
Asthma and COPD in Older People

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B. Nurs

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DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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ACKNOWLEDGEMENT OF AUTHORSHIP

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Statement of contribution for: Gibson PG, McDonald VM, Marks GB. Asthma in Older Adults. *Lancet*. 2010: 374; 803-813.

Vanessa McDonald made a significant contribution to the design and co-authorship of this review article.

Peter G Gibson

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ABBREVIATIONS

AHR	Airway Hyperresponsiveness
ASMM	Appendicular Skeletal Muscle Mass
ASMMI	Appendicular Skeletal Muscle Mass Index
ATS	American Thoracic Society
Ax	Assessment
BDR	Bronchodilator Response
BMD	Bone Mineral Density
BP	Blood Pressure
BMI	Body Mass Index
CCI	Charlson Co-morbidity Index
CPG	Clinical practice guidelines
COPD	Chronic Obstructive Pulmonary Disease
DEXA	Dual Energy X-Ray Absorptiometry
Dx	Diagnosis
EA	Eosinophilic Asthma
ELISA	Enzyme Linked Immunosorbent Assay
FENO	Fractional Exhaled Nitric Oxide
FER	Forced Expiratory Ratio
FEV ₁	Forced Expiratory Volume in 1 second
FVC	Forced Vital Capacity
GINA	Global Initiative for Asthma
GORD	Gastro Oesophageal Reflux Disease
GP	General Practitioner

HADS	Hospital Anxiety and Depression Scale
HR	Heart Rate
HR Max	Maximum Heart Rate
HRQoL	Health Related Quality of Life
hs-CRP	high sensitivity C-Reactive Protein
ICS	Inhaled Corticosteroids
IDP	Inhaler device polypharmacy
IG	Intervention group
IL	Interleukin
IPBM	Integrated Problem Based Management
IQR	Interquartile range
LABA	Long Acting Beta Agonist
LBP	LPS Binding Protein
LLN	Lower limit of normal
LTRA	Leukotriene Receptor Antagonist
MDA	Multidimensional assessment
mg	Milligram
mL	Millilitre
MMRC	Modified Medical Research Council
ng	nanogram
NT-Pro BNP	N-Terminal Pro-B-Type Natriuretic Peptide
NA	Neutrophilic Asthma
NE	Neutrophil Elastase
NEA	Non-eosinophilic Asthma
OAD	Obstructive Airway Disease

OCS	Oral Corticosteroids
PEF	Peak Expiratory Flow
PCC	Person Centred Care
PC20	Provocation concentration resulting in a 20% fall in FEV1
PD15 saline	Provocation Dose of saline resulting in a fall in FEV1 of 15%
pg	Picogram
PGA	Paucigranulocytic Asthma
pMDI	Pressurised Metered Dose Inhaler
PRP	Pulmonary rehabilitation programme
RR	Respiratory rate
SABA	Short Acting Beta 2 Agonist
SAPS	Short Assessment of Patient Satisfaction
SD	Standard deviation
SGRQ	Saint George Respiratory Questionnaire
SME	Self-management Education
SpO2	Pulse Oximeter Oxygen Saturation
Sx	Symptom
TNF- α	Tumor Necrosis Factor-alpha
UC	Usual care
ULN	Upper limit of normal
WAP	Written action plan
6 MWT	Six Minute Walk Tests

PUBLICATIONS ARISING FROM THIS THESIS

Articles

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Book Chapters

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Abstracts

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ABSTRACT

Obstructive Airway Diseases (OAD) such as asthma and Chronic Obstructive Pulmonary Disease (COPD) are common conditions among older people where they are associated with a significant and increasing disease burden. The management of these conditions in older people is complex. The complexities relate to the heterogeneity that exists in asthma and COPD in the older population, the increased prevalence of co-morbidity that occurs with both advancing age and OAD, and the consequences of ageing including age related structural changes that occur in the lung. The current approach to the management of older people with asthma or COPD is to establish a diagnosis and implement disease specific clinical practice guidelines. This approach however is limited as the clinical trials that inform guidelines have largely excluded older people and those with overlap OAD or co-morbidity. A further restriction of this approach is that many of the guidelines for asthma and COPD give limited consideration to the consequences of ageing or the existence of multiple complex co-morbidities and do not necessarily address what is important to the patient. Opportunities exist to improve the management and outcomes for older people with OAD and the research undertaken in this thesis sought to do this.

The research reported in this thesis aimed to improve our current understanding of Asthma, COPD and the overlap of asthma and COPD in an older population, and to develop an improved approach to the management of these patients. A mixed methods approach was used involving a cross sectional observation study, qualitative interviews and a controlled clinical trial.

This research has extended our knowledge of the clinical impacts of these conditions from a biological, clinical, functional and person centred perspective and describes a management approach that significantly improves the health status of older people with OAD.

SYNOPSIS

Background

Obstructive Airway Diseases (OAD) such as asthma and Chronic Obstructive Pulmonary Disease (COPD) are common conditions among older people where they are associated with a significant and increasing disease burden. The management of these conditions in older people is complex. The complexities relate to the heterogeneity that exists in asthma and COPD in the older population, the increased prevalence of co-morbidity that occurs with both advancing age and OAD, and the consequences of ageing including age related structural changes that occur in the lung. The current approach to the management of older people with asthma or COPD is to establish a diagnosis and implement disease specific clinical practice guidelines. This approach however is limited as the clinical trials that inform guidelines have largely excluded older people and those with overlap OAD or co-morbidity. A further restriction of this approach is that many of the guidelines for asthma and COPD give limited consideration to the consequences of ageing or the existence of multiple complex co-morbidities and do not necessarily address what is important to the patient. Opportunities exist to improve the management and outcomes for older people with OAD and the research undertaken in this thesis sought to do this.

Aims:

The overall aims of this research were firstly to develop and test a multidimensional assessment to characterise asthma, COPD and overlap OAD in people over the age of 55 years from a functional, clinical, biological, behavioural and person centred perspective and to determine whether these characteristics differed according to the OAD diagnosis. I also aimed to gain a deeper understanding of the experiences of older people with OAD and to assess the level of concordance between patients and physicians in terms of the importance of disease management problems. The final aim was to design and test the feasibility of a novel model of disease management that included multidimensional assessment and individualised problem based management.

Design

A mixed methods design was employed that incorporated a cross sectional analytical study, qualitative interviews and a controlled clinical trial. In the cross sectional study

100 participants who were over the age of 55 years with stable OAD defined by a FEV_1 <80% of predicted and FER of <0.7 were recruited. Participants underwent a multidimensional assessment to characterise the clinical problems that exist in older people with OAD and to determine the differences and similarities of these problems between asthma, COPD and overlap OAD diagnoses. A subgroup of 52 participants and 4 physicians rated the importance of each of the clinical management problems detected using a 5 point Likert scale to determine concordance between patients and physicians about the importance of these problems. Qualitative interviews were conducted with 21 participants recruited to the cross sectional study to provide insight into the experiences of older people with OAD. These data were used to design an intervention of integrated problem based management (IPBM) and this intervention was tested in a controlled clinical trial involving 24 participants.

Results

The multidimensional assessment identified a mean (SD) of 11.3 (2.5) clinical management problems and 3.1 (1.8) co-morbid conditions per participant. Common problems were: airways hyperresponsiveness (80%); airway inflammation (74%); activity limitation (74%) and systemic inflammation (60.5%). The number and type of problems were similar irrespective of a diagnosis of asthma, COPD or overlap OAD ($p=0.2$). The degree of health status impairment correlated significantly with the number of clinical management problems detected ($r = 0.59$; $p<0.000$), and each additional problem contributed to a clinically significant (4.2 unit) decline in health status.

When participants and physicians were asked to rate the importance of the clinical problems that were detected, the highest rated problem by the patient was dyspnea, mean (SD) 4.7 (0.42), whereas inadequate inhaler technique was rated as most important by the physician, 4.5 (0.58). There was good participant - physician concordance for the problems of dyspnea 100%, activity limitation 89%, and airway inflammation 76%. Poor concordance was found for inhaler technique inadequacy 58%, inhaler device polypharmacy 33%, atopy 22%, airway hyperresponsiveness 10% and the absence of a written action plan 27%.

The qualitative interviews explored the experiences and needs of 21 older people with OAD. From the data, six themes emerged, including 'being with or without a diagnosis', 'limits to being', 'not being heard or recognised', 'expectation, fears and hopes', 'to medicate or not: the underuse, abuse and misuse' and 'needing to understand'. These themes highlighted the needs, wants, fears, and concerns of older people with OAD and the gaps in current management approaches from the patients' perspective. Of particular importance was the older person's desire for an approach that valued them. They pointed to the need for a timely diagnosis, information and better understanding and education about their disease and, better approaches to ongoing assessment of their disease including the desire for objective feedback on their disease progress.

A model of disease management was developed and was informed by the results of the earlier studies. There were 24 participants recruited to this trial, 12 were assigned to the intervention group (IG) which involved a multidimensional assessment and tailored problem based management and 12 were assigned to usual care. This intervention was tested in a pilot controlled clinical trial of 24 participants. Of the 24 participants 54% were female. The mean (SD) age was 70.6 (7.4) years and post b-d FEV₁ was 48.29% (20.86). In the IG, 66.6% received tailored therapy [steroids and/or macrolides] to normalise sputum cell counts, 50% received statins for systemic inflammation, 66% were treated for mucus hypersecretion and 33% for sleep disorders. The intervention resulted in significant improvements in quality of life (QOL): the mean (SD) pre Saint George Respiratory Questionnaire (SGRQ) score for the IG was 54.1 (11.6) versus post 41.7 (15.3), $p=0.03$ compared to 51.3 (12.9) versus 48.9 (12.8), $p=0.6$ for usual care. The mean (SD) improvement in SGRQ for the IG was -12.3 (12.5) versus -2.2 (8.3), $p=0.04$ for usual care.

Conclusions

This research has advanced our knowledge of older people with asthma and COPD. It demonstrated that older people with OAD experience multiple clinical issues that adversely impact their health status. The number and type are similar irrespective of diagnosis. The multidimensional assessment developed in this thesis identifies significant clinical issues that may not be addressed in a diagnosis centred approach suggesting that a multidimensional approach is necessary when assessing and

managing older people with OAD. In terms of the importance of managing these clinical problems discordance exists between participants and physicians. Furthermore older people with OAD desire more involvement in their disease management and want more information about and objective feedback.

A model of disease management that includes multidimensional assessment and individualised treatment tailored to the results of the MDA is feasible and results in clinically and statistically significant improvements in quality of life in older adults with asthma and COPD