TECHNOLOGY ASSESSMENT IN NURSING

A Systematic Review of the Finnish and International Literature

Pirjo Partanen & Marja-Leena Perälä

FinOHTA Report No. 8
1998

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NATIONAL RESEARCH AND DEVELOPMENT
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PREFACE

The Finnish Office for Health Care Technology Assessment (FinOHTA) is working as a part of the National Research and Development Centre for Welfare and Health (STAKES).

The philosophy of the unit is to promote the national multidisciplinary health care technology assessment and to set up expert networks versed in technology assessment. The unit's second main task is to acquire assessment information and know-how from Finland and abroad, modifying these data to suit the local conditions and passing on this information to health care service users, operators and decision-makers.

FinOHTA does not engage in assessment through its own activities, but, rather, it has an encouraging, co-ordinating and supporting role in research operations. As regards information services and issues involving the co-ordination of assessment studies, FinOHTA collaborates with the international network of assessment units, INAHTA (The International Network of Agencies for Health Technology Assessment), and with its member organisations.

We wanted to chart the assessment situation also in nursing in order to form an impression of the issues studied and of the ways in which they have been researched. In addition, we hoped to hear experts' opinions of potential targets for prospective assessment studies.

We especially hope that this survey will spawn good assessment projects, whose results will reinforce the fundamental knowledge inherent in the methods used in nursing.

Furthermore, we hope that this report will inspire thoughts and ideas among the readers to enhance research on technology assessment in nursing. Such ideas will be gratefully received by the authors of this report and by FinOHTA.

Helsinki, 24 November 1997

Kalevi Lauslahti
Research Professor
Finnish Office for Health Care Technology Assessment (FinOHTA)
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PREFACE

CONTENTS

LIST OF TABLES

APPENDIX TABLES

APPENDICES

ABSTRACT

Pirjo Partanen & Marja-Leena Perälä. Technology assessment in nursing - A Systematic Review of the Finnish and International Literature

Professionals working in social and health care are accountable for developing their practice on up-to-date research. Technology assessment is a central means to evidence-based health care. The aims of this study were to clarify what technology assessment means in the context of nursing, and to identify and describe the research evaluating various methods (technologies) used in nursing. These kinds of investigations into nursing have previously been carried out in Sweden and Canada.

A systematic literature review was conducted of the Finnish and international research. Also evaluation studies on the methods used by multiprofessional teams in health care were regarded as relevant to this study. The Finnish studies (1980-1997) were sought for by hand searching theses (master's, licenciate's, and doctoral) in nursing and health care education, the proceedings of national nursing congresses, and a national scientific nursing journal. International research was identified through a search of electronic databases. Additional research was retrieved from citations in the reviewed publications. Primary international research was sought for years 1990-1997. Meta-analytical studies (meta-analyses, systematic reviews, and other literature reviews), synthezising the results of several primary studies, were identified back to year 1982.

Altogether 194 studies relevant to this review were identified: 46 meta-analytical studies, 31 national primary studies, and 117 international primary studies. Characteristics of the studies were identified and analyzed. The evaluated nursing methods were categorized into seven groups: patients' need evaluation; promotion and maintainance; prevention; therapy; rehabilitation; working patterns and process-related methods; and administrative support systems.

The meta-analytical research was conducted in the USA, in Canada, and in Britain. The international meta-analytical and the primary research was concerned most often with the therapeutic and rehabilitation methods used in the care of various adult, somatic patients. Meta-analytical Finnish research concerning the evaluation of nursing methods was missing. Most of the Finnish evaluation studies were concerned with methods, especially preventive methods, used in the care of adult hospitalized patients. Evaluation research concerning the methods used with children, patients' relatives, and in out-patient care was scarce. Methodological weaknesses of the studies often included a lack of randomization and of control groups, small sample sizes, and a lack of economic evaluation.

On the basis of this review it seems that in Finland evaluation research on nursing methods is scarce, but there exists international meta-analytical research, as well as primary studies evaluating the effects of nursing methods. People working in different nursing positions and fields need to take systematic action in order to strengthen the technology assessment research in nursing. Recommendations for future research activities and for the utilization of the existing research base in nursing will be presented in this report.

Key words: intervention, procedure, nursing method, meta-analysis, systematic literature review, technology assessment, evaluation research, effectiveness, nursing, health care

1 BACKGROUND AND PURPOSE OF THE STUDY

The discrepancy between the service need and available resources will presumably become more severe in Finnish health care. With the ageing population and the emergence of new diseases and treatments, the requirement that the activities be carried out in a proper and effective manner becomes highlighted. It has been shown in Finnish and international studies that many health care practices, such as the number of surgical operations, vary in terms of the region, hospital and individual physicians (Hermansson & Mäkelä 1996, Aro et al. 1995). In the field of nursing, the variation in nursing practices is also apparent since according to certain estimates (e.g. McCloskey & Bulecheck 1994, Bircumshaw 1991, Wilson-Barnett et al. 1991), a large proportion of the current methods and practices are based on tradition and an established way of doing things, which lack research base.

Health care technology assessment offers a central approach when aiming at research-based and appropriate practices. Health care technology assessment means the systematic and multidisciplinary evaluation of all the short and long-term effects of health care technology. The goal is to provide valid information to support decision-making for various health care operators, including service users. Assessment takes into account the effectiveness and costs of the interventions as well as social and ethical considerations. Evaluation is thought especially beneficial in methods and practices with substantial repercussions in terms of societal resources used. (Panelius et al. 1988, Goodman et al. 1996). Health care services are an extremely labour-intensive field. By the end of 1996, the professionally trained health care labour force in Finland was 214,000 strong. Of them, 165,477 (77%) were nursing personnel[1] (Vaalgamaa & Ohtonen 1997). The bulk of health care operating costs (some 70 %) consists of personnel expenses, of which more than a half (about 60%) are nursing staff salaries and wages. The quality of the activities depends heavily on professional skill and on the decisions made in the care situation. Therefore, the assessment of the practices and methods used by this group is important.

The purpose of this survey was to explore what technology assessment means in the context of nursing and to identify which methods used in nursing have been studied in Finnish and international research. Corresponding investigations were conducted in Sweden (SBU 1994) and Canada (Shamian & Chalmers 1996). This investigation is the first of its kind in Finland, and on the basis of it recommendations will be made for further activities to develop technology assessment in nursing research, education and clinical practice.

Since technology assessment in nursing is currently a new concept, the report will first discuss certain basic technology assessment terms, the development of technology assessment and methods used in it (Chapter 2). As for the Finnish and international literature review, and how it was carried out as well as the compilation, analysis and results of the material, these facts are described in Chapters 3 and 4. Finally, there is a

1 Nursing personnel here include the following professions: nurse, assistant nurse, practical nurse, child nurse, public health nurse, midwife, physiotherapist, mental health nurse, radiographer, dental assistant, medical laboratory technician, physiotherapy assistant and hospital and ambulance attendant. According to the labour administration report in July 1997, the number of nursing staff who were unemployed was 12,440. 7,000 resided abroad.

summary of the results with conclusions and recommendations for the various nursing fields in order to develop technology assessment further (Chapters 5 and 6).

The supervisory group for the review included Researcher Jari Metsämuuronen[2] (National Board of Education, SoTeKeKo Project), Senior Planner Taru Mikkola (STAKES), Administrative Director of Nursing Services Kaija Nojonen (Hospital District of Pirkanmaa, member of the scientific committee of health care technology assessment), Project Researcher Pirjo Partanen (STAKES), Senior Researcher Marja-Leena Perälä (Chairperson) (STAKES), Development Manager Virpi Semberg (Räisänen) (STAKES/FinOHTA) and Senior Nursing Adviser Marjukka Vallimies-Patomäki (Ministry of Social Affairs and Health).

2 TECHNOLOGY ASSESSMENT IN HEALTH CARE

2.1 Concepts

Health care technologies

By health care technologies one means all the preventive, diagnostic, treatment and rehabilitation methods and practices applied in health care. In addition to medicines, equipment and procedures, these include all the organisational and administrative support systems, within which the prevention, diagnostics, treatment and rehabilitation take place (Kankaanpää et al. 1986, Panelius et al. 1988). Figure 1 shows the expansion of the concept "technology" from a definition linked with equipment and medicines to the technologies used by various professional groups in health care, such as nursing personnel, and finally going beyond the health care sector to the provision of health, which is affected by society at large and by its health determining factors. It has been suggested (Liaropoulos 1997) that instead of health care technology one should speak about health technology, because after all the goal of the technologies is not to provide health services but health.

Nursing technologies[3]

Nursing technology is a term referring to the methods primarily used by nursing personnel with the purpose of helping persons to promote their health, to come to terms with their illness or with the resulting impediment and to help a person when death is imminent. Methods used vary according to the client's health, functional ability, situation and life span as well as the environment. Nursing affects individuals, families and communities. Nurses also use methods involving medication, medical equipment and procedures, for example when administering medicines, implementing respirator treatment, assisting in a

2 Jari Metsämuuronen also carried out part of the electronic database rertrieval for the literature review (Cinahl database retrieval).

3 There are various terms that are used when referring to nursing technologies, including: methods of practice, helping methods, nursing interventions, methods of intervention, nursing strategies, nursing therapeutics, treatments, caring interactions (Pelkonen 1994). In this review the terms method, intervention and technology are used synonymously.

surgical operation or attending a patient with a wound. The devices used in enabling the patient's functional ability are a part of nursing technology.

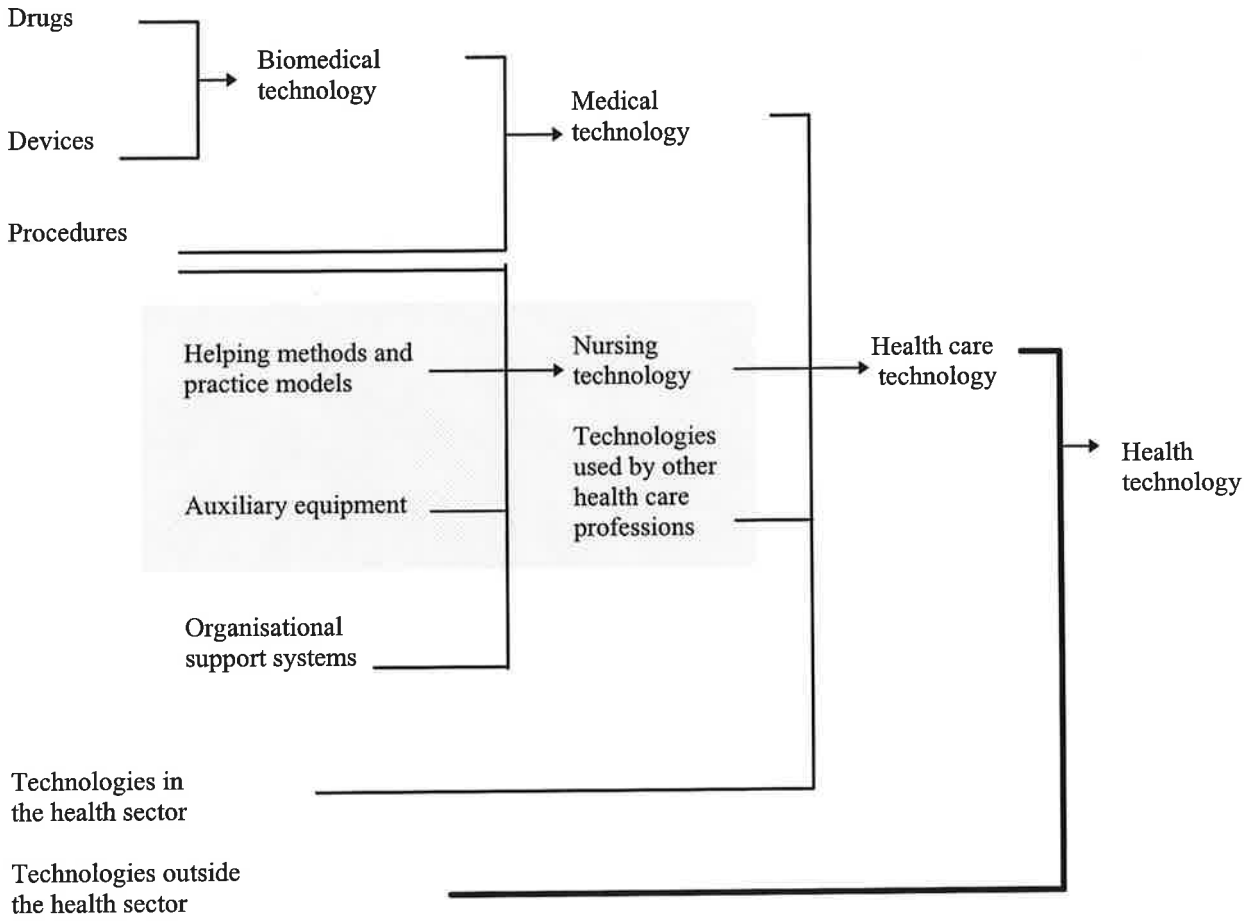

Fig. 1 Alternative definitions of health providing technologies (Modified: Liaropoulos 1997: 125-127)

Assessment of health care technologies

Health care technology assessment means the systematic evaluation of the properties and effects of health care technology. It may involve investigating either one or several of the following aspects of technologies (see e.g. Goodman et al. 1996):

- *Performance characteristics:* sensitivity, accuracy, reliability, the ease of use, expediency and maintenance.
- *Clinical safety:* evaluationing the acceptability of risk associated with using a technology in a particular situation.
- *Efficacy:* the benefit resulting from the use of a technology in addressing a problem under ideal conditions (if a technology fails in ideal conditions, it cannot be supposed to be viable in other conditions, either).
- *Effectiveness:* to what degree the desired effects are generally achieved in routine, general conditions. A technology whose efficacy has been proven in ideal conditions might still turn out deficient in terms of effectiveness.
- *Economic impacts:* a technology may have a wide range of microeconomic (e.g. various user's fees) and macroeconomic impacts. Cost-effectiveness, cost-utility and cost-benefit analyses compare resource requirements with the benefits of technologies. Macroeconomic impacts include e.g. the effects that technologies have on national health care costs, on the distribution of funds between various sectors, on the regulatory policies needed, on technological competitiveness and employment.
- *Social, legal, ethical and political impacts:* technologies such as genetic testing, infertility treatment, organ transplants and the life-support systems for the critically ill may challenge legal standards and socio-ethical norms. Allocating scarce resources to technologies that may be expensive and inequitably used raises broad societal concerns. (Goodman et al. 1996). The choices must be based on fairness, up-to-date methods, respect for the patient's autonomy, easy access to care as well as effectiveness, cost-effectiveness and the optimum use of services (Panelius et al. 1988).

Assessing the impacts of technologies described above takes place through systematic scientific research and analysis. The goal is to promote health services and health policies so that the health care objectives will be achieved as fully as possible. Assessment is multidisciplinary health care research, utilising theories and techniques in several scientific fields. Assessment activities, including both assessment research and dissemination of the assessment results, provide data to enhance decision-making at various levels in health care.

Evidence-based health care

Evidence-based health care entails the conscientious evaluation and judicious use of the currently best evidence not only in making decisions concerning an individual patient (evidence-based clinical practice) but also in decision-making regarding the care of patient groups or the whole population. Evidence-based clinical practice does not mean adherence to a set of instructions like one would follow a cooking recipe; instead, decision-making will also take into account the clinician's practical expertise as well as the patient's

preferences. Technology assessment produces information, which is a prerequisite for evidence-based health care. (Gray 1997, Sackett et al. 1997, Haynes et al. 1996, Teperi 1995).

2.2 Development of health care technology assessment

The development of technology assessment is considered to have started within the science and space committee of the House of Representatives in the United States Congress in 1965. One important result achieved by the committee was the law which secured the stable position of OTA (Office of Technology Assessment) as a body working for Congress. OTA has developed the field and pointed out its significance. (Menon & Marshall 1996, Banta 1995, Battista & Hodge 1995).

OTA was the first official technology assessment unit, but along with the USA also other countries started quite early operating in the field. Sweden was among the first to launch technology assessment in health care. For instance, at the beginning of the 1970s an assessment was made in Sweden regarding computed tomography equipment. The actual assessment unit in Sweden commenced its work in 1987.

In the 1980s, technologies were evaluated in e.g. Australia, Spain, the Netherlands, Canada and France. Units responsible for assessment were organised and national evaluation programmes were drawn up. As for the Nordic countries, Sweden, Denmark and Finland currently engage actively in technology assessment. Also some developing countries are starting technology evaluation. China's national centre is located in Shanghai, and in Latin America, Mexico, Brazil and Argentina have started developing their activities. There is also a lot of interest in Eastern and Central Europe and the Baltic states. (Banta 1995).

In Finland, technology assessment activities started to evolve in the 1980s. Having gone through certain stages (see Table 1), the health care technology assessment unit FinOHTA was established at STAKES at the beginning of 1995. The unit compiles assessment information in the country and from abroad, to be adapted to suit Finnish circumstances, if need be, and disseminates this information making it available to the health care field and the general public. FinOHTA promotes Finnish assessment research, promoting technology assessment know-how and the utilisation of the results in decision-making through information services and education, with the goal of enhancing the effectiveness of the Finnish health care services.

International co-operation in technology assessment is essential because of the rapid diffusion of information and in order for assessment practices to be uniform and to avoid unnecessary overlap in research (Menon & Marshall 1996). The emergence of modern communications technology, such as e-mail, the Internet and electronic databases, has greatly contributed to and boosted international co-operation during the past ten years. The umbrella organisation of publicly funded national assessment units is INAHTA, the International Network of Agencies for Health Technology Assessment, a member of which also FinOHTA is. Individual members in various fields may join the International Society of Technology Assessment in Health Care (ISTAHC). (Menon & Marshall 1996).

Table 1. The main phases of technology assessment in Finland (Modified: Konttinen 1995).

1986 The report by the working group of the Academy of Finland (Kankaanpää et al. 1986). Among other things, it supplied the definitions of medical technology.
1988 The second report by the Academy of Finland working group (Panelius et al. 1988). It recommended launching a development programme for assessment study, establishing a new interdisciplinary research tradition and organising the necessary training at institutes of higher education and research.
1992 The memorandum of the health care technology working group, appointed by the National Board of Medicine in 1990. The memorandum suggested that a technology unit be established in the National Agency for Welfare and Health (the predecessor of STAKES). In addition, a proposal was made concerning the establishment of a health care technology expert group representing various interest groups in national health care.
1995 The Finnish Office for Health Care Technology Assessment (FinOHTA) was founded at STAKES.

The Cochrane Collaboration means an international network of health care professionals and clients, with the purpose of acquiring information about the health care outcomes. Over two million new studies are published annually in the health care field. In order to control this flood of information, reviews of the literature are called for. Within the framework of the Cochrane Collaboration voluntary health care professionals compile and maintain an electronic database on systematic literature reviews. This co-operation is co-ordinated and supported by the Cochrane centres, currently 15 in all (1997). The first centre was founded in Oxford, where the databases are technically maintained and where the work done by review groups is beeing co-ordinated. The Nordic Cochrane centre commenced its activities in 1993 in Copenhagen. In addition to the Nordic countries, it serves the Baltic states, Poland, Russia, the Ukraine, Belorussia and Mongolia. The centre has established a network of key persons in all five Nordic countries. In Finland, the collaboration is co-ordinated by STAKES. The task of the Copenhagen centre is to assist in setting up review working groups and to give training and methodological support to persons working on the reviews. The centre co-ordinates the manual retrieval of national scientific journals so that studies missing from the databases could be found and registered. The Cochrane Library is the principal product of the Cochrane Collaboration. Electronically recorded on a CD-ROM or diskettes, it contains several specific databases as well as contact information for the Cochrane Collaboration (see Appendix 1). The information in the Cochrane Library is up-to-date: the Library is updated four times a year. (Fullerton-Smith 1995, Bero & Rennie 1995, Mäkelä 1995, 1994b, 1994c, Cullum 1994).

2.3 Technology assessment in nursing - current state

Technology assessment in nursing means a systematic investigation into the aspects and effects of all the helping methods and working patterns used in nursing (cf. Pillar et al.

1990). During the Crimean War, Florence Nightingale compared the mortality and morbidity figures between different hospitals, thus trying to examine the effectiveness of nursing. However, it was not until the 1960s in the USA, and even later in other countries, that an interest in the outcomes of nursing once again became apparent, first in order to improve the quality and subsequently in the 1980s and 1990s to effect cost saves. (Clark & Lang 1997). The difference between assessing quality and technologies lies in the fact that technology assessment is used to discover appropriate technologies, whereas quality evaluation tries to study the degree to which a given technology is used properly in various settings (Donabedian 1988).

The absence of a unified set of concepts makes it impossible to collect cumulative information about the effectiveness of nursing, not to mention that the lack of concepts hampers communication among the professional group and also conversing with other health care professionals and with the general public. It has been stated that the development of the nursing process documentation to cover the patient's problems (cf. nursing diagnoses), the nursing interventions to solve the problem and the outcomes, is a prerequisite for identifying the best interventions in a given situation. (McCloskey & Bulecheck 1994, Bulecheck & McCloskey 1992, Halttunen 1993).

Several development projects to unify terminology in nursing are underway both in the USA and Europe (Delaney et al. 1992). The International Classification for Nursing Practice (ICNP, 1996), drafted by the International Council of Nurses (ICN) combines existing classifications, rearranging their data. The classification is still unfinished and as such too broad and cumbersome. At the moment it categorises the patient's problems (nursing diagnoses) and interventions, but the classification of nursing outcomes is still under development (Clark & Lang 1997, ICN 1996).

While everybody in a team of professionals caring for the patient has the mutual goal of trying to promote the patient's health, it is important to evaluate the outcomes of the activities undertaken by each professional group. In the literature, the outcomes of nursing are suggested to be associated with e.g. physiological and psychological factors, behaviour, information, skills and expenses as well as with the duration of care and client satisfaction (Hamilton 1992). Outcomes are being achieved during the whole hospital period, they can be positive but also negative ones (complications, discontent, dependence). Developing nursing-specific outcome indicators is regarded as important for outcome evaluation (Clark & Lang 1997, Crawford et al. 1996, Ebener et al. 1996, Maas et al. 1996, Lush & Jones 1995, Bond & Thomas 1991).

Members of nursing personnel take part in the international co-operation of technology assessment, such as the review groups within the Cochrane Collaboration with multidisciplinary topics, e.g. the effects of breast-feeding, the impacts of intrapartum support or the rehabilitation of a stroke patient. A nursing network is planned for the Cochrane Collaboration to compile research data on nursing and to co-ordinate projects associated with nursing. (Varonen & Mikkola 1996). Randomised controlled trials form the basis of systematic literature reviews in the Cochrane Collaboration. The project by Cullum (1997) currently in progress will find out the scope of these studies on nursing methods. Studies are retrieved through the MEDLINE search and by manual search from research journals on nursing. So far, the search has resulted in 522 randomised trials and 20 systematic literature reviews regarding the effectiveness of nursing in 1988 - 1994. The

research articles found will be added to the register of randomised controlled studies (CCTR) in the Cochrane database, to be used in compiling systematic literature reviews in nursing.

Members of nursing personnel are in a position to participate in the annual meetings and conferences held by international co-operative organisations (ISTAHC, the Cochrane Collaboration). In addition, one has started to organise conferences on technology assessment in the field. For example, the first international conference on evidence-based nursing was held in the autumn of 1997 in Great Britain. The utilisation of research findings and technology assessment will be among the topics in the European nursing researchers' conference to be held in Finland, summer 1998.

To make the most of research data, many new scientific journals have emerged, applying strict criteria when selecting the best articles from other scientific journals. A structured abstract is made for each study, effectively conveying the substance and significance of each particular piece of research. These "new-wave" journals in medicine include ACP Journal Club and Evidence-Based Medicine. Having started in autumn 1997, the journal on nursing studies called Evidence-Based Nursing will be published quarterly. The journal will provide critically appraised research information in a condensed form about the impacts of nursing interventions for various decision-making situations. New means of data management, such as information networks and systematic data compilation with attendant methods, should be made available to health care units, so that currently the best knowledge will reach the persons making daily decisions among patients (Gray et al. 1997, Haynes et al. 1997).

2.4 Methods of assessing technologies

The steps of the assessment process are given in Figure 2. Assessment may be targeted at various technologies that either are in use or meant to be implemented. (Panelius et al. 1988). The exact specification and narrowing down of an assessment topic are among the most crucial aspects of the process. The narrowing down may take place on many criteria, the most important of which are the following: a health problem, target population, intervention and health outcome. The criteria for the selection of the subject matter should be presented openly. The criteria might be e.g.: high burden of morbidity or mortality, large number of patients affected, high costs, scientific/professional or general controversy, the need to make a decision on procurement, high potential to improve health outcomes or to reduce health risks, substantial variation in practice, availability of sufficient research findings to perform the assessment. (Goodman et al. 1996, Mäkelä et al. 1996).

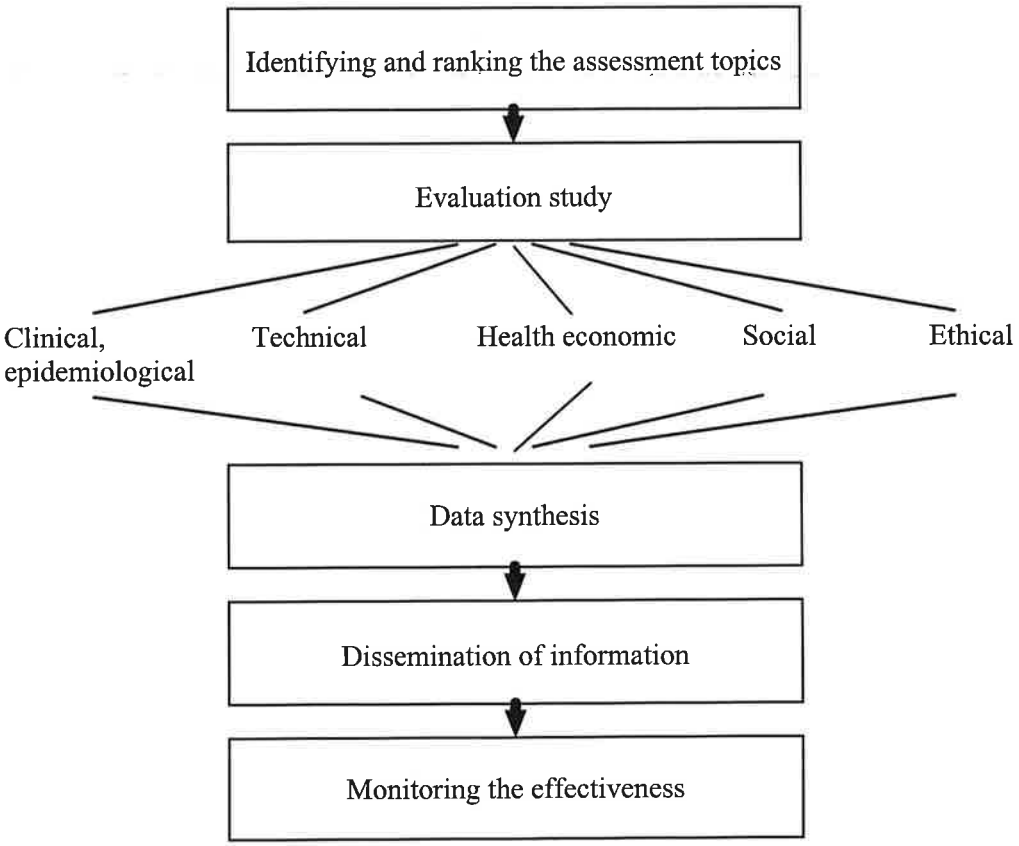

Figure 2. The steps of the health care technology assessment process (Modified: Panelius et al. 1988, FinOHTA 1997).

Assessment can be carried out by compiling existing information, or, in the absence of the necessary data, by conducting new primary research. For the purpose of producing new information in medical technology assessment the focus is on randomised studies. Randomisation means that the persons who may benefit from the intervention under investigation are randomly divided into two groups, one of which receives the treatment. The latter persons form the control group, receiving ordinary treatment or placebo. (Gray 1997). Because it is not always possible to carry out randomised studies, other research

methods are needed, as well. Research methods[4] used in medicine, resulting in new information are the following (Goodman 1993, Goodman et al. 1996):

- Large randomised controlled trial
- Small randomised controlled trial
- Nonrandomised trial with a control group,
  - contemporaneous / historical control group
- Cohort study
- Case-control study
- Cross-sectional study
- Surveillance
- Series of consecutive cases
- Single case study

The above-mentioned study approaches are given in the order of their scientific strength in terms of inherent validity. The inherent validity indicates the precision with which a connection between the intervention and the outcome may be established. The assessment of nursing interventions by using randomised research approaches is often problematic. The choice of the method used in evaluation depends on the purpose of the assessment and on the intervention evaluated. Measuring the effects of methods based on interaction (giving support or comfort to the patient, encouraging hope) presents different challenges to the choice of research methods than the measurement of technically oriented approaches (tending a wound, monitoring vital functions, handling medicines, counselling and education for patients). (Bonair 1994). Nursing has a rich tradition in using qualitative research. Also in the domain of technology assessment there is an increasing interest towards qualitative research. Quantitative approaches cannot answer all the questions, or they lead to wrong answers to important questions (Greenhalg & Taylor 1997). In most cases, the role of qualitative research in conjunction with technology assessment has been suggested to be one complementing its quantitative counterpart, e.g. in taking into account both the viewpoints of patients or care providers and the meaning attached by them to certain issues. (e.g. Gray 1997, Pillar et al. 1990, cf. Sandelowsky 1996).

There are several methods to synthetise the results of primary studies, such as meta-analysis, decision analysis, economic estimate, group estimate or consensus statements. By meta-analysis one means the systematic examination and synthesis of the results in primary studies for the purpose of drawing valid conclusions (Mäkelä 1994a, Moody 1990, Lynn 1989, Smith 1988, Curlette & Silva Cannella 1985, Burns and Grove 1987). Meta-analysis may be considered to mean only the statistical analysis of individual studies (Goodman et al. 1996). Meta-analysis was originally devised for the synthesis of actual experimental studies (Lynn 1989). In the literature on nursing it was introduced for the first time in 1982, whereupon it has been used in the synthesis of intervention studies on nursing (Smith & Stullenbarger 1991). There has been some discussion about the problems and feasibility of meta-analysis in making syntheses in nursing research (Lynn

4 This publication does not incorporate a description of these research methods. For further information, please refer to the literature on epidemiological research (e.g. Fletcher et al. 1988, Hernberg 1987, Sackett et al. 1997, Streiner & Norman 1996).

1989). On the other hand, one has started to use meta-analysis also in the synthesis of qualitative, descriptive research, and a specific approach has been designed for this purpose. (e.g. Smith & Stullenbarger 1991).

Systematic literature reviews have the aim of assembling the existing scientific data on the prevention, diagnostics, treatment and costs of a specific health problem. Being systematic is the key issue at all stages of the research process, e.g. in the compilation of primary studies, in the delineation of the criteria for including or excluding material, in the evaluation of the quality of the studies and in the synthesis of the results, either by means of statistical methods or qualitative synthesis. (Mulrow & Oxman 1996, Mäkelä et al. 1996, Fullerton-Smith 1995, Goodman 1993).

The goal of disseminating information is to influence decision-making at various levels. The information brought about by the assessment process should also be systematically diffused, starting from identifying the target group and the mechanisms to reach these people. In addition, the follow-up on the impacts of the assessment outcomes is a part of the evaluation process, and therefore a plan to implement it should be incorporated in the assessment plan. The technologies under observation and the evaluations concerning these technologies may have both preplanned and unexpected consequences (Goodman et al. 1996):

- Adoption or acquisition of a new technology.
- Reduction or discontinuation in the use of a technology.
- Change in the practice or behaviour of a clinician.
- Change in the way services are arranged in an organisation.
- Change in targeting health care resources nationally and regionally.
- Change in regulatory policy.
- Change in the marketing of a technology.

3 SYSTEMATIC REVIEW OF THE LITERATURE

3.1 Selection criteria for the studies

For the selection of Finnish and international primary studies and meta-analytical studies[5] (meta-analyses, systematic reviews of the literature, other literature reviews), four criteria were applied:

- **Type of intervention:** All helping methods and working patterns used in nursing, including support and administrative practices, also those methods applied multiprofessionally.
- **Participants:** Patients, clients, relatives and significant others, nursing personnel, multiprofessional teams, excluding students and teachers.
- **Outcomes:** All outcomes showing the effects of an intervention.

5 Meta-analytical study here means various types of reviews, which, based on the criteria, were included in this review. By choosing this term we wanted to avoid confusion brought about by the use of several terms for "review" in this publication.

- **Study designs:** An intervention has been evaluated experimentally or quasi-experimentally, e.g. by using an intervention study approach. Also research in progress was included.

Intervention refers to the intentional alteration of circumstances (Hernberg 1987, Abraham et al. 1995). Testing an intervention means the measurement of the effects of an altered situation resulting from intentional measures or other reasons in the experiment group. Intervention study differs from a true experimental research approach: one usually cannot use randomising, and thus it is quasi-experimental in nature (Hernberg 1987). Intervention studies use pre/post-test type of comparisons among the experiment group and comparisons with a control group. Also designs involving action research have often incorporated comparative evaluation of the feasibility and outcomes of a model or intervention tested in practice. Action research meeting the above criteria were also included in this review.

All primary and meta-analytical studies consistent with the inclusion criteria qualified for the review, regardless of their quality. Usually, assessing the quality of primary studies is a relevant and important phase of a systematic literature review (e.g. Mulrow & Oxman 1996). This review however aimed at making a broad-scale inquiry, and that is why - due to shortage of time and of research personnel - a detailed appraisal of the quality of studies was deemed impossible.

The Finnish studies were restricted to theses and dissertations, conducted mainly in the university departments of nursing science. As for international studies, not only studies in nursing but also the ones evaluating the methods used in nursing or in multiprofessional use were retrieved, irrespective of the researchers' professional background.

3.2 Search for the studies

Studies were retrieved both from electronic databases and by searching manually. By going through theses and conference papers manually we aimed at good coverage and at minimising publication bias.[6]

The international primary and meta-analytical studies in this review were retrieved from the following electronic databases (Appendix 1): CINAHL (1990 - 1997/Feb), MEDLINE (1990 - 1997/Jan), ArbSpriSwe (1990 - 1997/Jan), Sociofile (1990 - 1997/Jan) and the COCHRANE Library databases CDSR, DARE, CCTR (1994 - 1997/Feb). The dates in brackets indicate the time period applied to the search. The dates were restricted to begin from 1990, because preliminary search proved that the number of studies exceeded our resources and because it appeared that the dates from 1990 onwards most effectively yielded material meeting the criteria. The necessicity of narrowing the material

6 Publication bias means a distortion in the degree of representativeness in the literature, which is not attributable to shortcomings in the scientific validity of the articles but to reasons of publication. It has been noted that a study showing an intervention to have positive effects is more likely to be published than one showing ineffectiveness. A way of avoiding publication bias is to look efficiently for unpublished studies (such as theses and conference papers) and to ask experts in the field for unpublished studies. (Mäkelä et al. 1996, Mulrow & Oxman 1996).

down became evident when it transpired that in a meta-analysis of nursing intervention (Heater et al. 1988) 84 articles in all were used from the period 1977 - 1984. Thus, we did not see it possible to go through all primary studies meeting the criteria in this review. Nevertheless, meta-analytical studies were retrieved without a time limit.

Search terms were taken from the known articles relevant to this review. The search terms included: nursing, intervention/method, evaluation, effect/ outcome, meta-analysis/review. In test runs, also terms "technology" and "assessment" were used but they did not yield articles relevant to this review. The COCHRANE databases were checked by using the term "nursing", and the studies consistent with the criteria were selected. Librarians were consulted when necessary. The majority of the studies meeting the criteria were found in the CINAHL, MEDLINE and COCHRANE databases, but also the ArbSpriSwe and Sociofile databases, which were scanned, resulted in studies consistent with the criteria. In addition, material was looked for manually: the lists of references in the articles retrieved from electronic databases were checked, and the studies which met the criteria were included in the material of this review.

Finnish studies were searched from thesis abstract publications, from the proceedings of the four national conferences on nursing held in Finland, from The Finnish Yearbook of Nursing (Sairaanhoidon vuosikirja, SHVK) and issues of The Journal of Nursing Science (Hoitotiede). An attempt to include work in progress was made through letters (Appendix 2) sent to heads of nursing science departments at five universities (universities of Kuopio, Oulu, Tampere and Turku, and Åbo Akademi University; in the case of Kuopio, a letter was also sent to the Department of Health Policy and Management), requesting to report the abstracts of research done in 1996 - 1997 and of the studies in progress, corresponding to the criteria.

The Yearbook of Nursing (SHVK) was checked from 1980 - 1988 and issues of the Journal of Nursing Science from 1990 - 1997/Feb. The abstract publications of the Finnish conferences on nursing, held in Kuopio (Hentinen et al. 1990), Oulu (Hentinen et al. 1992), Tampere (Åstedt-Kurki et al. 1994) and Turku (Salanterä 1996), were also checked by hand. In addition, some relevant articles having come up through informal communication were included.

The total number of articles and abstracts checked was several thousand. Some 2,000 Finnish studies were examined, 1,200 of which were theses or dissertations. The amount of foreign research was several thousand. Articles were selected by comparing the studies with the established criteria. A part of the studies were singled out during data retrieval on the basis of study title or, when necessary, reading the abstract. If the choice to include or reject an article was impossible to make based on the abstract, the whole article was checked.

Eventually, 194 studies in all were chosen, with the following distribution:

Meta-analytical studies	46
Finnish primary studies	31
International primary studies	117

3.3 Analysis of the material

In order to describe the content of the studies, a classification framework was established on the basis of the literature and the content of the studies (see Appendix Table 3, explanation of the classifications). The classification framework was used in classifying all international primary studies, and to a degree this was feasible in the classification of meta-analytical studies and Finnish primary studies. The following is a description of the classification framework that was established.

Publication type here means an article or abstract used. The majority of the international studies selected were retrieved through electronic data search. This usually made the abstracts available. The whole article was requested only if the abstract failed to give the necessary information. Research articles were also ordered on the basis of manual search. The abstracts were satisfactorily informative in almost two-thirds of the studies found through electronic databases.

Target group refers to the group on which the study was focused: the persons whose treatment was investigated. The personnel were classified as a target group only if the study was not focused on patients, the population or relatives. The *methodological approach* of a study was roughly classified depending on whether the study used a randomised research design, whether a control group was used, at what phases the measurements were carried out (before-after intervention), and what was the number of participants (the total number of subjects in experiment and control groups). The *setting* refers to the relationship of the subjects with service use, i.e. whether the clients used hospital or outpatient services, or both, or whether they were recipients of long-term care.

The classification framework for *outcome areas* describes the issues reported as outcomes in a study. The outcome areas were formed by combining the traditional outcome areas (associated with illness, health, costs) with the assessment areas seen mainly as affected by nursing personnel, which the literature (Crawford et al. 1996, Lush & Jones 1995) considers to be the outcomes associated with the patient's functional ability, knowledge, participation and psychosocial wellbeing. In addition, on the basis of the substance of the studies two new classes were established to categorise the issues reported as outcomes in the studies, having to do with the activities, knowledge and attitudes of personnel. Appendix 3 gives the contents of the categories in more detail.

Nursing methods were modifying according to the classification by Raatikainen (1986). The categories of nursing methods are the following: (1) methods for assessing the patient needs, (2) methods of promotion and maintenance, (3) preventive methods, (4) therapeutic methods, (5) rehabilitative methods, (6) working patterns and other process-related methods and (7) administrative support systems. As the term implies, *the methods assessing patient needs* mean that a nurse applies various methods to observe the phenomena, person or setting relevant to nursing, in order to assess the need for care. *Promotion and maintenance* involve activities which aim at helping people in various situations by securing and reinforcing e.g. the person's physical, psychological and social ability to function and to cope with daily activities, enhancing his or her sense of wellbeing, personal development and human relations. *Preventive methods* refer to methods trying to prevent physical or psychological instability, the risk or undesirable effects of diseases, deterioration of social performance and imbalances of interaction.

Therapeutic methods involve actions with the goal of curing or alleviating physical illness, psychological distress and social powerlessness. *Rehabilitative methods* aim at restoring functional ability weakened due to a disease or injury and at bolstering the confidence of a person with a handicap, promoting participation in daily activities and social life. In addition to the activities considered belonging to traditional rehabilitation, this category includes hospital discharge and continuing care as well as informing about these issues. The category *working patterns and other process-related methods* in this connection means the ideological and practical working models in nursing that cannot be exclusively associated with any of the above-mentioned categories. *Administrative support systems* signify the interventions having to do with working conditions, personnel and the setting.

The international primary studies (see Appendix Table 3) were mainly classified by two persons: a researcher (Master of Health Care) and a trainee (Student of Health Care). The uniformity of the classifications was ensured at first by making three classifications jointly, going through the substance of the classes under the supervision of the researcher. The consistency of the classifications (e.g. Burns & Grove 1987:292-293) was tested by selecting five studies at random (three articles and two abstracts), which were subsequently classified by the researcher and two aides independently. The proportion of uniform classifications was 94% of all possible ways of classification. While working on the classification, the persons undertaking the task negotiated with the researcher to reach consensus, when necessary. The persons in charge of classification wrote the outcome areas as open texts, whereupon the researcher classified them according to the established classification. Also the nursing methods were classified by the researcher, and classifications open to interpretation were negotiated with the supervising senior researcher.

To describe the studies, the meta-analytical studies and Finnish primary studies were compiled in a table (see Appendix Tables 1 and 2). The Results section describes the data collected into the tables by using the classification framework.

4 RESULTS

4.1 Meta-analytical studies

In the searches conducted, 46 meta-analytical studies on methods used in nursing (also by other professions) were identified (Appendix Table 1). Over half (n=25) were meta-analyses. The number of systematic literature reviews was 12, while the remaining 9 came under the heading of review (review, narrative review, integrative review, literature review).

With the exception of one study (Mari & Streiner 1996, Brazil), the meta-analytical studies originated in three countries: the USA (n=26), Great Britain (n=12) and Canada (n=7). The meta-analytical studies consisted of several primary studies, which also came from the above countries (insofar as this information was given, n=10). Table 2 gives the

distribution in terms of number of primary studies involved in the meta-analytical studies. Among the meta-analytical studies the average number of primary studies was 40. Large-scale reviews, consisting of over a hundred primary studies, were 7 in this review.

Table 2. Number of primary studies in meta-analytical studies (n=46).

Number of primary studies per meta-analytical study	Meta-analytical studies
Under 10	6
11-20	11
21-30	7
31-40	6
41-50	3
51-100	6
Over 100	7
Total	46

The division of *nursing methods* into various categories, analysed in meta-analytical studies, is shown in Table 3. Most meta-analytical studies dealt with *therapeutic methods*. The American researcher Devine with her colleagues have since the 1980s studied the effects of psychoeducational care among various patient groups (Devine 1986, 1996, 1997, Devine & Cook 1983, Devine & Refschneider 1995, Devine & Westlake 1995). According to these studies, the patient's wellbeing, stress and pain experienced can be considerably influenced by systematically giving information to the patient about health and the disease, by educating in self-care and by supporting and encouraging the patient psychologically in many different ways. This also affected the convalescence and expenses as the hospital period became shorter.

While these studies involved several educational methods and psychosocial support, they generally failed to show which method was superior to others. Also Hathaway (1986) showed the effects of patient education in her meta-analysis. The study found that of the patients having received education prior to the surgery 67% showed postoperative results that were 20% better than with patients who had not been counselled. The use of psychosocial methods has been stated to reduce blood pressure among cardiac patients and decrease the lipid level of blood, thus resulting in decreased mortality (Linden et al. 1996).

In terms of size, the next category is *rehabilitative* methods, with the purpose of enhancing recovery and arranging post-discharge care. The meta-analysis by Evans et al. (1997) compared the impacts of multiprofessional rehabilitation programmes with ordinary rehabilitation based on medical care in the treatment of stroke and geriatric patients. The rehabilitation programmes were found to enhance considerably short-term survival and functional performance. Rehabilitation programmes decrease the likelihood of readmissions during the following year. The researchers stressed the importance of continuing rehabilitation after discharge.

Table 3. Number of meta-analytical studies by method category investigated in meta-analytical studies (n=46).

Method category and the reference number of the study[7]	Number of meta-analytical studies
Patient need assessment	1
• Pain assessment measurement (46)	
Promotion and maintenance	6
• Methods promoting communication between patient and care provider (1)	
• Impact of care practices of a hospital on the duration of breast-feeding (3)	
• Methods aiming at promoting the mental health of the elderly (8)	
• Methods enhancing ability to cope (22)	
• Methods enhancing cardiac patients' quality of life (24)	
• Early skin contact and breast-feeding (34)	
Preventive methods	4
• Prevention and treatment of pressure sores (10, 39)	
• Prevention programme for back injury (23)	
• Methods preventing falls among the elderly (31)	
• Home visits after childbirth to prevent child battering (35)	
Therapeutic methods	15
• Psychoeducational care among adult surgical patients (11, 12), patients with asthma (13), patients with hypertension (14), patients with cancer (15), patients with arthritis (18)	
• Preoperative instructing (17)	
• Methods aiming at weight loss (6)	
• Methods of controlling pain among children (7)	
• Support received from care providers during childbirth (21)	
• Methods aiming at cessation of smoking (36)	
• Methods alleviating the symptoms of cancer patients (38)	
• Active care during childbirth (43)	
• Dietary intervention in gestational diabetes (45)	
Rehabilitative methods	12
• Methods promoting self-management among children with asthma (2)	
• Educational methods among diabetics (4)	
• Multiprofessional rehabilitation at hospital (16)	
• Stimulation techniques among preterm infants (25)	
• Respiratory rehabilitation of COPD patients (26)	
• Psychological methods in the rehabilitation of cardiac patients (27, 30)	
• Psychosocial, family-centred methods in community settings among patients with schizophrenia (28)	
• Rehabilitation programmes in recovery from stroke (32)	
• Early discharge (24 h) after childbirth (33)	
• Impact of physical exercise on the quality of life among cancer patients (37)	
• Informing the mother about the child's development (44)	
Working patterns and other process-related methods	8
• Comparison of the care given by various care providers (physician, nurse, midwife) (5)	
• Home visits by public health nurses (9)	
• Research-based nursing pracice (19)	
• Effectiveness of different types of nursing interventions (41)	
• Primary nursing (42)	
• Alternative birth setting (20)	
• Specialised stroke units (40)	
• Case management in the treatment of severaly mentally ill people (29)	
Administrative support systems	-
Total	46

7 Reference numbers are given in Appendix Table 1.

A few meta-analytical studies evaluated *methods promoting functional ability and maintenance*. They assessed the effects of hospital practices on the duration of breast-feeding (Bernard-Bonnin et al. 1989) and on the development of mother-infant relationship (Renfrew & Lang 1996). Early contact between the mother and infant and the support given by nursing personnel, involving subsequent contact by phone after discharge, were found to prolong breast-feeding. Both these meta-analyses underline the fact that hospital care practices should not cause delay in beginning breast-feeding nor should its duration be restricted.

There were also some studies on *preventive methods*, evaluating e.g. the effectiveness of certain methods in the prevention of pressure sores among patients at risk (Cullum et al. 1995). This meta-analysis did not recommend any special method but rather stated that patients at risk should be given a mattress alleviating pressure instead of a standard hospital mattress. The review of the literature on the methods of preventing elderly persons' risk of falling (Oakley et al. 1996) states that balancing, low-impact aerobics and muscle strengthening may reduce the rate of falls among the elderly. Elderly persons' injuries due to falling can be diminished also through home visits, during which the home environment is evaluated and the necessary suggestions for improvement are made. Protective hip padding worn in institutional care may offer good protection for those at high risk.

Only one meta-analysis dealt with *methods assessing patient needs*, discussing the measurement used in evaluating pain (Wilkie et al. 1997/1990). It assessed the use of the McGill questionnaire in seven different situations involving adult persons suffering from acute pain, such as postsurgical discomfort, or from chronic pain, such as backache. The meta-analysis consisted of 51 primary studies, with usually discretionary samples. In none of the seven different situations involving pain did the questionnaire scores exceed 50% of the maximum pain score. Because of shortcomings in the reporting of the primary studies and due to the restrictions inherent in meta-analysis the Cochrane review referees suggest that this meta-analysis be treated with certain reservations.

A heterogenous group of meta-analytical studies were classified under the heading of *working patterns and other process-related methods*. One study discussed the care activities by nursing personnel (nurse practitioners and midwives) and physicians in relation to certain patient groups (Brown & Grimes 1995). The study compared the care given by nurse practitioners and physicians in certain situations: in minor acute cases or in stable chronic situations among patients with internal diseases and among children. According to the study, patients were more satisfied with the care given by nurse practitioners than with that of physicians. Patients' compliance was also higher, and the results in the treatment of pathological conditions were better when a nurse provided care. Another observation was that in the intrapartum care of obstetric patients the midwives used less technological aids and analgesics than the physicians did, with the results being equivalent.

Thomas and Bond investigated the effectiveness of nursing interventions in general (1995) and particularly the effects of primary nursing (1991) among different types of patients. Although there are many studies on the outcomes of primary nursing, it still remains unclear whether primary nursing leads to better results from the standpoint of patients and personnel, and if this were the case, under which circumstances do the better

results occur. In terms of client satisfaction, there is no difference between primary or other types of nursing. According to Thomas and Bond, the reason for this might be the fact that the studies have not employed sufficiently precise indicators for the changes (due to the absence of such indicators). Meta-analytical studies that could be categorised as *administrative support systems* were not identified.

In the meta-analytical studies, the *target group* almost solely consisted of patients; in two studies the relatives were clearly included along with patients, and in one study the target was nursing personnel. When looking at patients by *age group* one sees that the meta-analytical studies (66%, n=31) were most often targeted at adults. Two meta-analytical studies concentrated on children, while three discussed the elderly. In almost a quarter (23%, n=11) of the meta-analytical studies patient age was not specified.

In terms of *diagnosis*, the primary studies of the meta-analytical investigations discussed various types of patient groups. There were five studies on the methods used in the treatment of surgical patients, and the same applies to the methods employed among patients with internal diseases. Five studies were targeted at pregnant or parturient women, and another five dealt with mothers and their newborn infants. There were two meta-analytical studies in the field of psychiatry, and three discussed cancer.

When looking at the number of participants (subjects) per one meta-analytical study, it transpires that roughly a half (49%, n=24) did not specify the number of subjects in the meta-analytical study (Table 4). Of the meta-analytical studies 13 consisted solely of randomised controlled trials. In the majority of the meta-analytical studies (85%, n=39) the primary studies were either experimental or quasi-experimental.

Table 4. Total number of participants (subjects) in meta-analytical studies (n=46) per one meta-analytical study.

Total number of subjects	Number of meta-analytical studies
Under 500	3
501 - 2,000	5
2,001 - 3,000	1
3,001 - 5,000	6
Over 5,000	7
No information	24
Total	46

4.2 Finnish primary studies

The search yielded 31 Finnish primary studies meeting the criteria (Appendix Table 2). A study counted as one study even if it had been published in many forms, such as thesis, conference paper, article or some other publication. In addition, if a certain research project had resulted in several theses, they all counted here as one study. Given the scope of the search, it is obvious that some studies meeting the criteria might have been left out.

The proportion of studies evaluating methods used in nursing is small (2%, n=26) of all theses and dissertations (n=1,236) in the degree programmes of health care at universities, being 1.3% of Master's theses (n=14), 5.8% of Licentiate's theses (n=5) and 18% of PhD dissertations (n=7).

In *The Yearbook of Nursing* 1980 - 1988, four articles were found consistent with the criteria (years 1981, 1983 - 1984, 1986 and 1987) and which were based on theses. In the issues of *The Journal of Nursing Science* (1990 - 1997/Feb) two articles matching the criteria of this review were found. The proceedings of *four Finnish nursing conferences* yielded nine articles consistent with the criteria.

Table 5 shows the distribution by technology category of the Finnish studies evaluating methods used in nursing. The studies were quite evenly distributed between variousmethods, the only exception being studies on patient needs assessment, not found identified at all. The majority of the studies belonged to the category of prevention (29%, n=9).

The following gives examples of studies in different categories. Of *preventive methods*, the most frequently addressed topic was preoperative education (Hassinen & Vara 1986, Lepist` et al. 1994 and Vuorenheimo 1994). Adolescents formed the target group in two studies: the impacts of group dental health education on schoolchildren's oral health (Gynther 1991) and the feasibility and effects of a health education programme preventing the use of intoxicants (Tossavainen 1993).

Among the studies assessing *therapeutic methods* one examined the care development programme for patients recovering from myocardial infarction (Hentinen 1982, 1984). The study emphasised that in the care of patients with myocardial infarction, attention should be paid to both physical and psychological factors. During the programme, education given to patients became more individual, and the amount of information received by the clients increased. The patients started to exercise more and decreased their intake of butter. Rehabilitative methods were associated with the work practice of an occupational nurse, based on the theory of self-care (Komulainen 1990), instruction of preoperative physiotherapy (Herve & Nykänen 1985, 1986), group physiotherapy (Rusi 1991) and the rehabilitation of myocardial infarction patients (Fridlund 1990).

Research on primary nursing (Airaksinen & Vuorela 1983, Munnukka 1993, Perälä 1986, 1989 and Myöhänen 1985) *was included among working patterns and other process-related methods*. The study by Perälä et al. (1996, 1997) dealing with the changes in the personnel structure were included under the heading of administrative methods. Also the impacts of certain *administrative methods* were evaluated: the ADP-based information system MAMA (Hyvärinen & Kivekäs 1994, Kivekäs, Hyvärinen & Kinnunen 1996), supervision (Paunonen 1989) and integrating the health care and social services (Sinkkonen 1995, Taskinen, Sinkkonen & Kinnunen 1995).

Table 5. Number of Finnish primary studies (n=31, 1981-1997/spring) by method category.

Method category and reference number of study[8]	Number of studies
Patient need assessment methods	-
Promotion and maintenance	4
• Encouraging the relatives of elderly patients (11)	
• Training programme for nursing personnel to enhance patients' rights (13)	
• Family training programme at maternity clinic (29, 30)	
Preventive methods	9
• Group dental health education for adolescents (3)	
• Preoperative visit/information (4, 14, 31)	
• Intensified health education programme for preventing the use of tobacco and alcohol among adolescents (26)	
• Occupational health consultation (18)	
• Health education targeted at coronary disease risk factors (7, 9)	
• Programme aiming at avoiding episiotomy and rupture in intrapartum care (27)	
Therapeutic methods	5
• Care development programme for myocardial infarction patients (5) and education programme(15)	
• Theoretical model of cancer patient treatment (12)	
• Care development programme for long-term psychiatric patients (17)	
• Intrapartum practices (28)	
Rehabilitative methods	4
• Rehabilitation programme for myocardial infarction patients (2)	
• Physiotherapeutic preoperative training (6)	
• Self-care enhancing working model (10)	
• Group physiotherapy (22)	
Working patterns and process-rel ated methods	5
• Primary nursing (1, 16, 20)	
• Nursing model according to Roy's adaptation model in elderly care (24) and in home nursing (25)	
Administrative support methods	4
• ADP-based information system MAMA (8)	
• Supervision development programme (19)	
• Primary nursing and changes in the structure of personnel (21)	
• Integration of social and health services (23)	
Total	31

The *methods promoting and maintaining* functional ability were involved in e.g. the educational programme targeted at personnel, considered to have an impact on shared decision-making by personnel and patient (Sainio 1993) and on patients' rights in general (Leino-Kilpi et al. 1994). According to the researchers, the training programmes will make the attitudes of personnel more favourable towards patients' rights, a fact that is significant from the standpoint of realising these rights.

8 Reference numbers are given in Appendix Table 2.

Nearly all studies (90%, n=28) had the *patient/client* as their *target group*; one study included the relatives, as well. Three studies had the target of health care personnel (usually nursing personnel; one study included also physicians). The studies mostly dealt with the adult population. Two health education studies were made on adolescents, while the elderly formed a group in a couple of investigations. The target population was not always specified by age, in which case there were subjects from several age groups. It is noteworthy that among the studies reviewed there were no studies solely focusing on children. Of the two investigations into intrapartum practices, one looked at the outcomes also from the newborn infant's viewpoint.

As regards *the condition or field of activity* (Table 6) the patients usually belonged to the domain of either internal medicine (most commonly patients with myocardial infarction) (19%, n=6) or surgery (16%, n=5). A few studies dealt with pregnant or parturient women (13%, n=4). Some studies concerned methods used in psychiatry as well as in the care of cancer and cerebral apoplexy patients.

Hospitals (usually university or central hospitals) constituted by far the most common setting, with more than a half of the studies located there. Outpatient services (e.g. maternity clinic, occupational health or dental health services) were the setting in more than a third of the cases. A nursing home and school, respectively, were the setting in one study each.

Nearly a half of the studies involved less than 100 participants (subjects). Consequently, the other half had more than a hundred participants, and in the rest of the cases the information was missing. It should be noted, though, that for some studies only the abstract was consulted, while in other cases the entire report was in use.

Table 6. Subject matter by disease, condition or field in Finnish primary studies (n=31, 1981-1997/Jun).

Condition / field	Number of studies
Surgical disease	5
Internal disease (usu. cardiac)	6
Internal & surgical disease	1
Cancer	1
Psychiatric illness	1
Cerebral apoplexy	1
Pregnancy / childbirth / newborn infants	4
Dental care	1
Diagnosis category unspecified	2
Occupational health service clients	1
Nursing home clients	1
Home care / home nursing clients	2
Other target group (nursing personnel)	5
Total	31

Classification according to study design is given in Table 7. A half of the studies (52%, n=16) incorporated a controlled, pre-post test assessment. Of these only two had randomised division into groups. In most cases, the grounds for group division

(experiment and control groups) were left unreported or were stated briefly. A third of the studies (32%, n=10) had not used a control group, and a few studies with experiment and control groups did not have assessments made prior to the intervention. The studies using experiment and control groups, which had initially assessed the patients' expectations before the intervention but in the follow-up assessment had evaluated the intervention itself, were categorised as "other".

Table 7. Study design in Finnish primary studies (n=31, 1981-1997/spring).

Study design	Number of studies
Randomised	2
Experiment and control group, pre-post test	14
Experiment and control group, post test	3
Experiment group, no control group, pre-post test	10
Other	2
Total[9]	31

4.3 International primary studies

The total number of international primary studies was 117. The analysis was made based on either the article (n=53) or its abstract (n=64). The following is a description of the studies according to the data gleaned from classification. Table 8 shows the distribution by method category. The category of *therapeutic methods* turned out to be the largest one among international primary studies.

Table 8. Number of international primary studies (n=117, 1990-1997/Mar) by method category.

Method category	Number of studies
Patient need assessment	4
Promotion and maintenance	9
Prevention	14
Therapeutic methods	39
Rehabilitative technologies	29
Working patterns & other process-related meth.	13
Administrative support systems	9
Total	117

The therapeutic methods included e.g. the following: physical exercise among nursing home clients to enhance sleep (Alessi et al. 1995), the effect of music on various

9 Substudies counted as separate items.

types of patients (Augustin & Hains 1996; Burke et al. 1995), the impact of relaxation on the lipid profile (Carson 1996), the effect of a nursing method preventing self-inflicted harm on the care of persons with personality disorders (Cremin et al. 1995), the impact of waterbeds on the heart rate of preterm babies (Deiriggi & Miles 1995), home visits to depressed rural women (Hauenstein 1996), information given during an operation and its effect on the relatives' anxiety (Leske 1996) and the treatment of incontinence in primary health care (O'Brien 1996). The studies assessing rehabilitative measures included: the effect of cardiac rehabilitation of a patient suffering from myocardial ischemia, measured during stress test (Brooks & Gothler 1995), physical exercise for the elderly (Dawe & Moore-Orr 1995, Harada et al. 1995), health education and rehabilitation of patients with chronic obstructive pulmonary disease (COPD) (Mackay 1996), rehabilitation following short-term hospital treatment (Melin & Bygren 1992) and self-management programme for children with asthma (Persaud et al. 1996).

Examples of the studies evaluating *preventive* methods were the following: the effect of noise on the quality of sleep among intensive-care patients (Topf et al. 1996), the effect of a client-centred setting on agitation and sleep in dementia patients (Matthews 1996), pre-admission education for persons entering cardiac surgery (Nelson 1996) and the outreach visits aiming at the prevention of cardiovascular disease (Hulscher et al. 1997). Among the *methods used in promotion and maintenance* were included e.g. the empowerment of long-term residents through a resident-staff approach (Agbayewa et al. 1990), empathy and assertiveness in a nursing home setting (Gallagher 1993), a programme for maintaining ambulation among nursing home residents (Koroknay et al. 1995) and swallow management among stroke patients (Odderson et al. 1995).

Examples of *patient need assessment methods* included: development programme for pain assessment among patients with cancer (Dufault et al. 1995), health checks conducted by nurses (Langham et al. 1996) and counselling given to mothers in uncovering the side-effects of antibiotics during breast-feeding (Taddio et al. 1995). *Working patterns and other process-related* methods were e.g. the following: the influence of the quality of nursing on the need of mechanical ventilation in patients with COPD (Thorens et al. 1995), critical path for the care of coronary artery bypass surgery patients (Strong & Sneed 1991), case management (Rossler et al. 1992, Seltzer 1992) and care provided by midwives vs. routine care in terms of continuity (Rowley et al. 1995). Methods representing *administrative support systems* were e.g.: the bedside terminal system in hospital care (Brown et al. 1995, Marr et al. 1993), computer-supported care plans (Holzemer & Henry 1992), nursing process documentation (O'Gorman 1997), alternative nursing settings (Clark et al. 1995) and the clinical career structure for nurses (Koch 1990).

Overwhelmingly the most common *target group* of the studies were patients or clients (86%, n=101). The relatives, along with patients, were the object of interest in 12 studies. Community or population-based interventions were evaluated in two studies. The distribution by age group shows that almost a half of the studies (49%, n=57) focused on adults in the age group 19 - 65 (Table 9). The number of studies exclusively conducted on the elderly was also relatively high. The least studies were targeted at children and adolescents.

Table 9. Patients by age group in international primary studies (n=117, 1990-1997/Mar).

Age group	Number of studies
Children & adolescents (0 - 18 years)	19
Adults	57
Elderly (over 65)	38
Not specified	3
Total	117

The largest *diagnosis category* (Table 10) turned out to be clients or patients whose diagnoses were not specified, such as nursing home residents and hospital patients in general.

Table 10. Patients as subjects in international primary studies (n=117, 1990-1997/Mar) by diagnosis category.

Diagnosis category	Number of studies
Childbirth / pregnancy / newborn babies	13
Psychiatric illness	5
Dementia	8
Surgical illness	9
Internal disease	5
Cardiac disease	12
Cancer	5
Pulmonary disease	5
Neurological disease	5
Several diseases	13
Other	12
No diagnosis / do not qualify	3
Not specified (e.g. nursing home residents)	22
Total	117

Cardiac disease, myocardial infarction or cardiac surgery constitute the most common isolated *diagnoses or procedures*. There were a number of studies on pregnant or parturient women, where the newborn infant was included, as well. Another well represented group in international studies were patients with dementia. Stroke was the most common neurological disease, and one study discussed brain damage. Asthma and chronic obstructive pulmonary disease were the most usual diagnoses in respiratory diseases. In psychiatric illnesses, schizophrenia ranked as the most common diagnosis.

The setting studied was usually a hospital (Table 11). Nursing home residents and clients using outpatient services, respectively, were studied almost equally extensively.

Table 11. Settings studied in international primary studies (n=117, 1990-1997/Mar).

Setting	Number of studies
Hospital	49
Outpatient services / home	19
Hospital and outpatient services / home	24
Nursing home / long-term care / hospice	20
Other	4
Not specified	3
Total	119[10]

Of the international primary studies, 37% were randomised trials. One in three (33%) had a control group, but almost an equally large number (30%) failed to have it. Measurements made prior to the trial were missing in 11% of the studies (Table 12). In over a half of the studies the number of *participants* was under 100, and in a third it was over 100; in relatively many studies or abstracts (n=20) the number of subjects was left unspecified.

Table 12. Study design in international primary studies (n=117, 1990-1997/Mar), numbers and percentages.

Study design	Number of studies	%
Randomised	43	37
Experiment and control group, pre-post tests	29	25
Experiment and control group, post-tests	9	8
No control group, pre-post tests	32	27
No control group, post tests	4	3
Total	117	100

Table 13 contains the outcome areas of the studies according to the classification used here (Appendix 2). The studies seem to have used outcome assessment in a versatile manner in various outcome areas. The studies usually assessed the outcomes in the domains of patient's psychosocial wellbeing (49%, n=57) and functional ability (42%, n=49). The changes in patient's knowledge and attitudes were commonly measured in the interventions associated with patient education. Traditional sickness-related outcomes were also used in evaluation, such as the incidence of disease, mortality, pain, recovery, state of health, and various symptoms and measurements (blood pressure and pulse).

10 In one study the setting was ***both*** hospital & outpatient services/home ***and*** old-age home/long-term care/hospice; in another study the environment was ***both*** hospital & outpatient services/home ***and*** other.

Table 13. Outcome areas and their incidence in international primary studies (n=117, 1990-1997/Mar).

Outcome assessment area, associated with	Number of studies where discussed
Functional ability	50
Psychosocial wellbeing	57
Patient's knowledge / participation	21
Disease	52
Lifestyle	8
Costs	39
Care providers' performance	26
Care providers' knowledge / attitudes	11

In the outcome classification, assessment of costs was broadly viewed, including not only the outcomes in terms of money, which were seldom presented, but also hospital periods, outpatient vs. inpatient care, readmissions, service use, complications, patients' acquisity and the personnel structure. Such outcome assessments associated with costs were carried out in one out of three studies (33%, n=39).

5 SUMMARY AND CONCLUSIONS

The aim of this review was to find out what technology assessment means in the context of nursing and to identify the Finnish and international research assessing the effectiveness of methods used in nursing. In accordance with the international literature, studies using comparative research approaches were defined as technology assessment studies. The review was based on meta-analytical studies (n=46), Finnish (n=31) and international (n=117) primary studies. The Finnish studies were retrieved from the theses and dissertations conducted in the departments of nursing science at five universities (1981 - 1997/spring), from the proceedings of conferences and nursing publications (Finnish Yearbook of Nursing 1980 - 1988 and the Finnish Journal of Nursing Science 1990 - 1997/Feb). International primary studies were retrieved starting from 1990, whereas there were no time limit for meta-analytical studies.

Of the meta-analytical studies included in the review over a half were conducted in the USA, and the rest in Canada and Great Britain. Assessment was usually targeted at the methods used in somatic care, there being only two studies assessing the methods used in psychiatric care. Patient education and psychosocial support were the topics in relatively many studies. The studies based on many different patient groups resulted in strong

evidence regarding the impacts this psychoeducational care has on the patient's quality of life, recovery and also on the costs, due to shortened hospital periods.

The Finnish studies were mainly based on theses and dissertations. The proportion of nursing method assessment studies was highest in Licentiate's and PhD dissertations, and quantitatively in Master's theses. The studies almost exclusively focused on the patient, while the population or relatives were only seldom studied. In most cases, the preventive methods employed in the care of adults were evaluated, and in some cases interventions for the elderly or newborn babies were under assessment. Methods used with children and adolescents were very rarely subject to study. As for diagnosis, the methods most often studied were the ones involving the care of cardiac diseases (myocardial infarction). There appeared certain problems in the study designs: a third of the studies did not have a control group, random allocation of patients into groups was seldom used and the group sizes were often small. It is a demanding task to adopt a reliable assessment approach to the evaluation of many interventions used in nursing.

The international primary studies in most cases assessed the various therapeutic and rehabilitative methods used in the care of various patient groups. Health promotion interventions at the population level were evaluated in some studies. The proportion of randomised controlled trials was 37%. The group size was under 100 in more than a half of the studies.

On the basis of this review it seems that in Finland the number of studies evaluating the methods used in nursing is small. As for international research, somewhat more studies are available, and especially meta-analytical studies provide useful information for decision-making. It was not possible in this review to analyse the methods in more detail nor to make recommendations for their use. Nonetheless, the results of the studies referred to here can well be utilised in nursing practice, education and research. Hopefully, persons working in different fields of nursing practice will obtain the relevant studies and evaluate their significance and viability in their own work.

6 RECOMMENDATIONS

Recommendations are presented here in order to develop technology assessment further and to promote the utilisation of research in clinical practice, education and research. Directors of nursing services are in a key position in the promotion and implementation of evidence-based practice. Collaboration between clinical practice, education and research is vital in this process.

Recommendations for clinical practice

- The utilisation of research-based information in nursing and in all health care decision-making should be intensified. Nursing personnel should be offered possibilities to participate in training that strenghtens the skills required in utilising research findings.
- The knowledge, skills and tools needed by nursing personnel in research utilisation will be enhanced. These central skills and tools include the following: the ability to understand and critically appraise studies; computers and the skill needed to use them; information networks; electronic reference programs; the ability to carry out database searches; language skill (especially English).
- A change of culture in the units towards a research-based culture where nursing personnel adopt critical and reflective working patterns, using research-based information in decision-making.
- Systematic literature reviews as well as tools for obtaining them will be made available to nursing personnel.
- Nursing personnel will participate in drawing up clinical practice guidelines utilising the best information currently available.
- Nursing personnel will support also patients' and consumers' possibilities to participate in decision-making regarding their health and treatment. Patient education should be based on up-to-date information presented in an easily understandable form.
- Professional and scientific journals as well as trade unions will advance the development of evidence-based practice by publishing information about the central concepts of technology assessment and by systematically monitoring the results of technology assessment research. The monitoring of the studies could be organised e.g. by appointing persons responsible for various fields or by setting up a network to look for national and international meta-analytical studies, making short abstracts of them and offering abstracts for publication in journals.
- Directors of nursing services will assume the responsibility of enhancing evidence-based practice. In order to do this, they will seek support from educators and researchers.

Recommendations for education

- The professional basic education in nursing, as well as further and supplementary education, should provide students with basic abilities to utilise research-based information and to understand and implement the ideology behind evidence-based practice. The key expertise includes the following: the ability to read and critically

appraise research text and to use research methods, skills needed to change nursing practices, information management readiness and language skill.

- The educational methods as well as the teaching of nursing methods should be based on the current best knowledge.
- Education will also provide the students with readiness to retrieve meta-analytical research data from electronic databases (e.g. the Cochrane Library). Teaching the students to search for information will also enhance the use of up-to-date information in working life.
- Education should support clinical practice in implementing evidence-based methods e.g. by assisting in planning the necessary changes in policies and personnel training needed.

Recommendations for research and development

- Researchers will enhance their ability to assess the various interventions used in nursing. One should become familiar especially with using comparative study designs. By using qualitative methods and economic analyses in the evaluations it is possible to produce multifaceted assessment information.
- A unified terminology will be agreed upon (nursing diagnoses, interventions, outcomes), to be used in collecting cumulative information about nursing as well as in conducting evaluation studies. Measures will be taken to create an explicit nursing language and information networks in collaboration with international developers.
- Researchers will participate in the Cochrane Collaboration, conducting systematic literature reviews and disseminating information. Meta-analytical research will be co-ordinated nationally and internationally to avoid overlap.
- Together with other professionals, nurse experts will take part in developing national and regional guidelines based on the currently best evidence.
- Monitoring the impacts (clinical, organisational and societal effectiveness) of research will become an integral part of studies.
- In research methodology education and in study reporting, special attention should be paid to presenting research findings in an easily understandable form. In the planning phase, also an information dissemination and utilisation plan should be drawn up, identifying the key groups, including patients and the population at large.
- The methodological issues in reporting the studies (abstracts and articles) will be advanced to facilitate the appraisal of studies.
- As evaluation research on many interventions used in nursing is limited, especially as regards Finland, certain measures should be taken:
  - One should start the systematic analysis of the methods used in various fields and conduct focused literature searches in order to identify the existing research.
  - In assessing nursing methods, priority should be given to interventions involving large patient groups in a variety of settings and to methods with a potential to cause considerable benefits or harm.
  - On the other hand, assessment studies should be conducted on recurrent problems or on methods easy to test, such as attending a wound.
  - Studies should be conducted in areas where evaluation studies seems to be completely missing or is exceptionally rare, such as methods in outpatient care, intensive care, paediatric care, short-stay treatments, early discharge and administrative support

systems. Electronic patient record and patient classification methods are prerequisites for reliable method evaluations.

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APPENDIX TABLE 1: META-ANALYTICAL STUDIES

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
1	Anderson & Sharpe 1991 USA	To review intervention studies designed to enhance the communicative skills of health-care providers (physicians, nurse practitioners, medical students) and/or patients.	Meta-analysis of 40 studies - experimental/quasi-experimental design	Patients from different age groups and with different diagnoses No. of subjects: 2358	Communication interventions that facilitate verbal or nonverbal communication; modify the communicative behaviours of health-care providers and/or patients - instruction, feedback, modeling, skill practice	The success of patient-provider communication is due to pre-existing beliefs brought to the interaction by all participants. Relatively little attention is devoted to information provision , patients' understanding of information given, or education about preventive practices or self-management skills. **Cost information:** no Communication interventions are a sound approach for enhancing patient and provider communicative skills having the price of improved care for patients and more rewarding interactions for both patients and providers.
2	Bernard-Bonnin et al. 1997 Canada	To assess the impact of self-management teaching programmes on the morbidity of paediatric asthma.	Meta-analysis of 11 RCTs	Children (1 - 18 years of age) with asthma No. of subjects: 1290	Self-management teaching programs (SMTP)	Effects of teaching programmes were small on school absenteeism, asthma attacks, hospitalisation, hospital days and emergency visits. **Cost information:** no SMTPs have little influence on morbidity of peadiatric asthma due to multiple confounding factors not directly amenable to change by education; future programmes should focus more on intermediate outcomes such as behaviour.
3	Bernard-Bonnin et al. 1989 Canada	To assess the effect of hospital practices on breastfeeding duration.	Meta-analysis of 9 studies - controlled clinical trials	Mothers and their newborn infants No. of subjects: not given	Hospital practices - early contact between mother and infant - no feeding supplement - support of nursing personnel (with or without telephone follow-up)	Early mother-infant contact and nursing support with telephone follow-up have a positive effect on the duration of breastfeeding. Supplementation demonstrated a negative effect on breastfeeding (not significant). **Cost information:** no Hospitals should integrate these practices routinely in maternity wards

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
4	Broome, Lillis & Smith 1989 USA	To determine children's physiological, behavioural, and self-report responses to a painful procedure and to establish a descriptive profile of pain management interventions and the direction and magnitude of their effectiveness.	Meta-analysis of 27 studies - RCTs and non-randomised experimental studies - countries: not given	Children aged between 3 - 12 years No. of subjects: not given	Pain management interventions or strategies - types are not described	Highly significant relationship was found between pain management interventions and behavioural and physiological distress responses of children. At least a 30 % reduction in children's distress responses. **Cost information:** no
5	Brown 1997 USA	To examine the effectiveness of patient education for diabetic adults.	Meta-analysis of 82 studies - control groups, 56 - one-group pre-test/post-test, 26	Diabetics, primarily adults No. of subjects: not given	Educational intervention; - intervention designed to improve patient knowledge; self-care behaviour; metabolic control; and/or psychological outcomes	Positive effects on knowledge of dietary principles, self-care behaviour, psychological outcomes. Results of the knowledge variable are not generalisable to elderly populations. **Cost information:** no Educational intervention in diabetic adults is effective in producing positive patient outcomes
6	Brown & Grimes 1995 USA	To evaluate the patient outcomes (33) of nurse practitioners (NP) and midwives (NM) in primary care compared with those of physicians (MD) for equivalent clients in similar settings.	Meta-analysis of 43 studies - 13 randomized patient allocation - treatment and experiment groups	NPs vs. MDs: -Patients in internal medicine, general/family practice, pediatrics NMs vs. MDs: - Patients in hospitals, hospitals-based ambulatory settings and birthing centres No. of subjects: not given	Care activities e.g.: NPs, MDs: - health promotion - treatment of minor acute or stable chronic conditions NMs, MDs: - intrapartum care of low risk obstetric patients	NPs vs. MDs: - patient compliance with treatment recommendations ↑ (NP) - patient satisfaction ↑ (NP) - resolution of pathological condition ↑ (NP) NMs vs. MDs: - NMs used less technology and analgesia - neonatal outcomes equivalent to MDs' **Cost information:** no Findings generalisable to low risk patients only (NM), cost-effectiveness could not be stated.
7	Brown et al. 1997 USA	To evaluate the effectiveness of various strategies used to promote weight loss in patients with non-insulin-dependent diabetes mellitus (NIDDM).	Meta-analysis of 89 studies - experimental design	Patients with NIDDM and obesity No. of patients: 1800	Strategies to promote weight loss - behavioural therapies, exercise, diet, anorectic drugs, or a combination of strategies	Dietary strategies led to a 9-kg reduction in body weight and diet alone had the greatest effect on glycosylated hemoglobin (G-HbA1) levels (2.7 %). Effects of weight reduction strategies were smaller for patients aged > 55 years. **Cost information:** no

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
8	Burckhardt 1997 USA	To study the effects of treatment on the mental health of elderly people and in particular to examine whether different types of therapy had differential effects on the mental health of elderly clients.	Meta-analysis of 41 studies - RCTs and quasi-experimental studies - countries: not given	Elderly (average age 75 years) No. of subjects: not given	Intervention by a non-physician health care provider - reality orientation; cognitive training; physical exercise; socialization; reminiscence; interactive contact or touch	Beneficial effects on self-esteem, social behaviour, orientation, morale and cognitive performance. Any form of therapy tended to improve; best effect sizes had: socialization, interactive contact and cognitive trainings. **Cost information:** no There is considerable potential that selective report of positive results will be biased in favour of interventions.
9	Ciliska, Hayward, Thomas et al. 1997 Canada	To examine the effectiveness of public health nursing interventions offered through the strategy of home visits.	Systematic overview of 11 studies - randomised controlled trials, 3 (2685 subjects) - controlled clinical trials, 6 (1597 subjects) - cohort studies, 2 (152 subjects) - narrative synthesis	Clients (individual, family or group) of any age group who received an intervention at home by a public health nurse No. of subjects: 8868	Intervention - teaching/, emotional support/, counseling/, case management/, social enhancement/, physical care/, other	Home visits have no negative effects; positive impact on physical health, mental health and development, social health, health habits, knowledge and service utilization. **Cost information:** no The effects seem to be mediated by the intensity of the intervention and the pre-existing level of health and social status of the client.
10	Cullum et al. 1995 UK	To review the evidence for the accuracy of predicting the risk of pressure sores and the effectiveness of pressure relieving interventions.	Systematic review of 30 RCTs	Patients at high risk of developing pressure sores or with pre-existing pressure sores No. of subjects: not given	Pressure relieving, preventive interventions - manual repositioning, pressure relieving beds and mattresses	Standard hospital mattress is outperformed by a range of foam based, low pressure mattresses and overlays, and also by 'high tech' pressure relieving beds and mattresses, in both preventing and treating pressure sores. Patients at raised risk of developing pressure sores should be placed on one of the foam matter alternatives shown to be better than the standard hospital mattress. Insufficient evidence to identify 'best buy'. **Cost information:** no

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
11	Devine 1986 USA	To examine how psychoeducational interventions influence recovery, pain, psychological well-being and satisfaction with care among hospitalized adult surgery patients.	Meta-analysis of 102 studies - experimental design including both treatment and control subjects	Adult hospitalized surgery patients - elective surgery No. of subjects: not given	Psychoeducational interventions - health oriented information; information about self-care actions - teaching skills to reduce discomfort and/or complications - psychosocial support Treatment providers; - nurses - psychologists - pastoral counsellors - physicians	Positive effects on each of four classes outcomes (recovery, pain, psychological well-being and satisfaction with care) **Cost information:** no **Cost related information:** cost-relevant effects were obtained across a wide range of patients, treatment providers, hospital settings and historical periods Psychoeducational interventions are effective and should be incorporated into nursing practice; in order to manage this nurses need essential resources and organizational support.
12	Devine 1997 USA	To examine the effectiveness of psychoeducational care on the recovery, postsurgical pain and psychological distress of adult surgical patients.	Meta-analysis of 191 studies - controlled trials - random allocation 69 %	Adult hospitalized for a major-minor surgery No. of subjects: not given	Psychoeducational care 1) health care relevant information, 2) exercises to perform, 3) psychosocial support	Significant beneficial effects on recovery, pain and psychological distress and length of hospital stay **Cost information:** no Professionals should incorporate psychoeducational care into standard practice in their settings.
13	Devine 1996 USA	To determine the effectiveness of various types of psychoeducational care in adults with asthma.	Meta-analysis of 31 studies - random allocation 18 - nonrandom 6 - pre-post design 7 - USA 61 %, Great Britain 19 %	Adults with asthma No. of subjects: 1860	Psychoeducational care - education/ - behavioural skill development/ - cognitive therapy/ - nonbehavioural support/ counseling	Beneficial effects on occurrence of asthmatic attacks, dynamic respiratory volume, PEF, functional status, adherence to treatment regime, utilization of health care, use of PRN medications, psychological well-being and psychomotor knowledge of inhaler use **Cost information:** no Education and relaxation-based interventions improve important outcomes in adults with asthma.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
14	Devine & Refschneider 1995 USA	To determine the effects of psychoeducational care in adults with hypertension .	Meta-analysis of 102 studies - random assignment (58 %) - control group (77 %) - USA (77 %) - Canada (3 %) - Great Britain (9 %)	Adults with hypertension, outpatients No. of subjects: not given	Psychoeducational care; - patient education/ - psychosocial support/ - behavioural interventions - relaxation	Beneficial effects on knowledge, medication compliance and compliance with health care appointments and smaller effects on blood pressure. Effects on weight and anxiety could not be specified (compromising validity). **Cost information:** no Education, self-monitoring of RR/medications, psychosocial support are appropriate nursing interventions for outpatients with hypertension.
15	Devine & Westlake 1995 USA	To determine how psychoeducational care provided for adults with cancer affects seven outcomes - anxiety, depression, mood, nausea, vomiting, pain and knowledge.	Meta-analysis of 116 studies - RCTs 67 - USA (85 %) - Canada (10 %)	Adult cancer patients No. of subjects: 5326	Psychoeducational care consisting of one or more of the following categories: - education - nonbehavioural/noncognitive counseling - behavioural/cognitive counseling	Psychoeducational care benefited adults with cancer in relation to anxiety, depression, mood, nausea, vomiting, pain and knowledge. It was not possible to differentiate the effectiveness of various types of psychoeducational care. **Cost information:** no Strong research base for the benefits of psychoeducational care
16	Evans, Connis, Hendricks & Haselkorn 1997 USA	To compare the clinical effectiveness of rehabilitation programmes with medical care.	Meta-analysis of 11 studies - RCTs, 9 - non-equivalent control group designs, 2	Patients with a physically disabling diagnosis No. of subjects: 1805 stroke patients 378 geriatric patients	Multidisciplinary inpatient physical rehabilitation programmes vs. standard medical care	Significant difference in survival, functional ability and more patients remained at home after discharge during follow-up. **Cost information:** no Rehabilitation services are effective in improving short term outcomes; lack of long benefits suggest that therapy should be extended to home or subacute care settings.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
17	Hathaway 1986 USA	To examine the effect of preoperative instruction on postoperative outcomes.	Meta-analysis of 68 studies - experimental and control groups	Adult surgical patients No. of subjects: 4018	Preoperative instruction - psychotherapeutic and/or educational preoperative instructions for individuals or groups	67 % of the patients receiving preoperative instructions have 20 % better postoperative outcomes than those not receiving preoperative instructions (Mean effect size: 0.44) **Cost information:** no Preoperative instruction is supported as an intervention which influences positively the recovery of many surgical patients.
18	Hawley 1995 England	To determine the effects of psychoeducational interventions in the treatment of arthritis	Review of 34 studies - details of studies not stated in abstract	Patients suffering from rheumatoid arthritis (RA) or osteoarthritis (OA) No. of subjects: not given	Psychoeducational care, consisting of one or more of the following categories: - traditional educational/ teaching activities - psychological interventions ⇒ learning new skills to manage one's disease	Improvement in pain, depressive symptoms, self-efficacy, coping, self-management behaviour. Trend of greater improvement for OA than RA patients. Utilization of health care services reduced somewhat. **Cost information:** no PE-interventions are a useful additional modality in the management of rheumatic diseases and may improve treatment effects and quality of life.
19	Heater, Becker & Olson 1988 USA	To determine the contribution that research-based nursing practice makes to health care by comparing patient outcomes from experimental nursing interventions with patient outcomes from routine, procedural nursing care.	Meta-analysis of 84 studies - random assignment 55 - non-random 27 - matched controls 2 - 1977 - 1984	Patients from infants to elderly No. of subjects: 4146	Research-based independent nursing interventions - actions on professional nurses not requiring a physician's order	Patients who receive research-based nursing interventions can expect 28 % better outcomes (behavioural, knowledge, physiological, psychologial) than 72 % of the patients who receive standard nursing care. **Cost information:** no It is wasteful for professional nurses to perform nonnursing tasks.
	Olson, Heater & Becker 1990 USA	To determine the quantitative effects of nursing interventions on children and parents (their care practices, anxiety level and stimulation of premature infants).	Meta-analysis of 11 studies	Children from neonates to 16 years Parents No. of subjects: not given	Research-based independent nursing interventions	The subjects in the experimental groups who received a specific nursing intervention benefited more than 81 % more frequently than the subjects in the control groups who received standard or routine nursing care.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
20	Hodnett 1996 Canada	To evaluate the effects of labour and birth in an alternative birth environment compared to that in a conventional labour ward.	Systematic review of 5 trials - random assignment 4 - quasirandom 1 - England, Scotland, Canada, Sweden	Pregnant women who were at low risk of obstetric complications No. of subjects: 7846	Labour and delivery in a 'home-like' birth centre on hospital setting - details not stated	Many women were transferred to standard care during labour. Less likely to use pharmacological pain relief, happier with care, unaugmented labour with oxytocin, greater incidence of sore nipples and milk stasis. **Cost information:** no Stronger evidence to support the need to changes in caregivers behaviour than to support the need for structural changes in labour wards.
21	Hodnett 1997 Canada	To assess the effects, on mothers and babies, of continuous intrapartum support (social or professional) compared with usual hospital care.	Systematic review of 11 RCTs - Belgium, Canada, Finland, France, Greece, Guatemala, South Africa, USA	Women in labour and their newborn babies No. of subjects: 209	Intrapartum support from caregivers (nurse, midwife, midwife-student) or from a laywoman. - continuous presence, hands-on comfort, encouragement	Shorter labour, less intrapartum analgesia/anaesthesia or operative vaginal delivery, likelihood of Caesarean delivery, women rated their experiences more favourable. Newborns had less 5 minutes Apgar score < 7. **Cost information:** no Ensure that all labouring women receive support from specially trained care givers. Alterations in the current work activities of midwifes and nurses so that they can spend more time providing support, continuing education on the art and science of labour support.
22	Johnson 1984 USA	To describe the association between various types of interventions and emotional response (coping) of patients with elective surgery.	Narrative review of 21 studies - experimental or quasi-experimental designs - random assignment, 12 - countries: not given	Adults who underwent elective surgical procedures No. of subjects: not given	Different interventions to enhance coping - provider-patient interaction, physical activity instruction, instruction in coping strategies, abstract/concrete orienting information	Each type of intervention was associated with reduction in negative emotional response (emotional state, satisfaction, pain and personal well-being). The effects on length of hospitalization and/or pain medication occurred in studies where the interventions were a combination of abstract orienting information and instruction in physical activities. **Cost information:** no

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
23	Karas & Conrad 1996 USA	To describe knowledge about the effect of worksite back injury prevention programmes on selected study outcomes.	Integrative review of 15 studies - experimental, 7 - quasi-experimental, 8 - USA, 12 studies - Sweden, Israel and Canada, 1 study each	Male and female workers in different settings No. of subjects: 7523	Back injury prevention programs - back belts - back schools - exercise/flexibility training - educational classes	Positive outcomes were reported for all four types. Back school and the exercise/flexibility training programs demonstrated a greater proportion of positive results (studied more frequently). **Cost information:** measured in six studies (details not given), cost = combination of medical and lost time
24	Kinney et al. 1996 USA	To determine the effects of different pharmacological, mechanical, surgical, nursing and other treatments on the quality of life (QOL) in cardiac patients	Meta-analysis of 84 studies - 1987-1991 - random assignment 54, convenience 6, purposive 6 - experimental/quasi experimental design	Different cardiac patients No. of subjects: 20066	Intervention - pharmacological - pacing - medical - nursing - combination	A small but significant positive effect of pharmacological, mechanical, surgical, nursing or other treatments on QOL. **Cost information:** no Generalizability of the findings is limited due to incomplete reporting and other problems in the original studies
25	Krywanio 1997 USA	To determine the overall effectiveness of stimulation programs designed to enhance physiological development of infants of different mean weights.	Meta-analysis of 39 studies - Group 1 (11 studies); 3 interrupted time series, 2 cohort treatment, 6 as untreated control group, six had random as. - Group 2 (26 studies); 18 RCTs, 4 interrupted time series, 4 equivalent control group	Premature infants - gestation less than 37 weeks No. of subjects: not given	Stimulation techniques - Kinesthetic vestibular; environment alteration; Gustatory; Tactile; Multimodal (all senses); education-mother	Physiological development of premature infants was enhanced from 20 % to 80 %. **Cost information:** no Study supports the initiation of a programme of stimulation within NICU although the exact nature of the programme that would provide the greatest benefits remains unclear.
26	Lacasse et al. 1997 USA	To assess the effectiveness of respiratory rehabilitation on exercise capability and health-related quality of life (HRQL) in patients with chronic obstructive pulmonary disease (COPD).	Meta-analysis of 14 RCTs	Patients with clinical diagnosis of COPD No. of subjects: not given	Rehabilitation programmes - exercise therapy with or without any form of education or psychological support - compared with conventional care	Respiratory rehabilitation that includes at least 4 weeks of exercise training relieves dyspnoea and improves control over chronic obstructive pulmonary disease; improves physical performance and relevant quality of life measures. **Cost information:** no

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
27	Linden, Stossel & Maurice 1996 Canada	To determine whether the addition of psychological interventions to standard cardiac rehabilitation programmes improves mortality, nonfatal cardiac event recurrences, psychological distress and clinical risk factors in coronary heart disease (CHD).	Meta-analysis of studies - all had random assignment - treatment and control groups	Patients with CHD No. of patients: 3180	Treatments - group psychotherapy, relaxation, individual therapy, cognitive-behavioural therapy, stress management, individual psychological support as needed, music therapy and group education	The addition of psychosocial interventions to standard cardiac rehabilitation programmes improves mortality, reduces recurrence of CHD, psychological stress (anxiety and depression) and some biological risk factors (cholesterol and systolic RR), especially within the first 2 years. **Cost information:** no
28	Mari & Streiner 1996 Brazil	To estimate the effects of family psychosocial interventions in community settings for the care of persons with schizophrenia or schizophrenia-like conditions.	Systematic review of 12 RCTs - Australia, Europe, China, USA	Patients with a standardized diagnosis of schizophrenia and/or schizoaffective disorder No. of subjects: approximately 609	Psychosocial intervention with relatives of persons with schizophrenia that required more than 5 sessions and was not restricted to an in-patient environment.	Family intervention decreased the frq. of relapse and hospitalization, encouraged compliance with medication, may have helped stay in employment. Does not lessen the tendency of individuals/families to drop out of care nor the levels of emotion and family burden. No data to support preventing or promoting suicide. **Cost information:** no Results are generaliazable to other health service traditions.
29	Marshall et al. 1997 England	To determine the effectiveness of case management (CM) as a treatment for severely mentally ill people in community	Systematic review of 9 RCTs - USA, England	Persons suffering from severe mental disorder No. of subjects: not given	Case management intervention - assessment of needs - development of care plan - arrangement for provision of suitable care - monitoring the quality of care - contact with the mentally ill person	CM approach is less likely to result in loss of contact. Twice as likely to be admitted to psychiatric hospital. There is no evidence that CM improves clinical or social outcome or quality of life. **Cost information:** exist, but require still transformation There is limited amount of data available on the effectiveness of case management intervention.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
30	Mumford, Schlesinger & Glass 1982 USA	To determine the effects of psychological intervention on recovery from surgery and heart attacks.	Analysis of the literature 34 studies - random assignment, 21 - all controlled	Patients; from children to adults No. of subjects: 3155	Psychological intervention - information or emotional support - activities performed by psychiatrists, psychologists, surgeons, anesthesiologists, nurses	Surgical and coronary patients who are provided information or emotional support to help master the medical crisis do better than those who receive only ordinary care. **Cost information:** no **Cost implications:** reduced hospitalization approximately two days
31	Oakley, Dawson & Holland et al. 1996 England	To review the evidence for the effectiveness of interventions to prevent falls and subsequent injury in older people.	Systematic review of 20 RCTs	Elderly people, aged 60 and older No. of subjects: over 10,000	Interventions to reduce the risk of falling - exercise, assessment of the safety of the home environment and repairs needed, dietary interventions, hip protectors	Balancing, low impact aerobics and muscle strengthening exercise may reduce the rate of falls in older people with reasonable levels of fitness. Home visits may also reduce environmental and personal risks of falling. High dose vitamin D supplements with or without calcium seem to be effective in reducing risk of fracture. The use of hip pad protectors for people in institutional care who are at high risk of falling may significantly reduce the rate of injury due to falling. **Cost information:** no
32	Ottenbacher & Jannell 1993 USA	To determine the effects of rehabilitation programs on functional abilities of patients who survive a stroke.	Review of 36 studies - control groups	Stroke patients - hemiplegia or hemiparesis due to a stroke No. of subjects: not given	Rehabilitation programmes designed to improve physical function in patients after stroke	Average person in treatment groups functioned better than 66 % of participants in the control groups. Early intervention after stroke enhanced outcomes. **Cost information:** no Rehabilitation is effective but the difference between the treated and untreated groups was small; more high quality research is needed.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
33	Renfrew & Lang 1997 England	To determine the effect of discharge from hospital after birth within the first 48 hours or more on breastfeeding.	Review of 2 RCTs	Pregnant women No. of subjects: approximately 235	Discharge from hospital within first 48 hours vs 4 days or more	Multiparous women who were discharged early from hospital were more likely to be breastfeeding still 6 months post-partum. Women in early discharge groups were much less likely to give supplementary fluids to their babies during the first week after birth, and to feed more frequently on days 2 and 4 after birth. **Cost information:** no Discharge time from hospital may have an important role in affecting women's breastfeeding experience; the reasons for this area are not clear and need further exploration.
34	Renfrew & Lang 1996 England	To assess the effects of breastfeeding soon after birth on duration of breastfeeding and mother/infant relationship.	Systematic review of 3 RCT - Scotland, Sweden	Mothers intending to breastfeed and their healthy infants No. of subjects: 209	Early skin contact/breastfeeding following birth versus late contact and feeding after birth	Mothers who had early contact and feeding were more likely to communicate with their infants and to have no night feeding problems. Slightly fewer women stopped breastfeeding 6 and 12 weeks after birth. **Cost information:** no Interventions aimed at either delaying or speeding up the time of the first feed should be avoided.
35	Roberts, Kramer & Suissa 1997 England	To quantify the effectiveness of home visiting programmes in the prevention of child injury and child abuse.	Systematic review of 11 RCTs	Parents of disadvantaged children No. of subjects: 3433	One or more postnatal home visits	6/8 trials reported a lower incidence of injury in the home visit group **Cost information:** no Home visiting has the potential to reduce significantly the rates of childhood injury; relative effectiveness of professional vs. non-professional home visits remains unanswered.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
36	Silagy et al. 1997 USA	To assess the effectiveness of interventions that train health care professionals in methods of improving the quality of care delivered to patients who smoke.	Systematic review of 8 RCTs	Health care professionals and patients who smoked No. of subjects: 11228 No. of professionals: 878	Smoking cessation information from a health care professional who had received training in smoking cessation.	Slightly more patients stop smoking if they attend a health care professional who has received training in smoking cessation methods, were set or prescribed a quit date, were assigned a follow-up appointment and received self-help material. **Cost information:** no
37	Smith 1996 USA	To examine how physical exercise can enhance the quality of life (QOL) of people with cancer and to provide general guidelines for incorporating exercise into care of these people.	Literature review - published and nonpublished medical, nursing, rehabilitation, and physical exercise literature	Cancer patients No. of subjects: not given	Physical exercise - as one of wellbeing and health-promotion strategies for populations with chronical illness	Including physical exercise in the care plans of people with cancer can enhance their QOL; the development of an individualized exercise plan involves screening, assessment, goal setting and communication. **Cost information:** no Nurses must use sound clinical judgement and collaboration with other health care disciplines when recommending and encouraging the incorporation of physical exercise into the care plans of people with cancer.
38	Smith, Holcombe & Stullenbarger 1994 USA	To describe intervention effectiveness for symptom management in oncology nursing research.	Meta-analysis of 28 RCTs	Cancer patients from different age groups No. of subjects: not given	Symptom management interventions; - medication, self-hypnosis, aerobics, relaxation, ginger, massage, music, analgesia, teaching, consulting, scalp hypothermia, hypothermia cap, dressings, extremity wraps, oral care	Significant effectiveness was obtained for the interventions used to manage nausea and vomiting, pain, anxiety, alopecia, infection, and side effects of chemotherapy. Music as a pain-relief intervention was significant. Relaxation used with nausea and vomiting and with pain was not significantly effective and was highly variable in effect. **Cost information:** no Insufficient evidence exists at this time to recommend particular research-based nursing interventions to relieve symptoms in patients with cancer.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
39	Smith, Winsemius & Besdine 1997 USA	To review the literature on occurrence, prediction, and preventive and therapeutic interventions for pressure sores in elderly patients.	Review of 102 studies - studies of interventions had control groups	Elderly patients in hospitals and nursing homes No. of subjects: not given	Preventive or therapeutic interventions - preventive interventions: mattresses, air pads - therapeutic interventions: mucopolysaccharide cream, cadexomer iodine, topical gentamicin, collagenase ointment, polyurethane dressing, hydrocolloid dressing, air-fluidized bed, ascorbic acid, and ultraviolet light	Fewer patients developed sores when using mattresses containing polystyrene beads of water, or alternating air pads. **Cost information:** no Pressure unloading is the cornerstone of both prevention and management of pressure sores. Pressure sores are a major indicator of care quality.
40	Stroke Unit Trialists' Collaboration 1996 UK	To compare the outcome of stroke patients managed within a stroke unit with those managed in general medical wards.	Systematic review of 12 trials - random or quasirandom allocation - Great Britain, USA, Finland, Canada, Norwegian, Sweden No. of patients: approximately 1500	Patients with recently suffered stroke (excluding subarachnoid haemorrhage and subdural haematoma)	Specialist care; a multidisciplinary team of specialists who are knowledgeable about the care of the stroke patient and provide care for them	Stroke patients managed within specialist stroke units are more likely to survive and live at home after the stroke than those managed in general medical wards. Length of hospitalization does not increase. **Cost information:** no Sufficient evidence to support the setting of well organised multidisciplinary services for acute stroke patients
41	Thomas & Bond 1995 UK	To describe the effectiveness of nursing.	Review of 22 studies - both quantitative (27) and qualitative (15) studies included - control groups, 5 - RCTs	Different patients of various age and diagnosis groups No. of subjects: not given	Different types of nursing interventions - teaching/educational - product evaluation - others - also studies evaluating different types of nurses, aspects of nursing service	Patient satisfaction or patient opinion is the most commonly measured patient outcome. Patients were no more or no less satisfied in primary nursing. **Cost information:** no Lack of rigour in study design, too small sample sizes to be able to draw conclusions

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
42	Thomas & Bond 1991 UK	To review the outcomes of primary nursing with regard to patients and nursing personel.	Review of 23 studies - inclusion criteria; assessment of outcomes unless excluded, no modifications of primary nursing - treatment and comparison groups	Different types of patients and nursing personnel No. of subjects: not given	Primary nursing - each patient associated with one primary nurse, 24 hour accountability a day - no modifications excepted	Despite the plethora of studies attempting to evaluate primary nursing, there is little consensus as to whether, and under what circumstances, primary nursing results in improved outcomes for patients and nurses. Instead of asking whether primary nursing makes a difference it's more important to study which aspects of nursing make a difference, and how much they contribute. **Cost information:** no
43	Thornton & Lillford 1996 England	To review the evidence that 'active management' of labour reduce rates of caesarean sections and operative vaginal delivery in first labour.	Meta-analysis of 23 studies - RCTs - observational studies (used in a narrative way)	Women in labour No. of subjects: not given	Active management of labour - amniotomy; early oxytocin; amniotomy; companion in labour; diagnosis of labour	Active management of labour reduces the rates of operative interventions for delivery, but it is the presence of a companion in labour, rather than other ingredients, that is effective. **Cost information:** no Support during labour improves outcomes and should be encouraged; no evidence that oxytocin and amniotomy give any significant benefit in labour.
44	Turley 1985 USA	To assess the effectiveness of interventions of providing educational information for mothers about the sensory and perceptual capabilities of their infants on maternal-infant interaction.	Meta-analysis of 20 studies - experimentally controlled all	Mothers and their children No. of subjects: not given	Information giving - planned presentation of information to the mother concerning her infant's behaviors of alerting, visual response, auditory response, habituation, cuddliness, consolability, irritability, readability and smile	Providing information for mothers concerning their infant's social capabilities significantly increased the mother-infant interaction. The most effective time to present information is post-discharge period (at home). **Cost information:** no Hospital nurses should make collaborative efforts with community health nurses. Prepare individualized tapes of information to be listened at home; developmental newsletters; telephone networks between other mothers.

No.	Author(s), publication year, country	Aim of the study	Design / Methods	Participants (patient/client group)	Intervention	Main findings and/or conclusions - cost information: yes/no
45	Walkinshaw 1997 UK	To determine if primary dietary regulation in women identified as having gestational diabetes or impaired glucose tolerance will reduce fetal size and its complications and the metabolic neonatal consequences of aberrant fetal growth.	Systematic review of 4 RCTs	Women with abnormalities of oral glucose tolerance testing No. of subjects: not given	Dietary intervention as the primary initial therapy - a proportion of women in the treatment and/or no treatment groups may go on to have insulin therapy	There is slight but no significant reduction in birth weight. **Cost information:** no Current evidence suggests little practical benefit of primary dietary therapy.
46	Wilkie et al. 1997 UK	To examine the use of the McGill Questionnaire (MPQ) as a measure of pain quality and pain intensity in seven painful conditions to estimate normative MPQ scores.	Meta-analysis of 51 studies - convenience samples, 73 % - none of the studies included random selection - descriptive study designs, 63 %	Adults (mean ages 19 - 62 years) experiencing acute or chronic pain No. of subjects: 3624	Diagnostic method of pain assessment - use of one of the five versions of the McGill Pain Questionnaire (MPQ)	The estimated normative mean scores were no more than 50 % of maximum (may be skewed to the left); higher affective score appeared to differentiate chronic pain conditions from acute pain conditions **Cost information:** no Due to methodological shortcomings this review should be read with caution.

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APPENDIX TABLE 2. FINNISH PRIMARY STUDIES

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
1	Airaksinen & Vuorela 1983 Hentinen, Airaksinen & Vuorela 1984	To investigate the feasibility and impacts of changing the personnel structure and division of labour in a given unit .	- One university hospital ward - Pre/post -tests - No control unit	Patients in internal medicine (n=36), nursing personnel (n=25) and ward secretaries (n=2).	Change in the personnel structure and division of labour - 2 ward secretaries were hired - Certain tasks previously carried out by nurses and assistant nurses were delegated to secretaries	- Time spent by nurses in immediate patient care ↔, by assistant nurses ↓ - At weekends the time ↑ among both groups - Nursing documentation ↑ - A heavier workload occurred during final measurement: a confusing factor
2	Fridlund 1990	To assess the impacts of a comprehensive rehabilitation programme on recovery from myocardial infarction, compared to the outcomes of prevalent disease-centred care practice.	- Experiment and control groups - Random division into groups - Pre/post - test s (6 and 12 months) - Conducted in Sweden	Persons under the age of 65 afflicted with myocardial infarction (number of cases not given).	Comprehensive rehabilitation programme for patients with myocardial infarction - Professional rehabilitation and support: physician, nurse & physiotherapist - Group activities among laypersons - 6 months	- Physical condition ↑ - Satisfaction with life ↑ - Free-time activities, relationship with spouse, sex life ↑ => The comprehensive approach is more effective and humane than care based on traditional medical philosophy
3	Gynther 1991	To explore the effectiveness of intensified group dental education in dental health among schoolchildren between the ages of 12 - 16.	- Experiment and control groups, different schools - Pre/post-tests	Schoolchildren, age 12 - 16 (n=156+141).	Intensified group dental education - 2 times per year, duration 3 years	- Intensified group dental education did not significantly affect dental health, the related attitudes or behaviour.
4	Hassinen & Vara 1986 Hassinen & Vara 1987	To develop preoperative care practice through a preoperative visit and to assess its effects and feasibility.	- Experiment and control groups - Pre/post -test s	Gynaecological and surgical adult patients (n=62) and surgical ward personnel (n=48).	Preoperative visit - Made by a specialised nurse - Specialised nurses who have been given training by the researchers	- The majority of the patients considered the preoperative visit by specialised nurse important: information and getting to know the specialised nurse enhanced the sense of security - According to personnel, the visit improved access to patient information, care planning and implementation

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/conclutions
5	Hentinen 1982 Hentinen 1984	To explore the effects of a care development programme on the care of patients with myocardial infarction, on the outcomes and personnel.	- University central hospital, two wards - No control units - Pre/post-test s, at an interval of one year	Myocardial infarction patients under the age of 65 (n=60), with relatives and personnel (n=48).	Care development programme for myocardial infarction patients: - Observing both physical and mental factors in care - Intensifying education - Enhancing nursing process-related thinking - Clarifying the division of labour	According to documentation, education given to patients became more individual - Opinion of the relatives ↔ - Patients' knowledge of their illness and treatment ↑ - Patients' health behaviour ↔ - Exercise ↑ intake of butter ↓ - Sleeplessness, anxiety, fears ↔
6	Herve & Nykänen 1985 Herve & Nykänen 1986	To evaluate the effects of intensified physiotherapeutic education, given 1 - 2 weeks before admittance, on the recovery of patients from gallbladder operation.	- University central hospital - Experiment and control groups - Post-test	Patients referred to gallbladder operation (number not specified).	Physiotherapeutic education prior to admittance for patients about to enter elective gallbladder operation	Patients in experiment group - Postoperative participation in their own treatment ↑ - Pain and distress experienced less severe
7	Honka 1992	To assess the effects of a health education programme among patients with cardiovascular diseases on the patients' smoking and eating habits.	- University hospital - Pre/post -tests -No control unit	Myocardial infarction patients under the age of 65, patients referred to coronary artery angiography and patients with cerebral circulatory disorders - Men and women (n=683)	Intensified health education - Content not specified	- Reduction in smoking - Change towards a healthier diet - Serum cholesterol in men ↓, in women ↑ => A more personal approach to education, taking into account the patient's overall situation, should be adopted
8	Hyvärinen & Kivekäs 1994 Kivekäs, Hyvärinen & Kinnunen 1996	To investigate the impacts of the maternity service information system MAMA, compared to traditional documentation done manually.	- Central hospital maternity clinic and delivery room- Two hospitals, two procedures Post-tests	Staff at maternity clinics and in delivery rooms (n=13+16).	MAMA program - ADP-based information system for maternity services - Includes electronic filing functions, statistics, printouts - Replaces documentation on paper - Provides e.g. appendices to maternity clinic record, birth certificates for population register, etc.	- The MAMA software helped to save time due to reduced overlap and routine documentation - Investment calculation deemed the system economically unsound in the short run (benefits were measured 4 months after the program was installed) - Nursing personnel considered the program helped their work - Physicians and maternity clinic staff felt the program increased their work-load and made things more difficult

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/conclutions
9	Ihala 1982	To investigate the effects of health education during observation period (12 months), focusing on cardiovascular risk factors among men at high risk.	- Pre/post -tests - No control group	Men under the age of 65 at high risk of cardiovascular diseases (number not specified).	Health education programme focusing on cardiovascular risk factors.	Positive changes in health behaviour and in risk factors during monitoring.
10	Komulainen 1990	To assess the impacts of the work done by occupational health nurse, based on self-care theory, from the clients' viewpoint.	- Experiment and control groups from different occupational health clinics - Pre/post -tests	Occupational health service clients (n=44+35) - In conjunction with the employee's first medical examination	Operational model to support the clients' self-care - Supporting collaborative partnership	- The experiment had positive effects on the work of occupational health nurse - Equality in decision-making improved - Physical exercise among clients increased
11	Laitinen 1996	To evaluate the impacts of a project, targeted at elderly patients' informal caregivers, on the caregivers' participation in treatment and the perceived quality of care compared to traditional practice.	- University hospital, health centre ward, long-term ward - Experiment and control wards - Pre/post -tests	Patients at the age of 75 or over (n=97) and informal caregivers (N=369).	Programmes for promoting the informal caregivers' participation in the hospital care of elderly persons (content varying by the ward) - Encouraging the relatives, written directions, videos, games, the relatives' day, guest room - Primary nurse	- Participation of informal caregivers in daily activities in long-term wards ↑, but not in university hospital - Usually, informal caregivers provided emotional and social support - Interaction and communication between personnel and informal caregivers ↑ - Perceived quality of care ↑ =>Informal caregivers may feel intimidated by the technical care environment, they need guidance, encouragement and more communication with personnel
12	Lauri & Sainio 1996 Hantula & Suominen 1996	To improve the care of patients with breast cancer through a development programme and to assess the outcome. To improve the care of patients with breast cancer through a development programme and to assess the results. (The project expanded in 1995)	- Surgical and oncological clinic in university hospital - No control group - Pre/post - test - University hospital and regional hospitals - Project at planning stage, 1996 - 1998	New breast cancer patients (n=50) and nursing personnel. - Patients with various types of cancer	A theoretical model of cancer patient nursing - Content not specified	- The patients received information and support which helped to orient in the new situation - Adaptation and trust in the future reinforced, enhancing morale to a certain degree - Also personnel received new information and some staff members changed their care practices permanently

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings /conclutions
13	Leino-Kilpi, Sainio, Niittymaa & Kim 1994 Sainio 1993	To find out the effectiveness of an educational programme among nursing personnel in order to enhance the patients' rights. To evaluate the effectiveness of an educational programme enhancing the shared decision-making by patient and care provider, compared to normal practice. An international project - Finland, Japan, Norway, USA	- Surgical wards in central hospital - Experiment and control wards - Pre/post -test Ibid.	Surgical patients (n=50+50) and nursing personnel caring for them (n=38+39)	Educational experiment - Duration 4 weeks - Background reading material + individual assignments	- Personnel attitudes in experiment ward were clearly more positive towards the patients' right to participate in decision-making and privilege to question professional authority - Affected somewhat the shared decision-making of patients and nursing personnel and the attitudes of the nursing personnel - Patients' participation increased to a certain degree - Nursing personnel's knowledge and client satisfaction ↔ => Even a short educational intervention may affect the attitudes of personnel towards patient rights and their implementation => International results not presented
14	Lepistö, Leino-Kilpi & Scheinin 1994 Lepistö, Leino-Kilpi & Scheinin 1996	To examine the significance of preoperative information given by nurse to hysterectomy patients.	- University hospital - Experiment and control groups - Pre/post test	Hysterectomy patients (n=10+10)	Preoperative information - Experiment group: information given by nurse and physiotherapist in ward + information provided by nurse in surgical ward - Control group: information given by nurse and physiotherapist in ward - Knowledge tested before preoperative visit	- Positive changes in knowledge among experiment group more frequent than with controls - Post-operative pain considerably less severe in experiment group; the use of analgesics somewhat more extensive
15	Meriläinen 1981a Meriläinen 1981b	To compare two different types of education and their effects on the development of cognitive self-care ability, self-management behaviour and recovery among heart attack survivors.	- Random sample - Two hospitals - two educational practices - Pre/post test	- Male patients under the age of 65 having undergone myocardial infarction (n=117)	Education for cardiac patients - Extensive education, given by a cardiac nurse, physiotherapist, social worker in addition to ward personnel; rehabilitation continued after discharge - Restricted education: no systematic rehabilitation programme, possibilities for subsequent rehabilitation varied	Extensive education: - Patients felt they received more education - Cognitive self-care ability improved more - Self-care behaviour and the use of rehabilitation services more frequent

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
16	Munnukka 1993	To describe and assess the impacts of primary nursing on the structure, process and outcomes of nursing as well as on co-operation between and work done by different professional groups, compared to the corresponding results in wards with task-oriented nursing.	- 2 internal medicine wards and 2 surgical wards in university hospital - Experiment and control wards - Post-intervention assessment	Internal medicine and surgical patients (n=125), their relatives (n=64), nursing personnel (n=88), physicians (n=17)	Primary nursing, includes e.g.: - Change in the role of the nurse - Bedside reporting - Models by Orem and Roper	Primary nursing may enhance patients' wellbeing and health. The relationship between primary nurse and patient is crucial. Changeover to primary nursing can be promoted by agreeing on the goals, education and work supervision => The results can be utilised in reorganising nursing in various health care units
17	Nojonen 1988 Nojonen 1990	To improve the care of long-term psychiatric patients through a development programme and to assess the outcomes. To evaluate the effects on the patient's level of activities in daily life.	- 4 psychiatric hospitals, 11 wards - Outpatient rehabilitation home - Patients randomly selected - Pre/post -tests - No control units	Long-term psychiatric patients (n=121)	Development programme - Making the regional and institution-specific rehabilitation system more explicit - Unit-specific rehabilitation models	- The patients' level of daily activities improved, esp. with outpatients - Social performance improved, albeit momentarily - Constant support from the personnel is required to maintain the achieved skills - Rehabilitation plans became more precise => Patients will recover sooner in small, home-like units. It is important that rehabilitation is based on a coherent view of rehabilitation with a theoretical foundation
18	Nygren 1991	To assess the feasibility and effects of the occupational health consultation method.	- Pre/post -tests - No control unit	Workplaces: employees, employers / foremen, occupational health nurses (n=37/25) - The work involved using solvents - Nursing personnel in direct care	Health education experiment under the heading of Occupational health consultation - Video recording - Learning by experiencing	- The method had no impact on the employees' health behaviour - No major improvements at workplaces were carried out => Nevertheless, the occupational health consultation method deserves further development

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
19	Paunonen 1989	To plan and implement an educational programme in nursing, to train supervisors and to assess the realisation of this education as well as to evaluate the changes during the trial among participants, based on their own opinion.	- One university hospital, regional hospital and health centre - Experiment and control groups	- Specialised nurses, nurses and practical nurses (n=113+88)	Work supervisor education - Two-year supervisor education was planned and implemented Work supervision experiment - Duration 12 months - Group instruction - Those participating in training acted as supervisors	- Nursing work was perceived as having become better organised and more theory-oriented - Self-awareness among nurses ↑ - A more realistic self-image - Professionalism ↑ - Subjective fatigue ↓ - Atmosphere in unit ↑
20	1) Perälä 1986 Perälä 1989 Perälä & Hentinen 1986 2) Myöhänen 1985	1) To investigate the impacts of primary nursing on the care and experiences of the patient and on the activities of nursing personnel and ward activities as well as to explore the viability of primary nursing and the implementation process. 2) Impact on the implementation of the nursing process.	- Pre/post-intervention assessment - 3 university hospital wards - No control units	1) Hospital patients (n=120) and nursing personnel attending on them 2) Nursing care documents (n=138) - 76 took part in initial assessment, 62 by the end of trial	Changeover to primary nursing - Ward-specific approaches	1) Individual and comprehensive care ↑ - The task of a primary nurse is rewarding yet demanding => Primary nursing suits the Finnish nursing system, but it takes time and requires rethinking the practices of the entire organisation 2) - The nursing process documentation implemented better in final assessment - More attention was paid to psychosocial needs
21	Perälä & Räikkönen 1996 Metsämuuronen & Perälä 1996 Perälä, Matikka, Rissanen & Räikkönen 1997 Perälä 1996	To examine the effects of primary nursing and the nursing personnel structure compared to traditional nursing with the present personnel structure.	- Three hospitals - Experiment and control wards - Pre/post -tests, at an interval of 1 year	Hospital patients and nursing personnel - Midwives and child nurses (n=13 - 15 / 14 - 21)	Changeover to a one-level personnel structure (nurse / midwife) and the intensification of primary nursing	- Autonomy of the personnel ↑↑, job satisfaction ↑ - Client-orientation was enhanced: at first, job satisfaction ↓, after 2 years. ↔ / ↑ - Costs: care expenses and personnel costs ↔

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
22	Rusi 1991	To assess the effectiveness of group therapy in maintaining and promoting functional ability among elderly stroke survivors living at home.	- Pre/post - tests - No control group	Stroke patients (n=16)	Group physiotherapy - Once a week, 10 times total	Group physiotherapy maintains and in part also promotes the motor abilities of a stroke patient undergoing the so-called maintenance phase of rehabilitation.
23	1) Sinkkonen 1995 2) Taskinen, Sinkkonen & Kinnunen 1995	The project evaluated the process of joining the municipal administrative structures of the social and health services and its effects on the structure, substance, quality and effectiveness of these services.	Evaluation study in several phases - Pre/post design - Project in progress - Experiment and control groups	1) Elderly clients in home care (n=66), their relatives (n=74) and personnel in home care and institutional care (n=84+17) 2) Mental health care personnel (n=18+18)	Joining the municipal administrative structure of the social and health services	1) Pre-intervention outcomes: - Employees considered home care services adequate more often than the relatives did - Busy schedule was the greatest obstacle to co-operation - The elderly regarded living at home as important in terms of autonomy - Co-operation between home and institutional care was insufficient 2) - Typical signs of resistance to change were present at the initial stages of changeover
24	Taival 1988	To develop, test and evaluate a model of elderly care based on Roy's adaptation theory.	- Two wards at nursing home - Experiment and control wards - Pre/post design	Nursing home clients (n=30+30) and personnel, nurses and practical nurses	Elderly care model based on Roy's adaptation model - Content not specified	- The ability to use a care process based on Roy among nurses and practical nurses ↑ - Documentation in various adaptation areas ↑, but the solutions did not improve => Roy's adaptation model is useful in elderly care
25	Taival & Paunonen 1992	To assess the impacts of a home nursing design based on Roy's adaptation model on the patients' subjective wellbeing, on the nurses' conceptions of nursing and on home nursing activities.	- Pre/post - tests - No control units	Home nursing clients (n=100) and home nursing personnel (n=18)	Education for personnel: - Roy's adaptation model - Collaboration between the social and health sectors and with volunteers	The results reported were not identified.

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
26	Tossavainen 1993	To develop an intensified health education programme for the upper forms in comprehensive school in order to prevent smoking and alcohol use among adolescents and to evaluate its feasibility and impacts.	- lLogitudinal evaluation study - Randomised allocation into experiment and control groups	Adolescents 13 - 16 years of age - All 24 upper forms in comprehensive schools in North Karelia - 16 upper forms in comprehensive schools in the Province of Kuopio - Schoolchildren (n= 17,462; those participating in the final assessment)	- An intoxicant-abuse prevention programme - Informing about the short-term hazards of smoking and alcohol and about the reasons for their use - Reinforcing interpersonal relations and self-confidence - Knowledge concerning healthy food and physical exercise - Lectures, learning and practice situations	- After the first year, in the 7th form, smoking was on average 35% less common than in control schools, and inebriety was less frequent - In the 9th form, there were no clear differences in smoking or alcohol use between experiment and control groups - The programme did not affect the psychological make-up of the adolescents => The programme postponed the commencement of smoking and inebriety-oriented alcohol use; health education should have a more prominent role in the school curricula
27	Vallimies 1989	To assess the effects of a programme aiming at avoiding episiotomy and rupture, compared with traditional care practice.	- Maternity wards - Experiment and control units in different hospitals (2)	Women in childbirth (regular parturition) (n=418+236)	A programme for preventing episiotomy and rupture - New delivery techniques - Joint decision-making by the woman giving birth and midwife	In experiment group: - Episiotomies 15% ↓ - Perineum symptoms ↓ => The benefits of episiotomy in ordinary parturition are overrated
28	Vallimies-Patomäki 1997	To evaluate childbirth care practices and factors predicting the childbirth experience.	- University hospital delivery unit - Experiment groups (4), no actual control units - Expectations - experiences assessment	Women giving birth, newborn infants and fathers (n=913, mothers and fathers)	4 different care practices in childbirth - Spontaneous parturition - Regular parturition - Irregular parturition - Caesarean section during delivery	Reporting of the results in progress. Outcome areas: - Procedures and care practices in childbirth - Social support - Coping methods - Interaction between newborn infant and parent - Experience

No.	Author(s), year of publication	Aim of study	Design/Methods	Participants/target group	Intervention	Main findings/ conclutions
29	Vehviläinen-Julkunen 1987	To develop and evaluate a family education programme implemented at maternity clinic.	- Maternity clinics - Experiment and control groups - Pre/post - tests	Women expecting their first child and their spouses (family) (n=21+27)	Family education as activity model, small group instruction with the following principles: - Family-centredness, interaction, realism	- Family training should be organised in small groups, with about 10 participants - Also other experts should be present along with public health nurses - Emphasis should be given to the inclusion of the father - More than information is called for as the families expect support
30	Vehviläinen-Julkunen & Teittinen 1993 Vehviläinen-Julkunen 1992	To evaluate childbirth and family education associated with the primary health care planning, research and reform project A report on the Lapinlahti maternity clinic.	- Development work - Initial assessment (expectations) - Final assessment - No control groups	Expectant women with spouses (n=39+31)	Small-group family education model (6 - 10 participants) - Client-centredness - Clients participating in planning the programme - Multiprofessionalism	- The clients were satisfied with small working group. They felt that they could make decisions as experts in their own affairs and that they received support from others in the same situation - Small-group activities were hoped to continue at maternity clinics, as well
31	Vuorenheimo 1994	To investigate how preoperative education given to day care surgery patients, based on management strategy, affects their coping with the surgical care process.	- Patients belonging to experiment and control group in one unit - Preliminary inquiry	Adult day care surgical patients at health centre (n=50+50)	Educational programme - Made on the basis of the preliminary inquiry - Duration approx. 6 months	Study has been interrupted.

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APPENDIX TABLE 3. INTERNATIONAL PRIMARY STUDIES

Key to classification

Methods: **1** patient needs assessment, **2** promotion and maintenance, **3** preventive, **4** therapeutic, **5** rehabilitative, **6** working patterns and other process-related methods, **7** administrative support systems.

Publication: **1** entire article, **2** abstract.

Target: **1** patients/clients, **2** community/population, **3** patients + relatives/significant others, **4** other (incl. nursing personnel), **5** no information.

Age: **1** children, **2** adults, **3** persons over 65, **4** not specified.

Diagnosis: **1** childbirth/pregnancy/neonates, **2** psychiatric illness, **3** dementia/the elderly, **4** surgical condition, **5** internal disease, **6** cardiac disease, **7** cancer, **8** pulmonary disease, **9** neurological disease, **10** several diseases, **11** other, **12** no diagnosis (e.g. nursing home resident), **13** not specified/does not qualify.

Study design: **1** randomised, **2** control group, pre/post-test **3** control group, post-test, **4** no control group, pre/post-test, **5** no control group, post-test.

Participants: **1** number less than 30, **2** n= 31-50, **3** n= 51-100, **4** n= 101-200, **5** number over 200, **6** number not specified.

Setting: **1** hospital, **2** outpatient services/home, **3** the above combined, **4** nursing home/long-term care/hospice, **5** other, **6** no information.

Outcome measures, associated with: **1** functional ability, **2** psychosocial wellbeing, **3** patient's knowledge/participation, **4** sickness, **5** lifestyle, **6** costs, **7** care providers' performance, **8** care providers' knowledge and attitudes.

No.	Author(s), year, title of article	Method	Publication	Target	Age	Diagnosis	Design	Participants	Setting
1	Agbayewa et al. (1990) Empowering Long Term Care Facility Residents using a Resident Staff Group Approach	2	2	1	3	12	3	6	4
2	Aish & Isenberg (1996) Effects of Orem-based nursing intervention on nutritional self-care of myocardial infarction patients	5	1	1	2	6	1	4	3
3	Alessi et al. (1995) Does Physical Activity Improve Sleep in Impaired Nursing Home Residents?	4	1	1	3	11	1	3	4
4	Archbold et al. (1995) The PREP System of Nursing Interventions: A Pilot Test with Families Caring for Older Members	2	1	3	3	10	2	1	2
5	Atwood et al. (1995) The Effectiveness of Adherence Intervention in a Colon Cancer Prevention Field Trial	3	1	1	2	11	1	4	2
6	Augustin & Hains (1996) Effect of music on ambulatory surgery patients´ preoperative anxiety	4	2	1	2	4	2	2	1
7	Barnes-Boyd (1995) Effects of sustained nurse/mother contact on infant outcomes among low-income African-American families	2	2	1	1	1	2	4	2
8	Blair (1995) Combining Behavior Management And Mutual Goal Setting to Reduce Physical Dependency in Nursing Home Residents	5	1	1	3	12	1	5	4
9	Bradley & Kozak (1995) Nursing Care and Management of the Elderly Hip Fractured Patient	4	1	1	3	4	3	4	1
10	Brooks & Gothler (1995) Effects of cardiac rehabilitation on graded exercise test performance in patients with exercise induced myocardial ischemia	5	2	1	2	6	4	3	3
11	Brown et al. (1995) Evaluation of the Impact of a Bedside Terminal System in a Rapidly Changing Community Hospital	7	1	1	2	10	4	6	1
12	Burke et al. (1995) Music therapy following suctioning: four case studies	4	2	1	1	1	4	1	1
13	Carson (1996) The impact of a relaxation technique on the lipid profile	4	2	1	2	5	1	3	2
14	Clark et al. (1995) Alternative Nursing Environments: Do they Affect Hospital Outcomes?	7	1	1	3	12	1	3	1
15	Cremin et al. (1995) The efficacy of a nursing challenge to patients: testing a new intervention to decrease self-harm behavior in severe personality disorder	4	1	1	2	2	2	1	1

16	Danchaivijitr et al. (1995) Effects of Education on the Prevention of Pressure Scores	3	1	1	2	10	2	6	1
17	Dawe & Moore-Orr (1995) Low-intensity, range-of motion exercise: invaluable nursing care for elderly patients	5	1	1	3	12	1	1	4
18	Deiriggi & Miles (1995) The effects of waterbeds on heart rate in preterm infants	4	2	1	1	1	4	1	1
19	Dufault et al. (1995) Changing nurses´ pain assesment practice: a collaborative research utilization approach	1	1	1	2	7	1	1	1
20	Duffy et al. (1995) Clean intermittent Catheterization: Safe, Cost-effective Bladder Management for Male Residents of VA Nursing Homes	4	1	1	2	12	1	3	4
21	Easton et al. (1995) The effects of nursing follow-up on the coping strategies used by rehabilitation patients after discharge	5	2	1	2	12	1	3	3
22	Elander & Hellstrom (1995) Reduction of noise levels in intensive care unit for infants: evaluation of an intervention program	3	2	1	1	1	4	3	1
23	Farnworth et al. (1994) The costs and effects early discharge in the management of fractured hip	5	2	1	3	4	2	6	3
24	Flynn et al. (1996) Effect of three teaching methods of a nursing staff´s knowledge of medication error risk reduction strategies	3	2	4	4	13	4	4	1
25	Forster & Young (1996) Specialist nurse support for patients with stroke in the community: a randomised controlled trial	5	2	1	3	9	1	5	2
26	Gaebler & Hanzlik (1996) The effects of a prefeeding stimulation program on preterm infants	4	2	1	1	1	3	6	1
27	Gallagher (1993) Empathy and assertiveness training in a nursing home environment	2	2	1	3	12	2	3	4
28	Gardner (1991) A Summary of Findings of a Five-Year Comparison Study of Primary and Team Nursing	6	1	1	2	5	2	5	1
29	Goeppinger et al. (1995) From Research to Practice: The effects of the Jointly Sponsored Dissemination of an Arthritis Self-Care Nursing Intervention	5	1	1	2	11	4	4	2
30	Grap et al. (1996) Endotracheal suctioning: ventilator vs manual delivery of hyperoxygenation breaths	4	2	1	2	8	2	1	1
31	Hagen & Sayers (1995) When Caring Leaves Bruises: The Effects of Staff Education on Resident Aggression	3	1	1	3	12	4	4	4
32	Harada et al. (1995) Physical therapy to improve functioning of older people in residental care facilities	5	2	1	3	12	4	1	4
33	Harris et al. (1995) A perinatal continuing education program: its effects on the knowledge and practices of health professionals	7	2	1	1	1	4	6	1
34	Hauenstein (1996) Testing innovative nursing care: home intervention with depressed rural women	4	2	1	2	2	4	6	2
35	Holzemer & Henry (1992) Computer-supported Versus Manually-generated Nursing Care Plans: A Comparison of Patient Problems, Nursing Interventions, and AIDS Patient Outcomes	7	1	1	2	11	3	3	1
36	Huang et al. (1994) Effects of brochure and telephone councelling on cognitive change of parents having G-6-PD deficiency infants ... glucose-6-phosphate dehydrogenase deficiency	5	2	1 3	1	1	2	3	2
37	Hui et al. (1995) Outcomes of elderly stroke patients. Day hospital versus contentional medical management	6	2	1	3	9	1	4	3
38	Hulscher et al. (1997) Changing preventive practice: a controlled trial on the effects of outreach visits to organise prevention of cardiovascular disease	3	1	1	2	6	2	6	2
39	Inouye et al. (1993) A Controlled Trial of a Nursing-Centered Intervention in Hospitalized Elderly Medical Patients: The Yale Geriatric Care Program	5	1	1	3	10	1	5	1

40	Jenkins et al. (1996) A randomized single-blind evaluation of a discharge teaching book for pediatric patients with burns	5	2	1	1	11	3	4	3
41	Johnson (1996) Coping with radiation therapy: optimism and the effect of preparatory interventions	4	2	1	2	7	1	3	6
42	Jones et al. (1995) Home Parental Nutrition: The Royal Prince Alfred Hospital Experience	4	1	1	2	5	5	6	2
43	Kelder et al. (1993) Community-Wide Youth Exercise Promotion: Long-Term Outcomes of the Minnesota Heart Health Program and the Class of 1989 Study	3	1	2	1	11	2	6	5
44	Kemppainen et al. (1996) Effects of group discussion and guided patient care experience on nurses'attitudes towards care of patients with AIDS	3	2	1	2	11	1	6	6
45	Koch (1990) A new clinical career structure for nurses: trial and evaluation	7	1	4	4	13	4	5	3
46	Koroknay et al. (1995) Maintaining Ambulation in the Frail Nursing Home Resident. A Nursing Administered Walking Program	2	1	1	3	12	4	1	4
47	Langham et al. (1996) Costs and cost effectiveness of health checks conducted by nurses in primary care: the Oxcheck study	1	2	1	2	11	1	5	1
48	Leske (1996) Intraoperative progress reports decrease family members' anxiety	4	2	3	2	4	3	4	2
49	Luker (1992) Evaluating computer assisted learning for renal patients	4	1	1	2	5	4	2	3
50	Lund et al. (1995) Video Respite: An Innovative Resource for Family, Professional Caregivers, and Persons with Dementia	5	1	1 3	2	3	4	2	3 5
51	Lökk & Arnetz (1994) Impact on Health Care Consumption of an Experimental Daycare Intervention	6	1	1	3	12	2	3	5
52	Mackay (1996) Health education and COPD rehabilitation: a study	5	1	1	2	8	4	2	2
53	MacRae et al. (1996) A walking program for nursing home residents: effects on walk endurance, physical activity, mobility, and quality of life	5	2	1	3	12	2	3	4
54	Marr et al. (1993) Bedside Terminals and Quality of Nursing Documentation	7	1	1	2	5	1	3	1
55	Martin (1996) Pre-operative visits to reduce patient anxiety: a study	4	2	1	2	4	2	6	1
56	Mattes et al. (1996) Effects of sweet taste stimulation on growth and sucking in preterm infants	4	2	1	1	1	1	2	1
57	Matthews et al. (1996) Effects of an environmental manipulation emphasizing client-centred care on agitation and sleep in dementia sufferers in a nursing home	3	2	1	3	3	4	2	4
58	Melin & Bygren (1992) Efficacy of the rehabilitation of elderly primary health care patients after short-stay hospital	5	2	1	3	12	1	5	3
59	Melin et al. (1993) The cost-effectiveness of rehabilitation in the home: a study of Swedish elderly	5	2	1	3	12	1	4	3
60	Melin et al. (1995) Health outcomes of post-hospital in-home team care: secondary analysis of a Swedish trial	5	2	1	3	10	1	5	3
61	Melnyk et al. (1997) Helping Mothers Cope with a Critically Ill Child: A Pilot Test of the COPE Intervention	4	1	1 3	1	10	1	1	1
62	Miller et al. (1996) Controlled trial of a geriatric case-finding and liaison service in an emergency department	2	2	1	3	12	3	5	1
63	Moody et al. (1995) Effects of Intraoperative Manual Descending Compressions on Saphenous Vein Incision Healing	4	1	1	2	6	2	2	1
64	Moore (1996) The effects of a discharge information intervention on recovery outcomes following coronary artery bypass surgery	5	2	1	3	6	2	3	3

65	Mossey et al. (1996) Effectiveness of a psychosocial intervention, interpersonal counseling, for subdysthymic depression in medically ill elderly	4	2	1	3	2	1	3	3
66	Muijen et al. (1992) Home based care and standard hospital care for patients with severe mental illness: a randomised controlled trial	6	2	1	2	2	1	4	3
67	Mularz et al. (1995) Theory M: A Restructuring Process	6	1	1	2	10	2	6	1
68	Murphy & Liebman (1995) Fever care: Does nursing instruction make a difference?	4	1	1 3	1	11	2	4	3
69	Nelson (1996) Surgical nurse. Pre-admission education for patients undergoing cardiac surgery	3	2	1	2	6	3	2	1
70	Neufeld et al. (1995) Can physically restrained nursing-home residents be untied safely? Intervention and evaluation design	3	2	1	3	12	4	6	4
71	O'Brien (1996) Evaluating primary care interventions for incontinence	4	1	1	2	11	1	5	3
72	Odderson et al. (1995) Swallow management in patients on an acute stroke pathway: quality is cost effective	2	2	1	2	9	4	4	1
73	O'Gorman (1997) Nursing process documentation. A study of the effects on workload and documentation quality when using a computer system and a key word model for nursing documentation	7	2	1	2	10	5	6	1
74	Van Ort (1995) Nursing Interventions to Promote Functional Feeding	2	1	1	3	3	4	1	4
75	Ortiz de Cuevas & Campo (1995) A Program for the home care of patients with a symptomatic malignant terminal disease	5	1	1 3	2	7	4	1	2
76	Pearson (1996) A comparison of the ability of foam swabs and toothbrushes to remove dental plaque: implications for nursing practice	4	2	1	2	11	5	1	6
77	Perls & Herget (1995) Higher respiratory infection rates on an Alzheimer's special care unit and succesful intervention	4	2	1	3	3	2	4	4
78	Persaud et al. (1996) An asthma self-management program for children, including instruction in peak flow monitoring by school nurses	5	2	1	1	8	1	2	5
79	Pålsson & Norberg (1995) Breast cancer patients' experiences of nursing care with the focus on emotional support: the implementation of a nursing intervention	4	1	1	2	7	5	1	3
80	Ragneskog et al. (1996) Dinner music for demented patients: analysis of video-recorded observations...including commentary by Gerdner LA and Buckwalter KC; Ragneskog et al. (1996) Influence of dinner music on food intake and symptoms common in dementi	4	2	1	3	3	4	1	4
81	Richards (1993) The effect of a muscle relaxation, imagery, and a relaxing music intervention and a back massage on the sleep and psychophysiological arousal of elderly males hospitalized in the critical care environment	4	2	1	3	6	1	3	1
82	Richardson & Sullivan (1991) Preoperation interviews: a nursing intervention to reduce patients' anxiety	4	1	1	2	4	2	3	1
83	Rossler et al. (1992) Does case management reduce the rehospitalization rate?	6	2	1	2	2	2	4	3
84	Rovner et al. (1996) A randomised trial of dementia care in nursing homes	6	2	1	3	3	1	3	4
85	Rowley et al. (1995) Continuity of care by a midwife team versus routine care during pregnancy and birth: a randomised trial	6	1	1 3	1	1	1	5	3
86	Roye & Balk (1996) Evaluation of an intergenerational program for pregnant and parenting adolescents	3	2	1	1	1	2	3	2
87	Rudy et al. (1995) Patient outcomes for the chronically critically ill: special care unit versus intensive care unit	6	2	1	2	12	1	5	1

88	Sachdeva et al. (1996) Effects of availability of patient-related charges on practice patterns and cost containment in the pediatric intensive care unit	7	2	1	1	10	2	5	1
89	Samarel et al. (1997) Effect of Support Groups with Coaching on Adaptation to Early Stage Breast Cancer	5	1	1	2	7	1	4	1
90	Schinner et al. (1995) Effects of auditory stimuli on intracranial pressure and cerebral perfusion pressure in traumatic brain injury	4	2	1	2	9	4	1	1
91	Schnelle et al. (1995) Functional Incidental Training, Mobility Performance, and Incontinence Care with Nursing Home Residents	5	1	1	3	12	1	3	4
92	Schnelle et al. (1995) The Use of Computer-Based Model to Implement An Incontinence Management Program	4	1	1	3	12	4	5	4
93	Schwartz-Barcott et al. (1994) Client-nurse interaction: testing for its impact in preoperative instruction	6	1	1	2	4	2	3	1
94	Seltzer et al. (1992) Professional and family collaboration in case management: a hospital based replication of a community-based study	6	2	1 3	3	10	1	6	3
95	Shapiro (1995) Shortened Hospital Stay for Low-Birth-weight Infants: Nuts and Bolts of a Nursing Intervention Project	4	1	1 3	1	1	1	6	3
96	Shiao et al. (1996) Desaturation events during oral feedings with and without a nasogastric tube in very low birth weight infants	4	2	1	1	1	1	1	1
97	Shuster et al. (1996) Implementation and Outcomes of a Community-Based Self-Help Smoking Cessation Program	4	1	2	4	13	4	3	2
98	Snyder et al. (1995) Supportive Seminar Groups: An Intervention for Early Stage Dementia Patients	2	1	1	3	3	1	1	2
99	Spalding (1995) A comparative study of the effectiveness of a preoperative education programme for total hip replacement patients	5	2	1	3	4	3	6	1
100	Stevensen (1994) The psychophysiological effects of aromatherapy massage following cardiac surgery	5	2	1	2	6	1	6	1
101	Strain et al. (1992) Cost offset from a psychiatric consultation-liaison intervention with elderly hip fracture patients	1	2	1	3	4	2	5	3
102	Strong & Sneed (1991) Clinical Evaluation of a Critical Path for Coronary Artery Bypass Surgery Patients	6	1	1	2	6	4	1	1
103	SUPPORT (1995) A controlled trial to improve care for seriously ill hospitalized patients. The study to understand prognoses and preferences for outcomes and risks of treatments (SUPPORT)	4	2	1	2	10	1	5	1
104	Taddio et al. (1995) Effect of counseling on maternal reporting of adverse effects in nursing infants exposed to antibiotics through breast milk	1	1	1 3	1	1	4	4	1
105	Thomas (1996) Comparison of Patient Education Methods: Effects on Knowledge of Cardiac Rehabilitation Principles	5	1	1	2	6	1	3	1
106	Thorens et al. (1995) Influence of the quality of nursing on the duration of weaning from mechanical ventilation in patients with chronic obstructive pulmonary disease	6	1	1	2	8	2	3	1
107	Topf et al. (1996) Effects of critical care unit noise on the subjective quality of sleep	3	2	1	2	10	1	3	1
108	Turner (1996) A comparative analysis of the effects of a 12-week exercise program on the MET levels of anterior versus inferior myocardial infarct patients	5	2	1	2	6	1	1	1
109	Vaughan (1995) The gentle touch	4	1	1	2	12	2	3	1

110	Venderber et al. (1995) The Effect of Nursing Interventions on Transcutaneous Oxygen and Carbon Dioxide Tensions	4	1	1	2	12	4	1	1
111	Weinberger et al. (1996) Greater access to primary care increased both patient satisfaction and hospital readmissions	7	2	1	2	10	1	5	3 4
112	Williams et al. (1996) Health promotion workshops for seniors: predictors of attendance and behavioral outcomes	3	2	1 2	3	11	4	6	2
113	Winslow (1997) Effects of Formal Supports on Stress Outcomes in Family Caregivers of Alzheimer's Patients	4	1	3 1	2	3	4	5	2
114	Yeaw (1996) The effect of body positioning upon maximal oxygenationof patients with unilateral lung pathology	4	2	1	2	8	4	2	1
115	Young & Forster (1992) The Bradford community stroke trial: results at six months	5	2	1	2	9	4	4	2
116	Zimmerer-Branum & Nelson (1995) Occupationally Embedded Exercise versus Rote Exercise: A Choice Between Occupational Forms by Elderly Nursing Home Residents	5	1	1	3	12	1	3	4
117	Zimmerman et al. (1996) The effects of music interventions on postoperative pain and sleep in coronary artery bypass graft (CABG) patients... including commentary by Miaskowski C	4	2	1	2	6	2	3	1

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APPENDIX 1. DATABASES USED IN ELECTRONIC DATA RETRIEVAL

- **MEDLINE**

- The database corresponds to three printed publications: Index Medicus, Index to Dental Literature and International Nursing Index.
- Contains references with abstracts to more than 3,200 journals in 70 countries with over 250,000 articles annually.
- Updated once a month.
- The best database for searching for international scientific literature.
- Produced by the National Library of Medicine (NLM), USA.

- **CINAHL** (Cumulative Index to Nursing and Allied Health Literature)

- Specialises in nursing research, complementing the Medline.
- Produced by the Cinahl Information Systems.

- **The COCHRANE Library**

- The main product of the Cochrane Collaboration.
- An electronic publication updated at regular intervals (four times a year), with several databases:

1) The Cochrane Database of Systematic Reviews (CDSR), containing the systematic reviews as well as plans compiled and maintained by review groups.
2) The Cochrane Controlled Trials Register (CCTR), containing bibliographical data on tens of thousands of controlled trials.
3) The Database of Abstracts of Reviews of Effectiveness (DARE), incorporating reviews of effectiveness, their references, critical evaluations and short abstracts collected by the York centre in England (NHS, Centre for Reviews & Dissemination).
4) The Cochrane Review Methodology Database, including references of articles and books on review methodology and instructions for compiling reviews.
5) The Cochrane Collaboration, containing information about the Cochrane Collaboration and review group members' contact information.

- Material can be ordered from the BMJ Publishing Group (Great Britain).
- For more information, please refer to the Internet at http://www.cochrane.co.uk

- **ArbSpriSwe**

- The Nordic database in social welfare and health.
- Updated four times a year.
- Contains over 165,000 references since the 1980s.
- The data providers are Arbetslivsbiblioteket, Medicinska informationscentralen vid Karolinska institutet, Spris bibliotek, BTJ System ab and the central library of health care, from August 1996.

- **Sociofile**

- Contains information from the publications Sociological Abstracts, and Social Planning / Policy & Development Abstracts.
- References involving more than 1,600 publications all over the world since 1974.
- Updated three times a year.
- Produced by Columbia University (USA).

APPENDIX 2. LETTER SENT TO HEADS OF NURSING SCIENCE DEPARTMENTS AT FIVE UNIVERSITIES[1]

Dear Sir or Madam

We are conducting a review of technology assessment in nursing. By means of a literature review, our goal is to form an idea of the research done in the field both internationally and in Finland. In order to investigate the Finnish situation, we will examine the abstracts of university theses and dissertations, the abstracts of the four Finnish conferences on nursing, the Yearbook of Nursing and the issues of the Journal of Nursing Science. We have made the following specifications concerning the technologies and their assessment:

- By technologies in nursing we mean all the helping methods used in nursing as well as the so-called support and administrative measures, e.g. the division of labour, type of leadership.
- A technology in nursing may also be one used by other professions, such as collaboration between nurses and physicians.
- By research on these technologies we mean investigations where a technology is actively (by trial) or passively manipulated to find out the outcome in the experiment group.

We would like to ask for your help so that we could obtain all research on this topic, because the sources accessible to us do not contain all the studies conducted this year or the year before, and definitely not work in progress.

Therefore, we kindly request that you send us abstracts of experimental and quasi-experimental intervention studies on technologies in nursing carried out in 1996 and 1997, be they published, unpublished, in progress or in printing.

Although we know that you have a busy schedule, we would appreciate your co-operation through supplying the information requested by mail (return envelope enclosed) during March this year. We shall send you a copy of the report once it is completed by the end of this year.

If you need further information, do not hesitate to contact us.

Thank you for your co-operation. We look forward to hearing from you.

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[1] These included the universities of Kuopio, Oulu, Tampere and Turku as well as Cbo Akademi University. In the case of Kuopio, a letter was also sent to the Department of Health Policy and Management.

APPENDIX 3. OUTCOME ASSESSMENT AREAS

(and examples of the contents)

1 Associated with functional ability

- Washing, eating, excretion, dressing, physical performance, breathing.
- Self-management.

2 Associated with psychosocial wellbeing

- Fear, anxiety, personal adaptation, adaptation of the family / care provider, coping, role-specific performance,
  strain associated with the role of the family / care provider.
- Experiences, satisfaction.

3 Associated with patient´s knowledge / participation

- Knowledge, attitudes, participation in and compliance with care.

4 Associated with sickness

- Mortality, morbidity, pain, use of analgesics, recovery, state of health, symptoms, pulse, RR, etc.

5 Associated with health

- Healthy lifestyles: use of alcohol, smoking, attempts to refrain from these habits.
- The environment: noise.

6 Associated with costs

- Duration of hospital periods, outpatient vs. inpatient services, readmissions, service use.
- Complications, falls, acquisity, personnel structure.
- Money.

7 Associated with care providers

- Working style, quality, errors (e.g. with medication).

8 Associated with care providers' knowledge and attitudes

- Work satisfaction, morale, attitudes, knowledge.

Terveydenhuollon menetelmien arviointiyksikkö

Finnish **O**ffice for **H**ealth Care **T**echnology **A**ssessment

Goal:
- to promote effectiveness and efficacy in Finnish health care

Modes of operation:
- collection, analysis and synthesis of information about national and international health care technology assessment studies and its dissemination to health care users
- provision of quantitative and qualitative support to national assessment studies

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