was also provided. The items were randomly ordered. The scale was tested with a sample of registered nurses (n=1948) who were working full time, 924 of them held clinical positions.

Standard psychometric analyses were performed on the instrument and replicated (Funk et al., 1991). From the analyses of the main components, four factors were identified in this scale:

- characteristics of the potential adopter, as the nurse's research values, skills and awareness
- characteristics of the organization in which the research will be used, such as barriers and limitations that exist in work setting,
- characteristics of the innovation or research, as the qualities of the research and finally
- characteristics of the communication concerning the research, as the presentation and accessibility of the research.

Permission to use this scale was asked by Sandra Funk, Ph.D., by submitting a signed permission form available online.

In this study, the scale was adapted for German nurses. First, this involved changing a few terms or adding new terms to make the scale more suitable for them.

More specifically, the survey used for this study was a 71-item questionnaire. (Appendix B)

The first part of the questionnaire included questions on demographic information about respondents included characteristics of gender, age, educational background and current position in the hospital (questions 1-4), based on literature review.

The second part consisted of communicational characteristics, such as the frequency that a nurse looks for research or evidence to support his/her nursing practice (question 5), the place that a nurse usually finds information (question 6) and the frequency that looks for information from specific sources (question 7).

In the third part, questions based on Evidence-based practice were asked, as if the nurses are involved in research activities, guidelines or other researchable problems (question 8), how they evaluate the availability of information resources in the hospital (question 9) and the extent that someone is familiar with the term Evidence-based practice (EBP) (question 10).

The fourth part of the questionnaire (questions 11-39) consisted of questions that examined the nurses' perceptions of the four factors (*potential barriers*) that influence the first two stages of

the diffusion process and were measured by an adapted version of Funk's Barrier Scale. Barriers Scale is a measurement tool developed originally for nurses and measures barriers to research utilisation (Funk et al. 1991a). It was chosen, because it has been widely used to study research utilization by nurses and has statistical validity and reliability (Funk, 2004).

Focused on Rogers's' Diffusion of innovations model (Rogers, 1995), the four main factors that influence the diffusion process were:

Factor 1. Characteristics of the potential adopter: The nurse's research values, skills, and awareness. (8 items; alpha = .80)

• The nurse does not see the value of research for practice. (Question 30)

• The nurse sees little benefit for self. (Question 26)

• The nurse is unwilling to change/try new ideas. (Question 36)

• There is not a documented need to change practice. (Question 31)

• The nurse feels the benefits of changing practice will be minimal. (Question 19)

• The nurse does not feel capable of evaluating the quality of the research. (Question 38)

• The nurse is isolated from knowledgeable colleagues with whom to discuss the research. (Question 25)

• The nurse is unaware of the research. (Question 15)

Factor 2. Characteristics of the organization: Setting, barriers and limitations.
(8 items; alpha = .80)

• Administration will not allow implementation. (Question 29)

• Physicians will not cooperate with implementation. (Question 28)

• There is insufficient time on the job to implement new ideas. (Question 17)

• Other staff is not supportive of implementation. (Question 35)

• The facilities are inadequate for implementation. (Question 16)

• The nurse does not feel she/he has enough authority to change patient care procedures. (Question 23)

• The nurse does not have time to read research. (Question 39)

• The nurse feels results are not generalizable to own setting. (Question 24)

Factor 3. Characteristics of the innovation: Qualities of the research, such as the methodological soundness and the appropriateness of conclusions drawn from the research. (7 items; alpha = .72)

• The research has methodological inadequacies. (Question 21)

• The conclusions drawn from the research are not justified. (Question 32)

• The research has not been replicated. (Question 18)

• The literature reports conflicting results. (Question 33)

• The nurse is uncertain whether to believe the results of the research. (Question 20)

• Research reports/articles are not published fast enough. (Question 27)

• The amount of research information is overwhelming. (Question 37)

Factor 4. Characteristics of the communication: Presentation and accessibility of the research. (6 items; alpha = .65)

• Implications for practice are not made clear. (Question 12)

• Research reports/articles are not readily available. (Question 11)

• The research is not reported clearly and readably. (Question 34)

• Statistical analyses are not understandable. (Question 13)

• The relevant literature is not compiled in one place. (Question 22)

• The research is not relevant to the nurse's practice. (Question 14)

Cronbach's alpha in the previous characteristics was between 0.65-0.80. (Funk 1991)

Besides, questions 40-48 were added on the basis of the literature review and the same design was also used. The main factors used were the characteristics of the adopter and characteristics of the organization.

Characteristics of the adopter

• The nurse does not have computer skills (Question 40)

Characteristics of the organization (8 items, alpha=.73)

• Administration perceives evidence-based nursing as a low management priority. (Question 45)

• There is poor access to research evidence, due to slow or lack of computers or data bases. (Question 41)

• Research reports are published in a foreign language. (Question 48)

• There is resistance for changes in work setting. (Question 43)

• The time on the job to read research is not sufficient. (Question 47)

• There is not access to the library for the nurses. (Question 42)

• There are not worthwhile rewards for using research results. (Question 44)

• There is no support or incentives for clinical practice development. (Question 46)

An open-ended question that allows respondents to put additional barriers (questions 49-52) and a question to rank the three greatest barriers to using research into practice (question 53), from a list of 38, was utilised.

The fifth part of the questionnaire included a list of *facilitator*s to the use of research findings in nursing practice obtained from the literature review, having the same design as the barriers.

In the **characteristics of the organization** the items were: (10 items; alpha=.76)

• Improving availability of research reports. (Question 55)

• Having cooperative and supporting colleagues. (Question 57)

• Increasing the time available for research findings. (Question 58)

• Improving research knowledge. (Question 60)

• Hiring sufficient staff. (Question 61)

• Improving financial resources. (Question 62)

• Improving nurse's attitudes towards research. (Question 63)

• Giving rewards for using research. (Question 64)

• Translating the articles in German language. (Question 65)

• Enhancing administrative support and encouragement. (Question 56)

Concerning the **characteristics of the communication,** the items were:

• Improving the understandability of research reports. (Question 54)

• Conducting more clinical focused research. (Question 59)

An open question for additional facilitators (questions 66-69) and a question to rank the three greatest facilitators to using research into practice (question 70) from a list of 12, were also added.

In addition, the last question (nr 71), invited the nurses to add any other comments on the whole questionnaire.

4. *Validity and Reliability*

The Barriers Scale has proved to be valid in previous studies (Funk et al, 1991; Kajermo, 1998). The internal consistency of the instrument has been tested using Cronbach's alpha coefficient. Cronbach's alpha is an index of the degree to which all of the different items in a scale are measuring the same attribute (Polit 1996). The closer the score is to +1.00, the higher the reliability. According to Polit (1996), reliability coefficients should be generally at least 0.70. Cronbach's alpha in Funk's study was between 0.65-0.80 (Funk 1991).
"No opinion" responses were not included in the scoring.

In my research, Cronbach's alpha for the whole questionnaire was between 0.61-0.76. Cronbach's alpha coefficients were also calculated of each of the subscales as displayed in Table 1. Table 1 shows that coefficient varies from 0.65 to 0.80 in Funk's study and from 0.61 to 0.76 to my study. The alpha coefficients of the sub-scales in this study are similar to those in the study of Funk (1991); this confirms the high degree of internal consistency with which the items in the sub-scales measure their specific attributes.

5. *Procedure*

The questionnaire was accompanied with a cover letter that explained the purpose of the study to the participants. It assured the participants of their anonymity, that their participation in the study was voluntary and the data provided would be confidential.
The questionnaire was translated into German by German professionals. Then the questionnaires were given to the Nursing Director of the hospital, who explained the study and distributed the questionnaires to the head nurses of the departments of the hospital in their usual monthly staff meeting. Then the head nurses gave the questionnaires to the nurses working in their departments and encouraged staff nurse participation. Returned questionnaires were delivered to the post box of the Nursing Director of the hospital. Consent was assumed by the return of the questionnaire.

6. *Analysis*

Statistical Packet for Social Sciences (SPSS, 15) was used to compute the frequency and describe the statistics related to the four subscales of the Barriers Scale, the facilitating factors, as well as demographic data, communicational and evidence-based characteristics. The "no opinion" responses were excluded from the statistical calculations. Quantitative data were coded and analyzed using 15.0 software.

Chapter Three: Results

1. *Implementation of Evidence-based Practice in Germany.*

1.1. Demographic characteristics

Data were collected among nurses (n=250) in one general hospital in Germany. A total of 87 nurses returned the questionnaires, representing a 35% response rate. Demographic characteristics of the nurses are displayed in Table 2.

The vast majority (78%) of the respondents were female and 22% were male.

By age, forty-nine percent of the participants were under 34 years old and thirty-nine percent were between 35 and 49 years old.

All of the respondents reported having finished nursing school, 43% participated in additional professional development, 3% obtained a master's degree and 1% obtained a doctorate degree.

The areas of most participation were the medical-surgical units (41%), operating units (15%) and other units (37%) as depicted in Table 2.

1.2. Information characteristics

Respondents were asked for the frequency they looked for information to support their nursing practice. From Table 3 we can see that 35 % of them said they needed to seek information one or two times per month and 30% less than once per month.

When asked where they usually find the information they needed, 45% of the respondents said that they searched the internet and nearly 23% asked their colleagues or read journals or books.

38% of the respondents used reference texts as sources of monthly information. 55% had been informed by journal articles monthly, but the hospital library was used only by 10% of the nurses as a source of information. In fact 81% of the respondents reported that they had never used the hospital library.

1.3. Evidence-based practice activities

Respondents were also asked for the frequency they participated in different evidence-based activities over the last year. Only 11,5% had participated in research, 53% had participated in the development of guidelines and 19,5% had participated in the solution of researchable problems in the previous year.

When asked how they evaluate the availability of information resources in the hospital, 37% said that print materials were available, 77% said that online resources were available and 47% of the respondents said that other information resources were also available (Table 4).

Although evidence-based practice has been widely discussed in the literature over the last years, more than the half (65,5%) of the respondents said they were not familiar with the term, as displayed in Table 5.

2. *Barriers to Research Utilization*

Respondents were asked to rate each of the 38 items on the scale with the barriers according to the extent to which they were perceived as barriers.

Initially, a frequency table was generated for each item (question) to report how many respondents found the item to be a barrier 'to no extent', 'to a little extent', 'to a moderate extent', 'to a great extent' or chose the 'no opinion' option. Then 'moderate extent' and 'great extent' options were merged as in previous studies (Carroll et al, 1997; Parahoo, 2000) to make the comparison more meaningful in these studies. Table 6 shows how these barriers were ranked, when the categories great and moderate extent were merged. All the individual barriers to using nursing research findings are displayed in this table. Rank ordering the items from the list of the barriers by the percentage who rated the barrier at a moderate or great extent revealed barriers across the scales of the setting, presentation, research and nurse.

The greatest barrier was that there is not enough time on the job to read research, followed by insufficient time to implement new ideas.

The mean of the thirty-eight barriers scale scores ranged from 1,29 (The nurse does not have computer skills) to 2,31 (Administration perceived EBP as a low management priority) (see Table 6).

2.1. Setting

Eight out of thirteen barriers over 50% were related to 'setting' subscale (Table 6). The main setting-related barrier (84%) to research utilization mentioned by the respondents was lack of time on the job to read research. The other top barriers are the following: 'The nurse does not have time to read research', 'there is insufficient time on the job to implement new ideas' 'the nurse does not feel she/he has enough authority to change patient care procedures', 'other staff are not supportive of implementation' 'physicians will not cooperate with implementation', 'the nurse feels results are not generalizable to own setting' and 'there is not support for clinical

development'. Therefore, the setting category, which had been frequently presented in the items over 50%, emerged as a problematic area.

2.2. Presentation

Three items belonged to barriers over 50% in presentation of research subscale-characteristics of communication, presentation and accessibility of research. The majority of the participants felt that 'the relevant literature is not compiled in one place', 'implications for practice are not made clear' and 'statistical analyses are not understandable'(Table 6).

2.3. Nurse

Examination of the item ratings on the nurse subscale also revealed two items that were clearly perceived by this sample as a significant barrier to the use of research by the nurse. Receiving the highest rating was the item, 'The nurse is unaware of the research' and 'the nurse does not feel capable of evaluating the quality of the research' (Table 6).

2.4. Research

No item on the research subscale-characteristics of the innovation, qualities of research-was perceived as a barrier to the use of research in practice in the barriers over 50%. Statements in the barriers to research subscale received a high proportion of 'no opinion' answers (Table 6).

3. *Facilitators*

Participants were asked to make a list of twelve facilitators to the use of research in nursing practice. The categories of great and moderate extent were also merged.

The most frequently cited facilitator was that there should be more time available for research findings, followed by the answer that more employees should be hired.

The mean of the twelve facilitators scale scores ranged from 1,63 (Cooperative and supportive colleagues) to 1,94 (Improving research knowledge).

The individual facilitators found on this sample of nurses are displayed in Table 7.

3.1. Setting

Five out of the top 6 facilitators were related to 'setting' subscale. The most frequently mentioned facilitators were 'Increasing time available for research findings' and 'more employees/sufficient staffing' with a percentage of 86% each.

'Improving availability/accessibility of research reports', 'enhancing administrative support and encouragement' and 'improving financial resources' were the other frequently cited facilitators (Table 7).

3.2. Presentation

Only one item belonged to the top 6 facilitators of 'presentation' subscale. The majority of the participants felt that the understandability of research reports should be improved (Table 7).

4.   Additional findings

An opportunity to list additional barriers and facilitators to research utilization in a free text format was provided to the participants. These answers were not used in the analysis, because only a small number of respondents had written his /her opinions and for this reason the results could not be evaluated.

An opportunity also for the three greatest barriers and facilitators to nursing research was also provided. Concerning the barriers, most of the respondents felt that the lack of time on the job to read research was the greatest barrier. The second greatest barrier was lack of time on the job to implement new ideas, and resistance that exists in the work setting to make changes was identified as the third greatest barrier.

The three greatest facilitators which were identified were improvement of the availability of research reports, increasing time for research findings and hiring of more employees.

Chapter Four: Discussion

1.   *Implementation of Evidence-based Practice in Germany.*

Germany covers an area of 357.000 km^2 and has a population of 82 million people. The health care system is based on solidarity and subsidiarity. The 16 federal states are responsible for health policies; however, the health care professions, mandatory health insurance and hospital financing are controlled by national laws.

Concerning nursing in Germany, the National Nursing Act and an Ordinance in 1985 regulates the general nurse education at national level and defines the professional skills and responsibilities of nurses. Applied to the standards of the EU, the nursing education takes 3 years and covers theoretical and practical instruction as well as practical training. There are 940 nursing schools in Germany. Nurses can also attend a 2-year hospital post basic education, in different specialties. More than 40 universities offer degree courses for nurses in nursing science, nursing management and nursing education.

The German Centre for Evidence-based Nursing, which has been founded in 1998, spreads its activities mainly on three areas:

a. The promotion and development of the methodology of evidence-based nursing (EBN).

b. The dissemination of EBN with annually workshops by the trainers of the German Centre and

c. The collaboration with other health professions and institutions to implement and stimulate evidence-based practice.

1.1.   Response Rate

The Barriers Scale was first tested on a sample of nurses with a response rate of 40% by Funk et al (Funk 1991). The response rate in the current study was also low (35 percent). The survey was conducted via questionnaires with no personal contact. Therefore, the respondents were nurses who were more likely to have a positive attitude towards research. A reason for non response includes a lack of interest in the survey and high workload or survey load.

A group of nurses from a general German hospital was studied with regard to their perceptions of research utilization in clinical practice. From Table 2, we can see that 49% of the nurses were less than 34 years old, meaning that they received their basic education after 1995, which is after the widespread availability of electronic information and personal computers.

Although the nurses recognized the need for information in their practice, their most frequent source of that information was the Internet. This is obvious from the age of the nurses, because younger age groups are mostly occupied with internet rather than older age groups. The search engines are easy to use and success in obtaining results are presumably the two main causes for such use. However, 34,5% of the respondents expressed that they needed information only 1-2 times per month.

From Table 4 we can see that a large percentage of the nurses have not participated in research and in the solution of researchable problems, while half of them have participated in the development of guidelines. Information resources in this hospital are available to a great degree, especially on-line resources, which indicates the high level of German hospitals in information. The fact that they used these resources in a low degree is also obvious from their lack of familiarity with the term "evidence-based nursing", which has appeared in the titles of hundreds journal articles in recent years. When the term is unfamiliar, it is difficult to integrate evidence-based practice successfully.

1.2. Comparisons with Nursing Studies

The research studied the perceptions of nurses in a general hospital in Germany, concerning barriers to research utilization in practice. Nurses in this hospital recognized and appeared to value research as a way to improve patient care; however they identified a number of barriers that impede the nurse's ability to use research findings in clinical practice. The major barriers to the utilization of research findings were found to be the work organization (setting), the adopter (nurse) and the presentation of research findings. The first two barriers that included insufficient time on the job to read research and nurses' lack of time to read research generally, which both belong in the setting subscale, are merged in one, to depict the time in general that nurses dedicate to reading research.

The barriers and the facilitators of the utilization of research findings, as measured in this study, were consistent with previous works regarding barriers to research utilization.

Table 8 compares the ranking of barriers in this study with six other nursing studies: Funk, et al. (1991), Carroll, (1997), Parahoo, (2000), Retsas, (1999), Oranta, (2002) and Kajermo, (1998) using the top ten barriers from each study (Table 8).
The rank order of the barriers differs to a degree. The results are comparable in terms of the percent of rating items as great or moderate barriers in these seven studies.

2.   *Barriers related to setting*

The study indicated a range of barriers related to the group of German nurses studied. The major barrier to research utilization was related to time (nurses' insufficient time to read research on-duty and off-duty hours). This finding is supported by several studies (Kajermo, 1998; Carroll, 1997; Retsas, 1999) and may indicate the lack of time for someone to read research findings in this profession.

'Insufficient time on the job to implement new ideas' has been identified by 64% of the participants as a second barrier in this study. It was the first barrier in Retsas' study and among the top 4 in the other studies.

Nurses' belief that they lack authority to change practice was ranked as a third barrier in this study. This barrier was the first in Funk's and Parahoo's study and the second in Retsas' study (see Table 8).

'Physicians will not cooperate with implementation'. Lacey (1994) found that doctors were identified as 'potentially obstructive' to implementation of research utilization in nursing practice.

Lack of time reflects the serious and deep seated problem that exists in Germany as well as other hospitals all over the world. Time to read, evaluate, analyze, disseminate and implement research is very limited for nurses everywhere.

Nurse administrators have a pivotal role to play in decreasing these barriers and providing an organisational context which will support evidence-based practice. Time is the item most often presented to be a problem. There are different ways that administrator nurses can approach this item: writing into contracts that a certain period of time should be devoted to research implementation; giving more time for professional development with the hope that it is used for evidence-based practice, and other solutions. Different approaches should be used from different settings and we can not forget that creative thinking may be very important. We should keep in mind that if we do not dedicate time for research implementation, other avocations are possible to take priority.

Lack of authority can be explained from the percentage of nurses who answered the questionnaire, because half of them were under 34 years of age and as a result they are in lower

levels of hierarchy and are less likely to have authority to change procedures as nurses who belong to higher levels of hierarchy and tend to be older.

The individual authority of a nurse is a problem that should be taken into account both by educators and administrators. Whenever nurses lack belief in their own authority, they should be trained to improve their self-assurance, personal effectiveness and leadership. Nurse administrators also need critical abilities, so as to judge whether there should be changes or not.

Lack of authority may reflect an organization that has a traditional system of working, in which the nurses cannot develop their own job independently. Funk et al (1991) identified a way for clinicians to improve their authority. She signified that a decentralized administration and management divided to more than one person as a solution for nurses to increase their authority.

Concerning lack of cooperation, it is difficult for clinical nurses to deal with lack of support from colleagues and physicians.

Relationships between nurses/doctors can not be generalized. There are places that the cooperation among nurses, doctors and health care personnel is better than in others. Lack of cooperation is an interprofessional matter and efforts should be made to increase the autonomy for nursing practice and recognise the distribution of nursing research on the progress of patients's health.

3. *Barriers related to presentation of research findings*

The presentation of research findings was another major barrier. The fact that the relevant literature was not put together, according to the respondents, was perceived as an obstacle. This finding shows that the nurses do not have the tradition to use the library services as it is indicated from the great percentage of nurses (81%) that have not used the library (Table 3).

A great percentage of nurses (53%), suggested that scientific articles should be written in a way that can be easily understood, because implications for practice were not made clear. This means that nurses due to lack of knowledge and education in research techniques, find it difficult to evaluate scientific articles. The difficulty in understanding statistical analysis is far-famed and challenging. A double-strategy solution is essential. On the one hand, researchers should report statistics in a simple way and explain their meanings and suggestions for practice in clear language. On the other hand, nurses have to understand the basic laws of research. These can be studied in the graduate level or higher level education, even though clinical nurses may need

more assistance in developing these abilities. Administrators may have the skills to judge which people might profit from this education and provide the appropriate environment and funds.

Forty seven percent of the respondents considered the English language in research articles as a moderate or great barrier (Table 6). This seems to be an additional obstacle to the accessibility of research. More than half of the respondents suggested that the translation of articles in German language would facilitate their access to research. These nurses have to accustom themselves both with the special language of science and the foreign language.

4. *Barriers related to research*

Points of interest in Table 9 include the percentages responding 'no opinion'. Except the first point, (Administration perceived EBP as a low management priority), which belongs to the setting category, the other items with the highest percentages belong to the research category (e.g., "the research has not been replicated", "the literature reports conflicting results", "the research has methodological inadequacies").

This may indicate that among nurses, there is lack of education, knowledge, skills and interest in use of research findings. More than half of the respondents had finished the nursing school before the establishment of research related courses in their curriculum. This finding is congruent to the facilitators suggested by the nurses, such as improving the nurses' scientific knowledge.

The findings in this study concerning lack of knowledge and the mostly identified facilitators are in accordance to the findings of other studies (Funk et al. 1991, Kajermo 1998, Lacey 1994). Bostrom and Suter (1993) suggested that in order to motivate nursing staff to participate in research utilization, nurses should have chances in their career to learn about the research process in a clinical way, for example participating in data collection in surveys or studies.

5.   Facilitators

5.1.   Comparisons with Nursing Studies

The survey studied the perceptions of nurses in a general hospital in Germany, concerning the factors that facilitate research utilization among nurses in clinical practice. The major facilitators to the utilization of research findings were found to be in the work organization (setting), and the communication/presentation of research findings.

It is quite interesting to observe that the facilitators for the utilization of research findings, as measured in this study, were consistent with previous works regarding facilitators to research utilization. Unfortunately there are not so many studies regarding the facilitators as they exist as a result of barriers.

Table 10 compares the ranking of facilitators in this study with three other nursing studies. Funk, et al. (1991), Carroll, (1997), Parahoo, (2000) used similar facilitators. The rank order of the facilitators differs to a degree. The results are comparable in terms of the percent of rating items as great or moderate facilitators in these four studies.

The results in Funk's study include facilitators reported by 10% or more of the suggesting facilitators, while the results in Parahoo's study include the percentage of responses of the top 10 facilitators as listed by respondents. The critical difference in Funk's and Parahoo's studies in comparison with the current study is that the respondents had to choose only one of the suggested facilitators.

6.   Facilitators related to setting

Sufficient time and staff was also suggested from the other studies as a major facilitator, which reflect the barriers in the organisation. Time is important for study, visits to the library, reading, exploring ideas, going to courses, discussing with colleagues and developing protocols to fully implement changes in practice.

Funk et al (1991) and Parahoo (2000) identified in their study administrative support and encouragement as the best way to facilitate the use of research findings in practice. When the manager is open, positive, interested and enthusiastic, supports the staff and knows about

research, he/she serves as a role model for them and supports them to go on courses. As a result, nurses will have better attitudes towards research.

7.   *Facilitators related to presentation of research findings*

A lot of nurses suggested that the scientific articles should be written in an understandable way. This means that the nurses find difficult the evaluation of scientific articles, due to the lack of knowledge and education in research methods. It needs to be evaluated whether nursing curricula are successful, in transmitting the skills and knowledge that is required to understand statistical data. Data should be presented in a way that is easily understood by the practitioners.

8.   *Limitations*

This study has some limitations and generalizations should be made carefully. The response rate was 35%. A low response rate can indicate that the most positive participants return the survey (Fowler, 1984). Maybe the most research-aware nurses who understood the difficulties of implementation of EBN participated. If the response rate was higher, the results could be different. The sample also was low, which restricts the generalization of these findings to other populations outside the survey.

Another limitation of this study was the small sample size, which could be a significant source of bias. For this reason, it would be recommended to repeat the study with a larger number of nurses to support the findings. It is suggested, that any qualitative research that consists of interviews and observation, will bring to light the wealth of detailed data about people and cases.

Another limitation was "no opinion" answers. It was interesting to mention that a high percentage of "no opinion" answers, related to characteristics of the research findings, which could indicate the lack of research knowledge and skills to decide whether "research has not been replicated", there are "conflicting results in the literature" or "the research has methodological inadequacies".

The low response rate, the low sample and the 'no opinion' answers make it difficult to interpret and generalize the findings.
However, the study has produced some information, which though it may be limited to a degree, it is possible to use it in developing strategies for promoting evidence-based practice.

9.   Conclusions and Implications for Practice

The findings from this survey point out that the nurses in this German hospital are not at all familiar with the term "evidence-based nursing". However, to a great extent the hospitals have information resources that they can use, but very few nurses have participated in research.
This may imply that there is insufficient time to read research or to implement new ideas or there is lack of authority to change patient procedures, as shown in the results.
Even the doctors consulted their peers in uncertain clinical situations as found in a study by Covell *et al*. (1985), where doctors consulted colleagues from their own and other professions and they did not access research knowledge via media, such as journals, implicating that even if doctors have adequate access to computers, they found their answers asking their peers.

Another implication that can be made is that nurses show a resistance to change. Some people are more open to change than others, while some hold fast to traditions. Resistance to change is normal, however the nurses should provide the best quality care and not just say:"I have always done it this way". The health care science is always evolving and challenging us to be progressive.

A worrying conclusion is that nurses may not have the appropriate research skills that are so important to support their professional role. Nurses are professionals and if they want to be up-to-date, they should integrate evidence-based practice to their daily activities and they should have the abilities to understand, critically evaluate and integrate relevant research findings. It is suggested that nursing should be developed as an academic specialty in order to remove the barriers identified and to make research-based practice a reality. Furthermore, education about research, either as part of typical nursing education or through continuous education and workshop for nursing staff is of great importance, due to the different educational backgrounds of nurses.

Administrators can support the development of EBP by allowing nurses time to learn skills related to EBP, such as searching bibliographic databases or learning how to critically evaluate research studies. Time is also necessary for computer access or going to the library, conducting searches, holding team meetings to consider clinical questions, relevant research and application to clinical practice. Is it better for health care administrators to give time to nurses to be

informed with the current research during working hours or non-working hours? It is difficult due to the heavy activity and workload to find time or energy to be occupied with research-related activities. If nurses are to keep up with research, there should be access to reading material at or close to their place of work and time available to read research on-duty.

Administrators should also provide expertise and funds so that library holdings will include research relevant to clinical practice, including subscriptions to research journals. Electronic access to databases, full-text journal articles and resources such as the Cochrane Library are of great importance. This requires a positive attitude to research from the part of the nursing director and an ability to support research utilization.

The proportion of "no opinion" answers was highest in the research subscale. This may suggest that nurses may not have the ability to evaluate research findings, as reported in previous studies (Carroll, 1997; Kajermo, 1998) or they have not tried at all to evaluate them. This can be reinforced by upgrading the level of nursing education (Lacey, 1994; Parahoo, 2000).

Finally, EBP is a relatively new paradigm for nurses and other clinicians. For this reason, little evaluation exists to identify the best strategies for implementing EBP. Recent innovations need to be evaluated and creative strategies remain to be discovered.

9.1. Future implications for nurses

The high percentage of nurses that were unaware of the research findings, suggests that it would be beneficial to develop websites or a newsletter as an e-mail with systematic reviews. Additionally, it would be very helpful, if conclusions were presented in summaries with full reports, or there were articles available on the Internet.

Some areas in the study need further research. Studies concerning nurse staffing, have to be replicated in different organisations and countries. We could add the need for cost benefit analysis in future studies.

Online resources should be available for all the nurses and consultation with nurse researchers helps in implementing findings into clinical practice. The discussion of clinical information in different forums and the implementation of clinical practice guidelines, protocols for care are of high importance.

Nurses have to actively participate in all aspects of the implementation process. In order to develop these skills, they can attend educational courses that teach research methods and other views of evidence-based practice. Nurses who have these skills already should offer their knowledge and skills to other nurses in their clinical area. They can combine research findings into plans of care, by having reference to relevant studies, practice guidelines or systematic reviews to underline principles for clinical decisions and nursing activities.

9.2. Future implications for administrators

Administrators can support nurses by providing time for activities that promote evidence-based nursing, for example, going to the library, making electronic searches, and holding meetings. Maybe an organisational position for nurse researchers who can also organise research committees should be beneficial. Contacts with other nurse researchers, educational institutions and patient care agencies also belong to an organizational strategy.

Nurses with research skills can also translate research language into clinical language and research findings into changes for practice.

Administrators can also encourage an evidence-based practice environment, by asking for evidence to support nurses' suggestions or recommendations for change in a clear way, so as to improve the patient's care and the nurse as an individual will feel encouraged, supported and valued.

Appendices

Appendix A

Studies Exploring Barriers to Apply Research Findings in Practice among Nurses

	Author and Year	Methods Design	Study Population	Results Barriers	Facilitators	Implications
1	Funk, et al., 1991	Descriptive Exploratory	5000 Registered Nurses from the American Nurses' Association.	40% response rate (n=1989). Barriers included factors related to nurse, factors related to quality of the research factors related to characteristics of organization and factors related to communication.	Facilitators included increase of administrative support, improvement of availability of research reports, increase of research knowledge base.	New tool to identify barriers to research utilization
2	Carroll (1977)	Descriptive Exploratory	1100 nurses working in a large urban academic medical centre in the USA.	356 nurses returned survey (30%). Greatest barriers were lack of knowledge, insufficient time to implement new ideas and inaccessibility of relevant literature.	Top facilitators included more time available to review and implement research findings, more clinically relevant research and improve the availability of research reports.	The advanced practice nurse has the crucial role to decrease barriers to research utilization.
3	Kajermo (1998)	Descriptive	339 nurses at two hospitals in Sweden.	237 nurses participated (70%). Major barriers were that research was not readily available, that there were inadequate facilities and lack of knowledgeable colleagues.	Diverse models of education to increase their knowledge of research methods and abilities to evaluate research findings	Special positions for nurse researchers, continuing education for nursing staff.

No	Author (Year)	Design	Sample	Findings	Facilitators	Conclusion/Recommendation
4	Retsas (1999)	Descriptive	600 nurses in an Australian hospital	149 nurses returned survey (25%). Most frequently cited barriers were insufficient time to implement research findings, insufficient time to read research and lack of awareness of research findings.		Fundamental changes need to be made in the education system.
5	Parahoo (2000)	Descriptive Exploratory	2600 nurses in 23 hospitals in Northern Ireland	1368 nurses returned survey (52,6%). Greatest barriers were lack of authority to change patient procedures, lack of understanding statistical analysis and insufficient time to integrate new ideas.	Managers' support, time available and support from colleagues.	Factors that impede or facilitate the use of research should be identified both at local and national levels.
6	Oranta (2002)	Descriptive Exploratory	316 nurses in two major hospitals in Finland	253 nurses returned the questionnaire (80%). The main barriers included that most research was published in a foreign language, problems in co-operation and difficulties in understanding statistical analyses.	Most mentioned facilitators were nurses' positive attitudes and abilities, as well as encouragement and co-operation on the part of all personnel.	Nurse educators with skills. administration support to research utilization, raising the level of nursing education.

Appendix B

Questionnaire

Barriers and Facilitators to Using Research in Practice

For each item, cross the box of the response that best represents your view.

Demographic information data

1. What is your gender?

Female	☐
Male	☐

2. What is your age?

Under 34	☐
35-49	☐
More than 50	☐

3. What is your highest level of nursing education?

Nursing School	☐
Additional education	☐
Master's degree	☐
Doctorate	☐
Not known	☐

4. What is your primary work area in the hospital?

Medical-Surgical	☐
Intensive care	☐
Emergency Unit	☐
Operating Unit	☐
Other	☐

Communicational characteristics

5. How often do you look for information, research or evidence to support your nursing practice?

Often (several times a week)	☐
Regularly (weekly)	☐
Occasionally (1-2 times per month)	☐
Seldom (less than once per month)	☐
Never	☐

6. When you need information, where do you usually find it? (One answer please)

I look for assistance from the librarian	☐
I ask my colleagues or peers	☐
I read journal or books	☐
I search the bibliographic databases	☐
I search the Internet/World Wide Web	☐
I attend workshops, conferences, programs	☐
Other	☐

7. How often do you personally look for information from the following sources? (One answer please)

	Not at all	Monthly	Weekly	Daily	Many times daily
Reference Text /manual	☐	☐	☐	☐	☐
Research report	☐	☐	☐	☐	☐
Journal article	☐	☐	☐	☐	☐
Hospital library	☐	☐	☐	☐	☐

Evidence-Based Practice questions

8. How often have you personally involved in the following activities, over the past year? (One answer please)

	Not at all	Once	2-3 times	More than 3 times
Participated in research	☐	☐	☐	☐
Participated in implementation of development of guidelines	☐	☐	☐	☐
Participated in the solution of researchable problems	☐	☐	☐	☐

9. Generally, how do you evaluate the availability of the following information resources in your working place? (One answer please)

	Totally unavailable	Less than available	Available	More than available
Print materials	☐	☐	☐	☐
Online resources	☐	☐	☐	☐
Other information resources	☐	☐	☐	☐

Using a 5-point scale where 1 means "Not at all familiar" and 5 means "Completely familiar",

	Not at all familiar	To a little extent familiar	To a moderate extent familiar	To a great extent familiar	Completely familiar
10. How familiar you are with evidence-based practice (EBP)?	1	2	3	4	

Articles in nursing journals indicate that nurses in practice do not use the results of research to help guide their practice. There are a number of reasons why this might be. We would like to know the extent to which *you* think each of the following situations is a barrier to nurses' use of research to alter/enhance their practice.
The nurse refers to you as a respondent.
For each item, cross the response that best represents your view.

THIS IS A BARRIER

	To no extent	To a little extent	To a moderate extent	To a great extent	No opinion
11. Research reports/articles are not readily available	1	2	3	4	5
12. Implications for practice are not made clear	1	2	3	4	5
13. Statistical analyses are not understandable	1	2	3	4	5
14. The research is not relevant to the nurse's practice	1	2	3	4	5
15. The nurse is unaware of the research	1	2	3	4	5
16. The facilities are inadequate for implementation	1	2	3	4	5
17. The nurse does not have time to read research	1	2	3	4	5
18. The research has not been replicated	1	2	3	4	5
19. The nurse feels the benefits of changing practice will be minimal	1	2	3	4	5
20. The nurse is uncertain whether to believe the results of the research	1	2	3	4	5
21. The research has methodological inadequacies	1	2	3	4	5
22. The relevant literature is not compiled in one place	1	2	3	4	5
23. The nurse does not feel she/he has enough authority to change patient care procedures	1	2	3	4	5
24. The nurse feels results are not generalizable to own setting	1	2	3	4	5
25. The nurse is isolated from knowledgeable colleagues with whom to discuss the research	1	2	3	4	5

#						
26.	The nurse sees little benefit for self	1	2	3	4	5
27.	Research reports/articles are not published fast enough	1	2	3	4	5
28.	Physicians will not cooperate with implementation	1	2	3	4	5
29.	Administration will not allow implementation	1	2	3	4	5
30.	The nurse does not see the value of research for practice	1	2	3	4	5
31.	There is not a documented need to change practice	1	2	3	4	5
32.	The conclusions drawn from the research are not justified	1	2	3	4	5
33.	The literature reports conflicting results	1	2	3	4	5
34.	The research is not reported clearly and readably	1	2	3	4	5
35.	Other staff are not supportive of implementation	1	2	3	4	5
36.	The nurse is unwilling to change/try new ideas	1	2	3	4	5
37.	The amount of research information is overwhelming	1	2	3	4	5
38.	The nurse does not feel capable of evaluating the quality of the research	1	2	3	4	5
39.	There is insufficient time on the job to implement new ideas	1	2	3	4	5
40.	The nurse does not have computer skills	1	2	3	4	5
41.	Access to research evidence is poor (slow or no computers, or data bases)	1	2	3	4	5
42.	The nurse does not have access to the library	1	2	3	4	5
43.	There is resistance to make changes in the work setting	1	2	3	4	5
44.	The rewards for using research results are not worthwhile	1	2	3	4	5
45.	Administration perceived EBP as a low management priority	1	2	3	4	5
46.	There is not support or incentives for clinical practice development	1	2	3	4	5
47.	There is insufficient time on the job to read research	1	2	3	4	5
48.	Research reports are published in a foreign language	1	2	3	4	5

Are there other things you think are barriers to research utilization in your practice? If so, please list and rate each on the scale:

49.	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ .	1	2	3	4	5
50.	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ .	1	2	3	4	5
51.	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ .	1	2	3	4	5
52.	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ .	1	2	3	4	5

53. When looking backwards at the questions 11-48, which of the above items do you feel are the *three greatest barriers t*o nurses' use of research?

Greatest Barrier ....Item #: _____
Second Greatest Barrier ....Item #: _____
Third Greatest Barrier ....Item #: _____

We would like to know the extent to which *you* think each of the following situations is a facilitator to nurses' use of research to alter/enhance their practice.
For each item, cross the number of the response that best represents your view.

THIS IS A FACILITATOR

	To no extent	To a little extent	To a moderate extent	To a great extent	No opinion
54. Improving the understandability of research reports	1	2	3	4	5
55. Improving availability/accessibility of research reports	1	2	3	4	5
56. Enhancing administrative support and encouragement	1	2	3	4	5
57. Cooperative and supportive colleagues	1	2	3	4	5
58. Increasing time available for research findings	1	2	3	4	5
59. Conducting more clinically focused, relevant research	1	2	3	4	5
60. Improving research knowledge	1	2	3	4	5
61. More employees/sufficient staffing	1	2	3	4	5
62. Improving financial resources	1	2	3	4	5
63. Improving nurses' attitudes toward research	1	2	3	4	5
64. Giving rewards for using research	1	2	3	4	5
65. Translation of the articles in German language	1	2	3	4	5

Are there other things you think are facilitators to research utilization?
    If so, please list and rate each on the scale:

66. __ __ __ __ __ __ __ __ __ __ __ __ __ __ .	1	2	3	4	5
67. __ __ __ __ __ __ __ __ __ __ __ __ __ __ .	1	2	3	4	5
68. __ __ __ __ __ __ __ __ __ __ __ __ __ __ .	1	2	3	4	5
69. __ __ __ __ __ __ __ __ __ __ __ __ __ __ .	1	2	3	4	5

70. When looking backwards at the questions 54-65, which of the above items
do you feel are the *three greatest facilitators t*o nurses' use of research?
    Greatest Facilitator ....Item #: _____
    Second Greatest Facilitator ....Item #: _____
    Third Greatest Facilitator ....Item #: _____

71. Do you have any remarks to the questionnaire?

_____

_____

_____

Thank you for sharing your views!

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Tables

Table 1. *Cronbach's alpha coefficient for each sub-scale*

Sub-scale	Alpha in Funk's study	Alpha in my study
Organisation	0.80	0.66
Communication	0.65	0.61
Adopter	0.80	0.73
Innovation	0.72	0.72
Added questions Barriers in organisation	-	0.73
Added questions Facilitators in Organization	-	0.76
	N=1941	N=87

Table 2. *Demographic characteristics of nurses*

Gender	%
Female	78
Male	22
Age	%
Under 34	49
35-49	39
More than 50	12
Highest nursing education	%
Nursing school	52
Additional education	43
Master's Degree	3
Doctorate	1
Not known	1
Work area	%
Medical-surgical unit	41
Intensive care unit	6
Emergency unit	1
Operating unit	15
Other	37

Table 3. *Communicational Characteristics*

How often a nurse is looking for information	%
Several times a week	8
Weekly	23
1-2 times per month	34,5
Less than once per month	29,9
Never	4,6
Where to find information	%
Asking colleagues	23
Read journals-books	21,8
Search Databases	5,7
Search Internet	44,8
Attend Workshops, Conferences	4,6
Sources a nurse looks for information monthly	%
Reference texts	38
Journal articles	55
Hospital library	10
Not at all use of the hospital library	81

Table 4. *Evidence-Based Practice Questions*

How often a nurse participated the last year in:	Not at all	Once	2-3 Times	More
Research	88,5	9,2	2,3	
Development of guidelines	47,1	19,5	17,2	16,1
Solution of Problems	80,5	12,6	4,6	2,3
Evaluation of Information Resources	Not available	Less than available	Available	More than available
Print materials	24,1	39,1	32,2	4,6
On-line Resources	11,5	11,5	65,5	11,5
Other Information Resources	18,4	34,5	42,5	4,6

Table 5. *Familiarity with the term Evidence-Based Practice*

Familiar	%
Not at all	65,5
To a little extent	10,3
To a moderate extent	18,4
To a great extent	5,7

Table 6. *Rank Order of Great or Moderate Barriers to Using Research Findings,*
as Perceived by German Nurses (N= 87) from 1 (Greatest Reported Barrier) to 38

Rank order	Type of barrier	Barrier	% Rating	Mean	SD	No opinion
1	S	There is insufficient time on the job to read research	84	1,91	0,393	5
2	S	The nurse does not have time to read research	68	1,75	0,511	5
3	S	There is insufficient time on the job to implement new ideas	64	1,76	0,549	6
4	S	The nurse does not feel she/he has enough authority to change patient care procedures	64	1,9	0,591	12
5	N	The nurse is unaware of the research	62	1,78	0,579	8
6	S	Other staff are not supportive of implementation	59	1,89	0,637	15
7	S	Physicians will not cooperate with implementation	59	2	0,647	21
8	P	The relevant literature is not compiled in one place	58	1,9	0,648	21
9	S	The nurse feels results are not generalizable to own setting	58	1,9	0,648	17
10	P	Implications for practice are not made clear	53	1,8	0,662	15
11	S	There is not support or incentives for clinical practice development	53	2,01	0,69	26
12	P	Statistical analyses are not understandable	53	1,76	0,646	14
13	N	The nurse does not feel capable of evaluating the quality of the research	52	1,68	0,619	8
14	S	There is resistance to make changes in the work setting	49	1,68	0,638	9
15	N	The nurse sees little benefit for self	47	1,68	0,656	12
16	S	Research reports are published in a foreign language	47	1,86	0,718	20
17	S	The facilities are inadequate for implementation	46	1,83	0,719	20
18	N	There is not a documented need to change practice	46	1,67	0,659	9
19	S	Administration will not allow implementation	45	1,93	0,744	24
20	S	The nurse does not have access to the library	45	1,54	0,587	6
21	S	Access to research evidence is poor (slow or no computers, or data bases)	45	1,49	0,547	3
22	R	The amount of research information is overwhelming	44	1,67	0,676	11
23	P	Research reports/articles are not readily available	44	1,55	0,605	6
24	R	The conclusions drawn from the research are not justified	43	1,98	0,762	29

25	P	The research is not relevant to the nurse's practice	43	1,59	0,639	11
26	N	The nurse feels the benefits of changing practice will be minimal	41	1,67	0,693	15
27	P	The research is not reported clearly and readably	41	1,85	0,755	23
28	N	The nurse is isolated from knowledgeable colleagues with whom to discuss the research	37	1,51	0,626	8
29	N	The nurse does not see the value of research for practice	37	1,55	0,66	9
30	R	The research has not been replicated	37	2,24	0,762	44
31	R	Research reports/articles are not published fast enough	36	1,95	0,806	30
32	R	The literature reports conflicting results	35	2,03	0,813	33
33	S	The rewards for using research results are not worthwhile	35	1,78	0,784	24
34	S	Administration perceived EBP as a low management priority	28	2,31	0,797	55
35	R	The nurse is uncertain whether to believe the results of the research	26	1,66	0,79	19
36	N	The nurse does not have computer skills	24	1,29	0,504	12
37	R	The research has methodological inadequacies	23	1,9	0,876	33
38	N	The nurse is unwilling to change/try new ideas	22	1,31	0,556	6

S=Setting, N=Nurse, P= Presentation of Research, R= Research

Table 7. *Rank Order of Great or Moderate Facilitators to Using Research Findings, as Perceived by German Nurses (N= 87) from 1 (Greatest Reported facilitator) to 12*

Rank order	Type of facilitator	Facilitators	% Rating	Mean	SD	No opinion
1	S	Increasing time available for research findings	86	1,86	0,347	0
2	S	More employees/sufficient staffing	86	1,89	0,355	2
3	S	Improving availability/accessibility of research reports	79	1,91	0,448	6
4	P	Improving the understandability of research reports	75	1,89	0,492	9
5	S	Enhancing administrative support and encouragement	74	1,83	0,487	6
6	S	Improving financial resources	74	1,87	0,501	9
7	S	Improving research knowledge	74	1,94	0,514	14
8	P	Conducting more clinically focused, relevant research	66	1,89	0,579	15
9	S	Giving rewards for using research	66	1,77	0,543	8
10	S	Cooperative and supportive colleagues	63	1,63	0,485	0
11	S	Improving nurses' attitudes toward research	59	1,66	0,546	5
12	S	Translation of the articles in own language	55	1,71	0,608	11

S=Setting, P= Presentation of Research

Table 8. *Percent rating items as great or moderate barriers among seven studies*

Item	Factor	Barriers	This study	Funk et al 1991	Carroll 1997	Parahoo 2000	Retsas 1999	Oranta 2002	Kajermo 1998
1	S	The nurse has no time to read research	84	67	67	54	57.5	64	77
2	S	There is insufficient time on the job to implement new ideas	64	75	71	68	72	71	72
3	S	The nurse does not feel she/he has enough authority to change patient care procedures	64	75	68	75	64	56	64
4	N	The nurse is unaware of the research	62	75	76.5	55	49	59	40
5	S	Other staff are not supportive of implementation	59	71	52	56	54.5	56	35
6	S	Physicians will not cooperate with implementation	59	71	*	59	57	66	41
7	P	The relevant literature is not compiled in one place	58	63	63	56	42	59	58
8	S	The nurse feels results are not generalizable to own setting	58	68	*	61	55.5	61	45
9	P	Implications for practice are not made clear	53	62	*	49	49	67	64
10	P	Statistical analyses are not understandable	53	68	63.5	69	59	71	48
			N=87	N=1989	N=356	N=1368	N=149	N=253	N=237

S=Setting, N=Nurse, P= Presentation of Research

Table 9. *The proportion of nurses in the study who expressed 'no opinion'*

Item	Factor	Barriers	% responding no opinion
1	S	Administration perceived EBP as a low management priority	52
2	R	The research has not been replicated	44
3	R	The literature reports conflicting results	35
4	R	The research has methodological inadequacies	33
5	R	Research reports/articles are not published fast enough	30
6	R	The conclusions drawn from the research are not justified	28

S=Setting, R= Research

Table 10. *Percentage of nurses who rate 12 facilitators to a great or moderate extent*

Item	Factor	Facilitators	This study	Funk et al 1991	Carroll 1997	Parahoo 2000
1	S	Increasing time available for research findings	86	13,8	64,2	9,7
2	S	More employees/sufficient staffing	86	*	*	*
3	S	Improving availability/accessibility of research reports	79	22	54,4	6,5
4	P	Improving the understandability of research reports	75	11,7	50,3	*
5	S	Enhancing administrative support and encouragement	74	34,3	52,5	13,7
6	S	Improving financial resources	74	*	*	*
7	S	Improving research knowledge	74	22	50,3	6,4
8	P	Conducting more clinically focused, relevant research	66	14,4	58,1	*
9	S	Giving rewards for using research	66	*	*	*
10	S	Cooperative and supportive colleagues	63	16,9	52,2	8,2
11	S	Improving nurses' attitudes toward research	59	*	*	*
12	S	Translation of the articles in German language	55	*	*	*
			N=87	N=610	N=356	N=1368

S=Setting, P= Presentation of Research.