Master of Clinical Science

A systematic review of the effectiveness of nurse-led clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints.

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Abstract

Background Ear, nose and throat complaints are very common and can cause disruption to patients’ lives. Many conditions are of a chronic nature and are not currently managed in a timely manner by general practitioners in the community. This may be due to a lack of specialised knowledge, necessary diagnostic equipment, or a lack of time for lengthy patient education about management of their condition. A nurse-led model of care may be an effective alternative.

Objectives To examine the effectiveness of nurse-led clinics on adults with chronic ear, nose and throat complaints.

Inclusion Criteria

Participants Adult patients, aged 18 and older, attending ear, nose and throat clinics, regardless of complaint.

Interventions Nurse–led care in general practice and acute care in which the nurse was identified as taking a lead role in the care of the patients with chronic ear, nose and throat complaints.

Comparator General practitioner-led care, or ear, nose and throat consultant-led care, sometimes described as “standard care”.

Outcomes Service delivery outcomes- specifically patient satisfaction, waiting times, patient education booking queues, clinical and health outcomes, specifically, treatment times, treatment duration, course of treatment, self-treatment rates, change in presentation to clinic episodes, re-infection rates, prevention and cure, representation of patients to clinic for same complaint, levels of pain and
discomfort and financial outcomes, specifically differences in costing, nurse–led clinic versus medical–led clinic.

**Studies** Any relevant quantitative studies published in English between 1980-2013 were considered.

**Search Strategy** A standardised three-step search strategy aimed to find both published and unpublished studies. Databases searched included PubMed, CINAHL, Cochrane Library (CENTRAL), Scopus, Embase, MedNar and ProQuest Theses and Dissertations.

**Methodological quality** Assessed by two reviewers prior to inclusion in the review using standardised critical appraisal instruments from the Joanna Briggs Institute.

**Data Synthesis** Due to the methodological heterogeneity of the included studies, no statistical pooling was possible and all results are presented narratively.

**Results** The search identified 13,536 titles, of which 20 potentially relevant articles were retrieved. Of these 20, 17 were excluded following full-text review leaving three studies that were assessed for methodological quality and included in the review. Service delivery outcomes: Patient satisfaction was equal or higher and waiting times were shorter in nurse led clinics. Clinical and health outcomes: Lower pain/discomfort levels were demonstrated in nurse led clinics but other clinical/health outcomes were not addressed. Financial outcomes: Nurse-led clinics were cost effective when compared with medical-led clinics.

**Conclusions** While all studies reported evidence of effectiveness of nurse-led clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints, most of the data was self-reported and many of the outcomes of interest were not considered. The lack of experimental trials means that the level of evidence is low and further research is needed.

**Implications for Practice** Nurse-led ear, nose and throat clinics should be considered in the
management of adult patients with ear, nose and throat complaints, particularly those of a chronic nature which could be effectively managed by specialist nurses.

**Implications for research** Currently the overall level of evidence discovered regarding nurse-led ear, nose and throat clinics is low and further more thorough comprehensive studies are required to address all of the proposed outcomes. There is little to no evidence on a number of key outcomes and therefore more research is needed on the effect of nurse-led clinics to address these outcomes.

**Keywords** Nurse, nursing, nurse specialist, nurse practitioner, advanced nursing, ear, nose, throat, patient, satisfaction, cost, effectiveness, service, adult, chronic, acute
Student declaration

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Signed:

Caroline Whiteford

Dated: / /2015
List of Abbreviations

ACTUARI ...............Analysis of Cost, Technology and Utilization Assessment and Review Instrument

APRN....................Advance Practice Registered Nurse

CI ........................Confidence interval

CReMS....................Comprehensive Review Management System

CNM.....................Certified Nurse Midwife

CNP........................Certified Nurse Practitioner

CNS........................Clinical Nurse Specialist

CRNA....................Certified Registered Nurse Anaesthetist

ECN.......................Ear care Nurses

ENT.......................Ear, Nose and Throat

GP..........................General Practitioner

HSQ-12....................Health Related Quality Of Life Score

MAStARI....................Meta Analysis of Statistics Assessment and Review Instrument

MeSH........................Medical subject headings

NLDC........................Nurse Led Dizziness Clinic

NOTARI....................JBI Narrative, Opinion and Text Assessment and Review Instrument

QARI.......................JBI Qualitative Assessment and Review Instrument

SUMARI........................System for the Unified Management, Assessment and Review of information
Chapter 1 Introduction

1.1 Introduction to this thesis

Chapter one aims to introduce the reader to the development of the systematic review that forms the body of this thesis. It describes the methodology and processes used in the undertaking of this research. This chapter also situates and outlines the need for this review and discusses some context to a discussion around the effectiveness and cost effectiveness of nurse-led clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints and more broadly, systematic reviews in general.

1.2 The structure of this thesis

This thesis is made up of six chapters. Chapter one aims to give an introduction to systematic reviews in general, the systematic review process and role of systematic reviews in healthcare, specifically in the speciality of ear, nose and throat. Chapter two provides background to the topic of the review and focuses on the role of nurse-led clinics ear, nose and throat clinics. One of the requirements for publication of a Joanna Briggs Institute systematic review, is the development and publication of an a priori protocol, detailing proposed methods of the systematic review. Chapter three presents the systematic review protocol from which this thesis developed, as published (Whiteford, White et al. 2013). Chapter four details the results. This chapter is divided into four sections: identification of studies for inclusion in the review,
methodological quality of the included studies, findings extracted from individual studies and a synthesis of findings drawn from individual studies.

Chapter five discusses the results presented in chapter four as they relate to outcome measures of effectiveness and cost effectiveness of nurse-led ear, nose and throat clinics. Chapter five also provides some context to the review findings, highlights limitations of the study and the methodological issues experienced in the process of conducting this review. In Chapter six, conclusions are drawn from the review and recommendations for research and practice offered. The thesis is completed with a list of references, acknowledgements and appendices.

1.3 Situating this review

This review examines both the effectiveness and cost effectiveness evidence of nurse-led clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints. This systematic review does not focus on paediatric patients or studies written in languages other than English. The review has not been funded, sponsored or supported by a government organization or any interested groups from the subject area. This lack of external funding has resulted in a systematic review and thesis which has no agenda but to inform practice and recommend future research into this topic.

As a clinician working in the field of ear, nose and throat specialty and ambulatory care, it has been important to undertake this systematic review and to establish evidence-based recommendations for practice, as well as to identify future research and policy direction for
effectiveness and cost effectiveness in the area of nurse-led clinics in ear, nose and throat specialties.

1.4 An introduction to systematic reviews

A literature review generally includes published material that examines recent or current literature, may or may not include comprehensive searching, and may or may not include a quality appraisal of the included studies. The evidence synthesis is typically narrative and analysis may be chronological, conceptual or thematic. (Grant 2009)

A systematic review is also summary of a body of literature, however – unlike a literature review, uses explicit and reproducible methodology to systematically search, critically appraise, and synthesize evidence in order to address a specific issue. (The Joanna Briggs Institute. 2014)

The Joanna Briggs Institute has developed systematic review methodologies to synthesis best available evidence to inform clinical practice, policy and research on a wide variety of healthcare issues. The definition of evidence used by the Joanna Briggs Institute is deliberately broad to allow many areas of healthcare to be considered and currently includes: quantitative research findings, qualitative research findings, economic data and non-research evidence such as text and expert opinion. If we are to provide the best available patient care, healthcare decisions and healthcare policies should be informed by the best available evidence. Systematic reviews draw together several sources of evidence into one document and can be very useful for clinicians, researchers or policymakers who may not have the time available to
search and identify individual articles, critically appraise them and determine whether the evidence presented is relevant to their enquiry.

**Characteristics of a systematic review**

A systematic review uses a process of transparent, robust methodology whereby researchers can define a research question, conduct an extensive search, identify all relevant primary research relating to the research area, critically evaluate the methodological quality of identified studies and then extract data against predetermined outcomes. (Grant 2009) (The Joanna Briggs Institute. 2014)

In addition to synthesising best available evidence to address a research topic, systematic reviews can also play a role in discovering what is lacking in current research and be useful in identifying research gaps. In these ways, systematic reviews are able to inform future research and influence clinical practice, which is vital to safe and appropriate care. (Gopalakrishnan and Ganeshkumar 2013) The term ‘comprehensive systematic review,” is used to denote a review that considers more than one type of evidence. (The Joanna Briggs Institute. 2014) The present review was a comprehensive review and considered both evidence of effectiveness and of cost effectiveness.

**Types of evidence considered in a systematic review**
The Joanna Briggs Institute considers four main types of evidence: qualitative primary research, quantitative primary research, non-research text and expert opinion and economic studies.

**Qualitative evidence**: allows researchers to analyse human experiences and cultural and social phenomena. (Jordan Z 2006) In a health care context, qualitative research might focus on patient personal experiences, interpret behaviours, social contexts and beliefs, attitudes and perspectives of patients and clinicians, patient experiences and relationships. (The Joanna Briggs Institute. 2014)

A qualitative question might ask what the experience of a certain intervention has on a population. Qualitative evidence should ensure that participants’ voices are adequately represented and what influence the researcher has on the research and vice versa.

**Quantitative evidence**: seeks to establish relationships between two or more variables and then statistical models are used to assess the strength and significance of those relationships. Quantitative research looks at evidence of effectiveness, how an intervention achieves an intended effect. It may also consider incidence, prevalence, association, psychometric properties and measurement of physical characteristics, quality of life and satisfaction with care. (The Joanna Briggs Institute. 2014) One type of quantitative evidence is derived from experimental studies.

**Experimental studies**, consider a causal relationship between two variables, deliberately manipulating one of them and then looking at changes in the other and observational studies, a correlation or association between two variables. A quantitative question might look at the
effectiveness of an intervention on a defined population of people using statistical methods e.g.: this thesis, entitled, “The effectiveness of Nurse Led Clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints”.

**Economic evidence:** An economic evaluation considers health effects and the cost of interventions so could include quantitative designs of study with an added cost measurement inclusion. The types of economic studies might include cost effectiveness analysis (CEA) - results expressed in dollars per case or injury averted, different incremental summary economic measures reported, benefits measured in natural units. Cost utility analysis (CUA) - two dimensions of effects measured, results expressed as cost per dimension, benefits expressed in summary measures as combined quantity and quality measures. Cost benefit analysis (CBA) - benefits measured in monetary units, net present value, benefit cost ratio. Partial economic analysis, a cost minimisation analysis (CMA) - not a full form of economic evaluation, assumption is that the benefits / consequences are the same, the preferred option is the cheapest. (The Joanna Briggs Institute. 2014)

**Text and opinion based evidence:** non research / opinion based evidence based on expert opinion and found in journals, reports, magazines and papers. In the absence of research studies the best available evidence might be this type of evidence (The Joanna Briggs Institute. 2014).
**Comprehensive reviews**: consider two or more types of evidence. The usefulness of considering types of evidence together not only determines the effectiveness of an intervention but how that intervention has an overall effect. It can strengthen evidence by demonstrating qualitative, quantitative, textual and economic considerations for research questions.

Therefore this review considered economic and effectiveness studies together to consider the effectiveness and economic benefits of nurse-led clinics.

**Process of undertaking a systematic review**

There are seven steps that are widely accepted as being vital to ensuring the rigor of the systematic review process – regardless of the type of evidence under review. They are described in Table 1, adapted using (Grant 2009) and (The Joanna Briggs Institute. 2014).

**Table 1  Stages in undertaking a Systematic review**

<table>
<thead>
<tr>
<th>Systematic review question</th>
<th>The question identifies the inclusion criteria for the review. The question should reference the population, intervention, comparator and outcomes (PICO) of the intended review.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research protocol</td>
<td>The goal of developing a research protocol is to develop formulation of the questions and methods of the review before retrieving the literature. The methods for literature searching, screening, data extraction, and analysis should be contained in the protocol to minimise bias before starting the literature search</td>
</tr>
<tr>
<td>Comprehensive search strategy</td>
<td>The literature search aims for exhaustive, comprehensive searching to identify all international research relating to the review question. The search strategies aims to identify both published and unpublished</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Critical appraisal</td>
<td>A systematic review aims to synthesise the best available evidence, therefore the methodological quality of included studies needs to be appraised using validated checklist or tool to assess for biases. This quality assessment is undertaken by two reviewers to determine inclusion/exclusion of studies.</td>
</tr>
<tr>
<td>Data extraction</td>
<td>Details regarding participants, interventions, comparators and outcomes are to be extracted from included studies. Use of a standardised extraction tool aims to minimise errors in extracting data.</td>
</tr>
<tr>
<td>Data synthesis</td>
<td>Meta-analysis is the statistical synthesis of numerical data. It is important to combine study data only when it is appropriate to do so, otherwise analysis and subsequent conclusions drawn may not be valid. Where meta-analysis is not appropriate, data may be synthesis in narrative summary and include graphs and tables.</td>
</tr>
<tr>
<td>Interpretation of results</td>
<td>This information can largely be presented in the data analysis and results table in the manuscript. The strengths and weaknesses of the included studies must be discussed. Conclusions should be based on the best available scientific evidence. Recommendations for practice and future research can be made.</td>
</tr>
</tbody>
</table>

The systematic review protocol pre-defines the objectives and methods of the systematic review. It details the criteria the reviewer will use to include or exclude studies, identify data relevant to the topic and how it will be critically appraised and data extracted. The protocol provides the plan of the review and the Joanna Briggs Institute has developed a computer software program, SUMARI (System for the Unified Management, Assessment and Review of information) which is used to manage the systematic review process. SUMARI includes CReMS (Comprehensive Review Management System) software designed to assist reviewers.
manage and document a review, search results and findings. CReMS links to four analytic modules of SUMARI:

- JBI Qualitative Assessment and Review Instrument (QARI)
- JBI Meta-Analysis of Statistics Assessment and Review Instrument (MASTARI)
- JBI Narrative, Opinion and Text Assessment and Review Instrument (NOTARI)
- JBI Analysis of Cost, Technology and Utilisation Assessment and Review Instrument (ACTUARI).

The systematic review includes a thorough search of all relevant databases. Each selected database has specific search terms and these are outlined so the search is not only very detailed but reproducible. The studies identified in the searching process are then scrutinized to make sure these are the papers that will answer the research question through firstly abstract analysis and then full text analysis. The papers that meet all the criteria for review then undergo a critical appraisal process of the methodologies used in each of the studies conducted using a primary and secondary reviewer who have been trained in the assessment methodology. The primary reviewer initiates the review in SUMARI and assigns the secondary reviewer to the JBI review. They determine the time frame of the review, critically appraise potentially includable papers, provide an overall appraisal of papers following critical appraisal by the secondary reviewer, conduct primary data extraction from included papers and extract data from papers included. Associate reviewers may also be added to each review and if there is dispute or difference of opinion between the primary and secondary reviewer the associate reviewer may act as a mediator between the two reviewers.
The critical appraisal process uses standardised tools as outlined previously. By using the checklist questions in SUMARI, areas of concern in methodological quality are identified. The checklist enables the same questions are asked for each included study and they are all judged by the same criteria.

After the critical appraisal process, data extraction is undertaken and data synthesis occurs where appropriate, quantitative data can be combined into meta-analysis in order to generate a statistical summary of included studies. If there are too few studies identified a meta analysis is not possible and then the systematic review takes on a narrative analysis. For qualitative research, findings are combined in meta-synthesis and meta-aggregation generates a summary of findings which is then presented and expressed to answer original questions. These answers may then be used to inform practice and further research.

The decision to conduct a systematic review was based upon an interest in the effectiveness of nurse-led clinics and how recommendations might inform health policy and assist more nurse-led activity in the area of interest. As statistical evidence was a focus of interest, a quantitative review was considered appropriate. Cost information was also relevant to research interest, leading to the development of a comprehensive systematic review. In reviewing the literature and after critical appraisal it was evident there was insufficient papers to perform meta-analysis and therefore this systematic review presents synthesised findings in narrative summary.

1.5 **Quantitative evidence of effectiveness and cost effectiveness**
This thesis considered the effectiveness and cost effectiveness of nurse-led ear, nose and throat (ENT) clinics. The term effectiveness, as defined by the Joanna Briggs institute, refers to the effect of a particular treatment or intervention, drug or procedure on defined outcomes when used in actual practice. (The Joanna Briggs Institute. 2014) Effectiveness and cost effectiveness are terms in health care that are well suited to each other. Together they are the predominant study types utilised in research and the application of evidence in the social sciences such as psychology and nursing.

A study that looks at effectiveness focuses on the evidence of effect. This involves showing and describing how the intervention works or does not work. An effectiveness study would also show how effective the intervention is in preventing, reducing, destroying the intended target of the intervention. (Tranfield, Denyer et al. 2003)

Effectiveness studies also have to look at the benefits and harms of the intervention in its application which is often presented as a secondary finding.

Cost effectiveness studies not only look at the costs of interventions but also the outcomes or effects. In a cost benefit analysis the outcome is measured in monetary terms but in a cost effectiveness study results are presented as a ratio of cost to effect, in other words the cost of something to achieve an effect. One disadvantage of a cost effectiveness analysis is that programs with different types of outcomes cannot be compared. (Phillips 2001)

1.6 Challenges of undertaking a comprehensive systematic review
As noted previously, a comprehensive review is defined as a systematic review, which synthesises two or more methodologies of research. The challenge in undertaking a comprehensive systematic review is assessing, appraising and then defining the boundaries of the review to adequately include several forms of evidence. The present review considered quantitative and economic evidence. This was decided as an initial search of literature found appropriate and relevant work in the areas. Interestingly, following an extensive search and critical appraisal process, only three studies were identified as being relevant for inclusion. This highlights a lack of quantitative evidence in this area, which is surprising given the current drive for lower cost healthcare. This observation poses the question, is research being indexed correctly or is research not being published regarding this subject?
Chapter 2  

Background

This chapter intends to introduce and provide an overview of nurse led clinics, the history of nurse-led clinics and more specifically what such clinics offer in the context of an ENT specialty, from both clinical and economic perspectives.

2.1 Introduction to nurse led clinics

A broad definition of ‘nurse-led clinic” is one where clinics are run and managed by nurses that have advanced skills and can work autonomously. There is a wide variety in the way that different nurse-led clinics are structured, but they all contain some common characteristics. In most clinics nurses have their own caseload and patients consult with them in specified time slots. Nurses make detailed physiological assessment, subsequent care planning, delivery of treatments, monitoring of the patient's condition and management of medicines. They also refer patients to other colleagues. (Government 1996-2015) Nurses adopt a holistic framework to work with patients to develop healthcare plans that will maximise their health and stabilise their condition. Nurse led clinics are not a replacement for medical clinics rather the nurse-led clinic works alongside the traditional medical clinic. (Melbourne 2007) Nurse-led clinics support ongoing care for patients with chronic conditions or patients following acute episodes of care but still require ongoing monitoring. (Wong and Chung 2006)

Patient satisfaction with the delivery of care in nurse-led clinics has been found to be acceptable. (Horrocks and Anderson 2002) conducted a systematic review of 11 trials and 23 observational studies comparing care provided by nurse and physicians. The results of the review found that whilst there was no differences in health status, return consultations and prescriptions and referrals, there was higher
levels of patient satisfaction in communication with nurse practitioners, amount of information given to patients in nurse-led clinics and completeness of records kept. In a survey conducted in New South Wales in 2010, (The Nous Group 2010) Australians were also largely positive when asked if they would “use a nurse-led clinic if one opened in their area and offered more convenient access than general practice”, with 84% of Australians responding positively and only 14% saying they would not use nurse-led clinics. The remaining 2% of people were undecided. People living outside capital cities were more likely (89%) to report that they would attend a nurse-led clinic than those living in capital cities (81%).

Support for nurse-led clinics decreased as the age of respondents increased. The most significant variation observed (with regard to support for nurse-led clinics) was between the 18-24 years on 92%, compared to those 65 years and over with just 73% support. (The Nous Group 2010) From an economic point of view, there is evidence that nurse-led clinics also reduce the cost and number of acute presentations of patients to tertiary institutions as care of illnesses are managed and patients are more compliant to treatment and work with nurses in following prescribed health care plans to maintain optimal health (Uppal, Jose et al. 2004).

2.2 Emergence of nurse led clinics

The term “nurse-led clinic" emerged in literature in the 1980's. Prior to this time there was certainly evidence of nurses running clinics, including midwifery teaching, mother and baby education and generalised health education and treatment clinics. (O'Connor 1989) However there began to be an emergence of specialized clinics which coincided with emergence of new models of nursing practice and more focus on nursing training within academic institutions rather than only hospital based training for nurses. (Hatchett 2003) Government policy makers began to collaborate with the academic
community in establishing guidelines by which nurses would be trained and assessed by standardised competency frameworks and roles expanded to create qualified Nurse Practitioners. (ANMC 2006)

Nurses began to expand their practice performing roles normally only reserved for medical staff and began to perform their own research such as nurses running women’s health clinics (McTavish 2003) or nurses working in chronic disease management clinics (Eley 2013) and discovering outcomes such as higher patient satisfaction, lower levels of pain, better compliance to care plans and greater job satisfaction which supported the idea of nurse-led clinics. In the 1990’s, nurse-led clinics began to expand and become recognised as a new form of health care service. (McTavish 2003)

Such clinics were quite prevalent in the United Kingdom where many nurse-led. Nurse-led clinics were established in hospitals but also in locations such as shopping centres or attached to local Doctor surgeries. Nurses ran and managed the clinics but some did have limited hours when medical staff were present. They were often open after hours and nurses dealt with “walk in” patients seeking medical treatment for minor ailments, non life threatening conditions and those people who found attending a business hours medical practice difficult due to work or other commitments. One of the aims of this type of clinic was to relieve the pressure on overcrowded emergency departments and overbooked Medical General Practices. As these clinics grew and recognition of nursing skills and contribution to health services became more widely accepted, policy makers and governments became more supportive (Pearson 2000) and more support given to expand both nurse-led clinic functions and nursing roles.

Roles such as Nurse Practitioners, Clinical Nurse Specialists, Advanced Nurse Practitioners and Nurse Consultants were developed and the nurse-led clinic started to become an integral part of the health care service. Nurse-led clinics were not only operating alongside traditional medical clinics to complement the care given by doctors (by education of clinical interventions, clinical treatments) but
also operated independently by providing ongoing chronic care management. Internationally the role of
the nurse in nurse-led clinics is very similar. Whether the nurse is defined as an Advanced Practice
Nurse, a Nurse Practitioner, or a Clinical Nurse Specialist, terms commonly used in United Kingdom,
United States, Australia and European literature it is clear that the role of the nurse in the nurse in the
nurse-led clinic is almost identical. (Bliss 1977)

The nurse works within a well defined, structured model which includes guidelines and protocols to
assess patients, treat and evaluate medical interventions whilst also providing education, support and
ongoing care and to work in close collaboration with both medical and other allied health professionals
to maintain and monitor patient health.

2.3 Nurse led clinics in ENT

Often ENT conditions require long term, ongoing interventions and clinically nurses who work in nurse
led clinics are well placed to provide clinical care to patients with ear, nose and/or throat complaints,
particularly for patients with complaints of a chronic nature. Nurses who have received specialised ENT
training and have highly specialised skills can perform tasks of a clinical nature, such as microsuction of
ears for patients with chronic ear conditions, complex and simple wound care, administration of
specialized treatments and physical assessments and examinations. There is also an ability to
recognise early deterioration in conditions and rapid referral for more advanced care by medical
colleagues and also an ability to refer on to other health care professionals for investigative tests (e.g.
audiologists for hearing assessments). There is value in nurses reviewing and providing post operative
education for patients after procedures that have been straightforward and without complication (e.g.:
uncomplicated tonsillectomy) which may just require a nurse consult to establish whether the patient is
able to tolerate a normal diet without pain and examination of the throat to establish whether wound healing has occurred. Nurses performing this function in a clinic allow the medical staff to be freed up to concentrate on more complex cases which require more specialised medical intervention. As there are a lot of ear, nose and throat conditions that are of a chronic nature (e.g. recurrent ear infection, causing increased cerumen) there is also value in nurse-led clinics to provide the patient with ongoing education and support pertaining to their condition that require longer consults involving counselling and evaluation of treatments, an alternative to patients, rather than having to report to emergency departments in hospitals or general practices to seek treatment.

One of the skill sets that experienced nurses possess is an ability to communicate well with patients. Qualitative evidence notes that effective, clear communication with patients requiring ear care is essential. It can assist the nurse to obtain a clear and concise patient history, be able to identify contributory factors and be able to offer appropriate advice and care and empower the patient with knowledge on how to control their aural complaint. (Mangan 1999) There is quantitative evidence to support that patients from two similar socio-economic regions were more satisfied with the care given by nurses in nurse-led clinics and that their awareness of their conditions was greater in the nurse-led service. There was no statistical difference however in the patient’s pain or health status. (Fall, Walters et al. 1997) Specialised treatments such as microsuction of wax from ears may also be a skill that general practitioners are unfamiliar with and do not offer and therefore patients find alternative treatments (such as ear syringing) are not as successful. (Harkin 2005) This can lead to lack of compliance to treatment and lower levels of patient education regarding their complaint therefore may result in poorer clinical outcomes. There is also some evidence to suggest that utilisation of nurse-led clinics can have a positive result in costs associated with consults. (Uppal, Jose et al. 2004) Direct costs such as nurses salary were lower than a medical doctors’ salary but more research may be indicated to refine costs to include more analysis of costs associated in nurse-led clinics with
prescribing of medication and costs of investigations ordered by nurses versus doctors in medical clinics. There may also be a benefit to nurses working in the nurse-led clinics in terms of their role and expansion of their roles and skills and greater job satisfaction and improved collaboration with medical and allied health teams.
Chapter 3  Systematic review protocol

3.1 The systematic review protocol

The following chapter is a reproduction of the approved and published protocol (plan) for the systematic review on which this thesis is based. It is written in the format required by the Joanna Briggs Institute and consists of standard sections and includes some material from previous chapters (Chapter 1 and 2) as background to this review.

3.2 Background

Nurse-led clinics in the management of ear, nose and throat complaints.

ENT complaints, whilst very common, are rarely life threatening but can cause significant discomfort and disruption to many patients’ lives. Many of the conditions encountered are chronic and cannot be easily managed and accommodated by general practitioners (GPs) in the community. This is likely to be due to factors such as time constraints as these patients often need longer than a standard consultation. In addition, GPs often do not have the specialized equipment or education that is required to diagnose or treat ENT disorders (Harkin 2005) and therefore refer patients to tertiary institutions for ongoing treatment such as aural care. This increases the number of referrals to hospitals, which ultimately leads to longer non-urgent booking queues and longer waiting times for patients seeking treatment. Teamed with this is the current trend in health care to make better use of limited resources while still delivering high quality care within clinically acceptable timeframes (Mylvaganam, Patodi et al. 2009) and tighter budgets. (Uppal, Nadig et al. 2004)
In response to the increased need for more specialized ENT services, nurse-led clinics have emerged to treat patients with chronic and ongoing conditions of the ear, nose and throat. (Hatchett 2003, Harkin 2005) Nurses with specialized training in these clinics provide an educative role to patients to promote health, provide psychological assistance and support, monitor the patient's condition, involve patients in their own care, and perform nursing interventions as necessary - essentially holistic nursing care. (Harkin 2005)

Numerous studies highlight the lack of otolaryngology (ENT) teaching in GP training and suggest that a lot of the knowledge GPs rely on they have attained as medical students, which is often inadequate in managing complex ENT issues. (Harkin 2005) Nurses with specialized ENT training can facilitate training of GPs and community nurses by running study sessions and providing ongoing support thereby improving professional relationships between tertiary and primary healthcare settings. (Jordan Z 2006)

The effectiveness of nurse-led clinics from a patient satisfaction perspective was demonstrated well in some of the studies identified. (Horrocks and Anderson 2002, Wong and Chung 2006) Data reported in such studies indicates that patients' satisfaction was linked strongly in nurse-led clinics to aspects of care and service delivery such as shorter waiting times for first attendance, better communication, more advice on health care, self-care and management, and follow-up care. The therapeutic relationship between nurses and patients can be pivotal to patient compliance to treatment and trust/belief in care pathways. Nurses often possess better listening or counseling skills than doctors and can spend more time communicating with patients. (Robertson, Maxwell et al. 2009) This creates a more relaxed and empathetic atmosphere and encourages patients to communicate more openly. As there is a more holistic view taken by the nurse to the patient's issues this in turn improves relationships and
satisfaction with care. This can lead to clues to improved and timelier diagnosis and treatment of patient issues.

From a medical workload point of view, studies have shown that nurse-led clinics have been an effective solution to patient waiting times and have allowed junior medical staff more time to attend to more complex patient care such as clinical issues in ward environments, admission assessments in the emergency department and surgical training in the operating theatre. (Seeley and Scott Stevenson 2009), (Koay and Marks 1996, Mylvaganam, Patodi et al. 2009) Patient waiting times were decreased due to the nurse’s ability to share the workload of the medical staff and service delivery was improved. Senior nurses working in nurse-led clinics also have the ability to appropriately triage referrals from outside sources, such as GPs, and see and treat these patients in a more timely manner therefore decreasing waiting times and taking some burden from the medical workload.

These outcomes have strengthened the case for increasing the number and variety of nurse-led clinics and demonstrate their effectiveness in the current health system, which is overburdened with patients seeking ongoing treatment as the population ages and longer durations of treatment are necessary.

Expanding nursing roles could have measurable cost benefits to the health system by reducing health costs. (Fall, Walters et al. 1997), (Haque, Hashmi et al.), (Uppal, Nadig et al. 2004) The replacement of medical staff with nursing staff allows medical staff more time to attend to more complex cases. There is often more flexibility in the nurse’s timetable to see patients more rapidly if the patient is experiencing problems, which would otherwise have caused the patient a visit to a hospital emergency department or a GP. These activities carry a cost that can be avoided by the health system by creating quicker access
to specialized healthcare. Nurses in the nurse-led clinics also have a unique ability to educate patients in ear care and can provide longer consultation times than medical staff. (Fall, Walters et al. 1997) The benefit of this educative, counseling role is that patients have a better understanding of how to manage their condition more appropriately and can help to prevent chronic conditions becoming acute episodes of care that require more expensive and intensive workloads from medical staff. Often patients have better compliance to treatment and are monitored more closely in nurse-led clinics. (Robertson, Maxwell et al. 2009)

Nurse-led clinics are also an effective environment for nurses to feel more valued in their roles. The recognition of the nurses expertise within a multidisciplinary team enhances the professional profile of nurses and reduces the stigma of nurses being little more than “handmaidens” to medical staff. (Billings, Campbell et al. 2008/9) Nurses with specialized training are recognized for their skills and expertise and are in positions now where they are responsible for teaching and training junior medical staff. (Harkin 2005)

For the purpose of this systematic review, the focus is on nurse-led clinics lead by registered nurses with advanced skills. From an international perspective the definition of a nurse with specialized qualifications uses different terminology. The Nursing and Midwifery Board of Australia define a nurse practitioner as a registered nurse who is educated and endorsed to function autonomously and collaboratively in an advanced and extended clinical role. (ANMC 2006) It also describes advanced practice nursing (APN) as a term used to define a level of nursing practice that uses comprehensive skills, experience and knowledge in nursing care. The Royal College of Nursing, United Kingdom (UK) has published a policy statement that states that from an international and European literature search they would define advanced nursing practice as a level of practice rather than a job title and they use
competency based training to attain that level. (Nursing 2007) From a literature search, a document published by the National Council of State Boards of Nursing Advisory Committee and the APRN Consensus Work Group, United States of America, defines an advanced practice registered nurse (APRN) as a nurse who has completed an accredited graduate-level education program, passes a national certification examination, acquired advanced clinical knowledge and skills to provide direct care to patients, assumes responsibility and accountability for diagnosis and management of patients and has attained a license to practice in one of four APRN roles. These roles are certified registered nurse anesthetist (CRNA), certified nurse midwife (CNM), clinical nurse specialist (CNS) or certified nurse practitioner (CNP). (APRN 2008)

A preliminary search of the Joanna Briggs Library of Systematic Reviews, the Cochrane Library, CINAHL, PubMed and PROSPERO has revealed that there is not currently a systematic review (either published or underway) on this topic. This systematic review aims to identify the effectiveness of nurse-led ENT clinics and will highlight benefits of nurse-led care to patients with chronic ongoing ENT complaints. Cost information will also be extracted from included studies and synthesized; however the conduct of a cost benefit analysis is not the primary focus of the review.

Keywords

Nurse; nursing; nurse practitioner; advanced nursing; nurse specialist; ear; nose; throat; cost; patient; satisfaction; effectiveness; service; adult; chronic; acute
3.3 Objective

This systematic review aims to examine the effectiveness of nurse-led ear, nose and throat (ENT) clinics on service delivery and clinical outcomes. More specifically, the objectives are to identify the effectiveness of nurse-led clinics in improving patient satisfaction, expanding nurse roles, and improving efficiency of services for patients, including improving waiting times and holistic care. A secondary objective of this review is to examine the evidence on the cost effectiveness of nurse-led ENT clinics.

3.4 Criteria for considering studies for this review - Inclusion criteria

Types of participants

This review will consider studies that include adult patients, aged 18 years and older, attending ear, nose and throat clinics, regardless of complaint.

Types of intervention(s)

This review will consider studies that evaluate nurse-led care in general practice and acute care in which the nurse was identified as taking a lead role in the care of patients with chronic ear, nose and throat complaints.

There are many permutations of nurse-led care from the nurse performing simple organizational tasks to the nurse directing the clinical care of patients. For the purposes of this review, the nurse-led care of
interest should be performed by registered nurses employed within the primary care facility or outpatient clinic and also ENT nurse practitioners.

**Types of comparator**

The comparator will be general practitioner-led or ENT consultant-led care.

**Types of outcomes**

The outcomes of interest in this systematic review will fall into three categories: service delivery outcomes, clinical and health outcomes, and financial outcomes.

- **Service delivery outcomes**: including surveys of patient satisfaction and levels of patient education, waiting times, booking queues.

- **Clinical and health outcomes**: including treatment times, treatment duration, course of treatment, self-treatment influencing change in presentation to clinic episodes, reinfection rates, treatment, prevention and cure, representation of patients at the clinic for the same complaint data.

- **Financial outcomes**: including differences in costing, nurse-led clinic versus medical-led clinic where reported in relation to effectiveness measures.

**Types of studies**
To evaluate the effectiveness of nurse-led ENT clinics this review will consider randomized controlled trials (RCTs) as the study design of choice, however any relevant quantitative study design will be considered. For the economic component of the review all economic evaluations of nurse-led ENT clinics will be considered.

3.5 Search strategy

The search strategy aims to find both published and unpublished studies. A three-step search strategy will be utilized in this review. An initial limited search of MEDLINE and CINAHL will be undertaken followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe articles. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference list of all identified reports and articles will be searched for additional studies. Studies published in the English language will be considered for inclusion in this review. Studies published from January 1980 to May 2013 will be considered for inclusion in this review. The early 1980s were when nurse-Led clinics were generally accepted and became a widely available option for patient treatment and care. (Hatchett 2003)

The databases to be searched include:

PubMed

Cinahl

Cochrane Library (CENTRAL)

Scopus
Embase

The search for unpublished studies will include:

MedNar

ProQuest theses and dissertations

Initial keywords: Please refer to the Logic grid in Appendix I.

3.7 Method of the review

Assessment of methodological quality

Quantitative papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix II). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.

Economic papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Analysis of Cost, Technology and Utilization Assessment and Review Instrument (JBI-ACTUARI) (Appendix III). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.
Data collection

Quantitative data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI (Appendix IV). The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives.

Economic data will be extracted from papers included in the review using the standardized data extraction tool from JBI-ACTUARI (Appendix V). The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives.

Data analysis and synthesis

Quantitative papers, where possible, will be pooled in statistical meta-analysis using the JBI-MAStARI software. All results will be subjected to double data entry to minimize the risk of error during the data entry. Where appropriate, relative risks and/or odds ratios and their associated 95% confidence interval will be calculated for analysis of categorical data. For continuous data that were collected using the same scale, the weighted mean differences (WMD) and standard deviation will be calculated; for data collected using different scales, the standardized mean differences (SMD) will be calculated.

Heterogeneity will be assessed using standard Chi square test and if found will be investigated prior to any further analysis. Where appropriate, meta-analysis will be conducted using JBI MASTARI. Where statistical pooling is not possible, the findings will be presented in narrative form.
Economic findings will, where possible, be pooled using JBI-ACTUARI and presented in a tabular summary. Where this is not possible, findings will be presented in narrative form.

Conflicts of interest

None to declare

Acknowledgments

As this systematic review is part of a Masters of Clinical Sciences thesis, a secondary reviewer (Kate Davis, MSc candidate) was used for critical appraisal only.

References and Appendices of this protocol have been moved to the end of the thesis for consistency.
Chapter 4  Results

Introduction

This chapter presents the results of the systematic review search, study selection, assessment of methodological quality, and the narrative synthesis of included studies. This aims to bring context to the amount of information searched and the process of sorting this information. In addition, the methodological quality of included studies is reported according to defined criteria based on study design. Findings from the individual included studies are reported and a narrative synthesis is used to present the combined results of included studies according to the outcomes of interest for the systematic review. Tables are used to aid in data presentation according to the outcomes of interest.

4.1 Study identification results

The process of study identification is outlined in Figure 1. Seven databases and sources of unpublished literature yielded 13,536 titles for review, of which 13,193 were of obvious exclusions as they related to nurse-led clinics in other specialities or were opinion pieces. A further 295 titles were duplicate publications, leaving 48 abstracts that were examined for relevance to the review based on title and abstract content. After scrutinising the inclusion criteria, the full text of all 15 abstracts were retrieved for detailed examination. Five additional papers were retrieved by undertaking a hand search of the references of the 15 identified articles.
Following full text examination, three articles were retained for critical appraisal by the two reviewers. Tools for critical appraisal are shown in Appendix V. Appendix III provides details of the excluded papers and reasons for their exclusion. Characteristics of the three articles included in the review are tabulated as Appendix IV.

The studies included in the review were published between 1997 and 2010 and were all conducted in the UK. The participants ranged in age from 16 to 88 years and suffered from a range of ENT complaints.
Figure 1    PRISMA Flowchart detailing study identification and selection
4.2 Methodological quality assessment of studies

This chapter considers the methodological quality of both the quantitative and economic studies and outlines how the studies scored on the Joanna Briggs Institute's critical appraisal tools.

Three studies were selected for inclusion in the review and their methodological quality was assessed using the relevant JBI critical appraisal tools. The checklists are listed in Appendix V and the tables below (Tables 2 and 3) show how each study compared to the individual checklist criteria.

One study, (Reddy, Sargent et al. 2011) contributed to both service delivery and financial outcomes, however as there was no direct cost-benefit analysis, this paper was not critically appraised using the ACTUARI criteria and costs are presented for comparison only.

Overall, the methodology of papers included was moderate/strong. All papers focused on the population of interest (adult ENT patients), with patients being at similar stages of their disease (chronic) (Fall, Walters et al. 1997) and there being clear inclusion criteria. The sample of patients was considered to be representative of the population presenting with ENT complaints in all three included studies. Bias minimisation was considered by both of the included quantitative studies.
Both Reddy et al. and Fall et al. utilised a combination of objective and self-report measures. Although measures of self-reported pain/discomfort and patient satisfaction are subjective, such measures are appropriate for this question.

The study by Fall et al. followed two cohorts of patients residing in different geographical locations. This is a potential confounding factor that was considered in the analysis. Withdrawals from both studies were explained.

Measurements of cost were calculated in British pounds which is appropriate as both studies were conducted in the UK. Waiting times were expressed in days. Self-reported measures were reported as proportions. Appropriate statistical analysis was used by all of the included studies.

The single economic study considered all relevant costs and valued costs in a reliable way (standardised NHS costing schedule). It was unclear whether costs and outcomes were adjusted for differential timing and sensitivity analysis was not conducted.

Methodological quality of quantitative studies

There were two quantitative studies assessed for methodological quality and consensus was reached on all papers by the primary and secondary reviewer. The results of methodological assessment is
shown in Table 2 and the corresponding questions (Q1-Q10) can be found in the JBI MASTARI checklist in Appendix V and how the studies compared to the checklist is discussed in detail below.

### Table 2: Critical appraisal of quantitative studies

<table>
<thead>
<tr>
<th>Comparable Cohort / Case Control</th>
<th>Is the sample representative of patient in the population as a whole? Q1</th>
<th>Are patient at a similar point in the course of their condition/illness? Q2</th>
<th>Are confounding factors identified and strategies to deal with them stated? Q3</th>
<th>Has bias been minimized in relation to selection of cases and controls? Q4</th>
<th>Are outcomes assessed using objective criteria? Q5</th>
<th>Was follow up carried out over a sufficient time period? Q6</th>
<th>Was appropriate statistical analysis used? Q9</th>
<th>Were outcomes measured in a reliable way? Q8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall, M., Walters, S., Read, S., Deverill, M., Lutman, M., Milner, P., Rodgers, R., 1997</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Descriptive/ Case Series</td>
<td>Was study based on a random or pseudo random sample? Q1</td>
<td>Were the criteria for inclusion in the sample clearly defined? Q2</td>
<td>Were confounding factors identified and strategies to deal with them stated? Q3</td>
<td>Were outcomes assessed using objective criteria? Q5</td>
<td>Was follow up carried out over a sufficient time period? Q6</td>
<td>Were outcomes described and included in the analysis? Q7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reddy, VM, Sargent H, Prior, 2011</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>
Comparative Cohort/Case Control Studies

The single case control study methodological quality was assessed against the criteria for comparable cohort/case control studies, the checklist question Q1-Q9 can be found in Table 2 (above) The results of the methodological assessment is shown in Table 2 and discussed in further detail below. This overall quality will be explored at the end of the methodology section.

Allocation methods

The study by (Fall, Walters et al. 1997) had a population of patients with ear or hearing problems who were treated in eight Rotherham practices where ear care nurses (ECN's) had been employed for at least a six month period compared to nine Barnsley general practices without nurses trained in ear care. The patients were asked to complete two questionnaires, one before treatment, measuring the nature, severity and symptoms of their ear and hearing problems and general health status on the day of consultation. The patients were then invited to complete a second questionnaire three weeks later to record treatment received, symptom changes, health status and satisfaction with care. This included using a Health Status Questionnaire (HSQ-12)- Table 6.

Confounding factors, outcome measures and statistical analysis
Confounding factors were adequately addressed in the study by Fall et al. Potential confounding factors with this study are related to the sensitivity of the HSQ-12. It may not have been sensitive enough to detect changes in patients after treatment and also the sample size of the population may not have been large enough to detect differences. The time span of the study (three weeks between questionnaires) also may have been too short to detect any change in the patient condition. The study was however, able to demonstrate patient satisfaction with nurse-led care.

The study results demonstrate that of 949 eligible patients 790 or 83% agreed to participate in the study. One hundred and fifty six patients did not return the secondary questionnaire, which dropped the response rate to 80%. The clinical outcomes of pain and discomfort, initial contact, return visits, prescriptions received were similar whether the patients were treated by standard care (Doctor only) or nurse-led care. Patient satisfaction though was found to be statistically higher in the nurse-led care group of patients (Table 4). The statistical analysis was conducted with the aim of showing differences using HSQ-12.

Descriptive Studies / Case Series

The descriptive studies/case series study was assessed for methodological quality against the criteria for descriptive/case series studies (Table 2).

Allocation methods
The study by (Reddy, Sargent et al. 2011) had a population of 99 patients with a primary diagnosis of Benign Paroxysmal Positional Vertigo (BPPV). Information about the patients attending the nurse dizziness clinic (NLDC), their treatments and outcomes was recorded prospectively for the purposes of the study. This was by collecting the data from case notes. There was also a postal survey sent to patients. The survey was sent to 35 attendees of the clinic. The study states that these patients were selected randomly. Twenty-four responses were received which indicated a response rate of 69%.

Confounding factors, outcome measures and statistical analysis

Confounding factors were clearly defined. The confounding factors in this study are that the patient may have other ontological conditions such as Menieres disease, BPPV that was resistant to treatment and would need to consider surgery, or that the BPPV was due to other comorbidities such as central vertigo, cardiac disease, vestibular hypofunction, cerebrovascular event, migrainous vertigo or a non ontological cause. The outcomes were measured in a reliable way using surveys, however there was no information tables to demonstrate the specific questions asked and answers given but there was an outline of the survey stating patients were asked to rate the care they received from the nurse (from very bad to excellent) and patient preference as to whether they were happier to be seen by a doctor, a nurse or no preference. There was no evidence of recognised tools/statistical tests used other than a self created survey.

Methodological quality of the economic study

There was one economic studies assessed for methodological quality and consensus was reached on all criteria by the primary and secondary reviewer. The results of methodological assessment is shown
in Table 3 and the corresponding questions (Q1-Q10) can be found in the JBI ACTUARI checklist in Appendix V and how the studies compared to the checklist is discussed in detail below.

Table 3  Critical appraisal of the cost effectiveness study

<table>
<thead>
<tr>
<th>Cost effectiveness</th>
<th>Is there a well defined question? Q1</th>
<th>Is there comprehensive description of alternatives? Q2</th>
<th>Are costs &amp; outcomes valued credibly? Q6</th>
<th>Were sensitivity analyses conducted to investigate uncertainty in estimates of cost or consequences? Q9</th>
<th>Are the results generalizable to the setting of interest? Q11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uppal, S., Jose, J., Banks, P., Mackay, E., Coatesworth, A. P., 2004</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

The economic study was assessed for methodological quality against the criteria for cost effectiveness studies (Table 3).

There was a well defined question with a clear comparison. The aim of the study was to compare the cost of seeing a patient in a medical led conventional outpatient clinic compared to seeing a patient in a nurse-led ear clinic. A clinical description of the patients seen in the clinics was given so there was an understanding of the type of patients who would be attending the clinic. That is, patients with specific ear conditions (recurrent otitis externa, patients requiring microsuction wax removal, otitis media, pre operative patients, post operative patients, myringotomy, grommet insertion, mastoid surgery.)
Costs were measured accurately by a summary of a cost analysis comparing direct costs, (doctor and nurse salary, investigations, consumables) and indirect costs (indirect expenditure for clinical support staff and equipment, overheads to support non-clinical staff, domestics, personnel). These were demonstrated in a table layout which was easy to compare. There was also a table outlining the cost per patient, the number of patients and total cost in the two comparison groups, nursing versus medical.

There was clear evidence of the cost effectiveness in nurse led clinics but there was an acknowledgement by the authors that there may be a potential bias to the study that a proportion of the cost incurred in a nurse seeing a patient referred to an ear, nose and throat doctor for a second opinion by another service may already be costed in a standard follow up consultation. This might lead to a double cost being applied as the patient is classified as a new patient but they are actually a follow up patient (different cost allocation under national database of costs). But to counteract this bias, the authors pointed out that the cost of the patient being seen by a nurse was still more cost effective due to the comparison of nurse and doctor costs. The results of this study are of interest in meeting the outcome of reduction in waiting times because as patients were seen by a nurse, the time it freed up for medical staff allowed medical staff to see more complex cases therefore making a greater impact on booking queues for new patients with otological problems.

4.2 Findings from Individual Included Studies

In the section follows a textual description of the results from each included study. Data was extracted from the quantitative and economic studies using tools shown in Appendix V. Characteristics of the included studies are tabulated in Appendix IV.
Three papers met the inclusion criteria and were deemed of sufficient methodological quality for inclusion in the review. Brief descriptions of the aims of each study are detailed below, followed by review findings categorised according to type of outcome.

Findings from (Fall, Walters et al. 1997)

The aim of this study was to compare patient satisfaction, health outcomes and resource use for 488 patients with ear or hearing problems treated by nurses trained in ear care (ECN) with 225 similar patients treated by standard practice. The two groups of patients resided in two geographically distinct areas of Northern England. Patients were asked to self-report levels of pain and discomfort on the day of consultation (Q1) and three weeks later (Q2). Health outcomes were measured by self-report questionnaire (HSQ-12), comprising of eight domains. Cost analysis was based on standardised NHS charges.

The results showed there was little statistical evidence of a difference in pain and discomfort or a change in health status but there was higher rates of satisfaction in patients treated in nurse-led clinics than standard care/ medical clinics.

Findings from (Reddy, Sargent et al. 2011)

The aim of this study was to examine patient satisfactions and resource use for 99 patients with ear or hearing problems treated by nurses in a nurse-led dizziness clinic. A subgroup of patients were randomly selected (details not reported) to complete a postal survey rating level of satisfaction with
their treatment and whether they preferred to be treated by a doctor or a nurse. Satisfaction data is based on 24 completed surveys. The time between clinic consult and postal survey completion was not reported. The results showed that patients were equally as satisfied to be seen by a nurse in a nurse-led clinic than a doctor in a standard clinic and that also there was a cost saving to running nurse-led clinics although this was not the primary focus of this study.

Findings from (Uppal, Nadig et al. 2004)

The aim of this study was to compare the cost of seeing postoperative patients in an Otolaryngologist-led conventional outpatient clinic with a nurse-led ear clinic. A group comprising a total of 626 patients, (403 new patients, 223 follow up patients) were scheduled to attend the nurse led clinic. Direct costs, including nurse’s salary, investigations, consumables and doctor’s salary (from those patients referred on to the doctor) and indirect costs, including expenditure for support staff and equipment and overheads to support non-clinical staff were derived from standardised NHS costing’s and were captured. Results from this study found that there was a cost saving in nurse-led ear clinics compared to standard doctor led clinics and also that nurse –led clinics had an impact upon booking queues and waiting times as medical staff were able to see more new patients as nurses were seeing less complex, follow up patients.

4.3 Synthesis of review findings

This section presents the synthesis of the quantitative and economic data for nurse-led clinics for the management of ENT conditions. Findings have been divided into three categories: service delivery outcomes, clinical and health outcomes, and financial outcomes. Included papers addressed various aspects as detailed below:
• **Service delivery outcomes**: including surveys of patient satisfaction and levels of patient education, waiting times, booking queues.

• **Clinical and health outcomes**: including treatment times, treatment duration, course of treatment, self-treatment rates, change in presentation to clinic episodes, reinfection rates, treatment, prevention and cure, representation of patients at the clinic for the same complaint data. Level of pain and discomfort was also considered under this category.

• **Financial outcomes**: including differences in costing, nurse-led clinic versus medical-led clinic where reported in relation to effectiveness measures.

The quantitative studies in this systematic review had different inclusion criteria and outcome measures making meta-analysis of all the quantitative studies not clinically useful or appropriate.

Service Delivery Outcomes

Two studies, (Fall, Walters et al. 1997), (Reddy, Sargent et al. 2011) considered outcomes relevant to this category. Both studies examined patient satisfaction using self-report questionnaires. In addition,
one study examined waiting times. (Reddy, Sargent et al. 2011) No studies were identified as addressing the impact of nurse-led ENT clinics on the outcomes of either levels of patient education or length of booking queues.

**Patient Satisfaction**

Satisfaction levels were reported in two (Fall, Walters et al. 1997), (Reddy, Sargent et al. 2011) of the three included studies. Both studies indicated a high level of satisfaction of patients treated in nurse-led clinics (Table 4).

Satisfaction was reported by (Fall, Walters et al. 1997), and included asking patients about how satisfied they were with certain aspects of their care such as initial contact, return visits, prescriptions received and satisfaction with treatments. Over half of patients treated by specially trained ear care nurses reported being very satisfied with their care (53%), compared with 37% receiving standard care. The proportion of participants reporting dissatisfaction was twice as high (18%) in the standard care group, compared with (9%) in the nurse led group. Overall levels of satisfaction with treatment were high and the proportion reporting being either satisfied or very satisfied was 91% nurse led care and 82% standard care.

A subgroup of patients (n=24) was surveyed on their levels of satisfaction with their treatment in a nurse led dizziness clinic. Patients were asked to rate their care on a six-point scale ranging from “very bad” to “excellent”. Over half of the group reported their care as being excellent (54%) and all patients rated their care as being “good” or better. When asked whether they preferred being treated by either a doctor or a nurse, the majority of patients (21/24: 88%) expressed no preference as to whether they
saw the doctor or nurse. Two (8%) preferred to be seen by a doctor and one (4%) by a nurse, suggesting that this group of patients largely found being treated in a nurse led clinic acceptable. The sample size was however small for this study and the time between consultation and survey was not reported.

### Table 4  Patient satisfaction

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Participants</th>
<th>Outcomes</th>
<th>Patient Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall et al, 1997</td>
<td>Self-reported questionnaire informed by MRC Hearing Research Instrument</td>
<td>634 participants completed Q1 &amp; Q2.</td>
<td>Rotherham (UK) general practices with Ear care Nurses who underwent 6 months specialized training.</td>
<td>Overall levels of satisfaction was high across both conditions, however a greater percentage of patients reported being very satisfied with nurse led care than GP alone (P= 0.0001, X² test)</td>
</tr>
<tr>
<td></td>
<td>Q1 prior to consultation</td>
<td>Median age 54 (range 38-67 years)</td>
<td></td>
<td>Rotherham Clinic (Nurse led care)</td>
</tr>
<tr>
<td></td>
<td>Q2 3 weeks post consultation</td>
<td>47% female</td>
<td></td>
<td>n= 395</td>
</tr>
<tr>
<td></td>
<td>Data collected June until December 1995</td>
<td>53% prior ear-related clinic visit in previous 12 months.</td>
<td></td>
<td>extremely dissatisfied: 4.0%</td>
</tr>
<tr>
<td></td>
<td>Treatment was rated on a scale from extremely dissatisfaction</td>
<td>Presenting with painful, itching or discharging ears, excessive ear wax or hearing impairment or long standing ear disease.</td>
<td></td>
<td>very satisfied: 53.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Barnsley Clinic (Standard care)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n= 189</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>extremely dissatisfied: 4.2%</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>very satisfied: 37.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>participants reporting being dissatisfied:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>standard care: 18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>nurse led care: 9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Patients reporting being satisfied or</td>
</tr>
<tr>
<td>Study</td>
<td>Methodology</td>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reddy et al, 2011 United Kingdom</td>
<td>Postal questionnaire following clinic visit. Patients asked to rate the care received from specialist nurse in one of six categories from very bad to excellent.</td>
<td>Mean age 61.0 +/- 14.1 (range 35-86 years) Gender split not reported 24 patients with a presenting complaint of dizziness and a diagnosis of Benign Paroxysmal Positional Vertigo (BPPV) were surveyed via postal questionnaire following clinic visit. Patients were asked to rate nurse led care only, not asked to rate the care received by doctor(s). Excellent: n=13 (54%) Very good: n=6 (25%) Good: n=3 (13%) No patients rated their care as being bad or very bad. 2 patients did not answer 21/24 (88%) patients expressed no preference as to whether they saw the Dr or Nurse, 2/24 preferred to see the Dr (8%) 1/24 preferred to see the Nurse (4%)</td>
<td>very satisfied: standard care: 82% nurse led care: 91%</td>
<td></td>
</tr>
</tbody>
</table>

**Waiting Times:**

Waiting times were reported one study (Reddy, Sargent et al. 2011) and extracted data is presented in Table 5. The mean waiting time for patients for an appointment at the nurse-led dizziness clinic (NLDC) was 16 +/- 12 days (range 1-71 days). This is considerably less than the treatment target of 18 weeks (126 days), however the authors did not report the waiting times prior to introduction of the nurse led clinic so whether a mean waiting time of 16 days constitutes an improvement or not on standard care,
cannot be ascertained. The range of waiting times was large, contributed to by several patients (total not reported) reportedly postponing appointments.

(Reddy, Sargent et al. 2011) suggest that the nurse led clinic reduced waiting times as doctors were freed up to attend more complex cases, whilst the nurses attended the more routine cases.

**Table 5  Waiting Times**

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Participants/complaints</th>
<th>Waiting times</th>
<th>Nurse-Led care Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reddy et al, 2011</td>
<td>Mean time (days) to follow up in the nurse led clinic was recorded from patient notes</td>
<td>99 patients with a presenting complaint of dizziness and a diagnosis of Benign Paroxysmal Positional Vertigo (BPPV).</td>
<td>Waiting times for consultations in the clinic was reported.</td>
<td>From referral into nurse led clinic, mean waiting time was 16+/-12 days. (range 1-71 days)</td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
<td></td>
<td>The target waiting time for treatment was 18 weeks (126 days).</td>
</tr>
</tbody>
</table>

Clinical and Health Outcomes:

One study (Fall, Walters et al. 1997), discussed clinical and health outcomes (Table 6). This paper considered measures of self-reported pain/discomfort and domains of health status (HSQ-12).

No studies were identified that considered the effect of nurse-led ENT clinics on: treatment times, treatment duration, course of treatment, self-treatment, change in presentation to clinic episodes,
reinfection rates, treatment, reoccurrence prevention, representation of patients at the clinic for the same complaint and rate of cure.

A higher self-reported health-related quality of life (HSQ-12) score was reported for patients in the nurse-led clinic group at baseline. The authors interpreted this as representing a higher level of perceived health. The authors considered this as a potential confounding factor in the analysis at time T2 (3 weeks later), however details of how the analysis was conducted are not reported.

Levels of self-reported pain and discomfort were lower on the day of consult (T1) for the nurse-led group, however were not significantly different to those of the standard care group at T2. Levels of pain and discomfort were not reported at T2, however after adjustment for uneven baseline, there was no statistically significant difference in pain or discomfort reduction at each group.
### Table 6  Clinical and healthcare outcomes

<table>
<thead>
<tr>
<th>Method</th>
<th>Outcomes</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 - Self-report questionnaire of level of pain/discomfort</td>
<td>Pain/discomfort</td>
<td>Nurse-led clinic patients: (n=225) Standard clinic patients: (n=488)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None/slight: 67.7% None/slight: 51.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate to extreme: 32.4% Moderate to extreme: 48.5%</td>
</tr>
<tr>
<td></td>
<td>Discomfort</td>
<td>ECN clinic patients: (n=225) Standard care clinic patients: (n=488)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None/slight: 36.7% None/slight: 25.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate to extreme: 63.3% Moderate to extreme: 74.8%</td>
</tr>
</tbody>
</table>

**T2**

Pain reduction

Nurse-led clinic patients and standard clinic patients reported a similar reduction in level of pain 3 weeks post consult. $\chi^2 = 12.86, df=12, p=0.40$

Discomfort reduction

Nurse-led clinic patients reported a reduced level of discomfort 3 weeks post consult, compared with standard clinic patients. $\chi^2 = 19.33, df=12, p=0.08$

**Median HSQ-12 score (interquartile range)**

<table>
<thead>
<tr>
<th>HSG-12 Domain</th>
<th>Nurse-led clinic</th>
<th>Standard care</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical function</td>
<td>100 (50-100)</td>
<td>83 (33-100)</td>
<td>P = 0.03</td>
</tr>
<tr>
<td>Role (physical)</td>
<td>100 (25-100)</td>
<td>65 (25-100)</td>
<td>P = 0.001</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>85 (65-100)</td>
<td>65 (45-100)</td>
<td>P = 0.0001</td>
</tr>
<tr>
<td>Health perception</td>
<td>60 (80-85)</td>
<td>60 (25-85)</td>
<td>P = 0.002</td>
</tr>
<tr>
<td>Energy/fatigue</td>
<td>60 (40-80)</td>
<td>40 (20-80)</td>
<td>P = 0.04</td>
</tr>
<tr>
<td>Social functioning</td>
<td>100 (75-100)</td>
<td>75 (50-100)</td>
<td>P = 0.004</td>
</tr>
<tr>
<td>Role mental</td>
<td>100 (65-100)</td>
<td>65 (45-100)</td>
<td>P = 0.001</td>
</tr>
<tr>
<td>Mental health</td>
<td>72 (53-87)</td>
<td>60 (47-80)</td>
<td>P = 0.0004</td>
</tr>
</tbody>
</table>

**T2**

No individual domain saw a significant change for either patient group.
Financial Outcomes

Two studies compared the costs associated with a nurse-led ENT clinic in comparison to standard care. One study was an economic study (Uppal, Jose et al. 2004) and the second study included some cost data in addition to its main focus of effectiveness. (Reddy, Sargent et al. 2011)

One study (Uppal, Jose et al. 2004) discussed financial outcomes (Table 7). The aim of the study was to compare the cost of seeing a patient in an otolaryngologist-led conventional outpatient clinic with a nurse-led ear clinic. A cost analysis of the nurse-led ear clinic was conducted and compared with a cost analysis of a conventional outpatient appointment, medical led including direct and indirect costs. The results concluded that nurse-led ear clinics were more cost effective than a conventional outpatient appointment and showed a substantial reduction in cost per patient.

The second study (Reddy, Sargent et al. 2011), considered the cost of clinician time across 200 clinic appointments for 99 patients and reported that the nurse led clinic represented a net saving of £3,800, compared with the cost if the same treatment had been provided by a doctor.

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Standard Care</th>
<th>Nurse Led Care</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uppal et al, 2003, Cost Benefit Analysis</td>
<td>Number of patients: New = 403 – cost per patient</td>
<td>Number of patients: New = 403 – cost per patient</td>
<td>Difference in mean cost between two groups is 75.28 (£). This was £3,800</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>= 161 (£) Follow up = 223- cost per patient= 81 (£) Including all direct costs, total mean cost per patient = 132.50 (£)</td>
<td>Follow up= 223- cost per patient = 2.35 (£). Consumables, investigations, outpatient follow up with Dr including all indirect and direct costs, total mean cost per patient= 57.22 (£).</td>
<td>equivalent to a reduction in cost to the hospital of 47125.28 (£) for the 626 patients seen in the year.</td>
<td></td>
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<tr>
<td>---</td>
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<td></td>
</tr>
<tr>
<td>(Reddy, Sargent et al. 2011)</td>
<td>The cost of treating patients in the study was calculated using standardized NHS costing. Savings based on clinician costs only. 99 patients with a presenting complaint of dizziness and a diagnosis of Benign Paroxysmal Positional Vertigo (BPPV). The patients were seen over a total of 200 consultations.</td>
<td>Follow up appointment with a doctor: £76 Follow up appointment with a nurse: £55</td>
<td>Based on the 200 consultations, a net saving of £3,800 was reported</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

The results of the three studies indicate that patients have higher levels of satisfaction when treated in a nurse-led clinic. There is little difference in clinical outcomes including levels of pain and discomfort or the clinical treatment received but there is evidence that patients appreciate aspects of care such as longer consultation times in nurse-led clinics, therefore more opportunity to seek clarification of treatment options, shorter waiting times and an understanding of their condition. There is also evidence that nurse-led clinics are cost effective and a model of care that is accepted amongst the public. Nurse-led clinics should be integrated into the health system as an alternative option for patients requiring ongoing care of a specialised nature that cannot be provided by their general practitioner but cannot be left unattended or as part of a booking queue for treatment in tertiary facilities.
Chapter 5  Discussion

This Chapter provides the discussion on the six key management strategies areas identified in the protocol of the systematic review. These areas were identified using both quantitative and cost effectiveness evidence. This chapter also looks at the issues with research methodology that were found in conducting this systematic review and discusses the limitations of this study.

5.1 Service delivery outcomes

Quantitative evidence was found in two studies (Fall, Walters et al. 1997), (Reddy, Sargent et al. 2011) that patient satisfaction was high, however, there was a lack of reporting regarding the specific aspects or activities that patients were satisfied with. Some patients were willing to see a nurse in place of a doctor but there was little evidence presented that patients were appreciative of the reduced time it took to access a service. Nurse–led clinics were shown to have a positive effect on waiting times, from referral to treatment, however the included patient satisfaction surveys did not enquire as to how this affected patient satisfaction. It may have been useful for surveys to be more detailed to identify service delivery factors that have an influence on patient satisfaction. For example, specific activities such as the nurse spending longer consults with the patient or including other family members in education may have influenced patient satisfaction and further details of this kind may be useful in understanding service delivery aspects that patients value the most.
5.2 Clinical and healthcare outcomes

In the study of (Fall, Walters et al. 1997), pain and discomfort was examined using a quality of life tool, the HSQ-12, but there was little discussion in any of the papers about many of the desired outcomes. It would have been interesting to see evidence that nurse-led clinics had a positive impact upon treatment times and duration, course of treatment, self treatment influencing change in presentation to clinic episodes, reinfection rates, prevention and cure and representation of patients at the clinic for the same condition. All of these outcomes are critical in demonstrating the value of nurse-led clinics. The results of these types of outcomes can influence how new models of care such as nurse–led clinics are accepted and viewed as an integral part of a health care system. If there is clear evidence that clinical benefits result from nurse-led clinics it is more of an incentive for governments to invest in this type of care. Qualitative evidence such as positive patient stories (good clinical outcomes) as well as quantitative evidence, benchmarks of care using surveys of effectiveness provide robust arguments in favour of models of care such as nurse-led clinics. This is particularly important when looking at transforming healthcare to suit the needs of certain populations, putting the needs of the patient at the centre of the care delivered. There is a necessity to provide the best quality healthcare, with the best possible clinical outcomes by providing specific treatments without wasting time or money. This research has highlighted a need for further research into the value of nurse-led clinics in meeting these demands.
5.3 Financial outcomes

Financial outcomes were discussed in one study, (Uppal, Nadig et al. 2004) and briefly mentioned in another study. (Reddy, Sargent et al. 2011) The value of both studies was limited as they both discussed findings in one country and one currency, the United Kingdom and pounds sterling. Financial outcomes are an imperative aspect of utilising nurses in clinics versus medical staff in clinics. Every country has a budget allocated to health and a primary goal is to deliver the right healthcare services to the right population without exceeding spending. The manner in which healthcare is delivered is dependent upon the ability of healthcare services to work within that budget and therefore to be able to demonstrate a fiscal saving by using nurse to deliver high quality healthcare is attractive to governments.

5.10 Methodological issues in research

Quantitative methods of research alone to assess effectiveness of actions may result in a loss of rich data. Quantitative evidence seeks to establish relationships between two or more variables and then statistical models and tools are used to assess the power and significance of these relationships. (The Joanna Briggs Institute. 2014) Depending on the topic or question being researched the use of specific statistical instruments and tools may not detect or address all of the variables for the particular topic of interest. A health economic evaluation compares health effects and the costs of health interventions. Assessing cost effectiveness also raises methodological issues in research. If cost effectiveness is measured in a particular setting, country or currency then the findings may be difficult to translate to other settings from an economic viewpoint.
5.11 Limitations of this study

This systematic review and thesis aimed to present the best evidence in the effectiveness of nurse-led clinics on service delivery and clinical outcomes in adults with chronic ear, nose and throat complaints. Every effort was made to find all relevant papers but despite that, there may be some studies that have not been identified. This study in its search design only considered papers that were published in English and this could have resulted in some studies not being identified. This study was conducted to satisfy the criteria of a master's degree and in that there were some time restriction on the process of finding and utilising the evidence.

It became evident throughout this process that the methodological issues of the research that was being looked at limited the potential of the information that may have been discovered. Although there were papers directly excluded for their methodological quality I feel that some of the studies were excluded because they were considered a narrative or text and opinion paper, could have been a primary study, or were poorly reported. Also by limiting this study to economic and quantitative studies it reduced the amount of literature that was searched hence limiting the study.
Chapter 6  Conclusions and Recommendations

This chapter aims to provide conclusions from the results, findings and synthesis presented in this thesis. It will also give recommendations drawn from evidence to guide practice and research

6.1 Conclusions

The papers identified for this thesis and the underpinning systematic review, conclude that nurse-led ENT clinics have a positive impact and patients are as satisfied with the care delivered by nurses as medical staff. There were many outcomes of interest for the review that were not addressed in any of the included studies such as booking queues, prevention and cure, patient education, reinfection rates, clinical presentations to clinic and further research is needed to address these aspects of care. The evidence presented was useful in gaining an understanding of the role and duties nurses assumed in nurse-led ENT clinics but not detailed enough evidence about all of the desired outcomes to form a strong argument as to the overall effectiveness of the nurse-led clinics.

6.2 Recommendations for Practice

For adult patients with chronic conditions of the ear, nose and throat the recommendations for practice included in this study are as follows.

Nurse-led clinics should be considered as a complementary model of care to standard medical care  
(Grade B – see Appendix VI regarding JBI Grades of Recommendation)
By introducing more nurse-led clinics into primary and tertiary care patients with ongoing and chronic complaints will be able to access specialised care for their conditions in a timely manner due to the increased availability of resources. Nurses with specialised training and knowledge can not only assist medical staff with workloads but also recognise earlier when conditions need acute care and enable more timely referral to specialised Consultant care. This assists in acute admissions to hospitals and also enables more support for patients and their caregivers.

*Nurse–led clinics should be considered as they may have a positive impact on patient satisfaction (Grade B)*

Patients appreciate support and education in nurse-led clinics. The knowledge and advice given to patients increases their understanding of their condition and how to manage the symptoms effectively. Waiting times may be shorter for patients as nurses can treat review and ongoing care patients to allow medical staff to see and treat more new cases. This will have a positive impact upon booking queues, prevention and cure and patients re-presenting to clinics and emergency departments with issues from chronic illnesses.

*Nurse-led clinics should be considered as they may demonstrate cost benefits (Grade B)*

The utilisation of nurse-led clinics indicates indirect and direct cost benefits. Comparisons between nurses wages and medical wages is a cost benefit and also consideration should be given to the savings made to acute admissions to hospital by treating patients in a shorter timeframe in nurse-led clinics and therefore ensuring more patient compliance to treatment and closer monitoring of conditions to enable treatment to be commenced before conditions become acute.
6.3 Recommendations for further research

From this study it is considered that further research should focus on:

The effectiveness of nurse-led clinics on patient wellness

Increase study into the effectiveness of nurse-led interventions in nurse-led clinics upon health outcomes such as re-infection rates, prevention and cure, treatment durations and how nurse-led clinics can improve patient clinical and health outcomes. By conducting more comprehensive reviews with a combination of both qualitative, economic and quantitative research methodologies more robust evidence may be discovered to demonstrate the benefit of investing in models of care such as nurse-led clinics in communities.

Cost comparisons between nurse-led and medical led care

There is a need to compare and examine costs associated with nurse-led clinics compared to standard medical care in a much more thorough manner. A comparison of patients with identical diagnoses being seen in a defined time by nurse compared to doctor will determine the cost and value of expanding nurse-led clinics to allow medical staff skills to be utilized for more complex care. If there is a demonstrated saving by substituting medical clinics with nurse-led clinics with no compromise to patient satisfaction or clinical safety, the nurse-led model may be a cost-effective alternative for government investment.
Acknowledgements

As this systematic review forms partial submission for the degree award of Masters of Clinical Sciences within the School of Translational Health Science, the University of Adelaide, a secondary reviewer (Kate Davis) was utilized for critical appraisal.

I would like to thank Dr Sarahlouise White, my Primary Supervisor for her patience, encouragement and wisdom and friendship and my Secondary Supervisor, Dr Matthew Stephenson for his fantastic support, editing skills and advice. Both have taught me invaluable skills and inspired me to continue to question, research and discover. I could not have achieved all of this without both of you and I am very grateful. Thank you, also to my family for the support you have shown me as an adult academic struggling with timelines and to my workmates who encouraged and allowed me the time to complete this task. Lastly, thank you to my study group fellows who shared my experience and understood the learning journey and how each achievement we reached made us all so proud of each other.
References


## Appendix I: Logic grid of initial search terms

<table>
<thead>
<tr>
<th>Nurse led clinic</th>
<th>ENT</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>nurse led</td>
<td>ear diseases/ear disease</td>
<td>costs</td>
</tr>
<tr>
<td>nurse’s practice patterns</td>
<td>ear disorder</td>
<td>hospital</td>
</tr>
<tr>
<td>nurse practitioner</td>
<td>otologic disease</td>
<td>outpatient</td>
</tr>
<tr>
<td>nurse practitioners</td>
<td>hearing disorder</td>
<td>staff</td>
</tr>
<tr>
<td>nurse specialist</td>
<td>hearing loss</td>
<td>waiting time</td>
</tr>
<tr>
<td>advanced practice nurse</td>
<td>ear infection</td>
<td>patient satisfaction</td>
</tr>
<tr>
<td>advanced practice nursing</td>
<td>earache</td>
<td>booking</td>
</tr>
<tr>
<td>nurse led clinic</td>
<td>otitis</td>
<td>compliance</td>
</tr>
<tr>
<td></td>
<td>ear inflammation</td>
<td>education</td>
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<td>aural care</td>
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<td>grommet</td>
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<td>nose</td>
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<td>epistaxis</td>
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<td>polyp</td>
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<td>doctor</td>
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<td></td>
<td>consultant</td>
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<td>acute</td>
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<tr>
<td></td>
<td>chronic</td>
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</tr>
</tbody>
</table>
Appendix II: Example Search String (PubMed)

(Nurse led[tw] OR nurse’s practice patterns[mh] OR nurse practitioner*[tw] OR nurse practitioners[mh]
OR advanced practice nurs*[tw] OR advanced practice nursing[mh] OR nurse led [tw] OR clinic [tw])
AND (Ear diseases[mh] OR ear disease*[tw] OR ear disorder*[tw] OR otologic disease*[tw] OR
ontological disease*[tw] OR hearing disorder*[tw] OR hearing loss[tw] OR ear infection*[tw] OR
chronic[tw]) AND (Costs {mh] OR hospital [tw] OR outpatient [mh] OR staff[tw] OR waiting [tw] OR
Appendix III: Studies not selected for retrieval


Reason for exclusion: study does not meet all inclusion criteria - no useable data.


Reason for exclusion: paper discussing current professional practice requirements in ear care provision - does not address outcomes.


Reason for exclusion: does not meet inclusion criteria. Post operative nurse-led cardiac clinic.


Reason for exclusion: cross-sectional survey focusing on nurse practitioner roles. Did not match inclusion criteria.


Reason for exclusion: Cochrane review - does not match inclusion criteria


Reason for exclusion: article only, no useable data, does not meet inclusion criteria


Reason for exclusion: does not meet inclusion criteria/address outcomes. Fertility nurse role.


Reason for exclusion: does not meet inclusion criteria- Qualitative research


Reason for exclusion: descriptive study assessing patients need for a specialist Nurse in inflammatory bowel disease

**Reason for exclusion: does not meet inclusion criteria, no useful data related to ear, nose and throat complaints.**


**Reason for exclusion: does not meet inclusion criteria. Focus is a bronchiectasis clinic not ear, nose and throat.**


**Reason for exclusion: did not meet inclusion criteria- pediatric patients.**


**Reason for exclusion: data not useable. Intervention was a telephone call and not clinic attendance, therefore does not meet inclusion criteria.**


**Reason for exclusion: does not meet inclusion criteria, focus of study quality of life.**


**Reason for exclusion: does not meet inclusion criteria, does not discuss ear, nose and throat patients.**


**Reason for exclusion: does not meet inclusion criteria, discussion of establishing a nurse led clinic not relevant.**


**Reason for exclusion: Study does not meet inclusion criteria.**
### Appendix IV: Characteristics of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Methods</th>
<th>Participants</th>
<th>Intervention</th>
<th>Comparator</th>
<th>Outcomes</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall, M., Walters, S., Read, S., Deverill, M., Lutman, M., Milner, P., Rodgers, R., 1997 UK</td>
<td>Self-reported questionnaire informed by MRC Hearing Research Instrument and HSQ-12 health dimension scores: Q1 prior to consultation Q2 3 weeks post consultation</td>
<td>634 participants completed Q1 &amp; Q2. Median age 54yrs (range 38-67) 47% female 53% prior ear-related clinic visit in previous 12 months. Residing in Rotherham or Barnsley. Presenting with painful, itching or discharging ears, excessive ear wax or hearing impairment or long standing ear disease.</td>
<td>Consultations with a nurse who had undergone 6 months specialized training in ear care across 8 sites in Rotherham, north of England. Conducted by medical staff care (General Practitioners).</td>
<td>Standard care consultations, across 9 sites in Barnsley, north of England.</td>
<td>Health outcomes and resource use: Pain/discomfort: ECN clinic patients reported a reduction ($X^2 = 19.33$, df = 12, $P = 0.08$) in discomfort on the second questionnaire (Q2) three weeks post treatment, however there was no difference in the reduction of pain ($X^2 = 12.86$, df = 12, $P = 0.40$). Slight improvement in the factors affecting normal activities ($X^2 = 9.32$, df = 2, $P = 0.01$), however there were no significant differences between the two conditions in mean health gains using the HSQ-12 scale. Patient satisfaction: Overall levels of satisfaction was high across both conditions, however levels of patient satisfaction were higher in the ECN clinics than the standard care clinics. The proportion of participants reporting dissatisfaction was 18% standard care and 9% ECN. The proportion reporting being either satisfied or very satisfied was 91% ECN and 82% standard care. It is unclear on what data they collected to support their statements, however the authors suggest that “Rotherham (ECN) patients specifically highlighted the knowledge and helpfulness of ECNs which had increased their understanding of their own ear problems and how to manage them.” Number of return visits: Asked to come back and see GP:</td>
<td></td>
</tr>
</tbody>
</table>
| Reddy, V. M., Sargent, H., Prior, M. J. 2011 | Patients surveyed by postal questionnaire regarding satisfaction with care. Cost information was based on standard service. | Following an initial consultation with a doctor, 99 patients with a presenting complaint of dizziness with a diagnosis made of benign paroxysmal positional vertigo | ENT Nurse Practitioner led dizziness clinic | Conventional/standard care by ENT Consultants and Drs | Waiting times (days): Cost of clinician time (£): based on the cost of a follow up appointment with a doctor (£76) or a nurse (£55) Subgroup of 24 randomly selected | Waiting times: From referral into nurse led clinic, mean waiting time was 16±12 days.(range 1-71 days) The target waiting time for treatment was 18 weeks. Cost: a net saving of £3,800 across the 200 consultations was reported | Patient satisfaction: | GP:31.3%  ECN:15.1% 
Asked to come back and see nurse: 
GP:26.9%  ECN:59.8%  
**Use of resources:** Drugs prescribed per case: 6% GPs in the standard care clinics - compared to 1.5% at the ECN clinics.
 systemic antibiotics prescribed: 56.8% in the standard care clinic compared with 25.5% in the ECN clinic. 
**Costs:** Reported in UK pounds (£). No clear financial difference between the two clinics due to the large amount of variation in cost.
 Average cost per ECN patient was £35.67 (range: £0.5 – £604.24) compared with £45.45 (range: £4.80 – £490.30) standard care patient.
 On average, the cost of ECN care was significantly lower per patient (£9.68, 95%CI £19.86 - £1.16: P=0.04) than the standard care 
 Similar proportions of total cost were spent on medication (ECN 24.8%: SC 24.5%) |
charges for the treatment of the 99 patients.

Total of 200 appointment visits. Number of visits/patient ranged from 1-5, with the majority of 1 (45/99) or 2 (26/99) clinic visits per patient.

(BPPV). Recruited over 23 month period.

Males: n= 25, age (range 35-86yrs, mean 61.0+/-14.1 yrs).

Females: n=74, age (range 18-88yrs, mean 58.2+/-13.6 years).

35 were randomly selected to answer postal satisfaction questionnaire. 24 completed surveys returned=69%

patients were surveyed by postal survey for levels of satisfaction with treatment: (6 point scale ranging from very poor-excellent)

excellent: n=13 (54%)
very good: n=6 (25%)
good: n=3 (13%)

No patients rated their care as being bad or very bad.

2 patients did not answer
21/24 (88%) patients expressed no preference as to whether they saw the Dr or Nurse,

2/24 preferred to see the Dr (8%)
1/24 preferred to see the Nurse (4%)

| Uppal, S., Jose, J., Banks, P., Mackay, E., Coatesworth, A. P., 2004 | Cost effectiveness analysis | Post-operative follow up after myringotomy and grommet insertion patients, post-operative follow-up after mastoid surgery patients, new referral patients for microsuction of ear wax, referral from audiology department patients. | Nurse- led clinics for common outpatient otology procedures are more cost-effective than a conventional outpatient appointment with an otolaryngologist. | The data is dated but this paper clearly demonstrates how utilizing Nurse- Led clinics can be a cost effective solution for treating patients. It also demonstrates how, by utilizing a nurse can free up time for medical staff to see more complex cases. |

Uppal, S., Jose, J., Banks, P., Mackay, E., Coatesworth, A. P., 2004 | Cost effectiveness analysis | Post-operative follow up after myringotomy and grommet insertion patients, post-operative follow-up after mastoid surgery patients, new referral patients for microsuction of ear wax, referral from audiology department patients. | Nurse- led clinics for common outpatient otology procedures are more cost-effective than a conventional outpatient appointment with an otolaryngologist. | The data is dated but this paper clearly demonstrates how utilizing Nurse- Led clinics can be a cost effective solution for treating patients. It also demonstrates how, by utilizing a nurse can free up time for medical staff to see more complex cases. |
# Appendix V: JBI Critical Appraisal and Data Extraction Instruments

## JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is sample representative of patients in the population as a whole?</td>
<td></td>
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<tr>
<td>2. Are the patients at a similar point in the course of their condition/illness?</td>
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<td>3. Has bias been minimised in relation to selection of cases and of controls?</td>
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<tr>
<td>4. Are confounding factors identified and strategies to deal with them stated?</td>
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<tr>
<td>5. Are outcomes assessed using objective criteria?</td>
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<tr>
<td>6. Was follow up carried out over a sufficient time period?</td>
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<tr>
<td>7. Were the outcomes of people who withdrew described and included in the analysis?</td>
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<tr>
<td>8. Were outcomes measured in a reliable way?</td>
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<tr>
<td>9. Was appropriate statistical analysis used?</td>
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</tbody>
</table>

Overall appraisal: Include □ Exclude □ Seek further info. □

Comments (Including reason for exclusion)
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
JBI Critical Appraisal Checklist for Descriptive / Case Series

Reviewer ___________________________ Date ___________________________
Author ___________________________ Year _______ Record Number _______

1. Was study based on a random or pseudo-random sample?  
   ![Yes, No, Unclear, Not Applicable]

2. Were the criteria for inclusion in the sample clearly defined?  
   ![Yes, No, Unclear, Not Applicable]

3. Were confounding factors identified and strategies to deal with them stated?  
   ![Yes, No, Unclear, Not Applicable]

4. Were outcomes assessed using objective criteria?  
   ![Yes, No, Unclear, Not Applicable]

5. If comparisons are being made, was there sufficient descriptions of the groups?  
   ![Yes, No, Unclear, Not Applicable]

6. Was follow up carried out over a sufficient time period?  
   ![Yes, No, Unclear, Not Applicable]

7. Were the outcomes of people who withdrew described and included in the analysis?  
   ![Yes, No, Unclear, Not Applicable]

8. Were outcomes measured in a reliable way?  
   ![Yes, No, Unclear, Not Applicable]

9. Was appropriate statistical analysis used?  
   ![Yes, No, Unclear, Not Applicable]

Overall appraisal: Include [ ] Exclude [ ] Seek further info [ ]

Comments (including reason for exclusion)

____________________________________________________________________________

____________________________________________________________________________
### JBI Critical Appraisal Checklist for Economic Evaluations

<table>
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<th>No</th>
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<th>Not Applicable</th>
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<tbody>
<tr>
<td>1. Is there a well defined question?</td>
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<td>2. Is there comprehensive description of alternatives?</td>
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<td>3. Are all important and relevant costs and outcomes for each alternative identified?</td>
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<td>4. Has clinical effectiveness been established?</td>
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<td>5. Are costs and outcomes measured accurately?</td>
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<tr>
<td>6. Are costs and outcomes valued credibly?</td>
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<tr>
<td>7. Are costs and outcomes adjusted for differential timing?</td>
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<tr>
<td>8. Is there an incremental analysis of costs and consequences?</td>
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<tr>
<td>9. Were sensitivity analyses conducted to investigate uncertainty in estimates of cost or consequences?</td>
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<tr>
<td>10. Do study results include all issues of concern to users?</td>
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<tr>
<td>11. Are the results generalisable to the setting of interest in the review?</td>
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**Overall appraisal:** Include ☐ Exclude ☐ Seek further info. ☐

**Comments (including reasons for exclusion):**

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Page 82
# JBI Data Extraction Form for Experimental / Observational Studies

**Reviewer** ___________________________ **Date** ___________________________

**Author** ___________________________ **Year** ___________________________

**Journal** ___________________________ **Record Number** _________________

## Study Method

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<th>RCT</th>
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<th>Observational</th>
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## Participants

**Setting**

**Population**

## Sample size

Group A ________________  Group B ________________

## Interventions

**Intervention A**

**Intervention B**

## Authors Conclusions:

________________________________________________________________________

________________________________________________________________________

## Reviewers Conclusions:

________________________________________________________________________

________________________________________________________________________
Study results

Dichotomous data

<table>
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<tr>
<th>Outcome</th>
<th>Intervention ( ) number / total number</th>
<th>Intervention ( ) number / total number</th>
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Continuous data

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</table>
JBI Data Extraction Form for Economic Evaluations

Reviewer _______________________________  Date ____________________

Author _______________________________  Year ____________________

Journal, _______________________________  Record Number __________

Method of Evaluation

Cost Minimisation ☐  Cost Effectiveness ☐

Cost Utility ☐  Cost Benefit ☐

Interventions
______________________________
______________________________
______________________________

Comparator
______________________________
______________________________
______________________________

Setting
______________________________
______________________________
______________________________

Geographical
______________________________
______________________________
______________________________

Participants
______________________________
______________________________
______________________________

Source of effectiveness data
______________________________
______________________________
______________________________

Authors Conclusions
______________________________
______________________________
______________________________

Reviewers Comments
______________________________
______________________________
______________________________

Extraction Complete  Yes ☐  No ☐
Clinical Effectiveness Results

Study design

Year range of primary studies

Analysis used

Clinical outcome results

Economic Effectiveness results

Date/s of economic data

Modeling used

Measure of benefits used in economic evaluation

Direct costs

Indirect costs

Currency

Statistical analysis

Estimated benefits used in EE

Cost results

Synthesis of costs and results

Outcome category

<table>
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<th>Cost</th>
<th>Clinical effectiveness</th>
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<tr>
<td>+</td>
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</tr>
<tr>
<td>0</td>
<td>D</td>
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<tr>
<td>-</td>
<td>G</td>
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Key

<table>
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<th>Cost</th>
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<tbody>
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<td>+ Better</td>
<td>Lower</td>
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<tr>
<td>0 Equal</td>
<td>Equal</td>
</tr>
<tr>
<td>- Poorer</td>
<td>Higher</td>
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</table>
## Appendix VI: Joanna Briggs Institute Grades of Recommendation

<table>
<thead>
<tr>
<th>JBI Grades of Recommendation</th>
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<tbody>
<tr>
<td><strong>Grade A</strong></td>
<td>A 'strong' recommendation for a certain health management strategy where (1) it is clear that desirable effects outweigh undesirable effects of the strategy; (2) where there is evidence of adequate quality supporting its use; (3) there is a benefit or no impact on resource use, and (4) values, preferences and the patient experience have been taken into account.</td>
</tr>
<tr>
<td><strong>Grade B</strong></td>
<td>A 'weak' recommendation for a certain health management strategy where (1) desirable effects appear to outweigh undesirable effects of the strategy, although this is not as clear; (2) where there is evidence supporting its use, although this may not be of high quality; (3) there is a benefit, no impact or minimal impact on resource use, and (4) values, preferences and the patient experience may or may not have been taken into account.</td>
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</tbody>
</table>