



Implementation of Evidence-Based Practice in Nursing Using Action Research: A Review

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ABSTRACT

Background: As is often reported in the literature exploring the research–practice gap, applying the principles of evidence-based practice is easier said than done. Action research is a methodology with an explicit intent of linking the worlds of research and practice. This review attempts to answer the question: What is known about implementing evidence-based practice in nursing through action research?

Approach: A total of 21 action research studies have been used to answer this question. To prevent possible confusion over terminology, we used a conceptual framework that distinguishes various influencing factors in terms of four target groups (ranging from the individual end user to society as a whole) at whom the strategy is aimed and various strategies (ranging from individual feedback to contracting care providers) related to the same four target groups.

Findings: Studies often failed to name the implementation strategies applied, necessitating deduction from the text by the reader. In most of the studies the implementation strategy was directed at a combination of target groups. Many of the projects reviewed reported positive contextual outcomes, “knowledge improvement” among nurses, and to a lesser degree, improved “performance.” Patient outcomes were the least reported outcome measure.

Conclusion: With an element of caution, this review concludes that the implementation of evidence-based practice using action research is a promising approach. Caution is needed because of the lack of detailed descriptions of implementation strategies, and their intensity and frequency prevents us from drawing firm conclusions. These are important considerations for any action researcher intending to implement EBP using this approach.

KEYWORDS action research, implementation, evidence-based practice, nursing, review

Worldviews on Evidence-Based Nursing 2009; x(x):1–23. Copyright ©2009 Sigma Theta Tau International

INTRODUCTION

Evidence-based practice (EBP) is now a well-established concept in the nursing literature. In this paper, Sackett et al.’s (2000) definition of EBP is used, defined as an integration of best research evidence with clinical expertise and patient values in clinical decision making. Nevertheless, utilizing evidence-based practice is not straightforward, as witnessed by the citing of a gap between research and practice by various authors (Mullhall 2002; Halfens & Van Linge 2003; Hanberg & Brown 2006; Grol & Wensing 2006; Westert 2006).

The authors of this paper initially consider the factors that help and hinder the implementation of EBP, as well as what is known about the effectiveness of implementation strategies and interventions. Specific attention is then paid to action research as an implementation strategy that may be suitable for EBP. After a theoretical consideration

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The authors thank Shaun Cardiff and Angie Titchen, PhD, for their language support in writing the earlier version of this article and anonymous reviewers whose comments helped improve the content of this article considerably.

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Accepted 26 January 2009

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1545-102X/09

of action research, a review is presented that answers the question: "What is known about the results of implementing EBP in nursing using action research?" The results of the various research projects are dealt with successively, classifying them, paying specific attention to the target group on which the implementation strategy was focused as well as the various strategies used. Finally, the results and limitations of the available research literature are discussed.

Factors that Help and Hinder Implementation

Many authors (Funk et al. 1991a; Kitson et al. 1998; Corrigan et al. 2001; Grol & Wensing 2001, 2006; Fleuren et al. 2002; Rycroft-Malone et al. 2002; Greenhalgh et al. 2004; van Linge 2005; Gerrish et al. 2007; Thompson et al. 2007) have considered the question of why it is so difficult for health care professionals to use or adopt research findings. The Barriers to Research Utilization Questionnaire (BRUQ) developed by Funk et al. (1991b) has often been used to identify the factors that are considered barriers to research implementation in nursing practice (Gerrish et al. 2007). The authors identified 29 barriers and clustered them around four factors, which nurses perceive as obstacles to research utilisation in practice. These four factors are:

1. Characteristics of the adopter: the nurses' research values, skills and awareness.
2. Characteristics of the organisation: setting, barriers and limitations.
3. Characteristics of the innovation: qualities of the research.
4. Characteristics of the communication: presentation and accessibility of the research (Funk et al. 1991b).

The importance of the organisational context is also emphasized in the Promoting Action on Research Implementation in Health Services (PARIHS) framework. This framework also describes factors that help the implementation of EBP. Developed in 1998 (Kitson et al. 1998) and later refined (McCormack et al. 2002; Rycroft-Malone et al. 2002; Rycroft-Malone et al. 2004) the framework represents the most successful implementation of evidence occurring when:

- evidence is scientific and matches professional consensus and patients' preferences;
- the context has features of learning organisations, with transformational leaders and appropriate monitoring and feedback mechanisms; and
- there is an input from skilled facilitators who adapt their facilitation strategies based on the availability of resources, the context's culture and values, and the style of leadership and evaluation activities.

Gerrish et al. (2007) developed and tested a tool, the Developing Evidence-Based Practice Questionnaire, which they used for investigating factors associated with EBP among nurses in England. This tool consists of 10 identifiable factors that help and hinder the implementation of EBP, of which 8 demonstrated high reliability (Cronbach's $\alpha \geq 0.7$). One of the differences between this tool and the BRUQ (Funk et al. 1991b) is a broader interpretation of the term 'evidence' to include documents such as clinical protocols and guidelines, in addition to research evidence. This broader interpretation of evidence can also be found in the PARIHS framework (Rycroft-Malone et al. 2004).

Plas et al. (2006) conclude that the factors that influence the implementation of new knowledge are diverse. This raises the issue of competing terminologies, where authors use their own list of factors (or a different classification of the same factors) and terms, making the sharing and use of this information in day-to-day practice even more difficult.

To prevent possible confusion over terminology, we have chosen to carry out this review using a conceptual framework developed by Plas and colleagues (2006), which will be explained more fully in the methods section.

The Effectiveness of Strategies and Interventions

Bero et al. (1998) conducted an overview of 18 systematic reviews of interventions to promote the implementation of research findings in health care. Most of the included studies focus on physician behaviour, although nurses' behaviour is also taken into account. Thompson et al. (2007) warn that generalizing findings from existing reviews to the nursing profession is problematic because of the different nature and (social) structure of nursing compared to medicine. Therefore we restricted our search for studies to those focusing on the nursing profession. Halfens and van Linge (2003) explored which strategies are effective for the implementation of guidelines by nurses. They concluded that whilst educational strategies improve nurses' knowledge, this did not affect their behaviour or patient outcomes. Multiple strategies (a combination of education with one or more other strategies such as participation or aids) could be fairly effective in terms of improving the knowledge and behaviour of carers, but have hardly any effect on patient results.

Thompson et al. (2007) concluded from a recent systematic review that there are very few methodologically strong studies on the implementation of research findings in nursing practice. In the four studies they included, education was the most frequently used form of intervention used for promoting the use of research findings. However, education on its own did not prove to be effective. When education was combined with the training of a local opinion leader, increased research utilisation was observed. The

same positive results were also found in the only study not using education as the primary component, but rather researchers and nurses participating in multi-disciplinary committees formed to optimise pain management (Dufault et al. 1995).

Several authors (Denis et al. 2002; Dopson et al. 2002; Halfens & van Linge 2003) advise that characteristics of the context, the new knowledge, actors involved and their possible interactions should be taken into account when implementing change. Action research methodology is a form of implementation that satisfies these points as it directly addresses the problem of the division between research and practice (Noffke & Somekh 2005). Instead of being research “on” a social setting and the people within it, it is research (in collaboration) “with” stakeholders within their natural context. Participation and knowledge of those involved in the context is essential, making a consideration of its potential contribution to the implementation of EB practice worthwhile.

What is Action Research?

The origins of action research lie in the first half of the 20th century, and Lewin is often cited as the person who first used the term (Waterman et al. 2001). He was interested in a social science that could help resolve social conflicts.

This aim immediately identifies the differences between action research and other research methodologies: change (action) and research are combined. An action researcher not only wishes to gather knowledge about a particular situation, but also wishes to (help) improve the situation while investigating it.

Through a systematic review of the role of action research in UK health care settings, Waterman et al. (2001 p. 11) arrived at the following core definition:

Action research (AR) is a period of inquiry that describes, interprets, and explains social situations while executing a change intervention aimed at improvement and involvement. It is problem focused, context-specific and future-oriented. AR is a group activity with an explicit critical value basis and is founded on a partnership between action researchers and participants, all of whom are involved in the change process. The participatory process is educative and empowering, involving a dynamic approach in which problem identification, planning, action and evaluation are interlinked.

Waterman et al. (2001) conclude that two criteria are fundamental to action research. First, an intervention must be carried out as part of a cyclic process. Starting with problem identification or diagnosis (including reflection), the cycle moves on to planning, action (implementation of change and monitoring), and rounds off

with evaluation/reflection before starting a new situation analysis.

The second fundamental criterion of action research concerns the partnership between the researcher and those being investigated in the research process.

In action research, those being investigated are often referred to as co-researchers. Partnership is seen as essential for developing practical knowledge and for implementing change in practice. This partnership enhances the accessibility of the knowledge created to a wider public than researchers, and so helps achieve the emancipatory intent of action research.

The partnership and the level of participation of those being investigated (the co-researchers) can vary. The minimum level of participation needed to guarantee success is not yet known (Waterman et al. 2001).

Action research is an umbrella term covering various types and, depending on the author, different classifications. In this article, the typology of Hart and Bond (1995) is used. They sketch a continuum in which four types of action research are distinguished on the basis of seven criteria (educative base, individuals in groups, problem focus, change intervention, improvement and involvement, cyclic processes and research relationship). The four types of action research Hart and Bond (1995) distinguish are: experimental, organisational, professionalising, and empowering. The “experimental” type is focused primarily on discovering general patterns that serve as the basis for choices, while the “organisational” type is more concerned with overcoming resistance and creating more-productive working relationships (Hart & Bond 1995). Moving along the continuum is the “professionalising” type, which is focused on practice, and reflects the aspirations of developing professions (such as nursing) to raise their status and develop practice based on research. Finally at the other end is the “empowering” type, which is characterised by the adoption of an anti-oppressive position in which there is collaboration with vulnerable groups in society.

The literature contains some indications that action research is a suitable methodology for bridging the gap between practice and research, and for implementing new knowledge. In their review (70% of the study participants were nurses, the other 30% were medical staff, educators, students and management), Waterman et al. (2001) established the following short-term outcomes:

- learning results (67% of the studies) split between personal development (29%) and professional development (38%); and
- changes in working practice, services, provision of training, and the attitude and perceptions of the staff (60%).

Long-term effects (impacts) were found in 54% of the studies. The two most important areas where these effects were achieved were in changes in the provision of training (28%) and in clinical care (22%).

To bring Waterman and colleagues' review up-to-date, and to place more emphasis on the implementation of EBP within the nursing profession, a new review was carried out with the question: "What is known about the results of implementing EBP in nursing through action research?"

METHODS

A search was carried out using Academic Search Premier in which Medline and CINAHL are combined. A combination of the following keywords was used to search both the text and the titles of articles: "Action Research," "Evidence-Based Practice," "Evidence-Based," "Implementation," "Implementing" and "Nursing." Search expanders were also used to cover related concepts. There were no restrictions placed on the year of publication.

A problem arose when trying to identify unambiguous, universally accepted criteria for assessing the quality of action research. In their review, Waterman et al. (2001) encountered the same problem and therefore defined their own criteria. However, these have not been universally accepted. We too, had to formulate our own inclusion criteria, shown in Table 1.

Initially, 60 articles were found. A search for additional articles was made using the snowball method, which resulted in another 18 articles. Finally, Dutch literature was searched using the Dutch database INVERT. This resulted in one more article, using the search terms "actieonderzoek" and "verpleegkunde" (Loth et al. 2002). The abstracts of all 79 articles were examined for relevance to the review question. In those cases where the abstract did

not contain sufficient information to decide whether it was relevant, the whole article was read.

Of the 79 articles found, 24 satisfied the defined criteria. In some cases ($N = 6$), the same action research project was discussed in more than one article, which reduced the review to 21 action research projects. A total of 55 articles were excluded from the review. Table 1 shows how many were excluded per criterion. Sometimes more than one reason was used for excluding the same article, which accounts for the total number of exclusions (62) being higher than 55.

THE CONCEPTUAL FRAMEWORK

As mentioned earlier, we used a conceptual framework developed by Plas et al. (2006) for this review in order to prevent potential confusion over implementation terminology. Plas et al. (2006) developed the conceptual framework based on a literature review of the Dutch implementation literature (2000–2005) in preventive health care. The Dutch literature was completed using a selection of international implementation literature chosen by the researchers and an expert panel. The researchers acknowledge that they did not include all relevant literature.

Based on the chosen literature, a provisional framework was developed that was further refined by two expert panel meetings. The usefulness of the refined framework was then evaluated by (1) applying implementation strategies and influencing factors found in the literature to the framework, and (2) by researchers and professionals working in the field of implementation critiquing the framework. This resulted in the final conceptual framework published in the Netherlands in 2006.

Implementation strategy is defined as: "The whole set of goal-oriented, cohesive activities used to implement a

TABLE 1
Inclusion and exclusion criteria

INCLUSION CRITERIA	EXCLUSION CRITERIA
<ul style="list-style-type: none"> • Implementation of EBP in nursing (so not, e.g., in education) • Target group consists mainly of nurses and/or patients receiving nursing care • Partnership between researcher and those being investigated must be described • Action research cycle(s) must be recognisable • Results must be described and substantiated • Published in a peer-reviewed journal 	<ul style="list-style-type: none"> • Not an action research project that has actually been carried out, an argument in favour of action research or a preparatory study for an action research project ($N = 17$) • Target group does not consist mainly of nurses and/or patients receiving nursing care ($N = 4$) • No implementation or no relation to EBP ($N = 16$) • Collaboration between researcher and those investigated has not been made sufficiently clear ($N = 8$) • No results are reported or the results described are poorly substantiated ($N = 10$) • No insight is offered into the different phases of the cycle ($N = 7$)

specific way of working or product, aimed at changing something or bringing about lasting change” (Plas et al. 2006, p. 15). Influencing factors are defined as: factors that help or hinder an implementation process or implementation strategy (Plas et al. 2006, p. 16). The framework distinguishes various influencing factors in terms of four target groups (ranging from the individual end user, to society as a whole) at whom the strategy is aimed, and various strategies (ranging from individual feedback to contracting care providers) related to the same four target groups. The various implementation strategies and factors influencing implementation reported in the included studies are presented in Tables 2 and 3.

To answer our review question, a table (Table 4) was prepared displaying answers, with respect to each article, to the following questions.

- What innovation was implemented during what period of time?
- Who of the group being investigated was included in the research group (i.e., who played an active role in the research process)?
- What type of action research design was used, according to Hart and Bond’s (1995) classification? To obtain a picture of the inter-rater reliability of classifying the projects, each co-author classified four of the included articles chosen at random. The results were then compared with the classifications made by the first author. This resulted in a Cohen’s kappa of 0.89, an almost a perfect agreement (Landis & Koch 1977).
- What implementation strategy, as described by Plas et al. (2006) conceptual framework, was used and with whom? The inter-rater reliability of this question was measured in the same way as described above. The Cohen’s kappa was 0.52, demonstrating a moderate agreement (Landis & Koch 1977).
- What are the results of the action research project, using the following headings:
 1. knowledge of the practising professional
 2. performance of the practising professional
 3. patient outcomes
 4. outcomes relating to the context.

In this review, the context is understood as “the environment or setting in which the proposed change is to be implemented” (McCormack et al. 2002). This environment with its systems, processes and structures is characterised by the culture, the leadership, and the degree to which use is made of evaluation (McCormack et al. 2002). Culture is defined as: the values and beliefs underpinning (Manley 2004) “the way things are done around here” (Drennan 1992), which gives the context a character and feel

(Kitson et al. 1998). Manley (2004) describes three components and several cultural indicators of these components, found within what she calls a transformational (i.e., effective) culture. These three effective culture components are: staff empowerment, practice development and a workplace context where all stakeholders are of value and quality is everyone’s concern (Manley 2004). Leadership (the second element of the context) is important because a leader can change the organisational culture and create a context that is more conducive to the integration of evidence and practice (McCormack et al. 2002). Evaluation (the third element of the context) and context are linked because the culture of an organisation influences the type of evaluation tools used and the way the results evaluation are presented and valued (McCormack et al. 2002). Evaluation has a 2-fold importance: it generates knowledge that can be used to guide practice; it shows whether change was effective or efficient, as well as whether further change is needed (McCormack et al. 2002).

The issues that emerged from the review of the papers included in Table 4 are discussed in more detail in the remainder of this paper. The following topics are considered in succession: the duration of the research project, the composition of the research group, and the type of action research. The target group of the implementation is then considered, and the interventions used for implementing EBP are described. The section ends with an overview of the findings.

Duration of the Research Projects

The duration of the research projects ranged from 2.5 months (Koch et al. 2000) to 4 years (Hope et al. 2004, Waterman et al. 2005a). The average duration of the implementation was 22 months. Once again, different articles reporting the same action research project were treated as one article. In five articles (Gerrish et al. 1999; Atwal & Caldwell 2002; Sanares & Heliker 2002; Glasson et al. 2006; Simons & Macdonald 2006), authors failed to report how long the action research project lasted.

Composition of the Research Group

Which participants being investigated play an (more or less) active role in the research? A total of 17 projects included only professionals in the research group. Four research projects (Koch & Kelly 1999; Koch et al. 2000, 2001; Kralik & Koch 2005) included a combination of patients and professionals in the research group.

TYPE OF ACTION RESEARCH

As stated earlier, Hart and Bond’s (1995) classification of action research projects was used. The seven criteria (as described previously) were initially used. However, classifying an action research project was not straightforward. The characteristics of an individual project sometimes meant

TABLE 2

Implementation strategies in four different domains

INDIVIDUAL: END USER (PATIENTS/LAYMEN)	INDIVIDUAL: INTERMEDIARIES (CAREGIVERS, TEACHERS, ETC.)	ORGANISATION (CARE INSTITUTION, SCHOOL, DEPARTMENT, WARD, TEAM)	SOCIETY AS A WHOLE (CARE SYSTEM, OTHER SOCIAL SECTORS)
Mass media Use of mass media for education and guidance.	Mass media Use of mass media for education and guidance.	Change of strategic objectives Change in the long-term objectives of an organisation in order to encourage a certain change. Example: more attention for older patients in hospital.	Influence on the social agenda Activities to bring certain themes higher on the social policy and political agendas. Example: demanding attention for a subject in the public media.
Material for the individual Use of material intended for the individual (folders, self-study packages, CD-ROM, etc.) for education and guidance.	Material for the individual Use of material intended for the individual (folders, self-study packages, C- ROM, etc.) for education and guidance.	Change in organisation size Change in organisation size (in terms of staffing and other resources or service output) to encourage a particular change. Example: hospital merger.	Professional development of professions Professionalisation of a profession to encourage a particular change. Example: start of development of national guideline.
Personal contact Use of personal contact (with care provider, fellow sufferer, etc.) for education and guidance.	Personal contact Use of personal contact (with care provider, fellow sufferer, etc.) for education and guidance.	Change in physical environment Change in physical environment of the organisation to encourage a particular change. Example: move of department to different building.	Financial incentives for laymen/patients Use of financial reward or risk to encourage a particular change. Example: larger personal risk for medical insurance.
Meetings in small groups Use of meetings in small groups (self-help group, etc.) for education and guidance (arbitrary: up to 15 persons).	Meetings in small groups Use of meetings in small groups (self-help group, etc.) for education and guidance (arbitrary: up to 15 persons).	Change in mix of competences Change in staffing make-up to encourage a particular change. Example: employ more nurses relative to doctors.	Financial incentives for carers/institutions Use of financial reward or risk to encourage a particular change. Example: the introduction of a diagnosis–treatment combination.
Meetings in large groups Use of meetings in large groups (self-help group, etc.) for education and guidance.	Meetings in large groups Use of meetings in large groups (self-help group, etc.) for education and guidance.	Change in professional roles Change in tasks and responsibilities of professionals to encourage a particular change. Example: development of nurse practitioners.	Contracting of care providers Use of contracting of care providers to encourage a particular change. Example: contract with medical insurer.
Feedback based on measurements Use of feedback for individual functioning, based on measurements, for education and guidance.	Feedback based on measurements Use of feedback for individual functioning, based on measurements, for education and guidance.	Change in teams Change in structure or functioning of teams to encourage a particular change. Inclusion of paramedics in multi-professional team.	Legislation Implementation of legislation to encourage a particular change. Example: quality law of care-institutions.
Decision support Use of aids for cognitive support of individual decisions. Examples: automated advice, reminders, decision aids.	Decision support Use of aids for cognitive support of individual decisions. Examples: automated advice, reminders, decision aids.	Re-design of working processes Change in the structure of working processes to encourage a particular change. Example: care chain for stroke patients.	

(Continued)

TABLE 2
(Continued)

INDIVIDUAL: END USER (PATIENTS/LAYMEN)	INDIVIDUAL: INTERMEDIARIES (CAREGIVERS, TEACHERS, ETC.)	ORGANISATION (CARE INSTITUTION, SCHOOL, DEPARTMENT, WARD, TEAM)	SOCIETY AS A WHOLE (CARE SYSTEM, OTHER SOCIAL SECTORS)
<p>Change in living or working environment Change in living environment to encourage a certain lifestyle. Local mobility/exercise facilities.</p>	<p>Change in living or working environment Change in living environment to encourage a certain lifestyle. Local mobility/exercise facilities.</p>	<p>Standardisation of working processes Working out of recommendations or regulations for working processes to encourage a particular change. Examples: guideline, protocol.</p>	
<p>Use of symbols Use of people or organisations expected to influence the attitude of individuals. Terms include: champion, opinion leader, role model. If the symbol actually does something, this must be noted separately.</p>	<p>Use of symbols Use of people or organisations expected to influence the attitude of individuals. Terms include: champion, opinion leader, role model. If the symbol actually does something, this must be noted separately.</p>	<p>Computerisation of working processes Change in the use of information in working processes to encourage a particular change. Example: computerisation of dossiers.</p>	
		<p>Change in internal communication Communication with individuals and parts of the organisation to encourage a particular change, including the fostering of support. Example: communication on new strategic objectives.</p>	
		<p>Change in external communication Communication with individuals and organisations connected to an organisation including patients/laymen. Example: regional consultation.</p>	
		<p>Change in leadership and culture Change in leadership methods or shared standards and values in an organisation. Example: selection of a different type of manager.</p>	

that it met the criteria of different types of action research. In addition, not every article included sufficient details to enable an assessment using all of Hart and Bond's criteria. In spite of this, the classification process resulted in an almost perfect agreement between assessors (0.89 Cohen's kappa).

The most frequently occurring type of Action Research was professionalising ($N = 10$), followed by empowering ($N = 6$), experimental ($N = 3$), and organisational ($N = 2$).

What is the Target Group of the Implementation Strategy?

In line with Plas et al. (2006), an implementation strategy is understood to be a totality of connected activities targeted at achieving the introduction of a particular product or method of working, setting a specific change in motion, or realising a permanent change. As shown in Table 2, Plas et al. (2006) distinguish four target groups (ranging from an individual end user to society as a whole) at whom, or at what, the strategy can be directed. An implementation

TABLE 3

Influencing factors of implementation in four domains

INDIVIDUAL: END USER (PATIENTS/LAYMEN)	INDIVIDUAL: INTERMEDIARIES (CAREGIVERS, TEACHERS, ETC.)	ORGANISATION (CARE INSTITUTION, SCHOOL, DEPARTMENT, TEAM)	SOCIETY AS A WHOLE (CARE SYSTEM, OTHER SOCIAL SECTORS)
Individual cognitions	Individual cognitions	Organisation structure and working processes	Professional development
Individual motivations	Individual motivations	Organisation processes	Financial incentives
Individual behaviour	Individual behaviour Teams of professionals Networks of professionals	Available resources	Regulations

strategy can also be directed at more than one target group, and each target group can be the subject of more than one strategy or intervention. The strategies in the articles were often not named and consequently often had to be deduced from the text.

Most ($N = 15$) of the research projects included in the review used an implementation strategy directed at a combination of target groups in the conceptual framework. Only four research projects (Koch & Kelly 1999; Koch et al. 2000; Cooper 2005; Kralik & Koch 2005; Mitchell et al. 2005) used a strategy limited to a single target group.

In almost all cases ($N = 17$), the strategy was directed at professionals. The strategy was often ($N = 15$) directed at the organisation too, and to a lesser extent ($N = 6$) the end user, the patient, or his family. No examples were found that directed their strategy at the most abstract target group of Plas et al.'s (2006) conceptual framework: society as a whole.

Which Implementation Strategies were Applied for the Various Target Groups?

Implementation strategies aimed at the professional target group. In all the research projects ($N = 21$) an attempt was made to implement EBP using multiple strategies. The two most applied strategies for professionals (intermediaries) were small or large group meetings ($N = 17$), and personal contact ($N = 10$). Plas et al.'s (2006) conceptual framework differentiates between small group (up to 15 people) and large group (>15 persons) meetings. However, in this review this distinction is not possible because group size was often not reported. Group meetings usually had an educational nature. Other regularly occurring strategies aimed at professionals were feedback on the basis of measurements ($N = 7$) as well as the use of personal material ($N = 6$), such as folders and literature relating to education and guidance.

Strategies that seldom occurred were the use of mass media ($N = 1$) and changes to the living or working environment ($N = 1$).

Implementation strategies for the organisation target group. Of the 17 research projects where the strategy was directed at the organisation, all involved changing internal communication ($N = 17$). Creating a Community of Practice (Booth et al. 2007) or conducting ward meetings (Glasson et al. 2006) were examples of "changing communication."

Other strategies that regularly appeared were changing professional roles ($N = 6$) and standardising working processes ($N = 8$) through the use of tools such as guidelines.

Implementation strategies for the end user/patient target group. Of the five research projects where the strategy was directed at the patient or his family, the most common strategies used were personal contact ($\times 5$), group meetings ($\times 4$) and feedback on the basis of measurements ($\times 4$). Other strategies such as the use of mass media, changes to the living or working environment and the use of symbols, were not used at all.

Implementation strategies for society as a whole. No interventions were directed at influencing the most abstract level of Plas et al.'s (2006) conceptual framework: society as a whole. A possible explanation for this could be the fact that only those articles describing the functioning of the nurse in direct patient care (i.e., the micro level) were included in this review, whilst "society as a whole" is a factor at the macro level.

An Overview of the Described Results

In the review, the results found in the articles are broken down according to

- the knowledge of the professional,
- performance of the professional,
- patient outcomes and
- context outcomes.

The results are described successively under these outcome measures. In 15 research projects, the knowledge of the professional was found to have increased. Examples of this increase included: a better perspective on the care of

TABLE 4
Results of the included articles

AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
1. Booth et al. (2007)	Preparation of Best Practice Statements to inform nursing care of older people (length: 3.5 years).	Community of practice of geographically dispersed groups of registered nurses from the National Health Service (NHS) and independent care homes with expertise in caring for older people in Scotland ($n = 30$).	Professionalising	<ul style="list-style-type: none"> • Intermediary; Personal contact, material for the individual, feedback based on measurements, meetings in small/large groups, mass media. • Organisation; standardisation of working processes, changes in internal communication, changes in external communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • Expertise development by knowledge sharing. • More focused perspective on gerontological nursing. <p>Performance:</p> <ul style="list-style-type: none"> • Significant improvements in nutrition and hydration assessment, recording and individualized monitoring at 6 and 15 months after implementation. • Person-centred care planning. <p>Context:</p> <ul style="list-style-type: none"> • Guidance based on diverse forms of evidence. • Participation is leading to group ownership to promote good practice.
2. O'Neal and Manley (2007)	Developing action-planning skills (a key step in achieving change) with a practice development strategy in an acute hospital in the United Kingdom (length: over 3 years).	Nurses and practice developers for whom action planning was an issue.	Professionalising	<ul style="list-style-type: none"> • Intermediary; meetings in small/large groups, material for the individual, personal contact. • Organisation; standardisation of working processes, change in professional roles, changes in leadership and culture, changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • Barriers to successful action planning to be recognised and addressed. <p>Performance:</p> <ul style="list-style-type: none"> • Live action plan with progress against objectives. <p>Context:</p> <ul style="list-style-type: none"> • A patient forum is run and feedback is integrated. • Reviewing team structure to address patients issues • Adjustments for ease of use by patients. • Workplace culture has shifted towards increased team responsibility for change.

(Continued)

TABLE 4
(Continued)

AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
3. Simons and Macdonald (2006)	Implementing validated pain assessment tools across a children's hospital (length: not reported) in Northern Ireland.	Researcher and a clinical nurse pain specialist.	Experimental	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, personal contact. • Organisation: standardisation of working processes, changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • After 6 months, 55% of the nurses demonstrating knowledge how to use the tool. <p>Performance:</p> <ul style="list-style-type: none"> • A total of 23% of the children have a pain assessment tool at 6 months and 40% at 1 year. • Nurses are involving more parents in pain management of their children. • Differences in what the nurses said they were doing and the evidence provided by charts.
4. Glasson et al. (2006)	Developing, implementing and evaluating a new model of care in an acute medical ward in Australia (length: not reported).	Nursing staff ($n = 13$).	Professionalising	<ul style="list-style-type: none"> • End user: personal contact. • intermediary: meetings in small/large groups, feedback based on measurements, personal contact, decision support. • Organisation: changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • Expanding knowledge by sharing their knowledge. <p>Patient outcomes:</p> <ul style="list-style-type: none"> • Significantly more satisfied with physical care and discharge planning. • Significant improvement in ADL. • Significant improvement of knowledge about medication. <p>Context:</p> <ul style="list-style-type: none"> • Enthusiasm to change practice. • Empowerment in planning and changing practice.
5. Kennedy (2005)	Improving pressure ulcer prevention in a nursing home in the United Kingdom (length: 9 months).	Home nursing and care staff.	Professionalising	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, feedback based on measurements, personal contact. • Organisation: standardisation of working processes, changes in internal communication. 	<p>Performance:</p> <ul style="list-style-type: none"> • Improvements of pressure ulcer benchmarking scores. <p>Patient outcomes:</p> <ul style="list-style-type: none"> • Significant reduction of incidence of pressure ulcer. <p>Context:</p> <ul style="list-style-type: none"> • Improvement of professional relationships and communication. • Staff are more in control and is able to influence others. • Development and implementation of system of supervision.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
6. Kralik and Koch (2005)	Facilitating learning with people who have a mental illness and incontinence who are residing in Supported Residential Facilities in South Australia (length: 12 months).	Two researchers, continence nurse advisor and clients (N = 37) with both a mental illness and incontinence.	Empowering (clients)	<ul style="list-style-type: none"> End user: meetings in small/large groups (12x), feedback based on measurements, personal contact, decision support. 	<p>Knowledge:</p> <ul style="list-style-type: none"> Better understanding of impact of mental illness. <p>Patient outcomes:</p> <ul style="list-style-type: none"> More knowledge about incontinence and strategies. More use of self management strategies. Improvement of continence status.
7. Mitchell et al. (2005)	Facilitate changes in moving and handling practice for patients with stroke by empowering staff of a stroke unit to effect meaningful change in the United Kingdom (length 2.5 year).	Nursing staff of the stroke unit (N = 12).	Professionalising	<ul style="list-style-type: none"> Intermediary: material for the individual, meetings in small/large groups, change in physical environment, personal contact. Organisation: changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> Knowing how to move and handle stroke patients. Identification of issues that influence moving and handling practice. <p>Performance:</p> <ul style="list-style-type: none"> More handling according care plan. <p>Context:</p> <ul style="list-style-type: none"> Staff felt empowered through active participation. Staff felt validated. More aware of self and others. Enhanced understanding nurses and physiotherapists. Regard for patient and staffs safety. Rehabilitative handling workshop in the hospital. Ongoing audit to monitor. (Changes are still maintained).
8. Keady et al. (2005)	Development and implementation of an assessment constructed from service users experience in a memory clinic in Wales (length: 14 months).	Specialist memory clinic nurse, staff of the memory clinic (Clients experiences were used).	Empowering	<ul style="list-style-type: none"> intermediary; meetings in small/large groups, feedback based on measurements. Organisation; changes in internal communication, changes in leadership and culture. 	<p>Knowledge:</p> <ul style="list-style-type: none"> Recognition of the need to relate the user knowledge to practice-based knowledge. <p>Performance:</p> <ul style="list-style-type: none"> More person-centred assessment and interventions. <p>Context:</p> <ul style="list-style-type: none"> Care more organised according to clients' wishes.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
9. Ross et al. (2005)	Development and implementation of multidisciplinary assessment guidelines in a female ward for older people in a hospital in the United Kingdom (length: 3 years).	Project leader and multidisciplinary stakeholders: from medical, nursing and social care therapy from both the hospital and community trust.	Professionalising	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, personal contact, feedback based on measurements. • Organisation; standardisation of working processes, changes in internal communication, computerisation of working processes. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • Increased staff knowledge. <p>Patient outcomes:</p> <ul style="list-style-type: none"> • Improvement of perception of involvement, continuity of information and satisfaction. • Reduction of reported functional problems on going home. <p>Performance</p> <ul style="list-style-type: none"> • A total of 44% of staff identified standardized assessment as a component of recharge planning. • Some diagnostic instruments were completed for all patients. • Other instruments are not used. <p>Context:</p> <ul style="list-style-type: none"> • Extended roles. National recognition of project leader. • Joint appointment university and hospital to support practice development. • Changes are sustainable 3 years after project leader leaves.
10. Waterman et al. (2005a) Waterman et al. (2005b)	Promoting face down posturing of patients following vitreo-retinal surgery for macular hole in a hospital in the United Kingdom (length: 4 years).	Nursing staff, clinical nurse manager and a senior physician from inpatient ward and outpatient setting (N = 19). They used patients' experiences.	Professionalising	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, material for the individual, personal contact • Organisation; change in professional roles, change in mix of competences, changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • More knowledge why and how to use equipment and factors influencing posturing. <p>Patient outcomes:</p> <ul style="list-style-type: none"> • Patients are clearer about what is expected and more likely to posture quickly and longer. <p>Performance:</p> <ul style="list-style-type: none"> • Nursing care more appropriate and consistent although some areas progress could be made.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
11. Cooper (2005) b) Cooper (2004)	Implementation of an infection control link nurse programme to improve handwashing facilities in a hospital in the United Kingdom (length: 15 months).	Nursing staff ($N = 19$) and a radiographer.	Experimental	<ul style="list-style-type: none"> • Intermediary: meetings ($N = 5$) in small/large groups, feedback based on measurements, personal contact, material for the individual. • Organisation: changes in internal communication. 	<p>Context:</p> <ul style="list-style-type: none"> • New nurse practitioner post. • A loan system for posturing equipment. • Communication on ward improved. • Teaching sessions and packages. • Staff is contacted by professionals outside the trust for consultation. <p>Knowledge:</p> <ul style="list-style-type: none"> • Insight in barriers to the effectiveness of the link role. <p>Performance:</p> <ul style="list-style-type: none"> • Improvement of infection control. • Empowered behaviour. <p>Context:</p> <ul style="list-style-type: none"> • Sending out information helped to overcome the problem of access to information. • Positive experience of the link nurses relating to their influence and authority. • New learning materials (video) (Cooper 2004). <p>Context:</p> <ul style="list-style-type: none"> • Significant improvement of some materials. • Other materials didn't improve significantly. <p>Knowledge:</p> <ul style="list-style-type: none"> • Staff are more aware of therapeutic relationship and own potential. <p>Context:</p> <ul style="list-style-type: none"> • Staff are reminded about the patient's personhood. • Staff experience a positive shift in their relationship with clients.
12. Hope et al. (2004)	Implementing multisensory environments for older clients with dementia in a nursing home in the United Kingdom (second phase of a 4-year study).	Nursing staff ($N = 21$) and professionals allied to medicine ($N = 8$) working in the unit ($n = 29$).	Professionalising	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups. • Organisation: changes in professional roles, changes in internal communication. 	<p>Context:</p> <ul style="list-style-type: none"> • Significant improvement of some materials. • Other materials didn't improve significantly. <p>Knowledge:</p> <ul style="list-style-type: none"> • Staff are more aware of therapeutic relationship and own potential. <p>Context:</p> <ul style="list-style-type: none"> • Staff are reminded about the patient's personhood. • Staff experience a positive shift in their relationship with clients.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
13. Whitehead et al. (2004)	Implementing osteoporosis care based on agreed protocols (length: 2 years) in a hospital in the United Kingdom.	Two researchers, 2 nurses, 1 physiotherapist and a health educationalist.	Empowering	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, feedback based on measurements. • Organisation; change in professional roles, changes in internal communication. 	<p>Context:</p> <ul style="list-style-type: none"> • Introduction of a new preventive health promotion programme for osteoporosis. • Setting up formal osteoporosis referral guidelines. • Designing and developing new information packs for staff. • Liberating and enlightening process for the research participants. • Little feedback from, and interaction with and change by clinical staff.
14. Atwal and Caldwell (2002)	Implementation of a multidisciplinary integrated care pathway for patients with fractured neck of femurs on a orthopaedic ward in a hospital in the United Kingdom (length is not clear; longer than 1 year).	Multidisciplinary staff (medicine, nursing, physiotherapy, occupational therapy and care management) of the orthopaedic ward. Size of the group is not reported.	Experimental	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups. • Organisation; standardisation of working processes, computerisation of working processes, changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> • Increasing awareness of causes of discharge delays. <p>Context:</p> <ul style="list-style-type: none"> • New multidisciplinary integrated care pathway. • Little indication for improved multidisciplinary collaboration. <p>Performance:</p> <ul style="list-style-type: none"> • Discharge plans were made within 48 hours. • Better documentation of assessment according to care pathway (goals were rarely recorded).
15. Sanares and Heliker (2002)	Implementation of disciplined inquiry in the perioperative nursing arena of a large medical centre in the United States (length: not reported).	Nursing staff of a perioperative cluster. Size of the group is not reported.	Professionalising	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, feedback based on measurements, changes in living or working environment. • Organisation; changes in internal communication, changes of strategic objectives. 	<p>Context:</p> <ul style="list-style-type: none"> • Participation in several learning activities. • New facilities to stimulate the development. • Formalized process will serve as a prototype in other clinical areas.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
16. Koch et al. (2001)	Better understanding of how people living with MS manage their urinary incontinence in Australia (length: 4 months).	Four women with MS and urinary incontinence and 2 continence nurse advisors.	Empowering	<ul style="list-style-type: none"> End user: meetings in small/large groups (5x), personal contact, feedback based on measurements. 	<p>Knowledge:</p> <ul style="list-style-type: none"> Better understanding of how women with MS cope with incontinence. <p>Patient outcomes:</p> <ul style="list-style-type: none"> Patients are more empowered by research process. Better able to decide which pad to use and more able to prevent wet spots and odour.
17. Olsen and Wagner (2000)	Development and implementation of interdisciplinary preventive discharge planning on a hospital rheumatology clinic in Denmark (length: 28 months).	Multidisciplinary staff (chief nurse, physiotherapist, occupational therapist, nurse, social worker, chief doctor, unit leader of the home care service, general practitioner, research nurse and a researcher).	Professionalising	<ul style="list-style-type: none"> Intermediary: meetings in small/large groups, feedback based on measurements. Organisation; standardisation of working processes, changes in mix of competences, changes in internal communication. 	<p>Knowledge:</p> <ul style="list-style-type: none"> A local theory was formed about preventive discharge. Insight in enabling and adverse factors in the context. <p>Context:</p> <ul style="list-style-type: none"> Two useful instruments to improve discharge. Greater feedback from patients by entering into dialogue. Better contact between primary and secondary sector.
18. Koch et al. (2000)	Implementing best practice in the management of urine-incontinence by men in Australia (length: 2.5 months).	Four men with MS and urinary incontinence and 1 continence nurse advisor.	Empowering	<ul style="list-style-type: none"> End user: meetings in small/large groups (5x), personal contact, feedback based on measurements. 	<p>Patient outcomes:</p> <ul style="list-style-type: none"> Patients formulate action plans. Sense of urgency was reduced. Better sleep. More knowledge about incontinence. Felt empowered to make changes.

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
19. Gerrish et al. (1999)	Implementation of the assessment of pressure damage risk to patients within a large acute hospital in the United Kingdom (length is not reported).	Staff of the hospital (nurse managers, nurses, staff nurse, clinical nurse specialist). Size of the group is not reported.	Organisational	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, material for the individual, feedback based on measurements. • Organisation: standardisation of working processes, changes in professional roles, changes in internal communication. 	<p>Context:</p> <ul style="list-style-type: none"> • New training programme on prevention of pressure damage. • More strategic role for skin care specialist. • Collecting incidence and prevalence data. • In 1 cluster (extra support) practice is based on appropriate evidence. • In other clusters this is not the case due to the lack of ownership by the managers.
20. Dowswell et al. (1999)	Development and implementation of a collaborative stroke training programme for nurses on an elderly care rehabilitation ward in the United Kingdom (length: 5 months).	Staff of the rehabilitation ward (nurse manager, nursing staff, physiotherapists and a researcher). Size of the group is not reported.	Organisational	<ul style="list-style-type: none"> • Intermediary: meetings in small/large groups, personal contact. • Organisation: change in professional roles, changes in internal communication. 	<p>Context:</p> <ul style="list-style-type: none"> • Programme of 6 sessions is developed. • Seven to twelve nurses attended each session of the programme. • Participation in the programme is high (median is 6 sessions). <p>(Forster et al. 1999):</p> <p>Performance:</p> <ul style="list-style-type: none"> • More thoughtful and conscious approach to nursing. <p>Context:</p> <ul style="list-style-type: none"> • Attitude of nurses towards working with stroke patients is significantly improved. • Role of nurses is enriched. • Increase in confidence. • Barriers are breaking down. • Closer inter- and intra-disciplinary relationships. • More considerate of patient needs. • Start of continual improvement and learning.
c) Forster et al. (1999)					

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AUTHOR	INNOVATION	RESEARCH GROUP	TYPE OF ACTION RESEARCH	TARGET GROUP AND IMPLEMENTATION STRATEGY	OUTCOMES
21. Koch and Kelly (1999)	Identifying strategies for managing urinary incontinence with women who have multiple sclerosis (MS) (length: 4 months).	Eight women who have MS and urinary incontinence and 4 continence nurse advisors.	Empowering	<ul style="list-style-type: none"> End user: meetings in small/large groups, personal contact, feedback based on measurements. 	<p>Knowledge:</p> <ul style="list-style-type: none"> More knowledge about management strategies of patients. Nurses are able to conduct their own research groups. <p>Patient outcomes:</p> <ul style="list-style-type: none"> Use of more appropriate pads and effective strategies. Enhancement and enrichment of knowledge. Empowered by sharing the experiences. Continuation of the group after the research. <p>Context:</p> <ul style="list-style-type: none"> Major changes to provision and distribution of pads. Funding for further research on the topic.

older people (Booth et al. 2007) and a better understanding of the ways in which the present way of working could be improved (Waterman et al. 2005a; O'Neal & Manley 2007) or a better understanding of the impact of the illness on the patient (Kralik & Koch 2005).

In the remaining six articles, nothing is reported on changes to professional knowledge. Evidently, in these research projects, nurses' knowledge was not considered an outcome to be measured.

Nurse performance improved in 11 of the 21 research projects. These improvements ranged from better screening of patients (Booth et al. 2007) to the use of preventive measures (Cooper 2005; Kennedy 2005) and better discharge planning (Atwal & Caldwell 2002). Two articles reported no improvement in performance. For example, Atwal and Caldwell (2002) found that in spite of the implementation of an integrated care pathway, multidisciplinary collaboration was not improved. Ross et al. (2005) also found that some of the diagnostic tools implemented were not used by nurses. In the other articles, nothing was reported regarding changes to nurses' performance.

Did patients also benefit from action research? Outcomes affecting the patient were reported in only seven of the research projects. This outcome measure was the least reported. The most frequently reported patient outcome ($N = 5$) was an increased knowledge of those patients involved in the research (Koch & Kelly 1999; Koch et al. 2000, 2001; Kralik & Koch 2005; Glasson et al. 2006). An increase in patient satisfaction was also reported (Glasson et al. 2006), a health benefit in the form of a lower incidence of decubitus (Kennedy 2005) or reduced functional problems after discharge (Ross et al. 2005).

Koch et al. (2000, 2001) also observed that patients were empowered by the research, and their self-management was extended (Kralik & Koch 2005), which offers a practical example of empowerment.

Most of the research projects ($N = 17$) reported different results related to the context in which the research was carried out. In this review, context is understood to be 'the environment or setting in which the proposed change is to be implemented' characterised by culture, leadership and evaluation (McCormack et al. 2002).

In all 17 research projects that reported context results, cultural change in the context in which EBP was implemented was described. Examples included new care or training developed in collaboration with those involved (Gerrish et al. 1999; Koch & Kelly 1999; Atwal & Caldwell 2002; Whitehead et al. 2004; Waterman et al. 2005b; Booth et al. 2007), a different workplace culture (O'Neal & Manley 2007), a process of continuous improvement

(Forster et al. 1999), an enduring research climate (Gerrish et al. 1999; Waterman et al. 2005b), and a team that takes more responsibility for change (Kennedy 2005; O'Neal & Manley 2007).

Various authors also found positive results in communication and collaboration between team members and other disciplines (Forster et al. 1999; Olsen & Wagner 2000; Kennedy 2005; Mitchell et al. 2005; Waterman et al. 2005b) or in the nurse-patient relationship (Forster et al. 1999; Hope et al. 2004).

Additionally, the action research process appeared to create a clearer view of the barriers present in the context, which influence the implementation of EBP. Some examples of these barriers include time constraints and nursing staff levels that reduced the ability to perform nursing procedures (Cooper 2005; Glasson et al. 2006), high workloads (Cooper 2005) and no ownership of the implementation by the nurses from the beginning, due to a top-down approach (Olsen & Wagner 2000).

Apart from these positive contextual results, two authors reported that the hoped-for results to the context were not achieved. Whitehead et al. (2004) concluded that changes among staff who did not act as co-researchers were limited, and Gerrish et al. (1999) found that an evidence-based culture did not develop in other participating clusters because of inadequate support by management.

Leadership

No research projects reported specific results with regards to leadership. Various research projects (Kennedy 2005; Booth et al. 2007; O'Neal & Manley 2007) did describe that, as a result of the research, nurses felt responsible, personally involved, empowered (Mitchell et al. 2005; Glasson et al. 2006) and more influential (Cooper 2005). These results possibly denote the development of a culture of transformational leadership in which 'everyone is seen as a leader of something' (McCormack et al. 2002).

Evaluation

Three authors reported that implementation using action research had led to increased evaluation. O'Neal and Manley (2007) and Gerrish et al. (1999) described that more use was made of feedback from patients, and Mitchell et al. (2005) described a continuous audit in which results could be monitored constantly. The remaining articles did not report any results on this outcome.

In their review, Waterman et al. (2001) distinguish short-term results (outcomes) and long-term results (impacts). Within this review included studies described mainly short-term results. Only a few authors ($N = 3$) describe long-term findings, that is, results found 1 year

after implementation. Examples of these include: better screening, monitoring and record keeping 15 months after the implementation (Booth et al. 2007), greater use of measuring instruments after 1 year (Simons & Macdonald 2006) and continuation of improved performance 3 years after the departure of the project leader (Ross et al. 2005).

CONCLUSIONS AND DISCUSSION

With an element of caution, this review indicates that the implementation of EBP using action research may be promising. In all included studies, positive results are reported for one or more of the outcome measures referred to in this paper. Action research would therefore seem to be a useful way of bridging the gap between research and practice. However, this positive picture could have been influenced by publication bias, since articles with positive results are more likely to be published than those describing unsuccessful implementations. An indication of this possibility is demonstrated by the fact that very few articles in this review reported failure to achieve expected outcomes (Gerrish et al. 1999; Atwal & Caldwell 2002; Whitehead et al. 2004; Simons & Macdonald 2006).

The implementation strategies used in the research projects included in the review were often not named, and consequently had to be deduced from the text. Understanding what is in the “black box” of implementation is necessary if the research–practice gap is to be closed. This requires authors to provide detailed descriptions of the implementation activities used in research projects.

The duration of the research projects described could be ascertained from most of the articles in this review. However, this was not often the case with regard to the intensity, frequency and style of facilitation given by the researcher leading to results. Therefore, it is not possible to obtain insight into, or draw conclusions about the relationship between the intensity, facilitation style and frequency of the strategies adopted and the outcomes. Such descriptions are vitally important for knowledge about implementation, whatever methodology is being used. If such information were given, it would be possible to draw conclusions about the manner, degree and frequency of nursing staff facilitation required for the successful introduction of changes to their (professional) practice. We therefore strongly recommend that researchers (regardless if they use action research) should include such parameters in their publications. Hulscher et al. (2003) have developed a process of evaluation framework that could aid researchers and facilitators to achieve this goal. Alongside the frequency of the intervention activities, the framework also pays attention to the features of the target group, the change agent and

of the information imparted. It would also seem logical to add “facilitation style” to this framework.

Classifying the various research projects using Hart and Bond’s (1995) conceptual framework was not an easy task. During the assessment of the action research projects, situations arose in which a project was assessed as meeting the criteria for one of Hart and Bond’s (1995) descriptors (e.g., problem focus criterion for experimental action research), while at the same time meeting another descriptor criterion (e.g., individuals in groups criterion for professionalising action research). After careful discussion the reviewers agreed that each action research project would be classified as the type for which most characteristics were met. Each characteristic was given the same weight, although this would be debatable. However, Hart and Bond (1995) have not expressed any opinion on this. A disadvantage of the method adopted for this paper is that it gives the impression that a classified action research project holds the same characteristics throughout the study whereas Hart and Bond (1995) suggest the type of action research may vary during the different cycles.

One of the difficulties in assessing the type of action research is caused by the fact that most authors give little information about the methodology they used. This may be caused by editorial limitations on the number of words allowed for an article text. This may also explain why some research projects (Dowswell et al. 1999; Forster et al. 1999; Cooper 2004; Cooper 2005; Waterman et al. 2005a, 2005b) were split into different articles.

As stated earlier, there are no generally accepted criteria for a critical appraisal of action research. This is clearly an undesirable situation, although some authors argue that the researcher/practitioner is the only important judge of quality (Rolfe 1996). It could also be debated whether or not universal criteria for action research could be developed, or whether it is necessary to define a specific set of criteria for each type of action research. Hope and Waterman (2003) present three avenues of thought on the relationship between validity and action research and remind us of a similar debate between validity and qualitative research.

EBP is the well-considered use of the best available evidence, from diverse sources, for patient care. Such decision-making processes, which are subject to the influence of many factors, take place in a nurse’s head. This implies that simply studying nurse behaviour (Thompson et al. 2007) is insufficient as an outcome measure, as this only reveals what the nurse is “doing” and not what he or she is “thinking,” i.e., why he or she chose to act in a certain way and which alternatives he or she had considered. Following Thompson et al. (2007) it is recommended that, in addition to nurse performance, additional classes of

outcomes should be adopted, such as the use of research literature, clinical expertise, patient values and the integration of these three in the decision-making process. Researching the decision-making process and the factors that influence this process would provide essential knowledge on how decisions are made. In addition, such an outcome measure would do justice to the essence of EBP; the well-considered use of the best available knowledge, from different sources, in patient care.

The conceptual framework of Plas and colleagues (2006) proved to be a user-friendly tool in the assessment of the different implementation strategies and target groups. The framework enabled the use of unambiguous terms; a fundamental condition for generating knowledge in the implementation arena. As stated earlier, the inter-rater reliability score for classifying implementation strategies using the conceptual framework was moderate (Cohen's kappa 0.52). This moderate score was mainly caused by the fact that implementation strategies were not mentioned in the articles and therefore had to be deduced from the text.

A disadvantage of the conceptual framework is that the strategy "meetings in small/large groups," which was the strategy most named, gives no indication of the type of interaction between participants during these meetings. We already know from the review by Thompson et al. (2007) that education is the most commonly used implementation strategy, and Bero et al. (1998) reported that interactive education is more effective than "traditional" didactic educational meetings. An improvement to the conceptual framework would be to refine "group meetings" by adding descriptions that would make clear how interactive the meetings are. However, it should also be noted that few authors offered insight into the type of interaction during group meetings.

By using Plas et al.'s (2006) conceptual framework, it became clear that very few interventions were aimed specifically at changing leadership and culture, even though these factors are obstacles to the implementation of EBP (e.g., McCormack et al. 2002). However, it could be argued that other frequently occurring interventions, such as changes to internal communication and personal contact could also contribute (indirectly) to altering culture. Various examples of the "culture" outcome measures support this. Such dynamics between several domains and strategies are not sufficiently visible in the framework.

It is not possible to draw conclusions on whether or not action research is more or less successful in implementing EBP compared to designs that are less cyclic and not based on partnerships between the researcher and those being investigated. What is evident to us is that a participatory approach leads to results that are less expected than with a non-participatory approach to implementation. Examples

of this are nurses feeling personally responsible for a developed guideline (Booth et al. 2007), expertise development because of knowledge sharing (Glasson et al. 2006; Booth et al. 2007) and teams feeling more responsible for the changes to care (Cooper 2005; Kennedy 2005; O'Neal & Manley 2007). These are examples of changes to the culture of the organisation where the implementation took place. These cultural changes were also found by O'Neal and Manley (2007) and Gerrish and Clayton (2004).

The participatory approach enables nurses to become empowered (Mitchell et al. 2005) and enthusiastic (Whitehead et al. 2004; Glasson et al. 2006), and tasks are extended to include that of coresearchers (Whitehead et al. 2004; Waterman et al. 2005b). These findings are important because they could help reduce the number of nurses (prematurely) leaving the profession due to experiencing a lack of challenge from their work and/or a lack of personal and professional development opportunities.

It is also apparent in some studies that a participatory approach also enables patient empowerment (Koch et al. 2000, 2001). Since, from a nursing perspective, it is important that patients maintain control over their lives and illness, more specifically for those with chronic disorders (Elderhuis et al. 2004), this result is also key.

The importance attached to the results of this review partially will depend on the intended purpose of, and the opinions held about, the implementation of EBP. If those implementing EBP see it as introducing specific guidelines or ways of working that were developed outside of the specific context, and that after the introduction that "business as usual" should continue, the additional effects described previously may appear superfluous. Such approaches to the implementation of EBP are more linear and top-down than action research. However, if the implementation of EBP is seen as involving a change in the prevailing context so that nurses feel responsible for their actions, reflect on their ways of working, collaboratively seek evidence-based alternatives and implement and evaluate these changes, then the additional beneficial effects described previously will be of importance. In the Anglo-Saxon literature, this way of working is also called "practice development" (McCormack et al. 2004). With such a goal in mind, action research seems an appropriate method for reducing the gap between research and practice by uniting these previously separate worlds.

References

- Atwal A. & Caldwell K. (2002). Do multidisciplinary integrated care pathways improve interprofessional collaboration? *Scandinavian Journal of Caring Sciences*, 16(4), 360–367.

- Bero L.A., Grilli R., Grimshaw J.M., Harvey E., Oxman A.D. & Thomson M.A. (1998). Getting research findings into practice: Closing the gap between research and practice. An overview of systematic reviews of interventions to promote the implementation of research findings. *British Medical Journal*, 317(7156), 465–468.
- Booth J., Tolson D., Hotchkiss R. & Schofield I. (2007). Using action research to construct national evidence-based nursing care guidance for gerontological nursing. *Journal of Clinical Nursing*, 16(5), 945–953.
- Cooper T. (2004). Delivering an infection control link nurse programme: Improving practice. *British Journal of Infection Control*, 5(6), 24–27.
- Cooper T. (2005). Delivering an infection control link nurse programme: An exploration of the experiences of the link nurses. *British Journal of Infection Control*, 6(1), 20–23.
- Corrigan P.W., Steiner L., McCracken S.G., Blaser B. & Barr M. (2001). Strategies for disseminating evidence-based practices to staff who treat people with serious mental illness. *Psychiatric Services*, 52(12), 1598–1606.
- Denis J.L., Hebert Y., Langley A., Lozeau D. & Trottier L.H. (2002). Explaining diffusion patterns for complex health care innovations. *Health Care Management Review*, 27(3), 60–73.
- Dopson S., FitzGerald L., Ferlie E., Gabbay J. & Locock L. (2002). No magic targets! Changing clinical practice to become more evidence based. *Health Care Management Review*, 27(3), 35–47.
- Dowswell G., Forster A., Young J., Sheard J., Wright P. & Bagley P. (1999). The development of a collaborative stroke training programme for nurses. *Journal of Clinical Nursing*, 8(6), 743–752.
- Drennan D. (1992). *Transforming company culture*. London: McGraw-Hill.
- Dufault M.A., Bielecki C., Collins E. & Willey C. (1995). Changing nurses' pain assessment practice: A collaborative research utilization approach. *Journal of Advanced Nursing*, 21(4), 634–645.
- Elderhuis R., Verkooijen H., Jansen G. & Tiesinga L. (2004). Empowerment van chronisch zieken. Een literatuurstudie. *Verpleegkunde*, 19(1), 32–42.
- Fleuren M.A.H., Wiefferink C.H. & Paulussen T.G.W.M. (2002). Belemmerende en bevorderende factoren bij de implementatie van zorgvernieuwingen in organisaties. Leiden, the Netherlands: TNO Preventie en Gezondheid.
- Forster A., Dowswell G., Young J., Sheard J., Wright P. & Bagley P. (1999). Effect of a physiotherapist-led training programme on attitudes of nurses caring for patients after stroke. *Clinical Rehabilitation*, 13(2), 113–122.
- Funk S.G., Champagne M.T., Wiese R.A. & Tornquist E.M. (1991a). Barriers to using research findings in practice: The clinician's perspective. *Applied Nursing Research*, 4(2), 90–95.
- Funk S.G., Champagne M.T., Wiese R.A. & Tornquist E.M. (1991b). Barriers: The barriers to research utilization scale. *Applied Nursing Research*, 4(1), 39–45.
- Gerrish K., Ashworth P., Lacey A., Bailey J., Cooke J., Kendall S. & McNeilly E. (2007). Factors influencing the development of evidence-based practice: A research tool. *Journal of Advanced Nursing*, 57(3), 328–338.
- Gerrish K. & Clayton J. (2004). Promoting evidence-based practice: An organizational approach. *Journal of Nursing Management*, 12(2), 114–123.
- Gerrish K., Clayton J., Nolan M., Parker K. & Morgan L. (1999). Promoting evidence-based practice: Managing change in the assessment of pressure damage risk. *Journal of Nursing Management*, 7(6), 355–362.
- Glasson J., Chang E., Chenoweth L., Hancock K., Hall T., Hill-Murray F. & Collier L. (2006). Evaluation of a model of nursing care for older patients using participatory action research in an acute medical ward. *Journal of Clinical Nursing*, 15(5), 588–598.
- Greenhalgh T., Robert G., Macfarlane F., Bate P. & Kyriakidou O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Quarterly*, 82(4), 581–629.
- Grol R. & Wensing M. (Eds.). (2001). *Implementatie. Effectieve verandering in de patiëntenzorg*. Maarssen, the Netherlands: Elsevier.
- Grol R. & Wensing M. (2006). *Implementatie. Effectieve verbetering van de patiëntenzorg*. Maarssen, the Netherlands: Elsevier.
- Halfens R. & van Linge R. (2003). Disseminatie en implementatie van kennis in de verpleegkundige en verzorgende praktijk. In *State of the art studie Verpleging en verzorging/Elsevier gezondheidszorg*. Utrecht, the Netherlands: Landelijke Expertisecentrum Verpleging & Verzorging.
- Hanberg A. & Brown S.C. (2006). Bridging the theory—practice gap with evidence-based practice. *Journal of Continuing Education in Nursing*, 37(6), 248–249.
- Hart E. & Bond M. (1995). *Action research for health and social care: A guide to practice*. Buckingham, UK: Open University Press.
- Hope K.W., Easby R. & Waterman H. (2004). Finding the person the disease has; the case for multisensory environments. *Journal of Psychiatric & Mental Health Nursing*, 11(5), 554–561.
- Hope K.W. & Waterman H.A. (2003). Praiseworthy pragmatism? Validity and action research. *Journal of Advanced Nursing*, 44(2), 120–127.

- Hulscher M.E., Laurant M.G. & Grol R.P. (2003). Process evaluation on quality improvement interventions. *Quality & Safety in Health Care*, 12(1), 40–46.
- Keady J., Williams S. & Hughes-Roberts J. (2005). Emancipatory practice development through life-story work: Changing care in a memory clinic in North Wales. *Practice Development in Health Care*, 4(4), 203–212.
- Kennedy M. (2005). Improving pressure ulcer prevention in a nursing home: Action research. *British Journal of Community Nursing*, 10(12), S6, 386–393.
- Kitson A., Harvey E. & McCormack B. (1998). Enabling the implementation of evidence based practice: A conceptual framework. *Quality in Health Care*, 7, 149–158.
- Koch T. & Kelly S. (1999). Identifying strategies for managing urinary incontinence with women who have multiple sclerosis. *Journal of Clinical Nursing*, 8(5), 550–559.
- Koch T., Kralik D., Eastwood S. & Schofield A. (2001). Breaking the silence: Women living with multiple sclerosis and urinary incontinence. *International Journal of Nursing Practice*, 7(1), 16–23.
- Koch T., Kralik D. & Kelly S. (2000). We just don't talk about it: Men living with urinary incontinence and multiple sclerosis. *International Journal of Nursing Practice*, 6(5), 253–260.
- Kralik D. & Koch T. (2005). Look, think and act: Facilitating learning with people who have mental illness. *Educational Action Research*, 13(3), 393–412.
- Landis J. & Koch G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33, 159–174.
- Loth C., Meijer M. & de Jong A. (2002). Een goed begin is het halve werk. Verslag van een actieonderzoek naar het verpleegkundig methodische werken in de GGZ. *Verpleegkunde*, 17(1), 4–12.
- Manley K. (2004). Transformational culture: A culture of effectiveness. In B. McCormack, K. Manley & R. Garbett (Eds.), *Practice development in nursing* (pp. 51–82). Oxford, UK: Blackwell.
- McCormack B., Kitson A., Harvey G., Rycroft-Malone J., Titchen A. & Seers K. (2002). Getting evidence into practice: The meaning of “context.” *Journal of Advanced Nursing*, 38(1), 94–104.
- McCormack B., Manley K. & Garbett R. (2004). *Practice development in nursing*. Oxford, UK: Blackwell.
- Mitchell A., Conlon A., Armstrong M. & Ryan A. (2005). Towards rehabilitative handling in caring for patients following stroke: A participatory action research project. *Journal of Clinical Nursing*, 14, 3–12.
- Mullhall A. (2002). Nursing research and nursing practice: An exploration of two different cultures. *Intensive & Critical Care Nursing*, 18(1), 48–55.
- Noffke S. & Somekh B. (2005). Action research. In B. Somekh & C. Lewin (Eds.), *Research methods in the social sciences* (pp. 89–96). London: Sage.
- O'Neal H. & Manley K. (2007). Action planning: Making change happen in clinical practice. *Nursing Standard*, 21(35), 35–39.
- Olsen L. & Wagner L. (2000). From vision to reality: How to actualize the vision of discharging patients from a hospital, with an increased focus on prevention. *International Nursing Review*, 47(3), 142–156.
- Plas M., Wensing M., Fleuren M., Friele R., Haaijer-Ruskamp F., Keijsers J., Lazinga N. & Ravensbergen J. (2006). Begrippenkader voor implementatiestrategieën en beïnvloedende factoren bij implementatie. In de gezondheidszorg. Nijmegen, the Netherlands: WOK, Centre for quality of care research.
- Rolfe G. (1996). Going to extremes: Action research, grounded practice and the theory-practice gap in nursing. *Journal of Advance Nursing*, 24(6), 1315–1320.
- Ross F., O'Tuathail C. & Stubberfield D. (2005). Towards multidisciplinary assessment of older people: Exploring the change process. *Journal of Clinical Nursing*, 14(4), 518–529.
- Rycroft-Malone J., Kitson A., Harvey G., McCormack B., Seers K., Titchen A. & Estabrooks C. (2002). Ingredients for change: Revisiting a conceptual framework. *Quality & Safety in Health Care*, 11(2), 174–180.
- Rycroft-Malone J., Seers K., Titchen A., Harvey G., Kitson A. & McCormack B. (2004). What counts as evidence in evidence-based practice? *Journal of Advanced Nursing*, 47(1), 81–90.
- Sackett D., Strauss S., Richardson W., Rosenberg W. & Haynes R. (2000). *Evidence-based medicine; How to practice and teach EBM*. Edinburgh, UK: Churchill Livingstone.
- Sanares D. & Heliker D. (2002). Implementation of an evidence-based nursing practice model: Disciplined clinical inquiry. *Journal for Nurses in Staff Development*, 18(5), 233–238.
- Simons J. & Macdonald L.M. (2006). Changing practice: Implementing validated paediatric pain assessment tools. *Journal of Child Health Care*, 10(2), 160–176.
- Thompson D., Estabrooks C., Scott-Findlay S., Moore K. & Wallin L. (2007). Interventions aimed at increasing research use in nursing: A systematic review. *Implementation Science*, 2(1), 1–16.
- van Linge R. (2005). Evidence-based implementeren in de GGZ; Lectorale rede implementatiemethodieken GGZ. *Verpleegkunde*, 20(3), 193–198.
- Waterman H., Harker R., MacDonald H., McLaughlan R. & Waterman C. (2005a). Advancing ophthalmic nursing

- practice through action research. *Journal of Advanced Nursing*, 52(3), 281–290.
- Waterman H., Harker R., MacDonald H., McLaughlan R. & Waterman C. (2005b). Evaluation of an action research project in ophthalmic nursing practice. *Journal of Advanced Nursing*, 52(4), 389–398.
- Waterman H., Tillen D., Dickson R. & de Koning K. (2001). Action research: A systematic review and guidance for assessment. *Health Technology Assessment*, 5(23), 1–157.
- Westert G. (2006). Variatie in prestatie. *De kwaliteit van de gezondheidszorg aan bod* (p. 24). Bilthoven, the Netherlands: RIVM.
- Whitehead D., Keast J., Montgomery V. & Hayman S. (2004). A preventative health education programme for osteoporosis. *Journal of Advanced Nursing*, 47(1), 15–24.